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Bank financing and credit ratings

Mascia Bedendo[*] Linus Siming[†‡]

Abstract

By looking at a sample of firms rated by S&P, we study the extent to which the mix between bank financing and other sources of debt affects corporate credit ratings. We find that S&P penalizes firms of high credit quality that use relatively more bank debt compared to market debt. Instead, debt composition does not seem to matter when rating risky firms. We conclude that managers of firms of high credit quality should have relatively low (high) recourse of bank financing (public debt) from a credit ratings perspective.

JEL Classification: G20, G21

Keywords: Credit ratings, Credit rating methodologies, Debt structure, Credit quality

[*]Audencia Business School, 8 route de la Jonelière, 44312, Nantes, France. e-mail: mbedendo@audencia.com.

[†]Corresponding author: Linus Siming, Audencia Business School, 8 route de la Jonelière, 44312, Nantes, France. e-mail: lsiming@audencia.com.

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1 Introduction

Corporate credit ratings are important for firms and corporate managers devote much effort to reach or maintain certain target credit ratings (Graham and Harvey, 2001; Kisgen, 2009). Higher credit ratings are associated with benefits for firms through, chiefly, lower borrowing costs. The link between the firm's debt composition and its credit rating is well established by Denis and Mihov (2003) and Rauh and Sufi (2010) who document that firms with high credit ratings borrow primarily from the bond market, while the proportion of bank debt increases for riskier firms. This difference is largely determined by the firm's rating itself, as predicted by the theoretical models based on information asymmetry, borrower reputation, and efficient renegotiation (Diamond, 1991), which predict that borrowers with high credit ratings earn rents from their reputations with lenders.

What remains unexplored is the extent to which the mix between bank financing and other debt sources directly impacts corporate credit ratings. While many variables have previously been explored to explain credit ratings (Alp, 2013; Baghai et al. 2014), we are the first to examine the role of a firm's debt composition. This is also an important question from a practitioner viewpoint, since the answer can help corporate managers better understand which financing choices could help them improve their credit rating.

Ultimately, whether the debt structure of a firm affects its credit rating remains an empirical question. In this paper we study whether credit rating agencies assign different ratings to companies with very similar credit quality (in terms of capital structure, profitability, growth opportunities, etc.) that differ only in their sources of debt composition.

By looking at a sample of firms rated by S&P, we find that the rating agency seems to penalize firms of high credit quality that use relatively more bank debt compared to those that issue bonds. By contrast, debt composition does not seem to matter when rating risky firms. These results suggest that the composition of debt is foremost important for firms with good credit quality. We conclude that, from a credit ratings perspective, managers of firms of high credit quality should have relatively low (high) recourse of bank financing (public debt). Managers of risky firms do however not need to spend much time thinking about the composition of their debt from a credit ratings perspective.

2 Hypotheses Development

The documentation on rating methodologies issued by the three main credit rating agencies makes little reference to the debt structure of firms as a determinant of corporate ratings. Only S&P indicates that debt composition is taken into account when assigning corporate ratings but its effect is ambivalent. Under normal market conditions, access to the bond market is seen as preferable for firms of high credit quality—investment-grade, hereafter IG—firms. Instead, bank credit is recognized as relevant for firms of low credit quality—high-yield, hereafter HY—especially in volatile markets, although the benefits associated with bank credit could be offset by tighter covenants (S&P, 2008). By contrast, Moody's (2016) does not explicitly include debt structure among the determinants of credit ratings for non-financial firms, while Fitch (2010) only refers to bank debt as a potential source of financial flexibility in passing. For this reason we focus our study on S&P rated firms.

The ambivalence of the S&P guidelines well reflects the ample evidence that bank-based financing is associated with both benefits and drawbacks, compared to publicly held debt, from the viewpoint of the borrowing firm. On the one hand, a well consolidated strand of literature hypothesizes that banks have a higher ability to monitor the lender (Diamond, 1984; Boyd and Prescott, 1986; Berlin and Loyes, 1988) than bond holders, easier access to private information and thereby the ability to perform internal credit assessment (Fama, 1985), as well as lower coordination hurdles in case of restructuring or debt renegotiation (Gertner and Scharfstein, 1991; Chemmanur and Fulghieri, 1994; Houston and James, 1996). On the other hand, both theory and empirical evidence agree that firms are better off replacing costly bank debt—in particular bank debt with tight covenants for liquidity—with non-bank debt as their credit quality improves (Berlin and Loyes, 1988; Diamond, 1991; Chemmanur and Fulghieri, 1994; Boot and Thakor, 1997; Bolton and Freixas, 2000; Denis and Mihov, 2003; Rahu and Sufi, 2010). Based on this literature and the S&P guidelines we formulate the following two hypotheses:

