Peer Firms' Credit Rating Changes and Corporate Financing

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Abstract

We find that firms reduce net debt issuance (*NDI*, hereafter) when industry peers with the same credit rating were downgraded in the previous year, as opposed to an average *NDI increase* among all firms. This finding is consistent with the considerations of competition and contagion associated with relative strengths and weaknesses in credit quality. The peer effect on NDI reduction is ubiquitous across both speculative- and investment-grade firms, but is particularly strong for small size firms with speculative-grade ratings, and firms operating in concentrated industries, and in times when the economy is in expansion or outside financial crises. We also find that firms reduce leverage when their ratings are lower than the industry average, and that peer firms' rating effects remain strong even when controlling for the lower-than-average effect.

JEL Classification: G2, G32
Keywords: Corporate financing; Peer firms; Credit ratings; Upgrades; Downgrades

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Peer Firms' Credit Rating Changes and Corporate Financing

Abstract

We find that firms reduce net debt issuance (*NDI*, hereafter) when industry peers with the same credit rating were downgraded in the previous year, as opposed to an average *NDI increase* among all firms. This finding is consistent with the considerations of competition and contagion associated with relative strengths and weaknesses in credit quality. The peer effect on NDI reduction is ubiquitous across both speculative- and investment-grade firms, but is particularly strong for small size firms with speculative-grade ratings, and firms operating in concentrated industries, and in times when the economy is in expansion or outside financial crises. We also find that firms reduce leverage when their ratings are lower than the industry average, and that peer firms' rating effects remain strong even when controlling for the lower-than-average effect.

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1. Introduction

Recent research demonstrates the importance of peer firm effects. Graham and Harvey (2001) document that many chief financial officers (CFOs) consider peer firms' financing decisions important in making their own financing decisions. Thierry and Fresard (2014) find that corporate investments increase with the valuation of peers. This peer effect also exists in decisions regarding corporate executive compensation (Bizjak, Lemmon, and Naveen 2008) and cross-border mergers and acquisitions (Francis et al. 2014). This paper contributes to the literature on peer effects by examining whether peer firms' changes in credit ratings affect a focal firm's financing decisions.

A number of studies demonstrate that credit ratings contain incremental information not reflected in firm characteristics (see, e.g., Millon and Thakor (1985); Elton et al. (2001); Boot, Milbourn, and Schmeits (2006)).[1] This is because credit rating agencies—which specialize in gathering and evaluating information—may receive significant private information about the firm being assessed, and hence, can provide more reliable measures of a firm's creditworthiness (Kisgen 2006, 2009). A firm's credit rating downgrade or upgrade can influence other firms in the same industry. Two well-known examples of credit rating downgrades include General Motors and Ford, both of which had the same BBB- rating as of November 2004; both were later downgraded to "junk category" by S&P in May 2005, which generated significant price movements in the automotive sector (Acharya, Schaefer, and Zhang 2015).

[1] A firm's credit rating is one of the most important factors affecting corporate debt policies (Graham and Harvey 2001). Further, firms with a debt credit rating have significantly more leverage (Faulkender and Petersen 2006). A credit rating upgrade or downgrade leads to adjustments in stock and bond prices (e.g., Hand, Holthausen, and Leftwich (1992); Kliger and Sarig (2000)) and affects the firm's access to the commercial paper market, disclosure requirements, and its third-party relationships (Kisgen 2006). To the extent that different credit rating levels are associated with different costs and benefits, a change in a firm's credit rating may influence its capital structure (Kisgen 2006, 2009).

Firms with higher credit quality enjoy a lower cost of debt capital than their peers. Thus, we posit that firms are likely to consider their peers' credit rating changes when making financing decisions. In this paper, we study several questions. First, do changes in peer firms' credit ratings motivate and affect the financing activities of firms in the same industry? If so, what financing actions do these firms take? Second, does this peer firm effect vary with firm characteristics, industry competition environments, and economic conditions? To our knowledge, this paper is the first to examine the important effects of peer firms' credit rating changes on a firm's corporate financing.

Our study offers new insights into corporate financing motives as well as firms' related actions when they observe changes in peer firms' credit ratings. We focus on the revised outcome of a firm's credit quality assessment relative to its peers, which is a decision made by a third party and not by a firm or its peer firms. Therefore, this paper provides a new perspective for the literature on peer effects. We argue from the contagion and competition consideration perspectives associated with the relative strength or weakness of firms' credit quality and document strong evidence that peer firms' credit rating changes affect a firm's financing decisions. Specifically, we demonstrate that a firm that has not been downgraded in one year—but has observed its peers being downgraded—changes its net debt issuance in the subsequent year.

We also consider a mechanism by which peer effects are transmitted, which stems from firms' attempts to avoid the contagion effect and gain an advantage from the relative strength in the credit market. Several papers develop a link between a firm's financial distress and industry peers' outcomes. For example, Lang and Stulz (1992) analyze the contagion effect of peer firms' bankruptcy announcements as well as the competition channel that benefits the bankrupt firms'

competitors. Hertzel and Officer (2012) reveal that a firm's loan pricing is affected by industry-rival firms' financial distress, and that loan spreads widen surrounding industry bankruptcy waves.

Prior studies adopt bankruptcy filings that have much more limited occurrences. For example, Lang and Stulz (1992) use 59 bankruptcy filings, and Jorion and Zhang (2007) use 272 filings as the key right-hand side variable. Our use of credit rating changes, which is a measure of changes in default probability, offers two advantages. First, it allows us a larger sample size; our sample includes 5,709 credit rating change events, with 3,277 downgrades and 2,432 upgrades. Second, credit rating changes provide a more granular variation in credit quality and the probability of financial distress. This enables us to observe firm financing changes as peers' credit quality gradually improves or worsens, but not to the point of bankruptcy.

Importantly, we show that the effect of peer firms' rating changes is distinct from and uncaptured by firms' mimicking behavior—in which a firm follows its peer firms' financing actions—as advocated by Leary and Roberts (2014). If firms learn from their peers' financing actions, then when a rating change causes a firm to change financing activities, other firms may follow suit. All our analyses control for the net debt issuance of the upgraded and downgraded peer firms. It is also possible that a common industry shock may cause an overall rating change within an industry, which could potentially drive a wave of industry-wide leveraging or deleveraging. Thus, we further control for the effect of industry-wide credit rating changes and exclude the focal firm's observation, which essentially controls for the magnitude and direction of common shocks. We find that the effect of peer firms' credit rating downgrades remains strong, and thus, our findings indicate a distinct externality effect of peer firms.

We develop and test our hypotheses on the ways such an externality effect of peer firms' rating upgrades or downgrades may exert its influences on the firm's financing activities in the

next year. We identify firms as peers if they are in the same industry and have an identical credit rating in a given year. The rating change effects we analyze pertain to changes in financing in a given year of a firm whose peers' credit ratings were either upgraded or downgraded in the previous year, but whose own credit rating remained unchanged.

We use a sample of U.S. firms over the period 1985-2014 and find strong evidence that peer firms' credit rating downgrades are an important determinant of a firm's financing decisions. Such firms, on average, *reduce* their net debt issuance by 1.67% relative to total assets. In our sample, this translates into an average annual reduction in net debt issuance of 122.8 million dollars, given that the sample firms' average total assets are 7.352 billion dollars. This 1.67% *reduction* in the net debt issuance is economically significant from two perspectives: i) the direction of such firms' financing actions is opposite to the average *NDI increase* of 2.4% in our sample (Table 3), and ii) such firms' average decrease in *NDI* is large relative to the average *NDI* of all our sample firms. In contrast, firms witnessing peer firms' rating upgrades do not exhibit significant changes in their *NDI*.

We also find that firms reduce their net debt issuance when peer firms' ratings are downgraded, but do not significantly change their equity financing. Moreover, the reduction in NDI is primarily due to decreased debt issuance, which in turn, mainly comes from the reduction in the long-term debt. The peer effect we document is prevalent across firms and over time. Further, the peer effect in reducing net debt issuance is stronger for firms in concentrated industries than for those in competitive industries, and is also stronger when the economy is in expansion than in recession.

Moreover, we find that firms in the highest rating levels among investment-grade categories (with S&P ratings of AA- or higher) do not react to peer firms' rating downgrades. These high

credit quality firms typically maintain strong financial positions and are more financially flexible, which renders them more stable in their financial activities. We also find a significant decrease in the net debt issuances among investment-grade firms rated between A+ and A-. This finding is important because the majority of credit rating upgrades and downgrades occur to investment-grade firms (reported in Appendix, Table 1). Furthermore, firms with high speculative grades of BB+ and BB—those with credit ratings less than the investment grade threshold—exhibit significant decreases in net debt issuances when their peer firms are downgraded.

Next, we ask the following questions: If a firm's credit rating is lower than the industry average, would the firm be prone to reducing its leverage to improve its rating? How does a below-average rating exert pressure on the firm when peer firms' ratings are upgraded or downgraded? We first provide evidence of a significant below-average effect, in that an industry's average credit rating in the previous year serves as a reference point for all firms in that industry. When a firm's rating is below this reference point, it tends to reduce its net debt issuance by 5.18%, on average. Moreover, the *NDI* reduction, given peer firms' rating changes, is distinct from the effect of firms having a below-average rating. A firm with downgraded peers reduces its net debt issuance by 1.76%, even after controlling for the lower-than-average effect.

The remainder of this paper is organized as follows: Section 2 develops our hypotheses. Section 3 describes our ratings data and explains this study's sample and methodology. Section 4 discusses summary statistics and reports our main results on the effects of peer firms' rating changes on firms' financing policies. Section 5 conducts cross-sectional analyses to examine whether heterogeneous variations exist in the peer rating effects. Section 6 performs additional analyses to determine whether an interplay exists between the peer and below-average credit quality effects, and whether the peer effect varies over time. Section 7 concludes.

