The Impact of the Dodd-Frank Act on Acquisition Activity

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Abstract

The Dodd-Frank Act in 2010 increased ex ante downgrade threats without changing credit rated firms' underlying credit quality. We show that the Act had negative impacts on credit rated firms' acquisition activities, especially among speculative grade firms as they face greater downgrade-induced costs. The more selective acquisition strategies led to higher announcement returns and greater post-acquisition upgrade probabilities. Consistent with firms refraining from taking on overall acquisition risk rather than financial risk, we show significant reductions in both cash and stock settled deal making following Dodd-Frank. In sum, our study highlights that increased legal stringency on CRAs has important spillover effects on firms' M&A activities.

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1. Introduction

Can more stringent legislation on credit rating agencies (CRA) have important spillover effects on firms' acquisition activities? We explore effects of exogenous variation in CRAs' regulatory landscape on acquisition activity around the Dodd–Frank Wall Street Reform and Consumer Protection Act (hereafter: DFA) in July 2010. In sections 932 and 933, DFA authorized SEC to impose penalties on CRAs to curb rating inflation by incentivizing them to better monitor rated entities through improved due-diligence, internal controls, and supervision. Following DFA, the probability of downgrades increased (Dimitrov et al. 2015) but the overall rating accuracy did not improve, and uncertainty increased (Duanmu and McBrayer 2024). We test if increased downgrade threats and rating uncertainty work as sufficient conditions for firms to become more conservative and selective in their acquisition activities. DFA as a quasi-natural experiment offers an opportunity to examine how more stringent legislation on CRAs can have spillover effects on firm level acquisitions as the shock to rating levels are decoupled from changes in the firm's underlying credit quality.

Unlike prior work on the spillover effects of DFA on firm investments: our focus is on acquisitions. Acquisitions are large and visible investments that have important implications for firms strategical and financial policies. The first advantage of studying acquisitions rather than investments is the possibility to observe how DFA alters both firms' financial and investment policies. When undertaking an acquisitions firms can either settle the transaction with cash or pay with their own shares leading to different capital structure outcomes (Uysal 2011; Blomkvist et al 2022). A second advantage of studying acquisitions is that the stock market reactions are directly observable, which is not the case for other types of investments such as capital expenditures and R&D investments. We can thereby observe not only how firms alter their investment and associated financing strategies but also the perceived quality of investments.

The enactment of DFA can have both demand and supply side impacts on acquisitions. From a demand side perspective, DFA creates an increased downgrade threat and elevates uncertainty surrounding firms' rating levels. Corporate managers consider credit ratings as an important objective in their financial decision making (Graham and Harvey 2001). There are evident costs and benefits associated with credit rating changes. Downgrades and upgrades lead to immediate changes to firms' cost of capital (Jorion and Zhang 2007; Vazza 2017). Rating level changes can also have direct cash flow effects. Klapper et al. (2012) report that supplier terms are credit rating dependent. Downgrades can trigger covenant breaches and increased coupon payments (Bhanot and Mello 2006; Kraft 2015). Especially downgrades and upgrades from different letter categories are of importance as many institutional investors are constrained from holding bonds or commercial paper below certain rating levels (see, for example, Cantor and Packer 1995; Kisgen 2006, 2009). Furthermore, ratings also have spillover effects on bank lending, as Basel II bank's regulatory capital is risk-weighted depending on firms' rating levels (Hasan et al. 2021).[1] As a response to DFA, risk averse managers with credit rating targets can at their own discretion either reduce risky investments or alter the financing strategy.

From a supply side perspective, the intent of DFA was to improve the informativeness of credit ratings. Sharma et al. (2022) put forward three arguments for supply side rationing of corporate credit following DFA. First, the increased informativeness of ratings could make investors and banks reluctant to supply financing to poor credit quality firms. Second, as DFA is one of the largest regulations in US history, it also impacted banks through increased regulation concerning its governance, asset holdings, disclosure, securitization and so on. Third, the financial crisis preceding DFA could have long lasting changes in investor behavior, making

[1] Banks holding loans of A rated firms are only inclined to hold 50% regulatory capital, while BBB and BB are associated with 100% risk weighting and below BB is coupled with 150% risk weighting.

them reluctant to invest in especially high-risk bonds. Hence, DFA can constrain acquisitions by causing banks and investors to refrain from supplying capital.

We further analyze heterogenous impacts of DFA on high (Investment Grade) and low (Speculative Grade) rated firms. Speculative grade bond issuers face steeper cost of capital increases following downgrades. Vazza et al. (2019) report almost monotonically increasing cost of debt following downgrades over the rating spectrum (except for BBB- to BB+). Jorion and Zhang (2007) only find significantly negative stock market reactions after downgrades among speculative grade (SG) bond issuers. Lemmon and Roberts (2010) also argue for regulatory differences between the groups making SG firms more sensitive to legal changes. Sharma et al. (2022) report that especially SG firms reduce debt issuance following DFA. On the other hand, Aktas et al. (2021) put forward that smaller incremental credit risk changes are needed to trigger downgrades for investment grade (IG) relative to SG firms. Hence, it becomes an empirical question to verify if any of the groups' acquisition activities are disproportionally impacted by DFA.

Using a sample of 20,810 firm-years during a 10-year symmetric time-window around DFA, we conduct a quasi-natural experiment by employing a difference-in-difference (DiD) methodology. The DiD method allows us to compare the acquisition behavior of rated (treated) against unrated firms (control). Consistent with DFA having real effects on acquisition activity, we show that rated firms reduce their acquisition likelihood by 38.6% and intensity by 49% following the Act. DFA above all impacted firms with SG ratings, while unrated and IG rated firms' acquisition activity remained stable over time. Our findings suggest that lower rated firms' pre-DFA acquisition activity potentially were fueled by having access to the bond markets coupled with lax CRA monitoring, and that such advantages partly diminished following the more stringent regulation on CRAs. Interestingly, we find that firms reduce overall M&A (both transactions settled with cash and stock) rather than reducing cash settled

acquisitions alone. This suggests that firms respond to DFA by refraining from taking on overall M&A risk rather than just decreasing the proportion of cash-settled deals.

Next, we aim to distinguish between demand and supply side explanations. To test for a demand side explanation, we use an identification strategy based on Kisgen (2006). Downgrades and upgrades have heterogeneous implications within and between broader rating categories. Negative effects are less pronounced for firms downgraded from a neutral to a minus rating (for example, AA to AA-) compared to downgrades from a minus rating to a lower broad rating category (for example, BB- to B+). A demand side explanation postulates that firms with plus or minus *(PoM)* ratings become more conservative in their acquisition activities post-DFA relative to firms with a neutral rating. A supply side explanation instead fails to discriminate between the *PoM* and *Neutral* groups. We find support for a demand side explanation, where firms with *PoM* ratings reduce acquisition activity, and gain greater announcement returns relative to firms with neutral ratings post-DFA in several specifications. We further exclude a supply side explanation by studying the impact of speculative grade bond market liquidity. We use the BB-AAA spread to capture time-varying capital supply in the bond markets. The rationale is that spreads widen during periods of lower investor demand. Hence, a supply side explanation entails that acquisition activity should become more sensitive to changes in spreads following DFA. The outcomes of our tests lend support to a demand side rather than a supply side explanation.

Next, we consider DFA's impact on acquirer announcement returns and acquisition-related credit rating changes. As DFA caused firms to conduct fewer acquisitions, we expect firms to become more selective in their M&A strategies. A more selective M&A approach postulates that firms only conduct acquisitions with the highest NPV from their investment opportunity set while foregoing investments with lower but positive NPV, leading to a marginal increase in acquisition quality. Our findings show that rated acquirers' CARs increase by

2.28pp following DFA relative to control firms. Again, consistent with a demand side explanation, firms closer to an upgrade or downgrade conduct better acquisitions as the effect is stronger among SG issuers, and firms with *PoM* ratings.

Next, we consider the credit rating impact of rated firms' acquisitions before and after DFA. Prior studies report that acquisitions on average are credit quality deteriorating (Billett at al. 2004; Bessembinder et al. 2009; Furfine and Rosen 2009) or credit rating neutral (Aktas et al. 2021). Our findings suggest that the DFA induced downgrade threat and uncertainty instead caused firms to become more selective and cautious in their acquisition strategies, which lead to enhanced post-M&A credit ratings relative to non-acquiring peers.

For DiD models to offer causal interpretations, the parallel trends assumption must be satisfied. This implies similar pre-shock trajectories for the treatment and control group, that is in the absence of treatment the post-shock effect should be zero. We conduct three different parallel trends tests used in prior literature for both of our dependent variables (see, for example, Lemmon and Roberts 2010; Bindal et al. 2020; Sharma et al. 2022). Acquisition likelihood and intensity follow parallel trends in all specifications. Even though we observe a large drop in acquisition activity among rated firms during the financial crisis that precedes the enactment of DFA, the parallel trends tests hold. We also include interactions between treatment and financial crisis in all specifications to ensure that such differences are controlled for. We further test if our findings are driven by time-window choices in our empirical specifications. None of the additional specifications yield different results.

Our test design builds upon that DFA increased the downgrade threat without changes in the firm's credit quality. Therefore, we are interested in identifying the pure downgrade threat's impact on acquisition activity. However, this is problematic, as Faulkender and Petersen (2006) argue that credit rating research often compares firms that qualify for a rating to those that do not qualify. The unobservable differences between the two groups can drive

both the rating and acquisition decisions, and DFA may alter the correlation between firm characteristics of being rated and acquisitions. We account for such differences in three types of tests. First, we include firm-level fixed effects in all specifications to control for time-invariant unobservable firm characteristics. Second, we entropy balance the sample to weigh the covariates of the control group to match those of the treated group, which does not alter our findings. Third, we aim to separate out the mere rating effect from firm characteristics associated with a rating. By using the methodology of Faulkender and Petersen (2012), we separate between qualifying and non-qualifying firms, and instead compare the acquisition activity pre- and post-DFA between qualifying firms that obtain a rating against qualifying firms that do not obtain a rating. Our results indicate that the post-DFA acquisition effect is driven by the pure rating effect rather than firm characteristics linked to having a rating.

We further exclude two alternative explanations. First, DFA was preceded by the great financial crisis, which can have long-lasting effects on rated firms' and investors' behavior. We ensure that our findings are not driven by changes in behavior among the firms most severely affected by the crisis, by using a similar approach as Fahlenbrach et al. (2012) and Sharma et al. (2022). Second, Basel II was published in 2004 and implemented in 2007, which introduced borrower rating contingent risk weights for lending banks, making lending to lower rated borrowers more expensive. Our findings suggest that Basel II spillover effects cannot explain our results.

Our study contributes to several strands of literature. Primarily, our study adds to the understanding of the consequences of DFA on investment activity and returns to investments. Closest to our study, Sharma et al. (2022) analyze changes in bond issuance and cash settled investments (R&D, capital expenditures and cash acquisitions) in conjuncture with DFA. We complement their work in several ways. First, we focus on both stock and cash settled investments (M&A) and show that DFA not only had negative impacts on cash-settled/debt

financed investment activity but also on stock-financed. Hence, DFA altered firms' overall investment related risk assessment, rather than just their financial policies. Second, by studying acquisitions, we show that DFA not only led to a reduction in M&A activity but also increased acquirer announcement returns. Third, we show that acquiring firms' upgrade probability increased post-DFA relative to non-acquirers. We further complement the studies on post-DFA mergers among financial institutions (Bindal et al. 2022; Leledakis and Pyrgiotakis 2022), by studying changes in acquisition activity and returns among non-financial firms only indirectly impacted by DFA through more stringent CRA oversight.

Our study also adds to the understanding of differences in acquisition activity between rated and unrated firms (see, for example, Harford and Uysal 2014; Blomkvist et al. 2018) and between rating categories (see, for example, Aktas et al. 2021). We show that the higher acquisition activity and lower acquirer announcement returns found in prior literature among rated firms diminish following DFA. This suggests that DFA partly evened out capital market advantages stemming from having a bond rating. In auxiliary tests, we show that the inverse U-shaped acquisition – credit rating level relationship found in Aktas et al. (2021) becomes less pronounced post-DFA. Furthermore, Kang (2022) shows a negative correlation between having a plus or minus rating and acquisition activity. However, our study offers advantages over Kang (2022), as we present causal evidence in how legislation induced ex ante downgrade threats, independent of direct changes to underlying credit quality, impacts acquisitions. All in all, our study highlights how more stringent legislation of CRAs can have spillover effects on the real economy by reducing acquisition activity.

Lastly, our paper adds to the growing literature on the impact of regulatory uncertainty and environment on acquisitions and investments. De Bodt et al. (2024) report that regulatory uncertainty created by Department of Justice and Federal Trade Commission interventions in the M&A market negatively impact industry peers' M&A activity. Fich et al. (2023) and Ince

(2024) find that large firms with greater exposure to federal regulations conduct more acquisitions relative to small firms with similar exposure and those with lower exposure. Fabrizio (2013) reports that firms respond to increased regulatory uncertainty by reducing investments. We differ from the above studies by showing that a legislative initiative mainly impacting financial institutions have important spillover effects on non-financial firm-level acquisition activity.

2. Data

To study the impact of DFA on acquisition activity, we use a ten-year symmetric time-window around the event (July 2010) by including all COMPUSTAT and CRSP firms between 1.1.2005 and 31.12.2015. We exclude firms with negative book equity, sales<$10 million, along with financial firms and utilities (SIC-codes: 6000-6999 and 4900-4999). We gather acquisition data from Eikon and include completed transactions where the acquirer owns at least 90% of the target firm after the transaction and owns below 50% prior to the bid. The deal value must be above $1 million and 5% of the acquiring firm's total assets. Concurring with prior work (see for example, Harford and Uysal 2014; Aktas et al. 2021; Blomkvist et al. 2024), our dependent variables are acquisition likelihood (*ACQ*), an indicator variable taking the value of one if the firm conducts at least one acquisition during the given year, and acquisition intensity (*DV/TA*), the total deal value acquired scaled by lagged total assets.

Our treatment classification follows from Lemmon and Roberts (2010) and Sharma et al. (2022).[2] Treated firms must have a long-term S&P issuer rating during all their sample years and are restricted to not altering between Investment Grade and Speculative Grade ratings. We

[2] We use a broader treatment group relative to Lemmon and Roberts (2010) and Sharma et al. (2022), as they only focus on speculative grade firms. We take a more general approach by initially assuming that all rated firms are impacted by Dodd-Frank. We then study the impact on investment grade and speculative grade rated firms in isolation to analyse the heterogeneous impact across rating categories.

keep this limitation as we also partition treated into IG and SG firms.[3] We define IG firms to have a S&P long term issuer rating of BBB- and above, while SG firms have ratings of BB+ and below. We further exclude rated firms that have a default or selective default rating. To be classified into the control group the firm must be unrated during all the sample years. Each firm must have at least one observation before and after DFA. We end up with 20,810 firm-year observations and 2,244 acquisitions.