Hypothesis 1. *From a credit ratings perspective, a relatively low (high) recourse to bank (public debt) financing is beneficial for firms of high credit quality as bank financing is generally more costly compared to public debt financing.*

Hypothesis 2. *For firms of low credit quality one should not expect any benefits in terms of credit ratings from a relatively high recourse to bank financing, since such benefits may be offset by conditions imposed by stringent covenants.*

3 Empirical analysis

To test our hypotheses, we need to control for endogeneity, since we know that the issuer's credit quality plays a significant role in determining access to different funding sources. We use an ordered probit model for corporate ratings, estimated separately for IG and HY firms and only for firms with relatively low bank debt in each of the two groups. We then derive predicted ratings both in-sample and out-of-sample for firms with low and high bank debt, respectively. Our sample consists of a panel of U.S. non-financial firms rated by S&P and covered by CRSP, Compustat and Capital IQ from 2001 to 2013. We collect daily market data from CRSP, annual accounting data from Compustat and information on debt structure from Capital IQ. We apply the same filters as in Colla et al. (2014) when matching data from Compustat and Capital IQ. We measure a firm's rating with the S&P's Long-Term Local Currency Issuer Rating, obtained from Compustat. Table 1 displays the sample distribution across the different ratings and how we convert letter ratings into numerical codes using an ordinal scale ranging from 1 for the highest-rated firms to 17 for the lowest-rated firms.[1] Ratings from 1 to 10 (from 11 to 17) denote IG (HY) firms. This IG/HY cut-off point follows the rating manual of S&P.[2]

The main challenge of our study is to control for endogeneity, since issuers' ratings play a significant role in explaining their access to different financing sources. If we merely looked at the mix between bank and non-bank debt in our analysis, we would simply be capturing the difference between firms of high and low credit quality. To this aim, we follow a three-step approach. First, we exploit the cross-sectional variation in the debt composition of firms with similar credit quality, which is evident from Table 1. We group the individual ratings of firms into six rating classes. Within each class, we distinguish every year between firms

[1] We group together the lowest five rating notches since they are scarcely populated and this would produce empty cells in our probit specification.

[2] `https://www.spratings.com/en_US/understanding-ratings#secondPage`

S&P rating	Rating code	Proportion of high-bank debt firms	Rating class	Obs.	Bank debt/total debt Average	Bank debt/total debt Std. dev.
AAA	1	0.421				
AA+	2	0.667	1	301	0.053	0.150
AA	3	0.347				
AA-	4	0.578				
A+	5	0.416				
A	6	0.461	2	1,561	0.053	0.113
A-	7	0.495				
BBB+	8	0.373				
BBB	9	0.497	3	3,321	0.136	0.222
BBB-	10	0.599				
BB+	11	0.414				
BB	12	0.522	4	3,414	0.319	0.323
BB-	13	0.525				
B+	14	0.531				
B	15	0.497	5	2,541	0.309	0.326
B-	16	0.409				
CCC+						
CCC						
CCC-	17	0.482	6	199	0.255	0.270
CC						
C						

Table 1: Credit ratings: Classification and sample distribution

that rely less or more on bank financing by means of an indicator variable that equals 0 if the ratio of bank debt to total debt of the firm at year-end is below the median value of the ratio for the corresponding rating class in the year, and 1 otherwise. Bank debt consists of the sum of all term loans and revolving credit facilities (for the amount withdrawn). This approach would be biased if all low-bank debt (high-bank debt) firms of a given rating class were clustered into specific ratings: For example, if all low-bank debt firms in rating class 3 had rating BBB- and all high-bank debt firms had rating BBB+. This is not the case, since we can see from Table 1 that the proportion of firms categorized as high-bank debt in each rating code ranges between 35% and 67%. We compute medians across rating classes instead of individual ratings to ensure a sufficient sample size on a yearly basis and to account for the significant time variation in bank financing over our sample period, which is evident from Figure 1. From the figure we observe a clear increase in the median bank debt to total debt ratio for both IG and HY firms in the years from 2004 to 2008, followed by a sharp drop until 2010. The tent-shaped curve reflects the increased use of bank debt in the years leading up to the financial crisis and the subsequent shift to non-bank debt funding in the aftermath of the crisis.