2. Hypothesis Development

Firms with the same credit ratings in the same industry are perceived as having a similar credit quality. A credit rating downgrade reflects an increase in a firm's probability of default, which may negatively affect industry peers through two channels. First, the business relations channel results in a counterparty risk (e.g., Jarrow and Yu (2001); Jorion and Zhang (2009)). Second, when negative shocks emerge, an information channel leads investors to revise their required risk premiums for peers, even if these peers have no business relations with the downgraded firm. Lang and Stulz (1992) find that negative news announcements of Chapter 11 filings by bankrupt firms result in declines in stock prices of the firm's competitors. Similarly, Ferris, Jayaraman, and Makhija (1997) show that bankruptcy announcements generate a dominant contagion effect.

Jorion and Zhang (2007) also find evidence of contagion effects for Chapter 11 bankruptcies, while Jorion and Zhang (2009) show a link between a firm's financial distress and its creditors. A firm's financial distress also negatively impacts its suppliers' stock prices (Hertzel, Li, Officer, and Rodgers 2008). Further, Akhigbe, Madura, and Whyte (1997) document that peer firm bond-rating downgrades impact share prices. Thus, we posit that cautious managers will refrain from issuing more net debt to safeguard the firm from this contagion effect.

On the other hand, peer firms' downgraded credit ratings provide an opportunity for a firm to gain competitive advantages over its peers through the former's higher credit quality, resulting in lower discrete costs (Kisgen 2006), better access to the debt market (Hahn 1993), and higher market equity value (Hand, Holthausen, and Leftwich 1992). In contrast, the downgraded firm may experience more difficulty in gaining financing with debt (Kisgen 2006). Grinblatt and Titman (2002) and Kisgen (2006) provide compelling discussions on the clientele effect, in that

institutional investors often are restricted by statutory constraints and cannot invest in debt securities with credit rating levels lower than a certain threshold.

Lang and Stulz (1992) also consider the competition channel, by which a bankruptcy announcement could result in the redistribution of wealth from the bankrupt firm to its competitors. Extant theory and empirical evidence do not offer a clear ex-ante direction for firms' actions when a peer firm's credit rating is downgraded. We posit that the competition effect can potentially drive firms to reduce their net debt issuances to maintain higher credit ratings than their downgraded competitors. Our arguments as discussed in the development of Hypothesis 4 and our results reported in Table 9 indicate that firms in concentrated industries reduce their net debt issuance much more aggressively than firms in competitive industries when their peer firms experience credit rating downgrades.

The above evidence, taken together, suggests that, in the light of peer firms' credit rating downgrades, a firm may want to safeguard itself from the contagion effect and seize the benefit from the competition effect. Thus, we form and test our first hypothesis that peer firms' credit rating downgrades lead firms to reduce their debt financing.

Hypothesis 1 (H1): *Peer firms' credit rating downgrades lead firms to reduce net debt issuance.*

Conversely, extant empirical evidence shows that a firm's credit rating upgrade contains little incremental information due to the relatively transparent nature of firms' positive news. Prior studies, in general, do not find a significant market response to bond upgrades (e.g., Holthausen and Leftwich (1986); Hand, Holthausen, and Leftwich (1992); Goh and Ederington (1993)). The evidence suggests that peer firms' rating upgrades are not perceived as a significant information signal. Thus, we posit that peer firms' credit rating upgrades do not lead to any significant

adjustments in financing activities. This leads to our second hypothesis in the form of a null hypothesis, as follows:

Hypothesis 2 (H2): *Peer firms' credit rating upgrades do not lead firms to change net debt issuance.*

Our credit ratings are based on a debt issuer's rating, which places more weight on long-term debt than on short-term debt. Consequently, if a firm wants to maintain its rating level when peer firms' ratings are downgraded, reducing long-term debt would be more effective than reducing short-term debt. Additionally, long-term debt-issuance activities are the most relevant to a firm's capital structure (Welch 2004). Therefore, we formulate our third hypothesis:

Hypothesis 3 (H3): *The effect of peer firms' credit rating downgrades on a firm's net debt reduction mainly works through long-term debt.*

All else being equal, firms in concentrated industries would experience more pressure than firms in competitive industries to maintain good credit ratings when peer firms experience rating changes. This is due to the relatively smaller number of firms within a concentrated industry, in which one or more firms' rating upgrades (or downgrade) directly results in a competitive disadvantage (or advantage) for other firms. Consequently, these firms would reduce their net debt issuance more aggressively than firms in competitive industries do.

Similarly, small firms would also experience more pressure than large firms to maintain good existing credit quality when peer firms' ratings are downgraded. This is because smaller firms are more vulnerable, and it is relatively costlier for them to secure finance than for larger firms if they lose their existing credit rating status. Badoer and James (2016) report that an issue's term to maturity increases with the issue size. Hence, small firms would reduce their net debt issuance more aggressively than large firms. These discussions lead to our last hypothesis:

Hypothesis 4 (H4): *Peer firms' credit rating downgrades have a more pronounced effect on net debt issuance for firms in concentrated industries and small firms.*

Our study is also related to capital structure literature. The implicit assumption of the traditional theories, to a large extent, has been that a firm's leverage is based on considerations of its own financing policy, firm and industry characteristics (e.g., Titman (1984); MacKay and Phillips (2005)) and market frictions.[2] In the traditional theories, the role of peer firms' characteristics and actions is either unimportant or works through some firm-level factors, or is captured by market frictions surrounding the sources of capital. For example, Leary and Roberts (2005) demonstrate that adjustment costs dictate the speed at which the corporate capital structure responds to leverage shocks. These studies, however, do not consider the between-firm effects within the same industry.

3. Sample and Methodology

3.1 Sample construction

Our sample covers all firms with a credit rating in Compustat at the beginning of a year over the period from 1985—when ratings data first became available in Compustat—to 2014. From the Compustat Ratings File, we collect annual data on firm credit ratings issued by Standard and Poor's

[2] The trade-off theory of capital structure argues that a firm's optimal leverage ratio is determined by trading off between the benefits and costs of debt.[2] Earlier research considers corporate taxes (Modigliani and Miller 1963), costs of financial distress (Jensen and Meckling 1976; Myers 1977), agency costs and benefits in relation to conflicts of interest between shareholders and managers (Harris and Raviv 1990; Stulz 1990), and between equity holders and debtholders (e.g., Jensen (1986)). Other studies analyze information asymmetry between managers and outside investors and posit the signaling effect of debt (Ross 1977; Leland and Pyle 1977; Noe 1988), or propose the pecking-order theory (Myers 1984; Myers and Majluf 1984; Leary and Roberts 2010). Kisgen (2006, 2009) investigates the effect of a firm's own credit rating on its capital structure. Lemmon, Roberts, and Zender (2008) show that a firm's capital structure is persistent. Baker and Wurgler (2002) posit that firms time the market when issuing equity. Dittmar and Thakor (2007) assert that issuance decisions are driven by what the manager thinks his firm is worth. Other research relates product market strategies and industry characteristics to the capital structure. Brander and Lewis (1986) show that, due to the limited liability of equity holders, firms choose positive debt levels to pursue aggressive output strategies. Maksimovic (1988) derives debt capacity as a function of industry and firm characteristics.

(S&P) for all rated firms, as in Baghai, Servaes, and Tamayo (2014) and Kisgen (2006). Kedia, Rajgopal, and Zhou (2017) show that, relative to Moody's, the S&P's ratings are less subject to conflicts of interest related to the ownership of stable, large shareholders. We use the S&P long-term domestic *issuer* credit ratings (Compustat data item SPLTICRM), which reflect the opinion of an issuer's overall creditworthiness. We construct our peer-rating dummy variables by using the ratings at the start of a fiscal year.

S&P issues 22 alphanumeric ratings, listed from the highest creditworthiness category to the lowest: AAA, AA+, AA, AA−, A+, A, A−, BBB+, BBB, BBB−, BB+, BB, BB−, B+, B, B−, CCC+, CCC, CCC−, CC, C, D, and SD (Selective Default). Firms rated BBB− and above are typically considered as investment grade, and those rated below BBB− are speculative grade. For the purpose of estimating our regression models, we transform the S&P alphanumeric rating codes into ordinal numerical codes (e.g., Baghai, Servaes, and Tamayo (2014); Dimitrov, Palia, and Tang (2015)). Our numerical transformation assigns a value of 22 to AAA, 21 to AA+, 20 to AA, …, and 1 to D and SD.

We match the ratings data with firm-level annual financial statement data obtained from Compustat to arrive at one observation per firm-year. As is common in prior literature on capital structure, we exclude from the sample utility firms as they are highly regulated, and financial firms because regulations impose specific restrictions, such as the minimum capital requirement for banks and investor insurance for insurance firms, on their asset and liability structures. Following Kisgen (2006), we repeat our analyses by including utility firms and our results (not shown for brevity reasons) remain robust. We exclude firm-years that have missing observations for calculating variables for the empirical analyses. The final sample consists of 3,135 firms with 26,588 firm-year observations, among which 11,584 are classified as investment grade and 15,004

as speculative grade. In this study, we refer to investment-grade ratings as all ratings higher than or equal to BBB-, and speculative-grade ratings as all ratings lower than or equal to BB+. As detailed in the Appendix, Table 1, our sample consists of 5,709 credit rating change events, of which 3,277 are downgrades and 2,432 are upgrades.