We follow the literature that estimates acquisition likelihood and intensity when choosing time-varying firm and industry-level controls [see for example, Harford and Uysal, (2014)].[4] The firm-level controls include *Leverage*, Market-to-book (*M/B*), Cash/Total Assets (*Cash/TA*), *ln(Sales)*, EBITDA/Total Assets (*EBITDA/TA*) and past 12-months stock return (*12-Month Return*). The industry controls include a sales-based Herfindahl index (*Herfindahl*) and the industry's M&A liquidity (*M&A Liquidity*). All continuous variables are winsorized at the 1st and 99th percentile. Appendix A1 describes all variables in detail.

2.1. Research Design

To estimate the causal effect of DFA on acquisition activity, we estimate the following models:

$$ACQ_{i,t} = \alpha_1 + \beta_1 \times Treated_i \times Post + \beta_2 \times Post + \boldsymbol{X_{i,t-1}\gamma} + \theta_i + \varepsilon_{i,t} \quad (1a)$$

$$\frac{DV_{i,t}}{TA_{i,t-1}} = \alpha_1 + \beta_1 \times Treated_i \times Post + \beta_2 \times Post + \boldsymbol{X_{i,t-1}\gamma} + \theta_i + \varepsilon_{i,t} \quad (1b)$$

[3] To ensure that our findings are not driven by prohibiting firms to migrate between investment grade and speculative grade ratings, and vice versa, we allow for rating migration between the categories in robustness tests in Section 4.

[4] We follow the literature on acquisition likelihood (see, for example, Harford and Uysal 2014) rather than the literature estimating incremental debt financing following credit supply/demand shocks (see, for example, Lemmon and Roberts 2010; Sharma et al. 2022) when choosing our control variables. In our setting, post-DFA, the major change relative to the control group should be acquisition demand, shown through changes in acquisition activity.

Due to the inclusion of firm fixed effects (θ_i) and that treatment status does not vary over the sample period by design, the *Treated* indicator is absorbed by the fixed effects. Our estimations include standard errors clustered on firm level.[5] A negative β_1 coefficient (*Treated*×*Post*) indicates that treated firms reduce their acquisition activity relative to the control group following the Act. DFA was enacted in July 2010 but proposed already in July 2009, therefore, to avoid contaminating effects, we follow several studies on the impact of DFA and exclude 2010 from the sample (see, for example, Bindal et al. 2020). Hence, the post-variable takes the value of one following year 2010 and the pre-period ends in 2009. As also 2009 potentially can confound our results, we conduct a battery of robustness tests in section 4. **X** is a matrix of firm and industry level control variables. In addition to the control variables described in section 2 above, we account for potential abnormal differences during the financial crisis by following Sharma et al. (2022) and include a *Crisis* indicator and an interaction term between *Treated*×*Crisis* in the **X** matrix. The *Crisis* indicator takes on a value of one for the year 2008 and 2009. To achieve cleaner identification, we further divide treatment into IG and SG firms. We are therefore interested in the heterogenous impact of DFA on *IG*×*Post* and *SG*×*Post*.

2.2. Descriptive Statistics

Table 1 shows descriptive statistics for firm, industry and deal characteristics. The average firms' acquisition likelihood is 9.3% and acquisition intensity is 2.7%, annually. Our sample's acquisition likelihood is slightly lower relative to studies conducted on longer sample periods (see, for example, Harford and Uysal 2014). This is likely due to our short sample period includes the financial crisis years where acquisition volume dropped significantly, in addition to DFA. We can observe that cash and stock payment relative to total assets are 0.12 and 0.10

[5] We do not cluster on the time dimension, as Imbens and Kolesar (2016) argue that a low number of clusters may downward bias standard errors.

respectively. That the added proportions of cash and stock do not add up to the total acquisition intensity is due to missing data in EIKON on the proportion of stock payment. In our sample 27.7% of the firm years are classified as treated partitioned into 15.8% investment grade and 11.9% speculative grade. The proportion of speculative grade firm years mirrors those in Sharma et al. (2022) who use a similar setting to ours. However, we report a slightly higher proportion of investment grade firms. Overall, our control variables are in line with prior studies estimating acquisition likelihoods and intensities. We further present descriptive statistics for the deal characteristics. Interestingly the acquirer announcement returns are on average positive (1.5%). We report that roughly 76.9% of all transactions are settled solely with cash, while 4.1% are stock swaps.

<Table 1 about here>

Table 2 shows univariate statistics pre- and post-DFA for Treated (having a rating), investment grade and speculative grade relative to control firms (unrated). First, we are interested in the acquisition activity (likelihood and intensity) prior to DFA. We observe that treated firms acquisition likelihood is significantly higher relative to control firms pre-DFA (10.6% compared to 9%). This difference can be explained by the acquisition likelihood (12%) among speculative grade firms. Speculative grade firms also exhibit a significantly higher acquisition intensity relative to control firms pre-DFA. On the other hand, IG firms' acquisition activities are in line with the control groups. Secondly, we are interested in observing the heterogenous impact of DFA between treated firms and the control group. In a univariate setting, we do not observe any post-DFA differences in acquisition likelihood between treatment and control. Interestingly, even if speculative grade firms have higher acquisition likelihood relative to the control sample post-DFA, we can observe that the difference decreased substantially from 3pp to 1.8pp. In contrast to pre-DFA, SG firms do not exhibit greater post-Act acquisition intensity suggesting a decrease in relative acquisitiveness. Hence, we can

observe a slight relative decrease in acquisition activity among SG firms relative to control firms following DFA. This finding is not surprising, as Sharma et al. (2022) show that speculative grade relative to investment grade firm's debt issuance and investments are disproportionately impacted by the Act in their multivariate tests.[6]

In Panel B of Table 2, we show differences in deal characteristics between the treatment groups and control, pre- and post-DFA. Data show that treated firms conduct acquisitions of lower quality prior to DFA relative to control. The acquirer CAR estimates are -1.1pp, -1.8pp and -0.4pp lower for treated, IG and SG, respectively. However, following DFA, we do not report any statistically significant differences between any of the treatment groups and control. Hence, the enactment of DFA is linked to increased acquisition quality among treated relative to control firms. For example, SG acquirers increased their average CAR difference relative to control firms from -0.4pp to 0.9pp.

<Table 2 about here>

The univariate results show a slight reduction in acquisition activity and increase in acquisition quality following DFA relative to control firms. However, it is important to note that DFA was preceded by the great financial crisis which could have heterogeneous impact on treated and control firms. Therefore, the remainder of the paper includes controls for the financial crisis and interactions with treatment status to ensure that our findings are not driven by crisis induced differences. Furthermore, the univariate tests do not include important covariates that determine firms' acquisition activity. For example, rated firms can have characteristics that are linked to greater acquisition activity, therefore, in our multivariate tests, we include several covariates found explaining acquisition activity in prior studies (see for

[6] However, they do not find any significant differences between any of the groups in univariate tests, only in a multivariate setting.

example, Harford and Uysal 2014).[7] In addition, we also include firm fixed effects to ensure that we capture unobservable firm characteristics related to acquisition activity, allowing us to compare the same firm pre- and post-DFA.

3. Results

The second part of our analysis aims to verify whether DFA impacted acquisition activity between treated (rated) and control (unrated) firms. We estimate a Difference-in-Difference model around DFA in 2010, using a symmetric time-window, that is 2005-2015 [Model (1a) and (1b)]. The coefficient of *Treated×Post* offers a direct test of our main hypothesis, that acquisition activity drops among treated firms as a response to the increased downgrade threat and rating uncertainty following DFA. Given that DFA has an adverse impact on acquisition activity the interaction term *Treated×Post* should be negative and statistically significantly different from zero.

Columns (1) and (2) of Table 3 show the heterogenous impact of DFA on rated and unrated firms. Our findings reveal that rated firms reduce acquisition activity relative to unrated firms following DFA. The negative and significant coefficient of *Treated×Post* in column (1) suggests a 3.6pp decrease in acquisition likelihood following DFA among treated relative to control firms. The economic magnitude of the drop is substantial, a 38.6% drop in acquisition likelihood relative to its mean. Column (2) shows similar evidence on acquisition intensity (*DV/TA*). Treated firms' acquisition intensity drops by 1.3pp relative to control firms following DFA. This corresponds to a 49.0% drop in acquisition intensity relative to its mean. Hence, DFA caused rated firms to reduce both the acquisition likelihood and acquisition intensity. Rated firms acquisition activity relative to the control did not return to pre-crisis levels. Instead,

[7] Robustness tests in Section 4 show that our main results are driven by a mere rating effect rather than firm characteristics associated with having a rating.

in support of our hypothesis, we observe lower than expected acquisition activity post-DFA among treated firms.

In the next set of tests, we study DFA's heterogenous impact on IG and SG firms. The rationale behind the tests is that prior studies show a significantly higher cost-of-capital increase among low rated firms following downgrades (see, for example, Jorion and Zhang 2007; May 2010; Vazza et al. 2019). Lemmon and Roberts (2010) also argue for regulatory differences between the groups making SG firms more sensitive to legal changes. On the other hand, Aktas et al. (2021) put forward that smaller incremental credit risk changes are needed to trigger downgrades for IG relative to SG firms. Hence, it becomes an empirical question to investigate whether we observe different responses to DFA from IG and SG firms. If firms with SG ratings' acquisition activity is disproportionately impacted by the Act, we expect the coefficient estimate of *SG*×*Post* to be significantly negative, and also lower than the *IG*×*Post* estimate.

<Table 3 about here>

Our tests in columns (3) and (4) of Table 3 verify our hypothesis. Firms with SG ratings are disproportionately impacted by DFA. Our tests suggest that acquisition likelihood and acquisition intensity drop by 6.4pp and 2.6pp among SG firms. We also report negative coefficient estimates among IG firms, albeit not statistically significant. We further t-test the difference between the *SG*×*Post* and *IG*×*Post* coefficients and report significant differences between the two issuer groups (p-value <5% in both tests). All in all, our findings support that DFA impacted SG firms disproportionately. The signs of the control variables are in line with prior studies estimating firm-level acquisition likelihoods and intensities. *Market-to-Book*, *EBITDA/TA*, *Cash/TA*, and *Industry M&A Liquidity* all load positively against acquisition activity (see, for example, Harford 1999; Harford and Uysal 2014). Slightly different from cross-sectional work, that uses industry instead of firm fixed effects, we observe a negative impact of sales on acquisition activity. This likely stems from the use of lagged ln(sales) and

firm fixed effects. The fixed effect estimator demeans observations by average firm size. The deal completion occurs after the firm size measurement, making the coefficient negative.

Robustness tests in Internet Appendix Table IA1 show that our findings are not sensitive to the inclusion of year fixed effects, exclusion of the crisis indicators and allowing for clustering on both firm and year. Instead, the coefficient estimates slightly increase following the inclusion of year fixed effects. Not surprisingly, t-stats of *Treated*×*Post* increase also after clustering on year, this is likely due to including few year clusters in the estimations which downward bias the standard errors (Imbens and Kolesar 2016). Furthermore, recent work by Breuer and DeHaan (2024) highlight econometrical issues of using firm level fixed effects in samples that experience little time-series variation, which potentially might be the case with acquisition activity. To ensure that our findings are not driven by the granularity of our fixed effects, we re-estimate our models in Table IA2 and find similar results as before.

3.1. Demand or Supply Side Explanation

The sharp decline in acquisition activity around DFA found in previous tests can either be explained by a supply or demand side explanation, or a combination of both. A demand side explanation entails that managers with credit rating level preferences cut acquisition activity in response to the increased uncertainty and ex ante downgrade threat surrounding DFA. In this situation, we assume that the supply of bond financing at least does not decrease post-Dodd-Frank, and that the relative acquisition activity impact between rated and unrated firms stems from DFA. This is not an implausible assumption as pre- and post-DFA overall acquisitions levels are similar in Table 2. A supply side explanation instead postulates that bond markets become more reluctant in providing financing especially to riskier borrowers (below investment grade firms) due to the increased transparency and informational value in ratings (Sharma et al.

2022). However, prior research casts doubt on such an explanation, as ratings did not become more informative post-Dodd-Frank (Dimitrov et al. 2015) and firms did not become more sensitive to liquidity shocks in the bond market (Sharma et al. 2022). We conduct two types of tests to distinguish between the two explanations in an acquisition context. First, we study potential demand side considerations using the research design of Kisgen (2006, 2009) and Sharma et al. (2022). We split the rated firms depending on the rating's modifier (plus, minus or neutral), as managers of firms closer to a broad upgrade (plus rating) or downgrade (minus rating) are expected to act differently compared to firms with neutral ratings. Second, we explore the viability of a supply side explanation, by studying the impact of BB-AAA spreads to capture time-varying supply of bond market financing.

First, we aim to study the viability of our proposed demand side explanation. Drawing on Kisgen's (2006, 2009) rationale, downgrades and upgrades have heterogeneous implications within and between broader rating categories. Regulators do not differentiate between upgrades and downgrades within but between rating categories, creating an investor demand differential that causes a greater cost-of-capital wedge between categories compared to within. For example, negative cost of capital effects isless pronounced for firms downgraded from a neutral to a minus rating (for example, AA to AA-) compared to downgrades from a minus rating to a lower broad rating category (for example, BB- to B+). In our tests, we follow Sharma et al. (2022) by bundling the plus and minus categories to compare against firms with neutral ratings. Firms with a plus or minus rating are more sensitive to rating changes relative to firms with a neutral rating. One advantage of bundling the plus and minus categories is that the average credit quality is likely to be similar as in the neutral group. We estimate the heterogenous impact of having a plus or minus rating (*PoM*) relative to being unrated or having a neutral rating (*Neutral*). If a demand side explanation prevails, we expect firms with *PoM* ratings to be more conservative in their acquisition activities post-DFA relative to firms with a neutral rating. A

supply side explanation fails to discriminate between the *PoM* and *Neutral* groups due to similar credit quality leading to similar group outcomes. In the first set of tests, we split the treatment variable into having a *PoM* or a *Neutral* rating at *t-1*. Second, we partition treatment into two groups (*IG* and *SG* firms) and test them against the control group.[8]

<Table 4 about here>

Our findings in column (1) of Table 4 show a similar impact on acquisition likelihood for firms with *PoM* or *Neutral* ratings. The acquisition likelihood drops by 3.4pp and 4.0pp for *PoM* and *Neutral*, respectively. When also accounting for the size of the acquisition in column (2), we find different outcomes between the groups. Having a *PoM* rating negatively impacts acquisition intensity, while *Neutral* ratings fail to have a significant impact. Columns (3) and (4) show estimations comparing IG firms relative to unrated firms (excluding SG firms from the sample). Interestingly, we do not find any DFA impact on IG firms' acquisition activity regardless of being close to an upgrade or downgrade to broader rating categories. However, in column (3), we find some weak evidence that IG firms become more reluctant to conduct acquisitions post-DFA conditional on having a neutral rating, relative to the control group. Columns (5) and (6) repeat the analysis by focusing on SG firms (excluding IG firms). Our findings in column (5) differ substantially from prior results, as SG firms' acquisition likelihood drops by 7.2pp if they have a *PoM* rating, while we do not observe any significant reduction among SG firms holding a *Neutral* rating. However, the impact of DFA on acquisition intensity is similar for SG firms with both *Neutral* and *PoM* ratings [column (6)]. In sum, if a demand side explanation prevails, we expect *PoM* ratings to have a greater impact on acquisition activity relative to a supply side explanation. We do find some evidence in support of the idea that

[8] It is worth to note that the main effect of *Neutral Rating* is absorbed by the firm level fixed effects as Neutral plus PoM equals the firm level fixed effect for all treated firms as treatment status do not change over the sample period.

speculative grade firms are sensitive to the rating modifier, especially when it comes to the binary choice of making an acquisition or not.