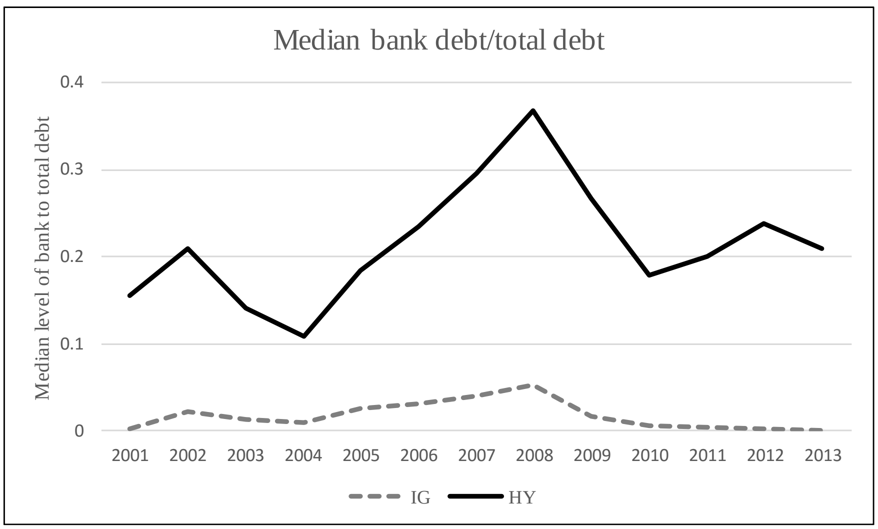

Figure 1: Median of bank debt to total debt by year

Second, we estimate an ordered probit model to explain corporate ratings as a function of firm characteristics and fixed effects. We estimate the model separately for IG and HY firms, following evidence of different empirical patterns in corporate ratings between the two groups (Alp, 2013). Importantly, the model is estimated only on firm-years that correspond to a bank debt indicator equal to 0, i.e. on firms with low-bank debt relative to their rating class. The ordered probit model maps the individual rating $IR_{i,t}$ of firm i in year t into a partition of the unobserved linking variable $Z_{i,t}$ according to threshold points μ, as follows:

$$IR_{i,t} = \begin{cases} 1 & \text{if } Z_{i,t} \in (-\infty, \mu_1) \\ 2 & \text{if } Z_{i,t} \in [\mu_1, \mu_2) \\ \vdots & \\ 9 & \text{if } Z_{i,t} \in [\mu_8, \mu_9) \\ 10 & \text{if } Z_{i,t} \in [\mu_9, \mu_{10}) \end{cases} ; \; IR_{i,t} = \begin{cases} 11 & \text{if } Z_{i,t} \in [\mu_{10}, \mu_{11}) \\ 12 & \text{if } Z_{i,t} \in [\mu_{11}, \mu_{12}) \\ \vdots & \\ 16 & \text{if } Z_{i,t} \in [\mu_{15}, \mu_{16}) \\ 17 & \text{if } Z_{i,t} \in [\mu_{16}, \infty) \end{cases} \tag{1}$$

for IG ($IR_{i,t} = 1, \ldots, 10$) and HY ($IR_{i,t} = 11, \ldots, 17$) firms, respectively. The latent variable $Z_{i,t}$ is then linked to a set of underlying observed variables selected from both prior literature (Alp, 2013; Baghai et al., 2014) and industry practice (S&P, 2008):

$$Z_{i,t} = \alpha_j + \gamma_t + \beta' X_{i,t} + \epsilon_{i,t} \tag{2}$$

where γ_t denotes year fixed effects to capture the time variation in rating standards, α_j denotes industry fixed effects (2-digit SIC codes) to account for specificities in ratings across sectors, and the matrix $X_{i,t}$ contains a set of explanatory variables, namely: Size (natural logarithm of market capitalization); Cash (cash and short-term investments/total assets); Tangibility (property, plant, and equipment/total assets); R&D expenses/total assets, set to 0 if data are missing; Capex (capital expenditures/total assets); Market-to-book ratio ((book value of assets–book value of equity+market value of equity)/book value of assets); Interest coverage (past three year average of (operating income after depreciation+interest expenses)/interest expenses); Profitability (past three year average of operating income before depreciation/sales); Book leverage (past three year average of (short-term debt+long-term debt)/total assets); Beta, derived from regressing the firm's daily stock returns on the CRSP value-weighted index return the past calendar year; Idiosyncratic risk (root mean squared error from the regression of firms' daily stock returns on the CRSP value-weighted index return); Short-term debt/total debt. All continuous variables are winsorized at 1% and 99%. Table 2 reports the estimates from the ordinal probit regressions on IG and HY firms. Since our outcome variables are inversely related to credit quality, a positive coefficient indicates a negative impact on the rating level and vice versa. Coefficient estimates and pseudo R-squared confirm the relevance of the standard determinants of credit ratings.