3.2 Variables used in the firm-level regression

Our hypotheses predict future financing changes of a firm when peer firms experience credit rating changes. We estimate a model for a firm's financing decisions following its peer firms' rating changes. The measures of a firm's financing activities are computed for the subsequent 12 months following the peer credit rating changes. We use net debt issuance (*NDI*) to capture firms' financing activities that are mainly reflected in *cash flow items,* rather than the change in the long-term debt ratio.[3] The main dependent variable, net debt issuance, in the regressions measures net long-term debt minus net equity issued each year and is defined as:[4]

$$NDI_{i,t} = \Delta LTD_{i,t} - \Delta Equity_{i,t}$$

where $\Delta LTD_{i,t}$ is long-term debt issuance (Compustat data item DLTISY) minus long-term debt reduction (Compustat data item DLTRY) for firm *i* from year *t*–1 to *t*, scaled by total assets in the previous year (Compustat item AT). The last letter "Y" in the Compustat data items indicates that

[3] Kisgen (2006, footnote 11 on page 1047) gives a detailed explanation on the use of net debt issuance, which we quote here: "*'For all net issuance measures, I use the direct cash flow variables as opposed to changes in balance sheet levels. Balance sheet level changes can include noncash changes, such as accretion of debt that was originally issued at a discount, changes from new translated balances of foreign debt due to changes in exchange rates, or marking to market hedging instruments that can be included with debt if related to the debt instrument. The cash flow statement variables are more direct measures of the specific issuance and reduction decision activity that I try to measure.".*

[4] We also use an alternative definition of net debt issuance that includes changes in current debt, according to Kisgen (2006), as net debt $\Delta Debt_{i,t}$ minus net equity issued each year, where $\Delta Debt_{i,t}$ is long-term debt issuance (Compustat data item DLTISY) minus long-term debt reduction (Compustat data item DLTRY) plus changes in current debt (Compustat data item DLCCHY) for firm *i* from year *t*–1 to *t*, scaled by total assets in the previous year (Compustat item AT). All our results, available upon request, are quantitatively similar, and do not change our conclusions.

the variable is year-to-date. $\Delta Equity_{i,t}$ is sales of common and preferred stocks (Compustat data item SSTKY) minus purchases of common and preferred stocks (data item PRSTKCY) for firm *i* from year *t*–1 to *t*, scaled by total assets in the previous year. We further separately examine the effects on long-term and short-term debt. We define $\Delta STD_{i,t}$ as the ratio of the change in short-term debt (Compustat data item DLCCHY) to total assets in the previous year.

We construct two dummy variables pertaining to peer firms' credit rating changes—the peer rating upgrade ($UG^{P}_{i,k,t-1}$) and downgrade ($DG^{P}_{i,k,t-1}$)—for each firm at the beginning of each fiscal year *t*. Specifically, the peer upgrade dummy of firm *i* within industry *k* in year *t*–1 takes a value of one ($UG^{P}_{i,k,t-1} = 1$) if the firm is not upgraded or downgraded in year *t* – 1 from year *t* – 2, and if there is one or more same-industry peer firms (indexed by *j*) with whom firm *i* shared the same credit rating (*CR*) in year *t*–2, that are upgraded in year *t*–1.[5,6] Mathematically, we have

$$UG^{P}_{i,k,t-1} = 1, if\ CR_{i,k,t-2} = CR_{j,k,t-2}, CR_{i,k,t-1} = CR_{i,k,t-2},$$
$$and\ CR_{j,k,t-1} > CR_{j,k,t-2}\ for\ j \neq i\ and\ j \in (1,2,\dots,l|l \geq 1);$$
$$= 0, otherwise.$$

Likewise, DG^{P} takes a value of one if the firm shares the same credit rating with one or more peer firms within a particular industry in a specific year, and that these firms are downgraded in the subsequent year, and zero otherwise. In the following discussions, we suppress subscripts *i*, *j*, *k* and *t* in the two dummy variables for notational convenience.

[5] We further conducted analysis for rating changes of two or more notches. Due to the restricted criteria for constructing the peer rating change dummies, the number of firms whose ratings were changed by two or more notches in the sample to be eligible for analysis is much limited. As expected, we do not find any significant relation between NDI and peer rating changes of two or more notches.

[6] We have also tested various years (one year before, same year, two years after) of financing activities surrounding peer-rating changes. For example, the results (available upon request) of the financing effect at time *t* of peer rating changes at time *t*-2, ie., two years after peer rating changes, show that a peer rating change in a relatively distant past is not likely to exert an impact on a firm's financing activities. The results also show that firms do not have significant financing activities a year prior to peer rating changes.

We illustrate our definition of a peer firm credit rating upgrade with the following example: Suppose that there are three firms in the telecom industry, A, B, and C with an identical credit rating of AA in the fiscal year 2000. If firms B and C are subsequently upgraded in 2001, but firm A maintains the same rating from 2000 to 2001, then the UG^P dummy for firm A takes a value of one in 2001. In contrast, UG^P takes a value of zero for firms B and C, as these firms are themselves upgraded, despite the other firm's upgrade.

We control for any possible industry-wide credit rating shocks, if any, by introducing a continuous variable $INDCR_{diff}$, which captures these shocks' magnitude and direction, whether large or moderate or positive or negative, or no shocks, as defined below:

$INDCR_{diff,\,t\text{-}1}$ is the change in the level of average credit ratings of an industry, excluding own firm's observation, from *t*–2 to *t*–1.

We address the possibility that, after the credit rating change in year *t*–1, firms follow the financing pattern of downgraded and upgraded firms from year *t*–1 to *t*. To this end, all our regression analyses include two variables $UGNDI_{ind,t}$ and $DGNDI_{ind,t}$ defined as follows. By construction, these two variables do not include own firm's observation:

$UGNDI_{ind,\,t}$ is the average net debt issuance of the upgraded peer firms in an industry from year *t*–1 to year *t.*

$DGNDI_{ind,\,t}$ is the average net debt issuance of the downgraded peer firms in an industry from year *t*–1 to year *t.*

We also include in our regression specification a set of conventional explanatory variables (all lagged by one year), for both firm-level and industry-level, as controls as they have been analyzed in many tests and have conventional interpretations.[7] These variables include *Leverage*,

[7] Kisgen (2006) shows a significant negative relation between leverage and debt financing. Titman and Wessels (1988) show that firm size is one of the crucial determinants of the capital structure. Myers (2001) and Fama and French

Size, *Liquidity*, *Profitability*, *Dividends*, *REarnings* (retained earnings), *Tobin's Q* (growth opportunities), *Tangibility*, and *NDTS* (non-debt tax shields), as defined below. For robustness checks, we also use these control variables in year t–2 and our results remain quantitatively similar (available upon request).

$Leverage_{i,t-1}$ is the ratio of the sum of short-term debt (Compustat data item DLC) and long-term debt (Compustat data item DLTT) scaled by the sum of short-term debt, long-term debt and stockholders' equity (Compustat data item LSE minus data item LT) for firm i in year t–1.

$Size_{i,t-1}$ is the logarithm of sales (Compustat data item SALE) for firm i in year t–1.

$Liquidity_{i,t-1}$ is the ratio of cash and cash equivalent (Compustat data item CHE) to total assets (Compustat data item AT) for firm i in year t–1.

$Profitability_{i,t-1}$ is the ratio of earnings before interest, taxation, depreciation and amortization (Compustat data item EBITDA) to total assets (Compustat data item AT) for firm i in year t–1.

$Dividends_{i,t-1}$ is the ratio of dividends (Compustat data item DV) to total assets (Compustat data item AT) for firm i in year t–1.

$REarnings_{i,t-1}$ is the ratio of retained earnings (Compustat data item RE) to total assets (Compustat data item AT) for firm i in year t–1.

$Tobin's\ Q_{i,t-1}$ is growth options and is defined as the ratio of the total book value of debt plus market value of equity (Compustat data item CSHO × data item PRCC) to total assets (Compustat data item AT)) for firm i in year t–1.

(2002) demonstrate that profitability is an important factor affecting the capital structure. Growth options (defined as Tobin's Q in our study) and tangibility are variables affecting the leverage ratio in Rajan and Signals (1995). Dividend policy and earnings relate to the increase in debt and equity sales (Titman and Wessels 1988). We include liquidity (see Kim, Mauer, and Sherman (1998)) to control for possible impacts on leverage from firms' cash positions and non-debt tax shields (DeAngelo and Masulis 1980; Bradley, Jarrell, and Kim 1984). Welch (2004) and MacKay and Phillips (2005) show that industry average leverage ratio is an economically important determinant of capital structure.

Tangibility$_{i,t-1}$ is the ratio of property, plant, and equipment (Compustat data item PPENT) to total assets (Compustat data item AT) for firm *i* in year *t*–1.

NDTS$_{i,t-1}$ is the non-debt tax shields and is defined as the ratio of deferred taxes and investment tax credit (Compustat data item TXDITC) to total assets (Compustat data item AT) for firm *i* in year *t*–1.

4. Summary Statistics and Main Regression Results

4.1. Summary statistics

Table 1 shows firms' net debt issuance (*NDI*) patterns across credit rating categories. Over time, high credit-quality firms issue more debt than equity, while low-rated firms reduce leverage, on average. These patterns suggest that high credit-quality firms are more able to access the debt market than low credit-quality firms. This has important implications for our study as we want to examine whether firms, and especially investment-grade firms, reduce their net debt issuances when peer firms experience credit rating upgrades or downgrades.

[Insert Table 1 here]

Table 2 shows the year-by-year percentages of firms in our sample that have experienced their industry peers' credit rating upgrades and downgrades, respectively. The results demonstrate the importance of the peer rating effects: the percentage of firms impacted by peer rating upgrades ranges from a minimum of 23% of all sample firms in 1986 to 53% in 2013; the percentage of firms impacted by peer rating downgrades ranges from 29% in 1992 to 56% in 2001. Note that our analyses require one year for observing a change in the peer firm's credit rating. Thus, Table 2 reports results up to the year 2013.

On the other hand, the proportion of firms experiencing peer firm-rating downgrades is generally higher than the proportion of upgrades. This pattern begins in 1986 and continues until

2009, when it exhibits a noteworthy reversal in 2010 when peer firm upgrades outweigh downgrades. This overall pattern coincides with our findings in the Appendix, Table 1, in that the number of upgraded firms becomes greater than the number of downgraded firms since 2010, which may reflect the economic recovery after the financial crisis.