Next, we consider a supply side explanation, by testing if treated firms' sensitivity to bond supply alters through the enactment of DFA. To proxy for credit supply, we use the BB-AAA spread (collected from FRED), which captures investors' willingness to supply financing for SG issuers. We are not the first to use spread based measure to capture time-varying capital supply (see, for example, Harford 2005; Massa and Xu 2012).[9] As a time-series variable the BB-AAA (*BB-spread*) exhibits substantial time-series variation, ranging from 1.94pp in the end of 2006 to 13.06pp in 2009. A lower spread indicates a greater willingness for investors to supply SG bond markets with liquidity and vice versa. A supply side explanation postulates that firms reduce acquisition activity post-DFA in response to lower capital availability (higher spreads). Especially SG firms should be impacted as they face greater financing constraints following negative capital supply shocks. Hence, we expect the sensitivity of acquisition activity to the *BB-spread* to increase following DFA. In our setting this means a negative interaction of *Treated* × *BB-spread* × *Post*. On the contrary, a demand side explanation predicts a non-negative *Treated* × *BB-spread* × *Post* interaction coefficient, as firms reducing acquisition activity due to downgrade threats and rating uncertainty should not be impacted by the credit supply.

<Table 5 about here>

Our findings in Table 5 show non-negative *Treated* × *BB-spread* × *Post* coefficients in all six regression models. Hence, we do not find any support for a supply side explanation. However, it is worth bearing in mind that the great financial crisis occurred just one year prior to DFA. In our setting, this should be less of a concern since treatment is also interacted with

[9] Harford (2005) and Massa and Xu (2013) use the commercial and industrial loan spread (C&I spread) based on Federal Reserve's survey on firms obtaining bank financing.

Crisis to account for abnormal capital supply differences between treatment and control groups during the crisis years.

All in all, we find some support for demand side considerations in explaining the relative reduction in acquisition activity among rated firms, post-DFA, where managers forego acquisitions to manage their rating level. Our findings do not lend support for a supply-side explanation as firms' acquisition activities do not show increased sensitivity to below investment grade bond market conditions following DFA.

3.2. Cash or Stock Payment

Our next set of tests aims to explore whether the reduction in acquisition activity among treated firms stems from reductions in cash or stock settled M&A. In the previous tests, we established that DFA likely altered firms' demand for acquisitions due to the increased downgrade threat and uncertainty. However, we do not know if the lower demand is only due to debt and negative debt (cash) considerations, or if DFA caused firms to also refrain from equity-financed deals. From a capital structure perspective, firms with strong preferences to conduct acquisitions can still minimize the impact on financial risk by altering the payment choice. A large body of literature considers the interlink between investments and capital structure outcomes (see, for example Uysal 2011; Elsas et al. 2014; Blomkvist et al. 2022). The consensus in the literature is that firms either use their payment method choice to correct the capital structure towards the optimal or that they de-lever prior to conducting acquisitions to free up debt capacity. Hence, firms can conduct acquisitions and still be able to maintain or increase their credit quality by opting for a higher proportion stock payment in the transaction. On the other hand, M&A is risky and increases the uncertainty of the value of the combined firm's assets due to difficulties of post-merger integration and realization of the potential synergies (Guo et al., 2021). This is

further enhanced through the low and large variability in long-run returns of acquiring firms (Andrade et al., 2001). Hence, firms facing increased rating uncertainty may refrain from conducting M&A irrespective of the payment method and resulting capital structure impacts.

To test whether financial or overall uncertainty channels can determine the reduction in M&A activity, we re-estimate the models from Table 3 with two different dependent variables. We estimate the total use of cash payment in relation to total assets with *Cash Payment/TA*, and the total use of stock payment with *Stock Payment/TA*. If DFA only has an impact on firms' willingness to conduct cash settled M&A, we expect *Treated* × *Post* to be negative only in the *Cash Payment/TA* regressions. If DFA on the other refrain firms from taking on overall M&A risk, we would expect *Treated* × *Post* to be negative in both the stock and cash payment regressions.

<Table 6 about here>

Our findings in columns (1) and (2) of Table 6 suggest significant declines in stock- and cash-settled M&A following DFA among treated firms. The coefficient estimates of *Treated* × *Post* is 0.6pp in both specifications. In columns (3) to (4) treatment is partitioned into *Investment Grade* and *Speculative Grade*. In line with prior estimates, we report that the effect is mainly driven by reductions in the M&A activity of SG firms. SG firms reduce both cash and stock settled M&A significantly following DFA relative to the control group. Hence, our findings suggest that firms refrain from taking on overall M&A risk rather than alter the payment method to reduce financial risk following DFA.

In additional tests on transaction level data, we also aim to verify that firms do not alter means of payment conditional on conducting an acquisition. We use three different measures of means of payment. First, 100% Cash to capture deals settled fully with cash payments. Second, 100% Stock to capture stock swaps. Third, *Cash%* is a continuous measure of the

percentage of the payment conducted with cash. If firms choose to alter their payment method due to capital structure considerations when conducting M&As, we expect *Treated* × *Post* to be negatively related to both *100% Cash* and *Cash%*, and positively related to *100% Stock*. Our findings in Table A2 do not suggest that treated firms alter their payment method following Dodd-Frank relative to control firms conditional on conducting acquisitions. Columns (1) to (3) show estimations using all rated firms as treatment group, none of the models suggest that firms settle their transactions in a different manner following the Act. The t-stats range from 0.03 to 0.68 in absolute terms. In columns (4) to (6) treatment is partitioned into *Investment Grade* and *Speculative Grade*. The only significant interaction is *IG* × *Post* in the *100% Cash* model. IG firms exhibit a relatively smaller propensity to pay fully with cash, post-DFA.

3.3. Further Analysis

Next, we aim to study DFA's impact on acquisition quality. We measure acquisition quality by the acquirer's cumulative abnormal return (CAR) around the M&A announcement date. Our previous tests suggest that the reduction in acquisition activity among treated firms following DFA was mainly driven by demand side considerations. Our initial CAR analysis cannot directly answer whether our findings are demand side driven or not. As classical supply side explanations postulate that potential acquirers reduce acquisition activity in response to lower capital supply. This is due to the fact that firms by definition become financially constrained and only conduct the most profitable investment projects and forego some positive NPV projects. This leads to higher marginal project NPV and thus higher CARs. However, higher marginal CARs can also stem from a demand side explanation. Harford and Uysal (2014) argue that managers use their credit ratings to access an incremental supply pool of funds and thereby conduct more acquisitions. If DFA increases rating uncertainty and ex-ante downgrade risk, downgrade averse managers could forego NPV positive acquisitions to maintain or increase their credit quality.

To test the impact of DFA on treated and control firms' acquisition quality conditional on firm characteristics, we conduct tests similar to those in the base case analysis. We continue to use firm-level fixed effects as we are interested in within-firm differences pre- and post-DFA. Golubov et al. (2015) show that unobservable firm-level characteristics are the main determinant of acquirer returns as some firms are inherently better acquirers than others. In addition to firm-level fixed effects, and time-varying firm and industry level controls, we include a wide range of deal-level variables found in prior research to explain CARs: *Relative Size*, *100% Cash*, *100% Stock*, *Public Target*, *Hostile Bid*, *Cross Border Deal* and *Tender Offer*. If DFA has a positive impact on acquisition quality either through a supply or demand channel, we expect *Treated* × *Post* to be positively related to *CAR*.[10]

<Table 7 about here>

Our base case models use acquirer *CAR -3/+3* as dependent variable, estimated from a market model with estimation window -350 to -50 trading days relative to the announcement date, and 7-day event window centered around the event.[11] Column (1) of Table 7 shows that the CAR increases with 2.3pp following DFA for treated relative to control firms. In column (2), we observe that this increase is driven by SG firms. They experience 3.9pp higher announcement returns following DFA relative to control firms, while we do not observe any significant effect among IG firms.

Next, we aim to establish if the effect is driven by demand side considerations by studying the impact of having a plus or minus (*PoM*) rating modifier relative to a *Neutral* rating. A demand side explanation postulates that firms' acquisition quality should be more sensitive

[10] As we drop singleton observations, the inclusion of firm-level fixed effects requires at least two observations per firm, we observe a from 2,244 observations in the univariate tests to 1,636 observations in the multivariate tests. Re-estimating the models by keeping singleton observations do not alter our findings.

[11] To test that our findings are not sensitive to the use of model or event window, we have estimated market model CAR models with a 11-day event window and CARs based on Fama-French 3-factor estimations in Internet Appendix Table IA3.

to *PoM* ratings, while a supply side explanation in turn predicts higher CARs in both categories. Our findings in column (3) support a demand side explanation, as acquisition quality only increases among treated firms with *PoM* ratings following DFA. Estimations in column (4) compare investment grade firms relative to control firms by excluding SG firms. Our findings do not show any post-DFA differences between rating modifiers and acquisition quality for investment grade firms. Column (5) excludes IG firms by solely focusing on SG firms. Our findings show a positive and statistically significant interaction between *PoM* and *Post* among SG firms. Hence, we can conclude that the reduction in acquisition activity leads to higher CARs. Especially SG firms reduce acquisition activity at their own discretion to the extent that the marginal acquisition quality significantly increases.

Next, we consider the pre- and post-DFA impact of acquisitions on ratings. Following Aktas et al. (2021), we measure an acquisition induced upgrade/downgrade as having a higher/lower rating at year *t+1 relative to t-1*. In our first set of tests, we study changes in upgrade and downgrade probability for firms undertaking acquisitions and those that do not.

<Table 8 about here>

Our findings in Panel A of Table 8 show pre- and post-DFA upgrade and downgrade likelihoods for all treated firms. Prior to the Act, we do not observe any differences in the likelihoods of becoming upgraded or downgraded between acquiring firms and non-acquiring firms. When conducting the analysis post-DFA, we observe an increase in upgrade probability from 15.8% to 25.5% among acquiring firms. However, this is expected as more firms became upgraded following the Act, as the pre-years were confounded with the great financial crisis. To better study upgrade and downgrade outcomes, we study the differences between acquiring and non-acquiring firms. We observe that the upgrade probability is significantly higher among acquiring relative to non-acquiring firms (25.5% vs 18.6%). We also find a slightly lower downgrade-probability among acquiring firms relative to non-acquiring firms (11.6% vs.

13.6%), albeit not statistically significant. Hence, following DFA firms conduct acquisitions that are to a great extent coupled with subsequent upgrades. Our findings are interesting in relation to earlier studies on post-M&A credit quality that report decreased quality following acquisitions (Billett at al. 2004; Bessembinder et al. 2009; Furfine and Rosen 2009), instead, we report higher ratings following M&A transactions. In line with prior findings, we do not observe any effect among investment grade firms, only among SG firms. SG firms exhibit both greater upgrade probability and lower downgrade probability post-DFA relative to non-acquiring firms.

To further study a demand side effect, we split our sample into firms with *PoM* modifiers and those with neutral ratings. This is due to firms with a *PoM* modifier having more to gain from rating upgrades and alleviating downgrades. Our findings in Internet Appendix Table IA4 show that the patterns found in Table 8 are mainly attributed to firms with a *PoM* rating. Hence, acquiring firms are more likely to become upgraded relative to non-acquiring firms following DFA, especially if they have a *PoM* rating.

Next, we study the impact of DFA over the rating spectrum. Aktas et al (2021) report an inverse U-shaped relationship between rating levels and acquisition activity. High and low rated firms conduct fewer acquisitions relative to firms in the middle of the spectrum, that is BB and BBB firms. Our graphical evidence in Figure 1 suggests the highest univariate pre-DFA acquisition likelihoods and acquisition intensities among BB and B rated firms, although the pre-DFA findings are potentially confounded by the financial crisis. After excluding the financial crisis in Figures 2a and 2b, we find similar acquisition likelihoods and activities as in Aktas et al. (2021), where BB rated firms are the most active acquirers pre-DFA. However, DFA impacts acquisition activity disproportionally. Our graphical evidence suggests a sharp post-DFA decline in acquisition activity among B and BB rated, while BBB rated firms'

acquisition activity remains rather stable over time. Interestingly, also higher rated firms exhibit drops in acquisition activity.

<Figure 1 about here>

<Figure 2 about here>

Next, we study changes in acquisition activity in a multivariate setting, by interacting the rating level with the post indicators. Our findings in Figure 3 verify prior findings by showing that SG acquirers and especially BB-rated firms are disproportionately impacted by DFA, while BBB firms remain rather unaffected by the Act. We find negative statistically significant *Rating Level* × *Post* coefficients among B-, BB-, BB, BB+ and A rated firms in the acquisition likelihood specifications. In the acquisition intensity regression, we find negative statistically significant *Rating Level* × *Post* coefficients among B-, BB-, BB and BB+ rated firms. Interestingly, pre-DFA acquisition activity was mainly concentrated among these firms. Hence, DFA levels out the curvature in the rating level – acquisition spectrum found in Aktas et al. (2021).

<Figure 3 about here>

4. Model Validation and Robustness Tests

This section provides validation of our research design and presents several robustness tests to verify that our findings are not driven by design choices. First, we discuss and test the parallel pre-trends assumption, which is a pre-requisite for a DiD model to offer a causal interpretation of the *Post* × *Treated* coefficient. Second, we acknowledge that rated and unrated firms are fundamentally different in terms of acquisition activity and firm characteristics. Therefore, we use entropy balancing to even out such differences. Third, having a rating is both a qualification and a selection problem. Firms must both qualify and select to have a rating. Hence, we aim to compare the pre- and post-DFA effects on firms qualifying for a rating but chose not to be rated

to those that qualifies and chose to be rated. Fourth, we aim to verify that our findings are not driven by including 2009 in our estimations, as it is potentially confounded by the proposal of DFA already in June 2009. We also aim to verify that our findings are not sensitive to including or excluding 2010 from the sample. As the crisis years potentially confound our estimations, we exclude the crisis years and only include the years 2005-2007 as the pre-period, as well as extending the period to start in 2003. Fifth, we ensure that our findings are not driven by the choice to not allow for migration between investment grade and speculative grade ratings.

As a pre-requisite for DiD models to provide a causal interpretation of β_1 in Model (1), the parallel trends assumption must be satisfied. This means that in the absence of treatment the *Treated* × *Post* coefficient estimate should yield zero. This assumption requires similar growth rates in the dependent variables during the pre-shock period. The identifying assumption behind the DiD estimator does not require that acquisition levels are similar between treatment and control groups, only the growth rates. For example, we know from Harford and Uysal (2014) that rated firms conducted more acquisitions on average relative to unrated firms during the time-period 1990-2011. In tests analogues to Lemmon and Roberts (2010) and Sharma et al. (2022), we test for differences in annual growth rates of ACQ and DV/TA between treated and control firms. Our findings in Panel A of Table A3 do not show any significant difference in annual growth rates of the main dependent variables between the treatment and control groups. We further employ regression-based tests to ensure that our dependent variables exhibit parallel pre-trends. We construct a time-trend (Year minus 2004) and interact it with treatment status. If the dependent variables have similar pre-trends between the treatment and control groups, then *Treated* × *Time-trend* should render statistically insignificant estimates. Panel B of Table A3 shows regression estimates on *ACQ* and *DV/AT*. The pre-trend assumption holds in the absence of firm-level fixed effects in columns (1) and (2). We include firm-level fixed effects, a crisis indicator, and the interaction term *Treated* × *Crisis* in columns (3) and (4). Even after

augmenting the model, *Treated* × *Time-trend* remains statistically insignificant. Hence, the parallel trends assumption holds in all three test specifications for both dependent variables.