[Insert Table 2 here]

Table 3 presents summary statistics of variables in this study. Panel A shows summary statistics for the whole sample, while Panel B separates the sample into two parts, with one sub-sample containing investment-grade firms and the other containing speculative-grade firms. On firms' financing activities, Panel A demonstrates that, on average, rated firms issue more debt than equity. The average of NDI is 2.4% which means that firms, on average, issue 2.4% more long-term debt than equity (i.e., $\Delta LTD - \Delta Equity$) relative to total assets in the previous year. The average change in long-term debt (ΔLTD) is 2.6% and the average change in equity ($\Delta Equity$) is 0.21%. Firms also tend to have more net increases in long-term debt (ΔLTD) than net increases in short-term debt (ΔSTD) (2.6% versus 0.10%). Overall, firms adjust their capital structure through the debt market than going through the equity market.

[Insert Table 3 here]

On average, firms finance 56% of their total assets through debt (*Leverage*) and are generally profitable, with a mean profitability of 13.5%; they also pay dividends equivalent to 1.5% of their total assets. In contrast to studies that use samples consisting of all firms collected from Compustat, our sample focuses on rated firms that tend to have high leverage (Faulkender and Petersen 2006; Kisgen 2006). A significant 34% of firms' assets are fixed. Standard deviations of most variables, however, show considerable cross-sectional variations, which illustrate the differences in firm leverage. Therefore, it is necessary to control for firm characteristics when examining the relative

importance of peer firms' credit rating changes in financing activities. The difference in the average industry credit rating $INDCR_{diff}$ ranges from -0.72 to 0.45, indicating swings in industry-wide credit rating changes.

The mean values of both variables $UGNDI_{ind}$ and $DGNDI_{ind}$ are positive, which shows that both upgraded and downgraded industry peers *increase* net debt issuance in the year following their own rating changes. This is important because our findings reported in later sections show that the firm observing peer firms' downgrades *reduces* its net debt issuances, an opposite result to those peer firms that were downgraded.

Panel B in Table 3 illustrates that investment-grade firms are larger in size than speculative-grade firms and have lower leverage, higher profitability, higher retained earnings, higher dividends, higher growth options as proxied by Tobin's *Q*, and higher net debt issuances. These differences suggest that lowly rated firms may have less flexibility than highly rated firms do in adjusting their debt financing when peer firms' ratings are changed. In an unreported test, we find that firms with a B+ rating or below are more financially constrained than are other speculative-grade firms. This evidence echoes our finding reported in Table 1, in that high credit-quality firms tend to have better access to the debt market than do low credit-quality firms.

4.2. The relation between peer firms' credit rating changes and net debt issuance: Baseline results

Our hypotheses predict an insignificant relation between debt financing and UG^P, and a significant, negative relationship between debt financing and DG^P. To examine the impacts of peer rating upgrades and downgrades on firm financing, we estimate the following model:

$$NDI_{i,t} = \beta_0 + \beta_1 UG^P_{i,t-1} + \beta_2 DG^P_{i,t-1} + \beta_3 X_{i,t-1} + \varepsilon_{i,t-1}, \quad (1)$$

where $NDI_{i,t,}$ is the net debt issuance of firm i in year t.[8] The peer rating upgrade UG^P occurs in year t-1 and takes a value of 1 if one or more peer firms experienced upgrades between year t-2 and year t-1, while the firm itself was not upgraded. Likewise, the peer rating downgrade DG^P occurs in year t-1 and takes a value of 1 if one or more peer firms experienced downgrades between year t-2 and year t-1, while the firm itself was not downgraded.

We classify our sample firms into 17 industries based on Kenneth French's industry classifications; after excluding utility and financial firms, 15 industries remain. It is important to note that our identification of industry peers dictates the number of industries eligible for analysis. To be included for analysis, an industry must have a group of firms that share an identical credit rating in a year and satisfy the condition that one or more of the firms in the group are either upgraded or downgraded in the next year, while others' ratings remain unchanged.[9] The maximum number of downgraded sample firms in a peer group is 28, and the maximum number of upgraded firms in a peer group is 14.

In the above regression specification, $X_{i,t\text{-}1}$ is a set of control variables, including firm-level and industry characteristics, which are observable at the end of year t-1. The regression equation tests whether the net issuance of debt for a particular firm-year is affected by changes in peer firms'

[8] We perform additional analyses using the *changes* in the ratio of long-term debt (a *balance sheet item*) and *changes* in the ratio of total debt, respectively, as dependent variables. Our results are robust when using these measures.

[9] We also used a classification of 30 industries. The relevant coefficient estimates show lower magnitudes due to the fewer number of firms available and eligible for analysis within an industry, but the overall results remain qualitatively similar and do not change our conclusions. Although adopting broader rating categories, instead of using an identical rating, would have more firms in an industry peer group while allowing for more detailed industry classification, the peer effects we intend to analyze are not precisely addressed. For example, the competition consideration among three firms with respective ratings of A-, A and A+ is not straightforward when the firm with an A+ rating is downgraded to A. Also, as Kisgen (2006) points out, a rating of A+ is considered differently from a rating of A in terms of discrete costs and benefits of ratings. In addition, we used the text-based industry classification based on the fitted Herfindahl index of Hoberg and Phillips (2016) to closely identify product market peers. However, this approach often reclassifies a firm's industry from year to year, and hence some of the same-rating peers in one year are moved to a different industry next year, which makes our analyses unfeasible. Thus, the classification of industries in our setting is a necessary tradeoff between the feasibility of implementing the analysis and the refinement in the identification of industry peers.

credit ratings in the previous firm-year. The slope coefficients β_1 and β_2 capture the effects of any adjustments in net debt issuances due to peer rating upgrades and downgrades, respectively. Standard errors in all regressions are clustered at the firm and year levels.

The main results for the effect of peer firms' credit rating downgrades (DG^P) as reported in Columns 1 through 4 in Table 4 are significant, both economically and statistically, and are robust to controls for industry characteristics. Column 1 reports that peer firms' credit rating downgrades (DG^P) significantly and negatively impact firm financing, having controlled for the change in average credit ratings in the industry ($INDCR_{diff}$) and the effect of net debt issuance ($UGNDI_{ind}$ and $DGNDI_{ind}$) of those upgraded and downgraded peer firms.

Further controlling for firm-level characteristics, Column 2 reveals that firms witnessing peer rating downgrades reduce more debt than equity, of approximately 1.63% (*t*-stat = −4.78) to total assets. This finding supports our first hypothesis. In line with the prediction of our second hypothesis, we do not find that peer firms' credit rating upgrades (UG^P) significantly impact firm financing, even after controlling for firm-level and industry characteristics. Since the regression coefficients on UG^P are all insignificant in the remaining tests, we mainly discuss the results for DG^P.

[Insert Table 4 here]

In addition to the firm-level controls noted in Column 2, Column 3 in Table 4 further controls for other industry-level characteristics: the industry averages of leverage, size, liquidity, profitability, dividends, growth options, tangibility, and *NDTS* (non-debt tax shields), where industry averages are calculated for each fiscal year (lagged by one year, which is the year when peer firms' ratings changed) for each variable. We find that the effect of peer firm downgrades on leverage becomes even stronger (coeff. = –1.67; *t*-stat = –4.85). Column 4 adds the GDP growth

rate, which we obtain from the Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org/). We find that peer firm downgrade effects on leverage become even stronger (coeff. = –1.78; *t*-stat = –5.76). Overall, the results reported in Table 4 are consistent with both Hypotheses 1 and 2.

4.3. The relation between peer firms' credit rating changes and adjustments in debt and equity

We more closely examine financing adjustments by evaluating the decisions to increase (or decrease) debt and equity in the year following peer firms' credit rating upgrades and downgrades. Table 5 presents the results. Coefficient estimates for the firm-level and industry-level controls in Tables 5 to Table 11 are not reported for brevity, but are available upon request. We find that firms are more likely to reduce NDI after their peer firms' credit ratings are downgraded.

As shown in Columns 1 and 2, we find that peer firms' credit rating downgrades affect the change in long-term debt ($\Delta LTD_{i,t}$), but no significant changes occur in short-term debt ($\Delta STD_{i,t}$). In Column 2, the coefficient estimate on DG^P is −1.59 (*t*-stat = −4.72), which shows that, when peer firms' credit ratings were downgraded, firms reduce their long-term debt by 1.59% to total assets. Column 3 shows that firms do not significantly change their equity when peer firms were downgraded. The changes in debt and equity components as shown in Columns 4 through 7 suggest that the coefficient on DG^P observed in Column 1 is mainly attributable to the reduction in long-term debt issuances (-2.32% with a *t*-stat = −5.43 in Column 4) following rating downgrades of peer firms. Note that although the UG^P dummy shows statistical significance for both long-term debt issuances and long-term debt reductions (Columns 4 and 5, respectively), the combined effect as reflected in the changes in long-term debt ($\Delta LTD_{i,t}$) in Column 2 is statistically insignificant.

Our finding—that firms primarily reduce their long-term rather than short-term debt following peer firms' rating downgrades—implies that reducing long-term debt is likely a more

effective strategy to maintain good credit ratings. This firm behavior is consistent with ratings agencies' evaluation practices. In summary, the results in Table 5 are consistent with Hypothesis 3.

[Insert Table 5 here]

5. Cross-firm Variation in the Peer-Firm Effect

5.1. The relation between peer firms' credit rating changes and net debt issuances: Investment- versus speculative-grade firms

In this section we examine whether investment- and speculative-grade firms respond differently to peer firms' credit rating changes. To this end, we first introduce two explanatory variables into the regressions: the credit rating level (*Rating*) and the investment grade status (*IG*). Specifically, the variable *Rating* is the numerical value of credit rating (22 for AAA, 21 for AA+…, etc.) of a firm in the previous year. The dummy variable *IG* equals one if a firm's credit rating is investment-grade in the previous year, and zero otherwise.

Columns 1 and 2 in Table 6 report the results. In Column 1, the positive coefficient on *Rating* indicates that the higher the rating a firm receives, the more net debt the firm issues. In Column 2, the dummy variable *IG* has a highly significant and positive coefficient, which indicates that investment-grade firms issue 4.89% more net debt than non-investment-grade firms. These results are consistent with those reported in Table 1 and Panel B in Table 3. In Columns 1 and 2, the coefficients on DG^P are −1.83 (*t*-stat = −5.37) and −1.69 (*t*-stat = −4.99), respectively. These findings indicate that firms reduce NDI when peer firms' credit ratings were downgraded in the previous year, even after controlling for a firm's credit rating level (Rating) or whether a firm is investment-grade (IG).

[Insert Table 6 here]

Furthermore, we separately estimate the regression for investment and speculative-grade firms. The coefficients on DG^P in Columns 3 and 4 in Table 6 show that, following rating downgrades of peer firms, speculative- and investment-grade firms reduce their net debt issuances by 1.83% (*t*-stat = −3.50) and 1.56% (*t*-stat = −4.18), respectively. In general, we find that NDI reduction triggered by peer firms' credit rating downgrades is prevalent across both speculative- and investment-grade firms.

In Column 5, we further interact the IG dummy with the UG^P dummy and the DG^P dummy in the regressions. Consistent with our results reported earlier, we find that firms reduce NDI when their peer firms' credit ratings were downgraded in the previous year, but we do not find a peer rating upgrade effect on NDI. The results also show that the IG dummy has a positive coefficient of 5.37%, consistent with the result in Column 2. The interaction term $IG \times UG^P$ is negative and statistically significant, which indicates that, given that peer firms were upgraded, the positive NDI of being an investment-grade firm (5.37%) decreases by 1.61%. In contrast, the interaction term $IG \times DG^P$ is statistically insignificant, showing that, when peer firms were downgraded, no significant difference in NDI exists between investment- and speculative-grade firms.

5.2. Firms in various credit rating categories

In this section, we look into detailed rating categories to analyze the effect of peer firms' credit rating changes. In order to test the difference between the NDI responses of different rating categories, we construct four dummy variables: AA takes a value of one if a firm's credit rating is greater than or equal to AA-, and zero otherwise; A takes a value of one if a firm's credit rating is between A+ and A-, and zero otherwise; BBB takes a value of one if a firm's credit rating is BBB

or BBB-, and zero otherwise; and BB takes a value of one if a firm's credit rating is BB+ or BB, and zero otherwise. We then combine these dummy variables with the dummy variables for peer rating upgrades and downgrades, UG^P and DG^P, to analyze the peer rating changes' effects on NDI .

Table 7 reports the results. As shown in Column 1, firms, on average, reduce net debt issuance by 1.47% (*t*-stat = −3.38) of total assets when their peer firms were downgraded, but do not significantly respond to peer upgrades. The AA rating category exhibits a positive and significant difference in NDI of 5.11%, which indicates that these firms have a distinctively higher NDI. However, the additional effects of peer upgrades and downgrades as captured by the interaction terms of $AA \times UG^P$ and $AA \times DG^P$ are not statistically significant, which indicates that these firms are insensitive to peer rating changes due to strong financial position. These findings are consistent with the evidence of Kisgen (2006), Tang (2009), and Badoer and James (2016), in that top-rated firms enjoy financial flexibility and access to external finance. The A rating category also has a distinctively higher NDI. The additional effect of peer upgrades $A \times UG^P$ on NDI is statistically significant, and the additional effect of peer downgrades $AA \times DG^P$ is marginally significant. These results indicate that these firms appear to be sensitive to peer rating changes and respond by reducing NDI.

Column 2 further considers the BBB rating category and shows that, although on average, these firms exhibit a slightly higher NDI, they are not sensitive to peer rating changes. In line with results in Column 1, the A rating category exhibits a reduction in NDI in response to peer upgrades, while the top AA rating category exhibits an insignificant response to peer upgrades or downgrades. Column 3 adds a dummy variable for the BB rating category. The coefficient of $BB \times DG^P$ shows that these firms additionally reduce net debt issuance by 1.44% of total assets

when their peer firms were downgraded, but do not significantly respond to peer upgrades. The results suggest that these higher-rated, speculative-grade firms are alert to their peers' rating downgrades. As these may adversely impact their credit standing and access to external financial markets, such firms may subsequently act to reduce their net debt issuances. The pattern of results for all other rating categories remains unchanged.

[Insert Table 7 here]

5.3. The relation between peer firms' credit rating changes and net debt issuance: Large versus small firms

We now analyze whether peer firms' rating changes affect large or small firms differently. We classify a firm in each year as a large (small) firm if its total assets are greater (less) than the median value of the total assets of firms in its industry. Columns 1 and 2 in Table 8 show the results for the full sample. We find that both small and large firms respond strongly and negatively to their peer firms' rating downgrades. Small firms reduce net debt issuance by 2.16% (t-stat = −3.67), while large firms reduce NDI by 1.50% (t-stat = −3.97).

We further classify firm size separately for investment- and speculative-grade firms. Columns 5 and 6 show that investment-grade large-size firms tend to significantly reduce NDI in the year after their peers have experienced credit rating downgrades. These results point toward the reputational concerns of large investment-grade firms. Columns 3 and 4 report that among speculative-grade ratings, only small firms significantly reduce net debt issuance in the year after their peers' credit rating downgrades. These results imply that small size firms with speculative-grade ratings, those who typically have greater financial constraints and are subject to relatively costlier external financing, have more serious concerns about peers' credit rating downgrades.

[Insert Table 8 here]

5.4. The peer firm effect: Firms in competitive versus concentrated industries

Next, we analyze whether peer firms' credit rating changes differently affect firms in competitive versus concentrated industries. We use the Herfindahl-Hirschman Index (HHI) based on sales as a measure of industry competitiveness. We classify firms as operating in competitive (concentrated) industries if the HHI index is below (above) the 33rd (67th) percentile of the index value. Table 9 reports the results. Columns 1 and 2 are based on the percentiles computed over the entire sample, while Columns 3 and 4 are based on those in individual years.

Overall, the results indicate that firms in concentrated industries reduce their net debt issuance much more aggressively than firms in competitive industries when peer firms experience credit rating downgrades. For example, when the classification of firms operating in competitive versus concentrated industries is based on the entire sample (Column 1), firms operating in competitive industries reduce their net debt issuance by only 1.02% for DG^{p}, which is statistically insignificant. In contrast, firms in concentrated industries (Column 2) reduce their net debt issuances by 1.71%, which is statistically significant (*t*-stat = −3.33).

The pattern of results in Columns 3 and 4 is also strong when the classification of firms is based on the HHI index value in individual years. The corresponding reductions are 1.61% (*t*-stat = −3.13) for firms in concentrated industries (Column 4) and 1.22% (*t*-stat = −1.79) for firms in competitive industries (Column 3). Overall, the results in Table 9 are consistent with the prediction of Hypothesis 4, and support the argument that a firm's rating downgrade benefits its rivals—as a concentrated industry contains relatively fewer firms—in line with the competition channel outlined by Lang and Stulz (1992).

[Insert Table 9 here]

6. Further Analyses

6.1. Industry-average rating, peers' rating changes, and the capital structure

In this section we address the questions of whether and how an industry's average credit rating affects a firm's financing in relation to peer firms' credit rating changes. To this end, we first compute the average industry rating in each year and then compare this with the firm's credit rating. We then construct a dummy variable (CR < IND), which takes a value of one if the firm's rating is lower than the industry's average credit rating, and zero otherwise. We then include this dummy variable in our regression analysis.

Table 10 reports the results. Column 1 shows that on average, firms reduce net debt by 4.59% (*t*-stat = −5.86) if their credit rating in the previous year is lower than the industry average (i.e., the dummy variable (CR<IND) = 1). This finding suggests a 'lower-than-average effect', in which an industry's average credit rating provides a reference point for a firm. When the firm's credit rating is lower than this reference point, it tends to reduce its net debt issuance.

[Insert Table 10 here]

Moreover, Column 2 in Table 10 shows that when peer firms are downgraded, the firm reduces its net debt issuance by 1.71% (*t*-stat = −4.94) after controlling for the lower-than-average credit quality effect. This lower-than-average effect remains strong and statistically significant: the coefficient on (CR<IND) is equal to −4.59 (*t*-stat = −5.87). On the other hand, the effect of peer firms' credit rating upgrades is statistically insignificant. We also consider the interaction terms between the lower-than-average effect and the peer rating effect. Column 3 in Table 10 shows that the interaction term between CR<IND and UG^P is positive and statistically significant.

Column 4 shows that, speculative-grade firms take significant actions to reduce net debt issuance when their credit quality is lower than average (coefficient on (CR<IND) = −3.98 with *t*-stat = −4.06) and when peer firms are downgraded (coefficient on DG^P = −1.83 with *t*-stat = −3.48). As Column 5 indicates, investment-grade firms exhibit a strong reduction in their net debt issuance with a coefficient of −1.57 (*t*-stat = −4.19) on DG^P. However, we find that the effect of lower-than-average credit quality is statistically insignificant for investment-grade firms. This suggests that the downgrades to peer firms bring down the industry average, which lessens this particular industry pressure, while the fact that peer firms are downgraded does prompt the firm to reduce its net debt issuance.