Acquisitions are large lumpy investment decisions resulting in large year-to-year variation. It becomes difficult to graphically assess parallel pre-trends due to the binary nature of the acquisition decision and because the financial crisis caused acquisitions to almost drop to zero. However, in all our regressions we control for differential effects between treated and control firms during the two abnormal years (2008 and 2009). In a similar vein as Sharma et al. (2022), Figure 4 shows *Treated* × *Year* coefficients in a regression setting controlling for the firm and industry characteristics of Model (1). We use 2009 as base year to exclude one year indicator from the regression. We can observe a significantly higher acquisition activity among treated firms prior to the financial crisis. During 2008 the acquisition activity among treated firms drop relatively to the control group. However, after DFA, the lower financial crisis acquisition activity among treated firms does not return to pre-crisis levels, although the overall acquisition activity increases. Instead, we observe a relatively lower acquisition activity among treated relative to control firms, post-DFA. As in Sharma et al. (2022), we also compare the residuals from regressions excluding treated and post indicators between treatment and control firms in Figure 5. Again, we observe that the difference between treated firms acquisition activity does not recover relative to control firms following DFA. We interpret this finding as credit rated firms reduce their acquisition activity in response to DFA.

Next, we consider across group differences between treated and control firms by entropy balancing the sample. To adjust for differences in observable characteristics between the two groups, we implement entropy balancing (Hainmueller 2012). Entropy balancing weighs the covariates in the control group to have the same means as in the treatment group. Indeed, none of the covariates exhibit differences between the control and the treatment group after the balancing. To weigh the control group characteristics equally to the treatment group's we use

all pre-DFA covariates from Table 3. Internet Appendix Table IA5 shows pre- and post-weighting differences in pre-DFA firm characteristics between the treated and control group.

Our findings in Table A4 do not show large discrepancies from Table 3. Treated firms conduct less acquisitions following DFA. DFA remains to have a stronger effect on SG firms. However, after entropy balancing the sample, also IG firms exhibit significantly lower post-DFA acquisition activity relative to the control group.

Evaluating the link between ratings and acquisitions is problematic due to several endogeneity issues. Since firms self-select into having a rating, we observe a selection problem. But not all firms can become rated, creating three groups of firms. First, firms that do not qualify for a rating (Group 1). Second, firms qualifying for a rating that become rated (Group 2). Third, firms qualifying for a rating but chose not to become rated (Group 3). One potential issue in our setting is that acquisitions are correlated with not only having a rating but also with firm characteristics. Hence, to ensure that our findings are driven by the DFA-rating effect and not changes in the correlation between firm characteristics associated with having a rating and acquisitions, we need to separate between Groups 1 and (2 and 3). We need to control for belonging to group 1, while comparing the acquisition outcomes between Groups 2 and 3 pre- and post-DFA. This allows us to neatly identify the actual impact of DFA on treated firms' acquisition activity. Therefore, we employ the two-step technique of Faulkender and Petersen (2012), also used by Harford and Uysal (2014) and Blomkvist et al. (2024). The first step of the exercise involves estimating a probit model to determine the likelihood of having a rating. We estimate three probit models in Internet Appendix Table IA6 to capture the probability of being rated, having an IG and a SG rating. In addition to the firm characteristics used previously in the study, we include important determinants of becoming rated, that is NYSE listing, being a S&P500 constituent and the proportion of rated firms within the 3-digit SIC-code industry. Following the estimations, we store the predicted probability of being rated. The predicted

probability of being rated captures if a firm qualifies for a rating (separates Group 1 from Groups 2 and 3). Next, we calculate the residual probability (treatment minus predicted probability). The residual probability distinguishes firms that qualify for a rating and become rated from those that qualify but choose to remain unrated (separates Groups 2 and 3).

To test the impact of DFA on rated firms acquisition activity, we include both baseline effects of treatment probability [*Pr(Treated)*] and treatment residual (*Treated Residual*) in the regressions along with its interaction terms with *Post*. If DFA impacted rated firms above what is expected from firm characteristics correlated with having a rating, we expect the treatment residual to be negative and statistically significant. The first two columns of Table A5 show the probability and residual of being treated (regardless of rating level), while the last two distinguish between the likelihood of having an IG or SG rating and its residuals. In line with our predictions, estimations in columns (1) and (2) show that the *Treatment Residual* negatively impacts acquisition activity post-DFA. *Pr(Treatment)* only shows a weak post-DFA negative relation to acquisition intensity in column (2), while not impacting acquisition likelihood in column (1). When separating between IG and SG probabilities and residuals in columns (3) and (4), we find that the residual of having a SG rating negatively impacts both acquisition likelihood and intensity. Among IG firms, we observe that firm characteristics predict lower post-DFA acquisition likelihood, while the residuals do not have any explanatory power on acquisitions. Hence, we can conclude that the actual rating effect detached from firm characteristics are driving the post-DFA differences between rated and unrated firms. This holds especially true among SG firms.

Next, we study how sensitive our findings are to our choice of shock year and our overall sample selection choices. Our DiD research design excludes 2010 from the model specifications due to the enactment of DFA in July 2010. However, it is possible that also 2009 was partly confounded by DFA as the Act was proposed as early as June 2009. To ensure that our findings

are not driven by design choices, we exclude 2009 from our sample. Our findings in columns (1) to (4) in Panel A of Table A6 show similar coefficient estimates as in Table 3 after excluding 2009. We further show that our results are not sensitive to including 2010 in columns (5) to (8) in Panel A. We also test the robustness of our findings by excluding the financial crisis years in columns (1) to (4) of Panel B, and again find similar coefficient estimates as in Table 3. We also account for the shorter pre-period in columns (1) to (4) by adding 2003 and 2004 to the sample in columns (5) to (8) and find similar results. Table A7 shows that the choice to disallow rating migration between SG and IG ratings does not impact the outcomes. Hence, our findings do not appear to be driven by research design choices.

4.1. Alternative Explanations

This subsection aims to exclude two alternative explanations that could yield similar patterns as in our baseline regressions. First, DFA was preceded by the great financial crisis, which can have long-lasting effects on rated firms' investment behavior. Our main specifications control for different impacts on rated and unrated firms during the financial crisis by interacting treated with a crisis indicator. One potential concern is that Figures 4 and 5 show that treated firms acquisition activity started to drop relative to unrated firms during the 2008, and remained lower throughout the entire post-period. Hence, an alternative explanation is that the crisis had long-lasting impact on rated firms. To ensure that our findings are not driven by long-lasting crisis effects, we follow Fahlenbrach et al. (2012) and Sharma et al. (2022) and calculate the returns of firms from 1.7.2007 to 31.12.2009 (*Crisis Return*). We then interact *Post* × *Crisis Return*, as firms more impacted by the financial crisis should have experienced lower crisis returns. Our findings in columns (1) to (4) of Table A8 do not suggest that long-lasting crisis effects drive our main findings. Instead, we find coefficient estimates close to those in Table 3 after controlling for firms' heterogenous crisis impacts.

Second, Basel II was published in 2004 and implemented in 2007 for US banks. Basel II introduced borrower rating contingent risk weights for lending banks, making lending to lower rated borrowers more expensive. The main cut-offs are from A- to BBB+ and B- to CCC+ as banks would change the risk weighting from 50% to 100% and 100% to 150%, respectively. Hasan et al (2021) test the impact on loan rates around those thresholds and find significant spillover effects on loan rates for firms downgraded from A- to BBB+ and B- to CCC+. The spillover effects from bond ratings to bank loan terms are an important factor and motivation for firms to maintain their ratings. However, to ensure that our findings are driven by a DFA effect and not solely a Basel II effect, we exclude the most Basel II exposed firms from our sample (A- and B-) and re-estimate the analysis in Table 3. Our findings in Table A8 are robust to the exclusion of A- and B- rated firms. Hence, we can conclude that it is not likely that Basel II spillovers fully explain our findings.

5. Conclusions

We study whether more stringent legislation on credit rating agencies has spillover effects on firms' acquisition activities? We explore exogenous variation in CRA monitoring on acquisition activity by studying the behavior around the Dodd–Frank Wall Street Reform and Consumer Protection Act (DFA) in July 2010. The act authorized SEC to impose penalties on CRAs to curb rating inflation, by incentivizing them to better monitor rated entities through improved due-diligence, internal controls, and supervision. Hence, the Dodd-Frank Act increased ex ante downgrade threats without changing credit rated firms' underlying credit quality.

We find that more stringent regulation on credit rating agencies has important implications on credit rated firms' acquisition activities. Our estimations show large drops in acquisition activity among rated firms relative to their unrated peers following the Act.

Speculative grade issuers are especially impacted by the Act as they face greater downgrade induced costs. The more selective acquisition strategies lead to both higher announcement returns and greater post-acquisition upgrade probabilities. Interestingly, we find that firms reduced overall M&A (both transactions settled with cash and stock) rather than only reducing cash settled acquisitions. Our findings suggest that firms respond to DFA by refraining from taking on overall M&A risk and only opting for the most viable deals rather than just decreasing the proportion of cash-settled deals.

We explore if our findings are driven by demand or supply side considerations. Our findings suggest that our results are tilted towards a demand side explanation, where firms become more cautious in their acquisition strategies when they are closer to an upgrade or a downgrade. We do not find any support for that overall bond market supply drives our findings.

We also exclude two alternative explanations: 1.) we show that our findings are not driven by the financial crisis; 2.) our findings are neither driven by changes in bank lending following the Basel II accord. We also conduct a battery of robustness tests relative to our DiD specification. First, we show that our findings are not sensitive to small alterations in the event window. Second, we show that our dependent variables follow parallel trends prior to DFA. Third, we entropy balance the treatment and control groups to account for differences between them, and report similar results. We also use the method of Faulkender and Petersen (2012) to ensure that our findings are not driven by firm characteristics more prevalent among rated firms, but instead a direct effect of having a rating.

In sum, the Act had real consequences by levelling out differences prevalent in prior research between rated and unrated firms, thereby reducing the capital market advantages of being rated. Our study highlights that increased legal stringency on CRAs has important spillover effects on M&A activity and quality.

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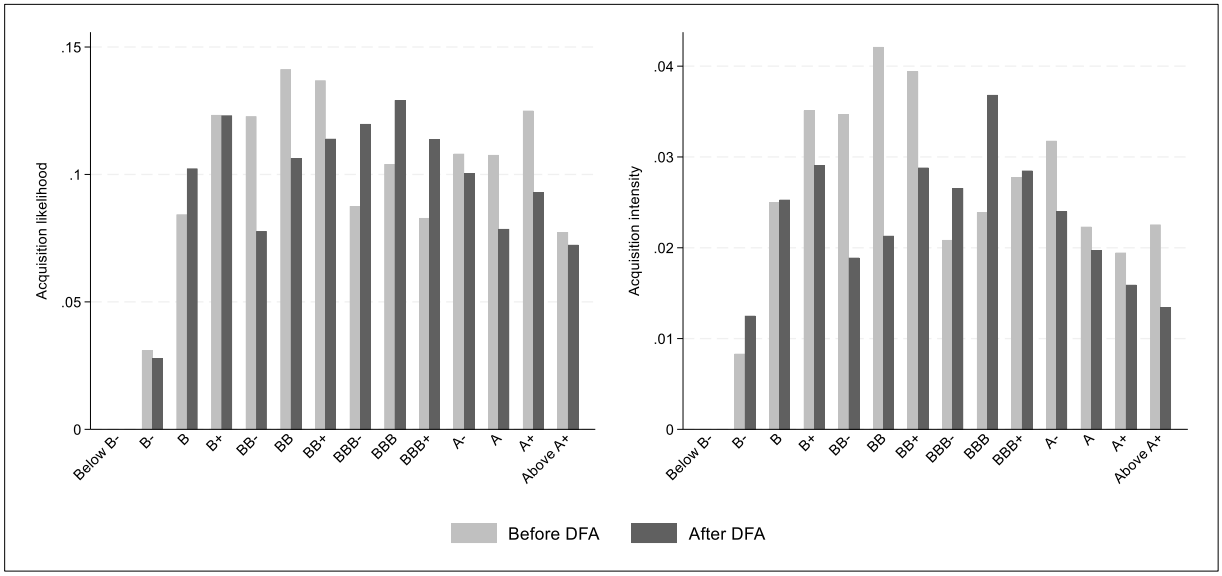
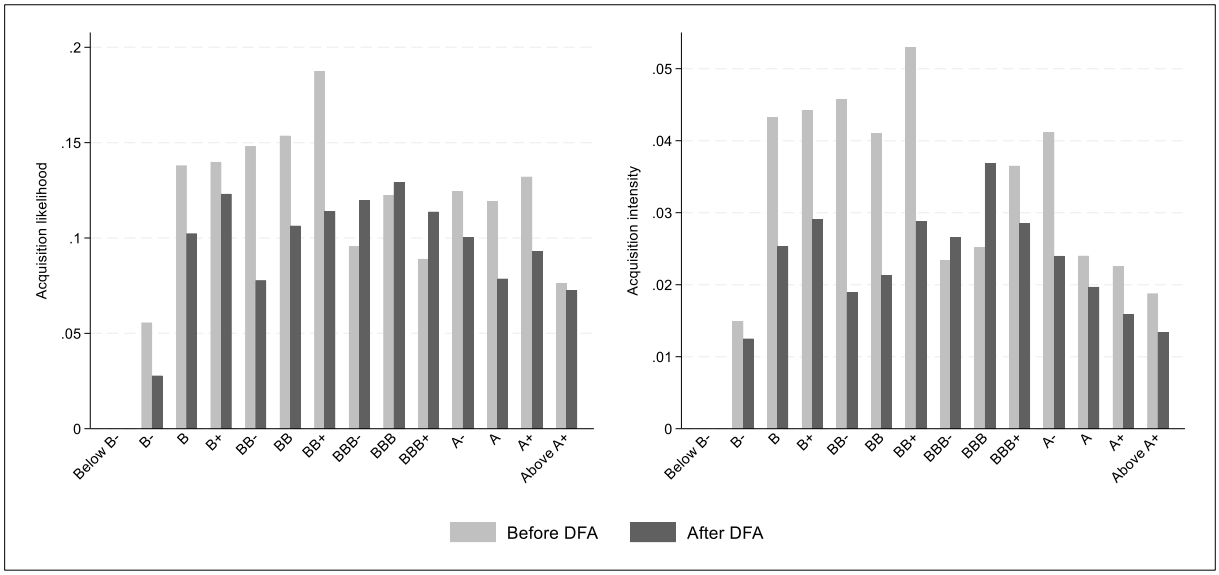
Figures