6.2. Time-series patterns: Financial crises and business cycles

Finally, we analyze whether firms in different economic environments react differently to peer firms' credit rating changes, and especially during financial crisis periods. Our results presented in the Appendix, Table 1, suggest that the effect of peer firms' credit rating changes may vary over time due to the occurrences of major historical events. We construct a 'Crisis' dummy variable that equals one if the year is 2008 or 2009, and zero otherwise. Our results reported in Table 11 remain consistent. Column 1 shows that firms reduce net debt issuance following peer firms' rating downgrades, but not following upgrades. The Crisis dummy is negative and significant. However, Column 2 shows that the interaction terms of Crisis with UG^P and DG^P do not show significant effects on NDI. These findings indicate that firms significantly reduced their net debt issuances during crisis periods, such that the marginal effect of peer rating changes is limited. Note that the negative and statistically significant coefficients on DG^P in Columns 1 and

2 indicate that outside the financial crisis period, rating downgrades of peer firms exert influences on net debt issuance.

We further verify whether our results are driven by common macroeconomic factors that could potentially affect both market-wide credit rating changes and the cost of external financing, resulting in changes in firm deleveraging. We follow McLean and Zhao (2014) and define a recession year as a year in which six months or more were in recession as classified by the National Bureau of Economic Research. Only three years in our sample period from 1985 to 2014 satisfy the recession criteria: 2001, 2008, and 2009. We construct a 'Recession' dummy variable that equals one if the year is 2001, 2008, or 2009, and zero otherwise. As shown in Columns 3 and 4, our main finding here is that peer rating downgrades exert an externality effect on a firm's financing through its NDI. Similar to what we find for the crisis period, the Recession dummy is negative and significant, and the interaction terms do not show significant effects on NDI. Overall, these results suggest that the additional effect of peer rating changes appears subdued when the external financing costs are higher or firms experience more difficulty in accessing external capital markets during recession years or periods of financial crisis.

[Insert Table 11 here]

7. Conclusions

In this paper, we provide evidence that industry peers' credit rating changes influence firms' financing activities. All our evidence shows that peer firms' credit rating downgrades create strong externalities for firms in the same industry. In particular, firms embark on significant reductions in net long-term debt issuance. These findings are consistent with our hypothesis that firms are mindful of each other's adversity. When peers are downgraded, which suggests potential

contagions or opportunities to gain competitive advantages, firms vigilantly manage financing activities in a precautious manner by reducing net debt issuance.

Further, we find that firms at the top end of the investment-grade do not change financing activities when peer firms' ratings changed. Instead, firms with A ratings exhibit significant effects when their peer firms were downgraded. Additionally, firms at the top end of the speculative-grade threshold, that is, those near the investment-grade boundary—exhibit particularly strong reductions in net debt issuance when their peers were downgraded. The peer effects we document are not only ubiquitous among investment- and speculative-grade firms, but also prevalent over time. However, we do observe cross-sectional variation in the peer effect. The peer effect is stronger for firms operating in more concentrated industries and in times of economic expansion or outside financial crises.

Moreover, we also document a distinct and significant lower-than-average credit quality effect. That is, firms substantially reduce net debt issuance when their credit ratings are lower than the industry's average credit rating. Importantly, the peer rating effect remains strong and statistically significant, even after controlling for the lower-than-average credit quality effect. Our findings highlight the significance of the interactions among firms and how these interactions can impact firms' financing activities.

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Table 1. Net debt issuance across credit ratings

This table shows the mean values of net debt issuance (NDI) across credit ratings in the sample. The sample of rated firms is from Compustat for 1985–2014 where credit ratings are as of the beginning of each year.

	AAA	AA+	AA	AA-	A+	A	A-
No. of Firm-Years	421	148	583	565	1,090	1,715	1,209
Net Debt Issuance (NDI)	2.62%	2.39%	3.05%	3.66%	4.09%	3.84%	4.27%
	BBB+	BBB	BBB-	BB+	BB	BB-	B+
No. of Firm-Years	1,652	2,284	1,917	1,484	2,226	2,991	3,644
Net Debt Issuance (NDI)	4.20%	3.70%	2.72%	2.80%	2.32%	2.59%	1.86%
	B	B-	CCC+	CCC	CCC-	CC & Below	
No. of Firm-Years	2,156	1,086	481	268	124	544	
Net Debt Issuance (NDI)	1.10%	-1.08%	-2.93%	-1.39%	-4.89%	-1.02%	

Table 2. Percentage of firms affected by peer upgrades and downgrades over the sample year

The table shows the percentage of firms affected by peer upgrades and downgrades over the sample period. Peer upgrades and downgrades occur when one or more peer firms (one or multiple firms with the same rating within the same industry in the same year) are upgraded or downgraded in the next year.

	1986	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
Peer Upgrades	22.93%	36.08%	32.15%	40.05%	25.35%	29.55%	28.92%	29.16%	37.12%	39.52%
Peer Downgrades	36.42%	43.64%	49.00%	38.11%	45.35%	39.90%	28.92%	34.54%	30.63%	34.51%
Total Firms	626	887	913	889	868	811	781	809	873	893
	1996	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Peer Upgrades	33.12%	44.78%	40.69%	30.16%	39.59%	33.89%	28.53%	39.14%	35.02%	41.33%
Peer Downgrades	34.95%	38.16%	43.07%	51.63%	52.49%	55.93%	47.05%	52.01%	48.66%	48.46%
Total Firms	940	982	1,026	1,091	1,147	1,153	1,141	1,141	1,106	1,059
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**		
Peer Upgrades	39.84%	41.62%	38.27%	33.15%	45.15%	44.71%	43.78%	53.13%		
Peer Downgrades	44.40%	42.56%	42.81%	44.96%	30.81%	34.68%	42.11%	34.79%		
Total Firms	1,031	981	964	950	905	907	918	911		

Table 3. Summary statistics of variables

This table reports the descriptive statistics of the variables used in regressions. The sample is from Compustat for the period 1985–2014 and excludes financial and utility firms. *NDI* (=Δ*LTD* – Δ*Equity*) is the change in long-term debt minus the change in equity, scaled by total assets at the beginning of each year. Δ*LTD* is long-term debt issuance minus long-term debt reduction scaled by total assets. *Debt Issuance* is long-term debt issuance, *Debt Reduction* is long-term debt reduction, Δ*Equity* is sales of common and preferred stock minus purchases of common and preferred stock scaled by a firm's total assets. *Equity Issuance* is sales of common and preferred stock, *Equity Reduction* is purchases of common and preferred stock, all normalized by total assets. Δ*STD* is the change in current debt scaled by total assets. *Leverage* is the ratio of the sum of short-term debt and long-term debt to the sum of short-term debt, long-term debt, and stockholders' equity. *Size* is the logarithm of sales. *Liquidity* is the ratio of cash and cash equivalent to total assets. *Profitability* is the ratio of earnings before interest, tax, depreciation, and amortization to total assets. *Dividends* are the ratio of dividends to total assets. *REarnings* are the ratio of retained earnings to total assets. *Tobin's Q* is the ratio of the book value of debt plus the market value of equity to total assets. *Tangibility* is the ratio of property, plant, and equipment to total assets. *NDTS i*s the ratio of deferred taxes and investment tax credit to total assets. GDP is the annual growth rate of US GDP. Panel A shows summary statistics, while Panel B shows the mean values of the variables used in the regressions classifying firms as either investment- or speculative-grade in the previous year. **, **, and * represent statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Summary statistics of variables

Variable	Mean	Std. Dev.	5th %tile	95th %tile
NDI	0.024	0.195	-0.148	0.246
ΔLTD	0.026	0.173	-0.114	0.220
ΔEquity	0.002	0.108	-0.083	0.079
Debt Issuance	0.162	0.335	0.000	0.702
Debt Reduction	0.135	0.271	0.000	0.559
Equity Issuance	0.020	0.081	0.000	0.096
Equity Reduction	0.021	0.064	0.000	0.104
ΔSTD	0.001	0.070	-0.069	0.071
Leverage	0.560	2.185	0.117	1.258
Size	7.430	1.569	4.931	10.027
Liquidity	0.083	0.110	0.003	0.297
Profitability	0.135	0.094	0.019	0.265
Dividends	0.015	0.052	0.000	0.053
REarnings	0.085	0.636	-0.589	0.595
Tobin's Q	1.347	1.759	0.535	2.946
Tangibility	0.340	0.228	0.044	0.789
NDTS	0.033	0.041	0.000	0.119
$INDCR_{diff}$	-0.080	0.433	-0.724	0.452
$UGNDI_{ind}$	0.006	0.125	-0.122	0.144
$DGNDI_{ind}$	0.031	0.161	-0.052	0.223
GDP	4.972	1.979	2.270	7.437

Table 3—Continued

Panel B: Investment- versus speculative-grade firms: Mean difference

Variable	Speculative Grade	Investment Grade	Difference (Speculative – Investment)
NDI	0.018	0.040	-0.022***
ΔLTD	0.022	0.024	-0.002
ΔEquity	0.014	-0.019	0.033***
Debt Issuance	0.210	0.099	0.110***
Debt Reduction	0.182	0.073	0.109***
Equity Issuance	0.026	0.012	0.014***
Equity Reduction	0.013	0.032	-0.019***
ΔSTD	0.001	0.001	-0.001
Leverage	0.676	0.406	0.270***
Size	6.690	8.407	-1.716***
Liquidity	0.088	0.077	0.083***
Profitability	0.115	0.160	-0.045***
Dividends	0.011	0.022	-0.011***
REarnings	-0.100	0.328	-0.428***
Tobin's Q	1.161	1.553	-0.391***
Tangibility	0.338	0.342	-0.004
NDTS	0.027	0.041	-0.014***

Table 4. Relation between peer firms' rating changes and net debt issuance: Baseline results

This table shows the coefficient estimates from the regression on net debt issuance (in %) with *t*-statistics in the parentheses. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). $INDCR_{diff}$ is the change in the level of average credit ratings of an industry, excluding own firm's observation. $UGNDI_{ind}$ and $DGNDI_{ind}$ are the yearly average Net Debt Issuance (*NDI*) of the upgraded and downgraded peer firms, respectively. The detailed definitions of other control variables are described in Table 3. Standard errors are two-way-clustered at the firm and year levels. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	3	3	4
UG^P	-0.04	-0.29	-0.29	-0.02
	(-0.13)	(-0.74)	(-0.75)	(-0.04)
DG^P	-1.23***	-1.63***	-1.67***	-1.78***
	(-3.93)	(-4.78)	(-4.85)	(-5.76)
$INDCR_{diff}$	-0.51	-0.34	-0.22	-0.55
	(-1.24)	(-0.93)	(-0.56)	(-1.33)
$UGNDI_{ind}$	-1.24	-2.02	-2.14	-0.57
	(-0.60)	(-0.79)	(-0.83)	(-0.22)
$DGNDI_{ind}$	0.21	0.05	-0.03	1.86*
	(0.15)	(0.06)	(-0.04)	(1.94)
Leverage		-0.04	-0.04	-0.04
		(-0.54)	(-0.54)	(-0.46)
Size		-1.06*	-1.00	-0.62
		(-1.80)	(-1.70)	(-1.07)
Liquidity		12.36***	12.20***	12.84***
		(3.27)	(3.12)	(3.15)
Profitability		31.31***	30.44***	30.49***
		(5.88)	(5.67)	(5.65)
Dividends		1.44	1.44	1.76
		(0.53)	(0.52)	(0.63)
Earnings		3.99***	3.92***	3.90***
		(4.39)	(4.35)	(4.38)
Tobin's Q		0.29	0.28	0.27
		(1.19)	(1.19)	(1.13)
Tangibility		7.46*	7.30	5.93
		(1.75)	(1.66)	(1.33)
NDTS		9.74	9.01	7.68
		(0.98)	(0.91)	(0.80)
GDP				0.16
				(1.24)
Intercept	2.90***	2.39	15.54	-5.15
	(17.50)	(0.50)	(1.30)	(-0.67)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	No
Industry Characteristics	No	No	Yes	Yes
Adj. R^2	0.07	0.08	0.08	0.07
N	19,727	19,727	19,727	19,727

Table 5. Relation between peer firms' rating changes and corporate financing components

This table shows the regression coefficients and *t*-statistics in the parentheses on the change in current debt (Column 1), the change in long-term debt (Column 2) the change in equity (Column 3), long-term debt issuance (Column 4), long-term debt reduction (Column 5), equity issuance (Column 6), and equity reduction (Column 7), with all variables measured in %. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). $INDCR_{diff}$ is the change in the level of average credit ratings of an industry, excluding own firm's observation. $UGNDI_{ind}$ and $DGNDI_{ind}$ are the yearly average Net Debt Issuance (*NDI*) of the upgraded and downgraded peer firms, respectively. The detailed definitions of other control variables are described in Table 3. Standard errors are two-way-clustered at the firm and year levels. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6	7
	ΔSTD	ΔLTD	ΔEquity	Long-Term Debt Issuance	Long-Term Debt Reduction	Equity Issuance	Equity Reduction
UG^P	0.01	-0.63	-0.33	-1.41**	-0.87**	-0.43**	-0.08
	(0.09)	(-1.64)	(-1.52)	(-2.30)	(-2.21)	(-2.29)	(-0.72)
DG^P	-0.05	-1.59***	0.08	-2.32***	-0.76**	-0.15	-0.22*
	(-0.44)	(-4.72)	(0.53)	(-5.43)	(-2.51)	(-1.09)	(-1.87)
$INDCR_{diff}$	0.08	-0.50	-0.28**	-0.45	0.16	-0.12	0.19**
	(0.55)	(-1.35)	(-2.16)	(-0.90)	(0.37)	(-0.85)	(2.65)
$UGNDI_{ind}$	0.18	-0.23	1.95	1.31	1.45	1.57	-0.53
	(0.41)	(-0.15)	(1.20)	(0.68)	(1.09)	(0.95)	(-1.31)
$DGNDI_{ind}$	-0.52	-0.04	0.00	-1.09	-0.97	-0.11	-0.07
	(-1.27)	(-0.05)	(0.01)	(-0.75)	(-0.90)	(-0.28)	(-0.28)
Intercept	-2.37	44.96***	29.69***	95.83***	47.05***	23.52***	-7.71**
	(-0.44)	(3.36)	(4.43)	(4.68)	(2.85)	(3.37)	(-2.08)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.07	0.09	0.17	0.30	0.40	0.15	0.22
N	8,983	19,727	19,556	18,836	19,129	18,900	18,515

Table 6. Relation between peer firms' rating changes and net debt issuance: Investment- versus speculative-grade firms

This table shows the coefficient estimates from the regression on net debt issuance (in %) for the full sample and for investment-grade and speculative-grade firms separately. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). *Rating* is a numerical bond rating with AAA = 22… and D/SD = 1. *IG* is a dummy variable that equals 1 for investment-grade firms and zero otherwise. $INDCR_{diff}$ is the change in the level of average credit ratings of an industry, excluding own firm's observation. $UGNDI_{ind}$ and $DGNDI_{ind}$ are the yearly average Net Debt Issuance (*NDI*) of the upgraded and downgraded peer firms, respectively. The detailed definitions of other control variables are described in Table 3. Standard errors are two-way-clustered at the firm and year levels. The *t*-statistics are in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
	NDI	NDI	NDI: Speculative Grade	NDI: Investment Grade	NDI
UG^P	-0.11	-0.22	0.55	-0.93**	0.53
	(-0.30)	(-0.56)	(1.05)	(-2.53)	(0.92)
DG^P	-1.83***	-1.69***	-1.83***	-1.56***	-1.87***
	(-5.37)	(-4.99)	(-3.50)	(-4.18)	(-3.55)
Rating	1.28***				
	(11.37)				
IG		4.89***			5.37***
		(7.17)			(7.50)
$IGxUG^P$					-1.61***
					(-2.82)
$IGxDG^P$					0.20
					(0.31)
$INDCR_{diff}$	-0.11	-0.20	-0.50	0.25	-0.21
	(-0.31)	(-0.52)	(-1.04)	(0.73)	(-0.56)
$UGNDI_{ind}$	-2.37	-2.27	-4.30	2.79*	-2.22
	(-0.91)	(-0.87)	(-1.34)	(1.74)	(-0.86)
$DGNDI_{ind}$	-0.02	-0.01	-0.64	-0.53	-0.03
	(-0.03)	(-0.02)	(-0.87)	(-0.27)	(-0.04)
Intercept	9.98	18.11	15.73	36.64**	17.50
	(0.84)	(1.51)	(0.69)	(2.53)	(1.45)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes	Yes
Industry Characteristics	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.09	0.08	0.04	0.17	0.08
N	19,727	19,727	10,385	9,256	19,727

Table 7. Relation between peer firms' rating changes and net debt issuance: Various *credit rating categories*

This table shows the coefficient estimates from the regression on net debt issuance (in %) for firms near the bottom end of investment grade or the top end of speculative grade. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). $INDCR_{diff}$ is the change in the level of average credit ratings of an industry, excluding own firm's observation. $UGNDI_{ind}$ and $DGNDI_{ind}$ are the yearly average Net Debt Issuance (*NDI*) of the upgraded and downgraded peer firms, respectively. The detailed definitions of other control variables are described in Table 3. Standard errors are two-way clustered at the firm and year levels. The *t*-statistics are in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3
UG^P	0.08	0.24	0.26
	(0.19)	(0.44)	(0.40)
DG^P	-1.47***	-1.75***	-1.33**
	(-3.38)	(-3.71)	(-2.49)
AA_{dum}	5.11***	5.83***	6.64***
	(4.62)	(5.14)	(5.60)
$UGxAA_{dum}$	-1.89	-2.07	-2.11
	(-1.50)	(-1.59)	(-1.54)
$DGxAA_{dum}$	-0.51	-0.21	-0.61
	(-0.48)	(-0.19)	(-0.54)
A_{dum}	5.27***	5.97***	6.76***
	(7.35)	(7.85)	(8.96)
$UGxA_{dum}$	-1.63***	-1.79***	-1.81**
	(-2.90)	(-2.80)	(-2.51)
$DGxA_{dum}$	-1.09*	-0.81	-1.24*
	(-1.76)	(-1.18)	(-1.72)
BBB_{dum}		1.45**	2.41***
		(2.44)	(3.84)
$UGxBBB_{dum}$		-0.57	-0.56
		(-0.80)	(-0.67)
$DGxBBB_{dum}$		1.07	0.65
		(1.45)	(0.88)
BB_{dum}			2.66***
			(3.15)
$UGxBB_{dum}$			-0.32
			(-0.30)
$DGxBB_{dum}$			-1.44*
			(-1.81)
Intercept	15.20	15.53	15.39
	(1.25)	(1.27)	(1.27)
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes
Industry Characteristics	Yes	Yes	Yes
Adj. R^2	0.08	0.08	0.08
N	19,727	19,727	19,727

Table 8. Relation between peer firms' rating changes and net debt issuance: Small versus large firms

This table shows the coefficient estimates from the regression on net debt issuance (in %) partitioned by firm size (using yearly industry median) for the full sample and for firms classified as investment-grade firms and speculative-grade firms by S&P separately. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). $INDCR_{diff}$ is the change in the level of average credit ratings of an industry, excluding own firm's observation. $UGNDI_{ind}$ and $DGNDI_{ind}$ are the yearly average Net Debt Issuance (*NDI*) of the upgraded and downgraded peer firms, respectively. The detailed definitions of other control variables are described in Table 3. Standard errors are two-way clustered at the firm and year levels. The *t*-statistics are in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	Full Sample		Speculative Grade		Investment Grade	
	1	2	3	4	5	6
	Less than median	Greater than median	Less than median	Greater than median	Less than median	Greater than median
UG^P	1.28**	-1.21**	1.62***	-1.04	-0.80	-1.09***
	(2.43)	(-2.14)	(2.80)	(-0.99)	(-0.82)	(-2.94)
DG^P	-2.16***	-1.50***	-2.42***	-0.88	-0.51	-1.67***
	(-3.67)	(-3.97)	(-3.71)	(-0.80)	(-0.73)	(-4.69)
$INDCR_{diff}$	-0.20	-0.51	-0.60	-2.05*	0.26	-0.03
	(-0.47)	(-1.00)	(-0.98)	(-1.94)	(0.42)	(-0.08)
$UGNDI_{ind}$	-1.99	-2.85	-2.65	-7.49	0.53	3.37*
	(-1.37)	(-0.48)	(-1.70)	(-0.79)	(0.18)	(1.73)
$DGNDI_{ind}$	-0.44	-1.16	-0.16	-4.40	-3.02	0.27
	(-0.35)	(-0.58)	(-0.11)	(-1.22)	(-1.14)	(0.12)
Intercept	35.82	19.61	36.29	11.71	10.04**	30.54**
	(1.44)	(1.51)	(1.23)	(0.29)	(2.31)	(2.32)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.07	0.12	0.05	0.09	0.29	0.17
N	8,837	10,694	7,075	3,150	1,708	7,474