Figure 1: Acquisition activity pre- and post-DFA



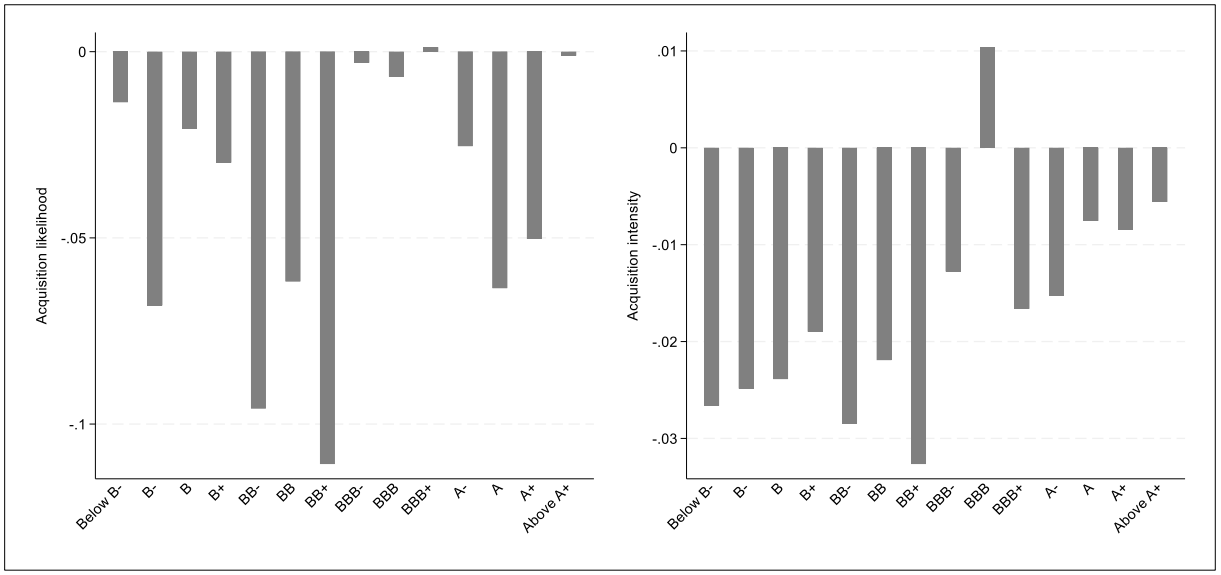
NOTE. This figure shows firms' acquisition likelihood (left) and intensity (right) over the credit rating spectrum. The light- and dark-gray bars show means pre- and post-DFA, respectively.

Figure 2: Acquisition activity pre- and post-DFA excluding financial crisis period



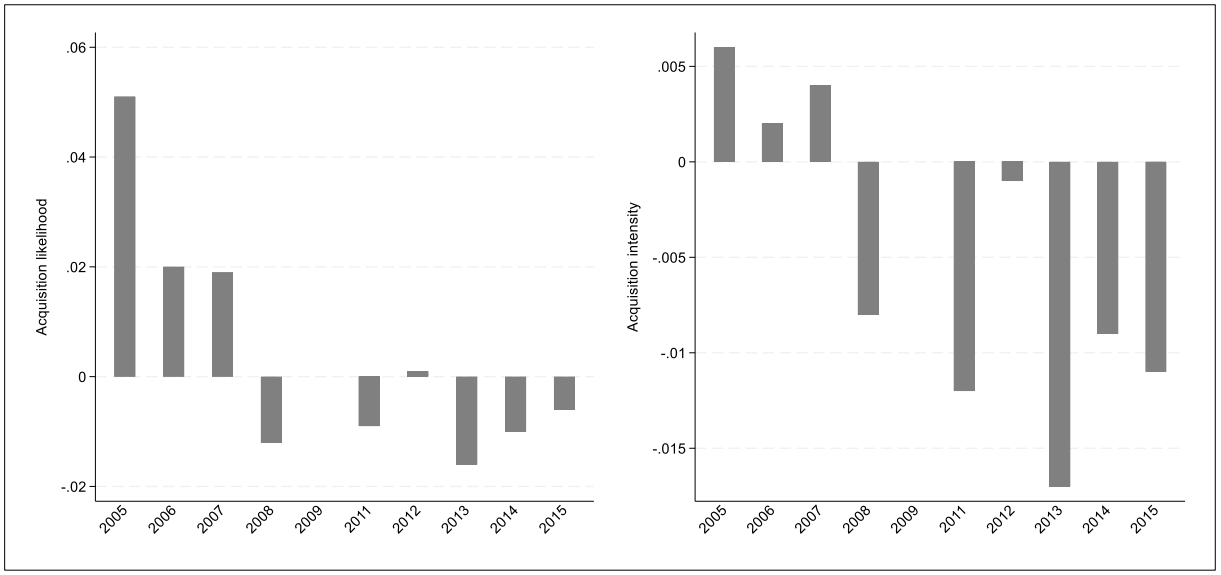
NOTE. This figure shows firms' acquisition likelihood (left) and intensity (right) over the credit rating spectrum, after excluding the financial crisis period of 2008 and 2009. The light- and dark-gray bars show means pre- and post-DFA, respectively.

Figure 3: Acquisition activity pre- and post-DFA in a multivariate setting



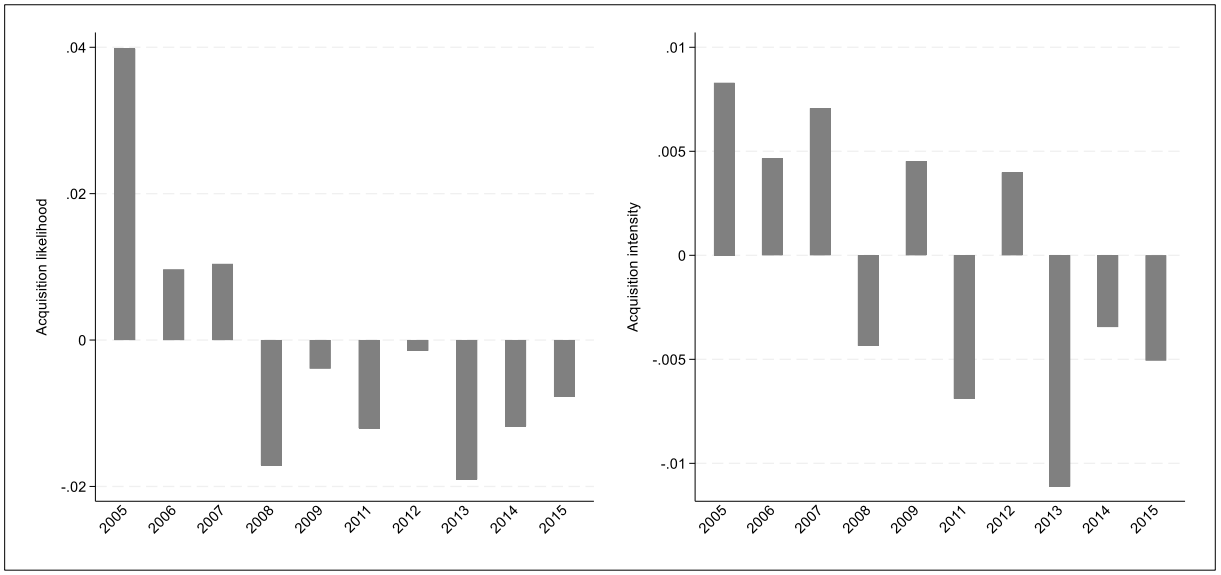
NOTE. This figure includes coefficients of interactions between rating level and the post-DFA indicator obtained from multivariate regressions as in Model (1a) and (1b).

Figure 4: Acquisition activity by year



NOTE. This figure shows interaction coefficients of treated (rated) and year indicators (2009 is used as base year). The estimates are obtained from multivariate regressions including controls and firm-level fixed effects. As 2010 is the shock year, it is excluded from the regression models.

Figure 5: Residual acquisition activity by year



NOTE. This figure shows differences in residuals between treated (rated) and control (unrated) from Model 1a and 1b excluding the Post and Treated variables and their interactions over time. As 2010 is the shock year, it is excluded from the regression models.

Tables

Table 1: Summary statistics

Firm and Industry Characteristics				
Variable	Mean	Std Dev	Min	Max
ACQ	0.093	0.291	0.000	1.000
DV/TA	0.027	0.113	0.000	0.914
Cash Payment/TA	0.012	0.055	0.000	0.372
Stock Payment/TA	0.011	0.064	0.000	0.618
Treated	0.277	0.448	0.000	1.000
IG	0.158	0.365	0.000	1.000
SG	0.119	0.324	0.000	1.000
M/B	1.923	1.265	0.589	8.788
Leverage	0.132	0.154	0.000	0.701
Ln(Sales)	6.318	2.050	2.403	10.872
EBITDA/TA	0.106	0.127	-0.474	0.400
Cash/TA	0.199	0.199	0.000	0.825
12-month Return	0.100	0.514	-0.840	2.969
Herfindahl	0.207	0.176	0.045	0.918
M&A Liquidity	0.026	0.045	0.000	0.270
No. of obs.	20,810			

Deal Characteristics				
Variable	Mean	Std Dev	Min	Max
CAR -3/+3	0.015	0.084	-0.224	0.311
Relative Size	0.339	0.531	0.052	7.568
100% Cash	0.769	0.422	0.000	1.000
100% Stock	0.041	0.197	0.000	1.000
Public Target	0.156	0.363	0.000	1.000
Tender	0.033	0.180	0.000	1.000
Hostile	0.000	0.021	0.000	1.000
Cross Border	0.187	0.390	0.000	1.000
No. of obs.	2,244			

NOTE. This table shows mean, standard deviation (Std Dev), minimum (Min), and maximum (Max) of the variables used in our analysis during the time-period 2005 to 2015 (excluding 2010). ACQ, DV/TA, cash payment/TA, stock payment/TA, Treated, IG, SG are measured at time *t* while all firm and industry characteristics are measured at time *t-1* (except M&A Liquidity measured at time *t*). Deal characteristics are measured at deal announcement. All variables are defined in Appendix A1.

Table 2: Univariate differences

Panel A	Pre-DFA							Post-DFA						
	Treated	IG	SG	Control	Treated-Control	IG-Control	SG-Control	Treated	IG	SG	Control	Treated-Control	IG-Control	SG-Control
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Firm and Industry Characteristics													
ACQ	0.106	0.095	0.120	0.090	0.016**	0.005	0.030**	0.103	0.101	0.106	0.088	0.015*	0.013	0.018^{+}
DV/TA	0.028	0.022	0.036	0.026	0.002	-0.004	0.010**	0.025	0.026	0.024	0.027	-0.002	-0.001	-0.003
Cash Payment/TA	0.014	0.012	0.016	0.012	0.002	-0.000	0.004*	0.012	0.013	0.012	0.012	0.000	0.001	-0.000
Stock Payment/TA	0.011	0.008	0.015	0.011	0.000	-0.003*	0.004^{+}	0.010	0.010	0.010	0.012	-0.001	-0.001	-0.001
M/B	1.712	1.941	1.436	2.106	-0.394**	-0.165**	-0.670**	1.672	1.887	1.342	1.913	-0.241**	-0.026	-0.570**
Leverage	0.214	0.141	0.301	0.096	0.118**	0.046**	0.205**	0.217	0.152	0.317	0.105	0.112**	0.047**	0.212**
Ln(Sales)	8.337	9.162	7.347	5.312	3.024**	3.850**	2.034**	8.739	9.411	7.710	5.647	3.091**	3.764**	2.062**
EBITDA/TA	0.148	0.167	0.124	0.093	0.054**	0.074**	0.031**	0.141	0.157	0.117	0.089	0.052**	0.068**	0.028**
Cash/TA	0.088	0.090	0.087	0.247	-0.159**	-0.158**	-0.160**	0.099	0.104	0.093	0.232	-0.133**	-0.129**	-0.139**
12-month Return	0.070	0.084	0.053	0.019	0.050**	0.064**	0.034*	0.170	0.168	0.174	0.173	-0.003	-0.005	0.001
Herfindahl	0.220	0.227	0.212	0.190	0.030**	0.037**	0.022**	0.243	0.247	0.237	0.205	0.038**	0.042**	0.031**
M&A Liquidity	0.023	0.024	0.022	0.029	-0.006**	-0.005**	-0.007**	0.023	0.023	0.022	0.027	-0.004**	-0.003*	-0.004**
No. of obs.	3,334	1,818	1,516	7,632				2,439	1,475	964	7,405			
Panel B	*Deal Characteristics*													
CAR -3/+3	0.004	-0.003	0.010	0.015	-0.011*	-0.018**	-0.004	0.020	0.013	0.030	0.021	-0.001	-0.007	0.009
Relative Size	0.289	0.261	0.313	0.369	-0.081**	-0.108*	-0.056^{+}	0.261	0.265	0.255	0.357	-0.096**	-0.092*	-0.103*
100% Cash	0.795	0.785	0.805	0.728	0.068**	0.057^{+}	0.077*	0.849	0.839	0.864	0.774	0.075**	0.064^{+}	0.090*
100% Stock	0.051	0.048	0.052	0.048	0.003	0.001	0.005	0.027	0.026	0.029	0.031	-0.004	-0.006	-0.002
Public	0.341	0.452	0.243	0.105	0.236**	0.347**	0.138**	0.248	0.310	0.155	0.083	0.165**	0.226**	0.072^{+}
Tender	0.078	0.118	0.043	0.022	0.056**	0.096**	0.021	0.058	0.065	0.049	0.014	0.044**	0.051*	0.035
Hostile	0.003	0.000	0.005	0.000	0.003	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cross Border	0.174	0.199	0.152	0.172	0.002	0.027	-0.020	0.244	0.277	0.194	0.192	0.053^{+}	0.086*	0.003
No. of obs.	396	186	210	859				258	155	103	731			

NOTE. This table includes variable means and mean differences between treated (rated) and control (unrated) firms. Columns (1) to (7) include variable means and mean differences pre-DFA (2005-2009), while columns (8) to (14) include the same statistics post-DFA (2011-2015). Columns (1) to (4) include variable means of the treated, investment grade (IG), speculative grade (SG) and control firms, respectively. Column (5) includes mean differences between treated and control firms. Similarly, columns (6) and (7) include mean differences between IG and control firms, and SG and control firms, respectively. Columns (8) to (14) repeat the similar process for the post-DFA sample. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table 3: Difference-in-difference estimates