Table 9. Relation between peer firms' rating changes and net debt issuance: Competitive versus concentrated industries

This table shows the coefficient estimates from the regression on net debt issuance (in %) partitioned by market competition. We use the Herfindahl–Hirschman Index (or HHI) based on sales as our measure of competitiveness in an industry. We classify firms as operating in competitive (concentrated) industries if the HHI index is below (above) the 33rd (67th) percentile. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). The detailed definitions of control variables are described in Table 3. Standard errors are two-way clustered at the firm- and year-levels. The *t*-statistics are noted in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	1 Competitive Industries: HHI less than 33% (calculated over the sample period)	2 Concentrated Industries: HHI greater than 67% (calculated over the sample period)	3 Competitive Industries: HHI less than 33% (calculated for individual years)	4 Concentrated Industries: HHI greater than 67% (calculated for individual years)
UG^P	-1.61*	-0.60	-1.14	-0.21
	(-2.06)	(-1.04)	(-1.26)	(-0.33)
DG^P	-1.02	-1.71***	-1.22*	-1.61***
	(-1.57)	(-3.33)	(-1.79)	(-3.13)
$INDCR_{diff}$	0.32	-1.16**	0.13	-0.90*
	(0.57)	(-2.26)	(0.26)	(-1.73)
$UGNDI_{ind}$	-1.79	0.15	-2.07	0.77
	(-1.17)	(0.06)	(-1.21)	(0.30)
$DGNDI_{ind}$	0.37	1.25	0.20	1.58
	(0.12)	(1.50)	(0.09)	(1.10)
Intercept	-6.70	16.14	20.79	11.82
	(-0.30)	(1.55)	(0.87)	(1.19)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes
Industry Characteristics	Yes	Yes	Yes	Yes
Adj. R^2	0.12	0.14	0.12	0.13
N	3,233	3,923	3,661	3,652

Table 10. Industry-average credit ratings, peer rating changes, and net debt issuance

This table shows the coefficient estimates from the regression on net debt issuance (in %) for the full sample and for investment-grade and speculative-grade firms separately after controlling for average industry ratings. (CR<IND) is a dummy variable which takes the value 1 if the firm's credit rating is less than the industry average in a particular year. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). The detailed definitions of control variables are described in Table 3. Standard errors are two-way clustered at the firm and year levels. The *t*-statistics are in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
	NDI	NDI	NDI	NDI: Speculative Grade	NDI: Investment Grade
(CR < IND)	-4.59***	-4.59***	-5.18***	-3.98***	-1.58
	(-5.86)	(-5.87)	(-6.44)	(-4.06)	(-0.97)
(CR < IND)×UG^P			1.72**		
			(2.58)		
(CR < IND)×DG^P			-0.02		
			(-0.04)		
UG^P		-0.20	-1.04**	0.58	-0.92**
		(-0.52)	(-2.38)	(1.13)	(-2.46)
DG^P		-1.71***	-1.76***	-1.83***	-1.57***
		(-4.94)	(-4.59)	(-3.48)	(-4.19)
$INDCR_{diff}$	-0.18	-0.29	-0.28	-0.53	0.22
	(-0.45)	(-0.73)	(-0.72)	(-1.06)	(0.65)
$UGNDI_{ind}$	-2.45	-2.44	-2.33	-4.48	2.69
	(-0.93)	(-0.94)	(-0.90)	(-1.42)	(1.62)
$DGNDI_{ind}$	-0.20	0.03	0.04	-0.55	-0.54
	(-0.26)	(0.04)	(0.05)	(-0.77)	(-0.27)
Intercept	18.06	19.83	19.48	18.52	36.43**
	(1.55)	(1.69)	(1.64)	(0.83)	(2.50)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm-Level Controls	Yes	Yes	Yes	Yes	Yes
Industry Characteristics	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.08	0.08	0.08	0.05	0.17
N	19,727	19,727	19,727	10,385	9,255

Table 11. Relation between peer firms' rating changes and net debt issuance: Financial crises and business cycles

This table shows the coefficient estimates from the regression on net debt issuance (in %) for different states of the economy: financial crisis (defined as years 2008 and 2009) and for expansion and recession periods separately. UG^P and DG^P are binary variables which take the value 1 if there are one or more peer upgrades or downgrades, (i.e., one or more firms with the same rating within the same industry in the same year that are upgraded or downgraded in the next year). The detailed definitions of control variables are described in Table 3. Standard errors are two-way clustered at the firm and year levels. The *t*-statistics are in parentheses. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4
UG^P	-0.04	-0.03	-0.05	-0.00
	(-0.11)	(-0.08)	(-0.13)	(-0.01)
DG^P	-1.74***	-1.81***	-1.72***	-1.78***
	(-5.64)	(-5.65)	(-5.56)	(-5.18)
$Crisis_{dum}$	-2.25**	-2.56***		
	(-2.20)	(-2.99)		
$UGxCrisis_{dum}$		-0.28		
		(-0.45)		
$DGxCrisis_{dum}$		0.95		
		(1.27)		
Recession			-1.75*	-1.83*
			(-1.81)	(-1.73)
UGxRecession				-0.49
				(-1.09)
DGxRecession				0.50
				(0.68)
$INDCR_{diff}$	-0.69	-0.68	-0.68	-0.67
	(-1.65)	(-1.64)	(-1.66)	(-1.64)
$UGNDI_{ind}$	-0.79	-0.75	-0.61	-0.61
	(-0.31)	(-0.30)	(-0.24)	(-0.24)
$DGNDI_{ind}$	1.79*	1.81*	1.74*	1.74*
	(1.87)	(1.90)	(1.85)	(1.87)
Intercept	-3.22	-3.14	-1.23	-1.09
	(-0.43)	(-0.42)	(-0.15)	(-0.14)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No
Firm-Level Controls	Yes	Yes	Yes	Yes
Industry Characteristics	Yes	Yes	Yes	Yes
Adj. R^2	0.07	0.07	0.07	0.07
N	19,727	19,727	19,727	19,727

Appendix Table 1

In Appendix Table 1 we report the yearly total number of credit rating upgrades and downgrades as well as the distribution of credit rating changes across two categories of firms: investment- and speculative-grade firms. We observe some interesting patterns. First, the majority of credit rating upgrades and downgrades occur in investment-grade firms. Second, the number of credit rating downgrades surged in 2001 and 2002, and increased sharply in 2008 and 2009, which are likely due to the dot-com bubble burst in the year 2000 and the recent global financial crisis over the period 2007-2009. Third, the proportion of speculative-grade firms that are downgraded varies over time, and increases toward the later part of our sample period, with a noticeable jump in 1999 and reaching more than 55% of all downgrades in 2011. Finally, the proportion of investment-grade firms that are upgraded stood at a high of nearly 76% in 1986, but dropped to a historical low of approximately 41% in 2004 and approximately 43% in 2010, which is then followed by a gradual recovery to reach a new high of 80% in 2014.

Distribution of upgrades and downgrades across years

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Upgrades	0	29	68	69	78	55	68	82	92	64
Investment		75.86%	64.71%	63.77%	67.95%	61.82%	61.76%	53.66%	56.52%	76.56%
Speculative		24.14%	35.29%	36.23%	32.05%	38.18%	38.24%	46.34%	43.48%	23.44%
Downgrades	0	117	108	99	80	102	102	64	62	58
Investment		77.78%	75.93%	70.71%	67.50%	63.73%	60.78%	65.63%	79.03%	79.31%
Speculative		22.22%	24.07%	29.29%	32.50%	36.27%	39.22%	34.38%	20.97%	20.69%

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Upgrades	105	82	93	105	52	62	64	58	91	102
Investment	68.57%	68.29%	67.74%	64.76%	63.46%	69.35%	57.81%	50.00%	59.34%	41.18%
Speculative	31.43%	31.71%	32.26%	35.24%	36.54%	30.65%	42.19%	50.00%	40.66%	58.82%
Downgrades	82	83	75	107	158	176	219	217	173	125
Investment	71.95%	69.88%	68.00%	77.57%	62.03%	72.73%	67.12%	61.29%	65.90%	68.00%
Speculative	28.05%	30.12%	32.00%	22.43%	37.97%	27.27%	32.88%	38.71%	34.10%	32.00%

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Upgrades	97	92	106	95	64	175	149	109	116	10
Investment	62.89%	57.61%	48.11%	61.05%	48.44%	42.86%	56.38%	58.72%	61.21%	80.00%
Speculative	37.11%	42.39%	51.89%	38.95%	51.56%	57.14%	43.62%	41.28%	38.79%	20.00%
Downgrades	156	149	131	171	185	64	67	79	65	3
Investment	66.03%	58.39%	71.76%	59.06%	56.22%	68.75%	44.78%	63.29%	52.31%	66.67%
Speculative	33.97%	41.61%	28.24%	40.94%	43.78%	31.25%	55.22%	36.71%	47.69%	33.33%