	ACQ_t (1)	DV_t/TA_{t-1} (2)	ACQ_t (3)	DV_t/TA_{t-1} (4)
Treated × Post	-0.036**	-0.013**		
	(-3.16)	(-3.03)		
IG × Post			-0.019	-0.005
			(-1.44)	(-1.05)
SG × Post			-0.064**	-0.026**
			(-3.53)	(-3.95)
Post	0.014*	0.011**	0.014*	0.011**
	(2.15)	(4.48)	(2.14)	(4.48)
M/B_{t-1}	-0.001	0.003*	-0.001	0.003*
	(-0.29)	(2.11)	(-0.26)	(2.13)
$Leverage_{t-1}$	-0.232**	-0.085**	-0.230**	-0.084**
	(-7.80)	(-5.95)	(-7.73)	(-5.92)
$Ln(Sales)_{t-1}$	-0.019**	-0.015**	-0.019**	-0.015**
	(-2.86)	(-4.52)	(-2.85)	(-4.51)
$EBITDA/TA_{t-1}$	0.171**	0.075**	0.171**	0.075**
	(5.66)	(4.72)	(5.65)	(4.71)
$Cash/TA_{t-1}$	0.234**	0.087**	0.235**	0.087**
	(8.97)	(6.54)	(8.99)	(6.54)
12-Month Return	0.004	-0.001	0.003	-0.001
	(0.79)	(-0.51)	(0.76)	(-0.52)
$Herfindahl_{t-1}$	0.037	0.012	0.038	0.012
	(0.95)	(0.83)	(0.98)	(0.86)
$M\&A\ Liquidity_t$	0.703**	0.321**	0.704**	0.322**
	(10.31)	(9.51)	(10.33)	(9.52)
Crisis	0.001	0.002	0.001	0.002
	(0.13)	(0.80)	(0.12)	(0.79)
Treated × Crisis	-0.035**	-0.008$^+$		
	(-2.88)	(-1.77)		
IG × Crisis			-0.022	-0.004
			(-1.51)	(-0.78)
SG × Crisis			-0.054**	-0.015$^+$
			(-2.96)	(-1.93)
Constant	0.152**	0.087**	0.151**	0.086**
	(3.60)	(4.14)	(3.58)	(4.13)
Firm FE	Y	Y	Y	Y
No. of obs.	20,810	20,810	20,810	20,810
Adj. R^2	0.113	0.083	0.113	0.083

NOTE. This table reports difference-in-difference estimates around the Dodd-Frank Act in 2010 to analyze its impact on acquisition likelihood (ACQ) and intensity (DV/TA) during the pre-(2005-2009) and post-(2011-2015) periods. Columns (1) and (2) include tests for treated (rated) relative to control (unrated) firms, while columns (3) and (4) partition treated firms into investment grade (IG) and speculative grade (SG) and compare them to the control sample. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^+$ $P < .10$; * $P < .05$; ** $P < .01$

Table 4: Tests of a demand side explanation

	Rated		Investment Grade		Speculative Grade	
	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)	(5)	(6)
PoM × Post	-0.034*	-0.015**	-0.004	-0.008	-0.072**	-0.025**
	(-2.42)	(-2.94)	(-0.27)	(-1.14)	(-3.25)	(-3.47)
Neutral × Post	-0.040*	-0.009	-0.037^{+}	-0.001	-0.045	-0.023^{+}
	(-2.26)	(-1.41)	(-1.74)	(-0.11)	(-1.49)	(-1.84)
Post	0.014*	0.011**	0.010	0.010**	0.007	0.009**
	(2.15)	(4.48)	(1.59)	(3.86)	(1.17)	(3.62)
PoM	-0.010	0.004	-0.020	0.004	0.001	0.004
	(-0.60)	(0.68)	(-0.93)	(0.54)	(0.02)	(0.30)
Constant	0.154**	0.086**	0.106*	0.065**	0.103*	0.068**
	(3.64)	(4.10)	(2.51)	(3.06)	(2.55)	(3.31)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
No. of obs.	20,810	20,810	18,330	18,330	17,517	17,517
Adj. R^2	0.112	0.083	0.111	0.081	0.112	0.079

NOTE. This table shows difference-in-difference regressions examining whether the decrease in acquisition activity (ACQ and DV/AT) is due to demand side considerations. The pre-DFA period includes 2005-2009, while Post includes 2011-2015. The main variables of interest are PoM (having a plus or minus modifier attached to the rating) and Neutral (no modifier). Columns (1) and (2) include treated (rated) and control (unrated) firms, while columns (3)-(4) and (5)-(6) partition treated into investment grade and speculative grade firms. The regressions include the controls of Table 3. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table 5: Tests of a supply side explanation

	Rated		Investment Grade		Speculative Grade	
	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)	(5)	(6)
Treated × BB-spread × Post	0.003	0.003	0.006	0.002	-0.000	0.005
	(0.36)	(0.86)	(0.56)	(0.41)	(-0.02)	(1.11)
Treated × Post	-0.050	-0.025^{+}	-0.047	-0.013	-0.056	-0.046*
	(-1.43)	(-1.85)	(-1.16)	(-0.81)	(-0.96)	(-2.25)
Treated × BB-spread	0.001	0.001	0.005^{+}	0.001^{+}	-0.004	0.000
	(0.56)	(1.27)	(1.86)	(1.84)	(-1.25)	(0.12)
Post × BB-spread	-0.003	-0.004*	-0.003	-0.004*	-0.004	-0.005**
	(-0.74)	(-2.33)	(-0.74)	(-2.32)	(-1.07)	(-2.82)
BB-spread	-0.002	0.000	-0.002	0.000	-0.001	0.000
	(-1.47)	(0.42)	(-1.44)	(0.53)	(-1.33)	(0.72)
Post	0.028	0.026**	0.024	0.025**	0.027	0.027**
	(1.61)	(3.65)	(1.41)	(3.42)	(1.55)	(3.78)
Constant	0.161**	0.091**	0.110**	0.069**	0.114**	0.073**
	(3.78)	(4.34)	(2.61)	(3.27)	(2.80)	(3.57)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
No. of obs.	20,810	20,810	18,330	18,330	17,517	17,517
Adj. R^2	0.113	0.083	0.111	0.082	0.112	0.079

NOTE. This table shows difference-in-difference regressions examining whether the decrease in acquisition activity (ACQ and DV/AT) is due to supply side considerations. The pre-DFA period includes 2005-2009, while Post includes 2011-2015. We proxy bond market supply by the BB-spread, defined as the yield difference between BB and AAA rated bonds. Columns (1) and (2) include treated (rated) and control (unrated) firms, while columns (3)-(4) and (5)-(6) partition treated firms into investment grade and speculative grade firms, respectively. The regressions include the controls of Table 3. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table 6: Cash and stock payments

	Cash Payment$_t$/TA$_{t-1}$	Stock Payment$_t$/TA$_{t-1}$	Cash Payment$_t$/TA$_{t-1}$	Stock Payment$_t$/TA$_{t-1}$
	(1)	(2)	(3)	(4)
Treated x Post	-0.006**	-0.006*		
	(-2.89)	(-2.37)		
IG x Post			-0.004	-0.001
			(-1.55)	(-0.25)
SG x Post			-0.010**	-0.014**
			(-2.99)	(-3.60)
Post	0.003**	0.006**	0.003**	0.006**
	(2.73)	(4.36)	(2.72)	(4.36)
M/B$_{t-1}$	0.000	0.002**	0.000	0.002*
	(0.54)	(2.21)	(0.55)	(2.25)
Market Leverage$_{t-1}$	-0.044**	-0.024**	-0.044**	-0.023**
	(-6.67)	(-3.03)	(-6.66)	(-2.97)
Ln(Sales)$_{t-1}$	-0.004*	-0.009**	-0.004*	-0.009**
	(-2.54)	(-4.84)	(-2.53)	(-4.83)
EBITDA$_{t-1}$/TA$_{t-1}$	0.034**	0.025**	0.034**	0.024*
	(5.92)	(2.51)	(5.92)	(2.49)
Cash/TA$_{t-1}$	0.043**	0.036**	0.043**	0.036**
	(7.23)	(5.05)	(7.23)	(5.06)
12-Month Return	-0.000	-0.001	-0.000	-0.001
	(-0.10)	(-1.29)	(-0.10)	(-1.33)
Herfindahl$_{t-1}$	0.006	-0.004	0.006	-0.004
	(0.92)	(-0.48)	(0.94)	(-0.44)
M&A Liquidity$_t$	0.121**	0.152**	0.121**	0.152**
	(8.59)	(7.81)	(8.60)	(7.82)
Crisis	-0.005*	-0.001	0.000	0.002
	(-2.40)	(-0.45)	(0.05)	(1.14)
Treated x Crisis	0.005*	0.003		
	(2.09)	(1.03)		
IG x Crisis			-0.004	0.001
			(-1.54)	(0.52)
SG x Crisis			-0.006$^+$	-0.008*
			(-1.69)	(-2.11)
Constant	0.023*	0.050**	0.023*	0.050**
	(2.54)	(4.45)	(2.53)	(4.43)
Firm FE	Y	Y	Y	Y
No. of obs.	20,810	20,810	20,810	20,810
Adj. R^2	0.075	0.053	0.075	0.053

NOTE. This table reports difference-in-difference estimates around the Dodd-Frank Act in 2010 to analyze its impact on cash paid acquisitions (Cash Payment/TA) and stock paid acquisitions (Stock Payment/TA) during the pre-(2005-2009) and post-(2011-2015) periods. Columns (1) and (2) include tests for treated (rated) relative to control (unrated) firms, while columns (3) and (4) partition treated firms into investment grade (IG) and speculative grade (SG) and compare them to the control sample. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^+$ $P < .10$; * $P < .05$; ** $P < .01$

Table 7: Cumulative abnormal returns around the merger announcement date

	Rated			IG	SG
	CAR -3/+3	CAR -3/+3	CAR -3/+3	CAR -3/+3	CAR -3/+3
	(1)	(2)	(3)	(4)	(5)
Treated × Post	0.023*				
	(2.10)				
IG × Post		0.011			
		(0.93)			
SG × Post		0.039*			
		(2.29)			
PoM × Post			0.033*	0.006	0.077**
			(2.37)	(0.48)	(3.25)
Neutral × Post			0.013	0.022	-0.001
			(0.92)	(1.28)	(-0.04)
PoM			-0.007	0.008	-0.031^{+}
			(-0.56)	(0.55)	(-1.73)
Post	0.005	0.005	0.005	0.006	0.007
	(0.48)	(0.54)	(0.52)	(0.62)	(0.69)
Constant	0.107^{+}	0.114^{+}	0.111^{+}	0.115^{+}	0.124*
	(1.79)	(1.89)	(1.84)	(1.79)	(2.04)
Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
No. of obs.	1,636	1,636	1,636	1,406	1,371
Adj. R^2	0.090	0.092	0.090	0.088	0.093

NOTE. This table examines acquisition quality before (2005-2009) and after (2011-2015) the Dodd-Frank Act. The acquirer cumulative abnormal return is calculated using a -3 to +3 event window around the acquisition announcement date. Column (1) includes treated (rated) and control (unrated) firms, while column (2) partitions treated firms into investment grade (IG) and speculative grade (SG) firms. Column (3) partitions treated into firms with a plus or minus (PoM) modifier attached to the rating and firms without a rating modifier (Neutral). Columns (4) and (5) includes PoM and Neutral ratings for IG and SG, respectively. The regressions include the following unreported controls: M/B, leverage, ln(sales), EBITDA/TA, cash/TA, 12-month return, Herfindahl, M&A liquidity, Relative size, 100% cash, 100% stock, Public target, Tender offer, Hostile, Cross-border, Crisis and interaction terms of crisis with treated, IG, and SG. Please note that the main effect of Neutral is excluded from the regression due to Neutral + PoM can fully explain a firm's treated status. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. Estimations drop singleton observations, resulting in a loss of 608 observations relative to Table 2. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table 8: Post-M&A upgrade and downgrade likelihoods

Panel A: All Treated						
	Before DFA			After DFA		
	Non-acquirers	Acquirers	Diff	Non-acquirers	Acquirers	Diff
Upgrade	0.153	0.158	-0.005	0.186	0.255	-0.069**
Downgrade	0.195	0.164	0.031	0.136	0.116	0.020
No. of obs.		354	3,334	2,188	251	

Panel B: Investment Grade						
	Before DFA			After DFA		
	Non-acquirers	Acquirers	Diff	Non-acquirers	Acquirers	Diff
Upgrade	0.137	0.139	-0.002	0.129	0.134	-0.005
Downgrade	0.157	0.145	0.012	0.137	0.141	-0.004
No. of obs.	1,646	172		1,326	149	

Panel C: Speculative Grade						
	Before DFA			After DFA		
	Non-acquirers	Acquirers	Diff	Non-acquirers	Acquirers	Diff
Upgrade	0.173	0.176	-0.003	0.273	0.431	-0.158**
Downgrade	0.242	0.181	0.061^{+}	0.136	0.078	0.058
No. of obs.	1,334	182		862	102	

NOTE. This table shows univariate differences in upgrade and downgrade likelihoods between acquirers and non-acquirers among treated (rated) firms before (2005-2009) and after (2011-2015) the Dodd-Frank Act (DFA). We measure Upgrade (Downgrade) as having a higher (lower) rating at *t+1* compared to *t-1*. Panel A includes all treated firms, Panel B only investment grade firms, while Panel C only includes speculative grade firms.
$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Appendices

Table A1: Variable definitions

Variable	Definition	Data source
ACQ	An indicator variable denoting that takes on a value of one if a firm conducts at least one acquisition during a given year.	Eikon
DV/TA	Ratio of total deal value of M&A transactions at *t* to total assets measured at t-1.	Eikon/Compustat
Treated	An indicator variable taking the value of one if a firm has a long-term S&P credit rating during all sample years, and zero otherwise.	Compustat
IG	An indicator variable taking the value of one if the long-term S&P credit rating is BBB- or higher, and zero otherwise.	Compustat
SG	An indicator variable taking the value of one if the long-term S&P credit rating is BB+ or lower, and zero otherwise	Compustat
Post	An indicator variable taking the value of one if year is greater than 2010, and zero otherwise. Dodd-Frank Act was passed in July 2010.	
PoM	An indicator variable taking the value of one if the credit rating of a firm includes a plus or a minus sign, and zero otherwise, measured at *t-1*.	Compustat
Neutral	An indicator variable taking the value of one if the credit rating of a firm does not include a plus or a minus sign, and zero otherwise, measured at *t-1*.	Compustat
BB-spread	The difference in yields between AAA and BB rated bonds.	FRED
CAR -3/+3	Cumulative abnormal returns calculated around -3 to +3 days around the event. We use a market model with CRSP equally weighted index and an estimation window of -50 to -350 trading days around the event.	CRSP
Cash Payment/TA	The total deal volume settled by cash over the firm's total assets.	Eikon
Stock Payment/TA	The total deal volume settled by stock over the firm's total assets.	Eikon
CAR -5/+5	Cumulative abnormal returns calculated around -3 to +3 days around the event. We use a market model with CRSP equally weighted index and an estimation window of -50 to -350 trading days around the event.	CRSP
FF CAR -3/+3	Cumulative abnormal returns calculated around -3 to +3 days around the event. We use a Fama-French three-factor and an estimation window of -50 to -350 trading days around the event to calculate the expected return.	CRSP
100% Cash	An indicator variable denoting that the M&A transaction is settled with 100% cash.	Eikon
100% Stock	An indicator variable denoting that the M&A transaction is settled with 100% stock.	Eikon
Cash%	Percentage of the payment conducted with cash in a given M&A transaction	Eikon
Time-Trend	A variable indicating the number of years since the beginning of our sample period calculated as a given year minus 2004, that is, time-trend variable will be 1 for 2005, 2 for 2006 and so on.	
Crisis Return	A firm's stock market return between 1.7.2007 to 31.12.2009.	CRSP
Controls		
12-Month Return	Stock return during the last 12-months	CRSP
Cash/TA	Ratio of cash holdings to total assets (TA).	Compustat
Crisis	An indicator variable taking the value of one if year is equal to 2008 and 2009, and zero otherwise. The Great financial crisis occurred during 2008 and 2009.	
Cross Border	An indicator variable denoting that the acquirer and target are located in different countries.	Eikon
EBTIDA/TA	Ratio of earnings before income, tax, depreciation and amortization (EBITDA) to total assets (TA)	Compustat
Herfindahl	Sales based Herfindahl index calculated on 3-digit SIC code	Compustat

Hostile	An indicator variable denoting a hostile or unsolicited M&A.	Eikon
Leverage	Market leverage calculated as (debt in current liabilities + long term debt)/market value of assets. Market value of assets is calculated as total assets + (share price * shares outstanding) – book value of equity.	Compustat
Ln(Sales)	Firm size calculated as natural logarithm of sales	Compustat
M&A Liquidity	Ratio of total industry deal value to total assets in the same industry	Eikon/Compustat
M/B	Market to book ratio calculated as the ratio of market value of assets to book value of total assets. Market value of assets is calculated as total assets + (share price * shares outstanding) – book value of equity.	Compustat
Public Target	An indicator variable denoting that the target is a publicly listed firm.	Eikon
Relative Size	Ratio of deal value to total assets	Eikon/Compustat
Tender	An indicator variable denoting a tender offer in a M&A transaction.	Eikon

Table A2: Means of payment

	100% Cash	100% Stock	Cash%	100% Cash	100% Stock	Cash%
	(1)	(2)	(3)	(4)	(5)	(6)
Treated × Post	-0.031	-0.017	0.167			
	(-0.55)	(-0.68)	(0.03)			
IG × Post				-0.103^{+}	0.014	-4.382
				(-1.67)	(0.47)	(-0.62)
SG × Post				0.069	-0.061	5.243
				(0.83)	(-1.43)	(0.49)
Post	0.018	0.005	-5.437	0.021	0.003	-5.112
	(0.42)	(0.23)	(-1.16)	(0.49)	(0.17)	(-1.09)
Constant	0.699**	-0.022	15.324	0.732**	-0.034	18.709
	(2.67)	(-0.18)	(0.57)	(2.86)	(-0.27)	(0.69)
Controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
No. of obs.	1,636	1,636	1,636	1,636	1,636	1,636
Adj. R^2	0.326	0.281	0.201	0.329	0.282	0.206

NOTE. This table shows regressions analyzing the impact of the Dodd-Frank Act on means of payment in M&A transactions. We use three different measures of the payment method: 100% cash payment [columns (1) and (4)]; 100% stock payment [columns (2) and (5)]; and the percentage of cash [columns (3) and (6)]. We are interested in the pre- (2005-2009) and post-Act (2011-2015) differences between treated (rated) and control (unrated) firms in columns (1) to (3). In columns (4) to (6), we partition treated into Investment Grade (IG) and Speculative (SG) firms. The regressions include the following unreported controls: M/B, leverage, ln(sales), EBITDA/TA, cash/TA, 12-month return, Herfindahl, M&A liquidity, Relative size, Public target, Tender offer, Hostile, Cross-border, Crisis and interaction terms of crisis with treated, IG, and SG. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. Estimations drop singleton observations, resulting in a loss of 608 observations relative to Table 2. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table A3: Tests for parallel trends

Panel A: Growth rates				
	Treated	Control	Diff	T-stat
	(1)	(2)	(3)	(4)
ACQ growth	-0.016	-0.005	-0.011	-1.27
DV/AT growth	-0.006	-0.002	-0.004	-1.02
No. of obs.	3,262	7,183		

Panel B: Regression with time-trends				
	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)
Treated × Time-Trend	-0.005	-0.000	-0.010	0.001
	(-1.20)	(-0.03)	(-1.15)	(0.39)
Time-Trend	-0.011**	-0.004**	-0.003	0.000
	(-4.91)	(-4.65)	(-0.58)	(0.03)
Treated	0.028^{+}	0.001		
	(1.77)	(0.21)		
Crisis			-0.019	-0.012*
			(-1.44)	(-2.12)
Treated × Crisis			-0.007	-0.009
			(-0.27)	(-0.84)
Constant	0.124**	0.039**	0.121**	0.031**
	(14.30)	(11.27)	(14.47)	(9.25)
Firm FE	N	N	Y	Y
No. of obs.	10,966	10,966	10,850	10,850
Adj. R^2	0.004	0.002	0.085	0.056

NOTE. This table includes tests verifying that the parallel trends assumption is satisfied during the pre-treatment period (2005-2009). Panel A reports univariate annual growth rates for acquisition likelihood (ACQ) and intensity (DV/AT) between treated (rated) and control (unrated) firms along with the mean differences and t-statistics. Panel B reports regression estimates after including a time-trend variable (Year minus 2004). Columns (1) and (2) report simple time-trend regressions interacting time-trend with treated (without firm fixed effects). Columns (3) and (4) include both firm fixed effects and a crisis indicator along with its interaction with treated. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses for panel B. All variables are defined in Appendix A1.
$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table A4: Entropy balancing

	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)
Treated × Post	-0.079**	-0.027*		
	(-3.28)	(-2.44)		
IG × Post			-0.062*	-0.021^{+}
			(-2.52)	(-1.83)
SG × Post			-0.112**	-0.040**
			(-3.82)	(-3.24)
Post	0.069**	0.031**	0.069**	0.031**
	(3.21)	(3.18)	(3.20)	(3.18)
M/B_{t-1}	-0.008	-0.003	-0.007	-0.003
	(-0.97)	(-1.18)	(-0.91)	(-1.14)
$Leverage_{t-1}$	-0.200*	-0.095*	-0.195*	-0.094*
	(-2.58)	(-2.48)	(-2.51)	(-2.44)
$Ln(Sales)_{t-1}$	-0.045**	-0.016	-0.044**	-0.015
	(-2.78)	(-1.58)	(-2.76)	(-1.56)
$EBITDA/TA_{t-1}$	0.345**	0.100^{+}	0.345**	0.102*
	(3.96)	(1.96)	(3.94)	(1.97)
$Cash/TA_{t-1}$	0.370**	0.098**	0.369**	0.097**
	(3.94)	(2.89)	(3.93)	(2.86)
12-Month Return	-0.024**	-0.012**	-0.025**	-0.012**
	(-2.73)	(-3.26)	(-2.75)	(-3.25)
$Herfindahl_{t-1}$	-0.169^{+}	-0.140	-0.166^{+}	-0.139
	(-1.81)	(-1.64)	(-1.78)	(-1.62)
$M\&A\ Liquidity_{t}$	1.073**	0.596**	1.074**	0.597**
	(4.27)	(5.77)	(4.28)	(5.78)
Crisis	0.047*	0.009*	0.047*	0.009*
	(1.99)	(2.10)	(1.98)	(2.09)
Treated × Crisis	-0.075**	-0.011^{+}		
	(-2.75)	(-1.86)		
IG × Crisis			-0.065*	-0.009
			(-2.33)	(-1.58)
SG × Crisis			-0.092**	-0.014
			(-2.83)	(-1.39)
Constant	0.436**	0.169*	0.429**	0.167*
	(3.38)	(2.31)	(3.34)	(2.29)
Firm FE	Y	Y	Y	Y
No. of obs.	15,852	15,852	15,852	15,852
Adj. R^2	0.140	0.123	0.140	0.124

NOTE. We re-estimate Models (1a) and (1b) analogous to those in Table 3 after entropy balancing the control groups pre-shock (2005-2009) characteristics to be similar as those in the treated group. The pre- and post-balancing differences in covariates can be found in Internet Appendix Table IA5. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table A5: Residual effects of having a rating

	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)
Pr(Treated)	-0.091*	-0.003		
	(-2.10)	(-0.17)		
Pr(Treated) × Post	-0.018	-0.009^{+}		
	(-1.38)	(-1.73)		
Treated Residual × Post	-0.065**	-0.021**		
	(-3.33)	(-2.89)		
Pr(IG)			0.019	0.047**
			(0.42)	(2.67)
Pr(IG) × Post			-0.037*	-0.012^{+}
			(-2.34)	(-1.94)
IG Residual × Post			-0.016	0.001
			(-0.66)	(0.10)
Pr(SG)			-0.070	0.005
			(-1.25)	(0.19)
Pr(SG) × Post			0.017	-0.014
			(0.59)	(-1.32)
SG Residual × Post			-0.092**	-0.029**
			(-4.36)	(-3.82)
Post	0.009	0.010**	0.007	0.011**
	(1.35)	(3.69)	(1.08)	(3.87)
Constant	0.150**	0.090**	0.159**	0.092**
	(3.46)	(4.20)	(3.67)	(4.27)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
No. of obs.	20,810	20,810	20,810	20,810
Adj. R^2	0.113	0.083	0.113	0.083

NOTE. This table reports regressions on acquisition activity (ACQ and DV/TA). The main variables of interest are the probability of rated [Pr(Treated)] estimated from a probit model in Internet Appendix Table IA6, and the residual probability of being rated (Treated Residual). We are interested in their pre-and post-DFA impact on acquisition activity. Columns (1) and (2) include the probability of being treated and its residual for all rated firms, while columns (3) and (4) study the impact of the probability of having an investment grade (IG) and speculative grade (SG) rating and their residuals on acquisition activity. The regressions include the controls of Table 3. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table A6: Robustness to sample period choices

Panel A:	Excluding 2009 and 2010				Including All Years			
	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treated × Post	-0.035**	-0.012**			-0.035**	-0.013**		
	(-2.99)	(-2.75)			(-3.18)	(-3.21)		
IG × Post			-0.016	-0.004			-0.018	-0.006
			(-1.24)	(-0.81)			(-1.43)	(-1.20)
SG × Post			-0.066**	-0.025**			-0.061**	-0.025**
			(-3.51)	(-3.83)			(-3.52)	(-4.01)
Post	0.012$^+$	0.011**	0.012$^+$	0.010**	0.010$^+$	0.010**	0.010$^+$	0.010**
	(1.86)	(4.18)	(1.84)	(4.17)	(1.70)	(4.16)	(1.69)	(4.15)
Constant	0.150**	0.086**	0.148**	0.085**	0.142**	0.086**	0.141**	0.086**
	(3.34)	(3.93)	(3.32)	(3.91)	(3.59)	(4.38)	(3.57)	(4.37)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
No. of obs.	18,474	18,474	18,474	18,474	23,987	23,987	23,987	23,987
Adj. R^2	0.118	0.085	0.119	0.085	0.108	0.080	0.108	0.080

Panel B:	Including 2005-2007 and 2011-2015				Including 2003-2007 and 2011-2015			
	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treated × Post	-0.035**	-0.012**			-0.024*	-0.008*		
	(-2.94)	(-2.77)			(-2.23)	(-2.13)		
IG × Post			-0.016	-0.005			-0.008	-0.001
			(-1.19)	(-0.93)			(-0.73)	(-0.31)
SG × Post			-0.067**	-0.025**			-0.053**	-0.021**
			(-3.50)	(-3.72)			(-2.90)	(-3.78)
Post	0.012+	0.012**	0.012+	0.012**	0.010+	0.010**	0.010	0.010**
	(1.81)	(4.46)	(1.79)	(4.45)	(1.65)	(4.12)	(1.64)	(4.11)
Constant	0.170**	0.097**	0.168**	0.097**	0.143**	0.087**	0.142**	0.087**
	(3.53)	(4.11)	(3.51)	(4.09)	(3.75)	(4.96)	(3.73)	(4.95)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
No. of obs.	16,488	16,488	16,488	16,488	19,974	19,974	19,974	19,974
Adj. R^2	0.122	0.094	0.122	0.095	0.112	0.084	0.113	0.085

NOTE. This table shows re-estimations of the difference-in-difference models in Table 3 by altering the sample period. In Panel A, we first exclude the years 2009 and 2010 in columns (1) to (4), while including all year observations from 2005 to 2015 in columns (5) to (8). In Panel B, we exclude 2008, 2009 and 2010 in columns (1) to (4), while additionally including 2003 and 2004 in columns (5) to (8). The regressions include the controls of Table 3. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

+ $P < .10$; * $P < .05$; ** $P < .01$

Table A7: Tests allowing for rating migration

	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)
Treated × Post	-0.039**	-0.015**		
	(-3.73)	(-3.75)		
IG × Post			-0.020	-0.008+
			(-1.64)	(-1.78)
SG × Post			-0.066**	-0.024**
			(-4.21)	(-4.25)
IG			-0.009	-0.002
			(-0.44)	(-0.23)
Post	0.016**	0.013**	0.016**	0.013**
	(2.58)	(5.19)	(2.59)	(5.20)
Constant	0.180**	0.105**	0.183**	0.106**
	(4.37)	(5.12)	(4.44)	(5.16)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
No. of obs.	22,957	22,957	22,957	22,957
Adj. R^2	0.114	0.086	0.114	0.086

NOTE. This table shows difference-in-difference estimations analogous to those in Table 3 on acquisition activity (ACQ and DV/TA). In these tests, the sample selection allows for firms to migrate between investment (IG) and speculative grade (SG) ratings, during the period of 2005 to 2015 (excluding the shock year 2010). The regressions include the controls of Table 3. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

+ $P < .10$; * $P < .05$; ** $P < .01$

Table A8: Long-lasting effects of the financial crisis and Basel II impacts

	Long-lasting Crisis Effects				Excluding A- and B- Firm-years			
	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treated × Post	-0.034**	-0.012**			-0.031*	-0.010*		
	(-2.96)	(-2.83)			(-2.45)	(-2.10)		
IG × Post			-0.022	-0.006			-0.023^{+}	-0.004
			(-1.64)	(-1.17)			(-1.66)	(-0.85)
SG × Post			-0.054**	-0.023**			-0.047*	-0.022**
			(-2.93)	(-3.48)			(-2.51)	(-3.01)
Post × Crisis Return	0.014*	0.004	0.013*	0.003				
	(2.20)	(1.29)	(1.98)	(1.02)				
Crisis Return	-0.077**	-0.011	-0.085*	-0.014				
	(-2.05)	(-1.23)	(-2.33)	(-1.54)				
Post	0.022**	0.013**	0.021**	0.013**	0.012^{+}	0.011**	0.012^{+}	0.011**
	(3.00)	(4.64)	(2.89)	(4.48)	(1.93)	(4.33)	(1.93)	(4.32)
Constant	0.141**	0.085**	0.135**	0.082**	0.136**	0.082**	0.136**	0.082**
	(3.14)	(4.04)	(3.02)	(3.91)	(3.23)	(3.85)	(3.23)	(3.84)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
No. of obs.	20,636	20,636	20,636	20,636	19,630	19,630	19,630	19,630
Adj. R^2	0.115	0.086	0.115	0.086	0.113	0.080	0.113	0.080

NOTE. This table reports difference-in-difference estimates around the Dodd-Frank Act in 2010 to analyze long-lasting impacts of the great financial crisis in columns (1) to (4), and the direct impact of Basel II in columns (5) to (8), by excluding firms rated A- and B- from the estimations. The dependent variables are acquisition likelihood (ACQ) and intensity (DV/TA). Columns (1) and (2), and (5) and (6) include tests for treated (rated) relative to control (unrated) firms, while columns (3) and (4), and (7) and (8) partition treated firms into investment grade (IG) and speculative grade (SG) relative to a control sample. Crisis Return is the firm's stock market return between 1.7.2007 to 31.12.2009. The regressions include the controls of Table 3. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Internet appendices

Table IA1: Inclusion of different fixed effects, controls and clustering

	Firm and Year FE				No Crisis interaction				Cluster Firm and Year			
	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}	ACQ_t	DV_t/TA_{t-1}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treated × Post	-0.031**	-0.012**			-0.021*	-0.009**			-0.031**	-0.012**		
	(-3.05)	(-3.13)			(-2.33)	(-2.84)			(-4.13)	(-3.46)		
IG × Post			-0.014	-0.004			-0.009	-0.003			-0.014	-0.004
			(-1.17)	(-0.98)			(-0.80)	(-0.81)			(-1.41)	(-1.33)
SG × Post			-0.058**	-0.024**			-0.041**	-0.019**			-0.058**	-0.024**
			(-3.61)	(-4.03)			(-2.92)	(-3.87)			(-3.80)	(-4.81)
Post	0.009	-0.003	0.008	-0.003	0.015**	0.010**	0.015**	0.010**	0.009	-0.003	0.008	-0.003
	(0.36)	(-0.28)	(0.34)	(-0.31)	(3.36)	(5.67)	(3.36)	(5.67)	(0.74)	(-0.56)	(0.69)	(-0.60)
Constant	0.170**	0.113**	0.169**	0.113**	0.167**	0.093**	0.167**	0.093**	0.170*	0.113**	0.169*	0.113**
	(4.03)	(5.36)	(4.00)	(5.34)	(4.17)	(4.66)	(4.17)	(4.65)	(2.99)	(3.67)	(2.99)	(3.65)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y
No. of obs.	23,987	23,987	23,987	23,987	23,987	23,987	23,987	23,987	23,987	23,987	23,987	23,987
Adj. R^2	0.108	0.080	0.109	0.081	0.108	0.080	0.108	0.080	0.108	0.080	0.109	0.081

NOTE. This table re-estimates the difference-in-difference regressions of Table 3 allowing for small adjustments to the fixed effects and clustering. Columns (1) to (4) include both firm and year fixed effects with t-stats clustered at the firm level. Columns (5) to (8) include firm fixed effects with t-stats clustered at the firm level but without controlling for crisis and its interaction with treated. Columns (9) to (12) include firm and year fixed effects with t-stats clustered at the firm and year level. The regressions include the controls of Table 3. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table IA2: Industry x year fixed effects

	(1) ACQ_t	(2) DV_t/TA_{t-1}	(3) ACQ_t	(4) DV_t/TA_{t-1}
Treated	0.039**	0.016**		
	(3.56)	(3.96)		
Treated x Post	-0.023*	-0.011*		
	(-2.14)	(-2.41)		
IG			0.008	0.007
			(0.57)	(1.47)
SG			0.066**	0.025**
			(4.60)	(4.47)
IG x Post			-0.008	-0.002
			(-0.60)	(-0.46)
SG x Post			-0.038*	-0.020**
			(-2.34)	(-3.35)
Constant	0.029*	0.013*	0.023^{+}	0.012*
	(2.19)	(2.49)	(1.77)	(2.37)
Controls	Y	Y	Y	Y
FF48 x Year FE	Y	Y	Y	Y
No. of obs.	20,810	20,810	20,810	20,810
Adj. R^2	0.029	0.026	0.030	0.026

NOTE. This table re-estimates the difference-in-difference regressions of Table 3 allowing for using less granular fixed effects on the industry x year. The regressions include the controls of Table 3. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table IA3: Robustness tests of CAR estimates

	CAR -5/+5 (1)	CAR -5/+5 (2)	CAR -5/+5 (3)	CAR -5/+5 (4)	CAR -5/+5 (5)	FF CAR -3/+3 (6)	FF CAR -3/+3 (7)	FF CAR -3/+3 (8)	FF CAR -3/+3 (9)	FF CAR -3/+3 (10)
Treated × Post	0.0301*					0.0196^{+}				
	(2.368)					(1.810)				
IG × Post		0.0159					0.0084			
		(1.230)					(0.742)			
SG × Post		0.0496*					0.0348*			
		(2.379)					(2.043)			
PoM × Post			0.0402**	0.0142	0.0868**			0.0241^{+}	-0.0019	0.0694**
			(2.648)	(0.994)	(3.119)			(1.826)	(-0.148)	(3.033)
Neutral × Post			0.0171	0.0194	0.0112			0.0135	0.0221	-0.0025
			(1.015)	(0.952)	(0.480)			(0.965)	(1.239)	(-0.140)
PoM			-0.0110	0.0135	-0.0492*			0.0034	0.0198	-0.0267
			(-0.691)	(0.833)	(-2.121)			(0.299)	(1.524)	(-1.576)
Post	0.0003	0.0010	0.0006	0.0007	0.0024	0.0075	0.0081	0.0076	0.0088	0.0096
	(0.027)	(0.088)	(0.054)	(0.059)	(0.210)	(0.784)	(0.846)	(0.791)	(0.884)	(0.957)
Constant	0.1281^{+}	0.1353*	0.1323*	0.1241^{+}	0.1479*	0.1066^{+}	0.1129^{+}	0.1056^{+}	0.1115^{+}	0.1214^{+}
	(1.930)	(2.032)	(1.980)	(1.748)	(2.169)	(1.717)	(1.815)	(1.701)	(1.667)	(1.914)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of obs.	1,636	1,636	1,636	1,406	1,371	1,636	1,636	1,636	1,406	1,371
Adj. R^2	0.107	0.108	0.106	0.118	0.116	0.083	0.084	0.082	0.077	0.082

NOTE. This table examines acquisition quality before (2005-2009) and after (2011-2015) the Dodd-Frank Act. The acquirer cumulative abnormal return (CAR) is calculated using either -5 to +5 [columns (1) to (5)] or -3 to +3 [columns (6) to (10)] event window around the acquisition announcement day. The first five columns use a market model to estimate the expected return parameters, while the latter five use a Fama-French three-factor model. Columns (1) and (6) include treated (rated) and control (unrated) firms, while columns (2) and (7) partition treated firms into investment grade (IG) and speculative grade (SG) firms. Columns (3) and (8) partition treated into firms with a plus or minus (PoM) modifier attached to the rating and firms without a rating modifier (Neutral). Columns (4), (5), (9) and (10) include PoM and Neutral ratings for IG and SG, respectively. The regressions include the following unreported controls: M/B, leverage, ln(sales), EBITDA/TA, cash/TA, 12-month return, Herfindahl, M&A liquidity, Relative size, 100% cash, 100% stock, Public target, Tender offer, Hostile, Cross-border, Crisis and interaction terms of crisis with treated, IG, and SG. Please note that the main effect of Neutral is excluded from the regression due to that Neutral + PoM can fully explain a firm's treated status. Heteroscedasticity robust t-stats clustered on firm are reported in parentheses. Estimations drop singleton observations, resulting in a loss of 608 observations relative to Table 2. All variables are defined in Appendix A1.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table IA4: PoM tests for post-M&A upgrade and downgrade likelihoods

	PoM						Neutral					
Panel A: All Treated												
	Before DFA			After DFA			Before DFA			After DFA		
	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff
Upgrade	0.159	0.134	0.025	0.203	0.299	-0.096**	0.143	0.193	-0.050	0.161	0.192	-0.031
Downgrade	0.210	0.187	0.023	0.131	0.116	0.015	0.171	0.131	0.040	0.143	0.115	0.028
No. of obs.	1,860	209		1,294	147		1,120	145		894	104	
Panel B: Investment Grade												
	Before DFA			After DFA			Before DFA			After DFA		
	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff
Upgrade	0.144	0.122	0.022	0.147	0.172	-0.025	0.127	0.159	-0.032	0.106	0.081	0.025
Downgrade	0.169	0.178	-0.009	0.135	0.149	-0.014	0.141	0.110	0.031	0.138	0.129	0.009
No. of obs.	967	90		762	87		679	82		564	62	
Panel C: Speculative Grade												
	Before DFA			After DFA			Before DFA			After DFA		
	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff	Non-Acq	Acq	Diff
Upgrade	0.176	0.143	0.033	0.284	0.483	-0.199**	0.168	0.238	-0.070	0.255	0.357	-0.102
Downgrade	0.255	0.193	0.062	0.126	0.067	0.059	0.215	0.159	0.056	0.152	0.095	0.057
No. of obs.	893	119		532	60		441	63		330	42	

NOTE. This table shows univariate differences in upgrade and downgrade likelihoods between non-acquirers (Non-Acq) and acquirers (Acq) among treated (rated) firms before (2005-2009) and after (2011-2015) the Dodd-Frank Act (DFA). PoM includes tests for firms whose credit ratings include a plus or a minus modifier, while neutral includes tests for firms without a credit rating modifier. We measure Upgrade (Downgrade) as having a higher (lower) rating at *t+1* compared to *t-1*. Panel A includes all treated firms, Panel B only investment grade firms, while Panel C only includes speculative grade firms.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$

Table IA5: Covariates pre- and post-entropy balancing

	Pre-weighting			Post-weighting		
Variable	Rated	Unrated	Diff	Rated	Unrated	Diff
M/B 2004	1.801	2.304	-0.503	1.801	1.802	-0.001
M/B 2005	1.811	2.264	-0.453	1.811	1.813	-0.002
M/B 2006	1.852	2.205	-0.353	1.852	1.851	0.001
M/B 2007	1.822	2.058	-0.236	1.822	1.820	0.002
M/B 2008	1.411	1.431	-0.020	1.411	1.410	0.001
Leverage 2004	0.184	0.077	0.107	0.184	0.183	0.001
Leverage 2005	0.178	0.076	0.102	0.178	0.178	0.001
Leverage 2006	0.171	0.076	0.095	0.171	0.171	0.001
Leverage 2007	0.189	0.086	0.103	0.189	0.189	0.000
Leverage 2008	0.259	0.126	0.134	0.259	0.259	0.000
Ln(Sales) 2004	8.362	5.200	3.162	8.362	8.344	0.018
Ln(Sales) 2005	8.462	5.331	3.131	8.462	8.445	0.017
Ln(Sales) 2006	8.559	5.467	3.092	8.559	8.541	0.018
Ln(Sales) 2007	8.638	5.570	3.068	8.638	8.620	0.018
Ln(Sales) 2008	8.693	5.623	3.070	8.693	8.674	0.019
EBITDA/TA 2004	0.148	0.111	0.038	0.148	0.148	0.000
EBITDA/TA 2005	0.154	0.111	0.043	0.154	0.153	0.000
EBITDA/TA 2006	0.158	0.106	0.052	0.158	0.158	0.000
EBITDA/TA 2007	0.152	0.104	0.049	0.152	0.152	0.001
EBITDA/TA 2008	0.148	0.093	0.054	0.148	0.147	0.000
Cash/TA 2004	0.093	0.247	-0.154	0.093	0.094	-0.001
Cash/TA 2005	0.092	0.243	-0.152	0.092	0.092	-0.001
Cash/TA 2006	0.085	0.233	-0.148	0.085	0.086	-0.001
Cash/TA 2007	0.083	0.222	-0.139	0.083	0.083	-0.001
Cash/TA 2008	0.084	0.212	-0.127	0.084	0.085	-0.001
12-month Return 2004	0.254	0.257	-0.003	0.254	0.255	0.000
12-month Return 2005	0.114	0.096	0.018	0.114	0.114	0.001
12-month Return 2006	0.225	0.222	0.003	0.225	0.224	0.001
12-month Return 2007	0.122	0.069	0.053	0.122	0.121	0.001
12-month Return 2008	-0.378	-0.407	0.029	-0.378	-0.378	0.000

M&A Liquidity 2005	0.033	0.039	-0.006	0.033	0.033	0.000
M&A Liquidity 2006	0.024	0.033	-0.009	0.024	0.024	0.000
M&A Liquidity 2007	0.025	0.036	-0.011	0.025	0.025	0.000
M&A Liquidity 2008	0.012	0.014	-0.002	0.012	0.012	0.000
M&A Liquidity 2009	0.020	0.021	-0.001	0.020	0.020	0.000
Herfindahl 2004	0.216	0.189	0.027	0.216	0.216	0.000
Herfindahl 2005	0.219	0.191	0.028	0.219	0.219	0.000
Herfindahl 2006	0.219	0.192	0.027	0.219	0.219	0.000
Herfindahl 2007	0.227	0.201	0.026	0.227	0.227	0.000
Herfindahl 2008	0.239	0.208	0.030	0.239	0.239	0.000
Firms	507	1,217		507	1,217	

NOTE. This table shows firm and industry mean characteristics pre- and post-entropy balancing. We balance control firms' covariates for all years during the pre-DFA period to match those of the treated (rated) sample, for example, M/B for every year during 2004 to 2008 constitutes one observation per firm. The table shows the variable name and the associated year (as we use lagged covariates in our analysis except for M&A liquidity).

Table IA6: First stage probit model of residual rating tests

	Rated	IG	SG
	(1)	(2)	(3)
M/B $_{t-1}$	0.019	0.088**	-0.075**
	(1.03)	(3.83)	(-3.56)
Leverage$_{t-1}$	2.769**	-2.219**	3.559**
	(27.43)	(-12.83)	(37.03)
Ln(Sales) $_{t-1}$	0.532**	0.726**	0.148**
	(47.31)	(45.20)	(16.10)
EBITDA/TA $_{t-1}$	0.335	0.466	0.689**
	(1.62)	(1.56)	(3.72)
Cash/TA $_{t-1}$	-0.987**	-2.478**	0.012
	(-7.30)	(-12.40)	(0.10)
12-Month Return	0.169**	-0.104*	0.246**
	(5.38)	(-2.14)	(8.60)
Herfindahl $_{t-1}$	-0.574**	-0.228*	-0.429**
	(-6.51)	(-2.14)	(-5.12)
M&A Liquidity $_{t}$	2.289**	1.659**	1.418**
	(7.07)	(4.11)	(4.63)
Proportion Rated	2.139**	0.929**	1.373**
	(26.81)	(10.09)	(19.35)
S&P500	1.088**	1.029**	-0.689**
	(22.09)	(24.37)	(-15.10)
NYSE	0.419**	0.575**	0.228**
	(14.29)	(14.20)	(7.59)
Constant	-5.710**	-7.048**	-3.307**
	(-55.89)	(-46.57)	(-39.03)

No. of obs.	20,810	20,810	20,810
Pseudo R^2	0.595	0.650	0.302

NOTE. This table reports probit estimates on being treated [column (1)], having an investment grade (IG) rating [column (2)] and having a speculative grade (SG) rating [column (3)]. Conditional probabilities are used for estimating the probability of having a rating and the residual probability of having a rating in Table A5. All variables are defined as in Appendix A1. Heteroscedasticity robust t-stats clustered on firm in parentheses.

$^{+}$ $P < .10$; * $P < .05$; ** $P < .01$