Third, we generate predicted ratings from the ordinal probit both in-sample (for firms whose proportion of bank debt is below the median for the corresponding rating class in the year) and out-of-sample (for firms with a ratio of bank debt to total debt above the median). Rating errors are defined as the difference between the rating predicted by the model and the actual rating assigned by S&P. Positive (negative) rating errors indicate that the actual rating is better (worse) than the predicted one. Given our estimation strategy, if bank financing is a significant determinant of corporate ratings over and above the standard determinants included in the ordered probit, we expect to find differences in the rating errors between firms that rely relatively less or more on bank debt. Figure 2 shows the distribution of rating errors in-sample and out-of-sample for both IG and HY firms. Summary statistics of the rating errors are reported in Table 3. Together, Figure 2 and Table 3 indicate that, on average, S&P assigns higher (lower) ratings than those predicted by the model to IG (HY) firms: In essence, our probit specification consistently underestimates (overestimates) corporate ratings for companies of high (low) credit quality. This is not a concern, since our aim is

	IG	HY
Size_t	-0.420***	-0.443***
	(0.058)	(0.041)
Cash_t	1.204**	1.878***
	(0.594)	(0.337)
Tangibility_t	-0.893**	0.703***
	(0.440)	(0.262)
$\text{R\&D}_t$	-0.315	2.641**
	(2.067)	(1.274)
Capex_t	4.153***	-0.024
	(1.458)	(0.596)
M/B_t	-0.178***	0.158**
	(0.067)	(0.067)
$\text{Interest coverage}_t$	-0.004*	-0.001
	(0.002)	(0.002)
Profitability_t	-1.329**	-1.705***
	(0.523)	(0.292)
Leverage_t	2.168***	1.736***
	(0.440)	(0.249)
Beta_t	0.140	0.129**
	(0.130)	(0.060)
$\text{Idiosyncratic risk}_t$	70.852***	37.782***
	(8.773)	(2.957)
Short-term debt_t	-1.440***	-0.236
	(0.247)	(0.236)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Obs.	2,619	3,018
Pseudo R-squared	0.170	0.209

Table 2: Credit rating model

This table displays estimation results for the ordered probit model estimated on firms (IG and HY) with low-bank debt relative to their rating class. Robust standard errors in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

not to estimate the most accurate rating model. Most importantly for our purposes, this pattern is not entirely homogeneous across low- and high-bank debt firms. The comparison between predicted and actual ratings reveals that rating agencies penalize IG firms that use relatively more bank debt compared to those that borrow from the market, while no significant difference emerges within HY firms. IG issuers that rely relatively less on bank financing enjoy significantly higher ratings than those whose proportion of bank debt is above

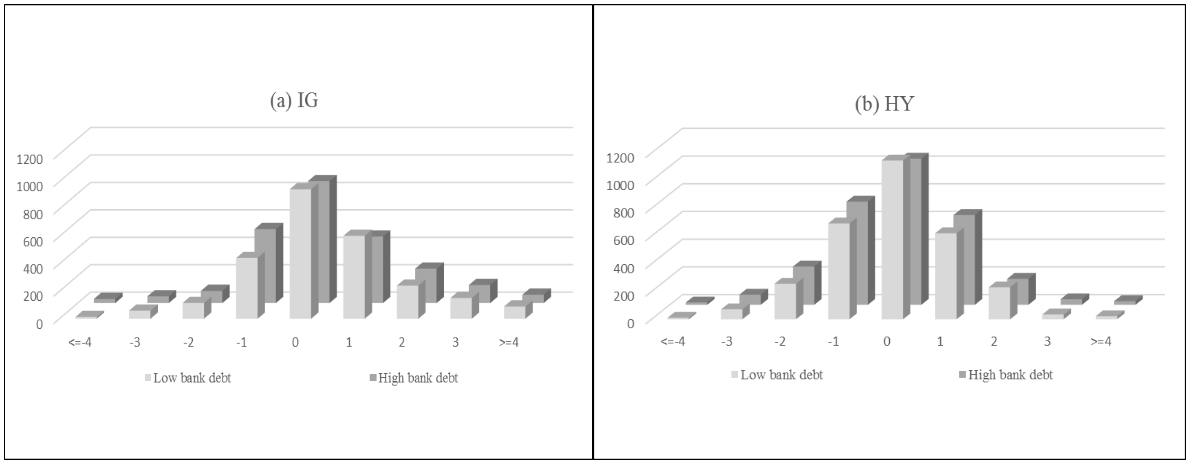

Figure 2: Distribution of rating errors

the median, which is in line with our first hypothesis. HY issuers with a larger share of bank debt do not seem to be penalized by rating agencies compared to those with a low proportion of bank debt since the difference in rating errors is not statistically significant, which is in line with our second hypothesis. All in all, our results suggest that S&P particularly values recourse to the bond market for companies of good credit standing, while they do not attach a significant role to the debt structure composition of riskier companies.

	Mean	Std. err.	Obs.	t-test	z-test	KS-test
IG low-bank debt	0.389***	0.029	2,659	3.040***	3.242***	0.043**
IG high-bank debt	0.263***	0.029	2,524			
HY low-bank debt	-0.059***	0.023	3,088	1.427	1.618	0.028
HY high-bank debt	-0.106***	0.023	3,066			

Table 3: Summary statistics of credit rating errors

The t-test (z-test) [KS-test] shows two-sample t-test for the difference in means (Wilcoxon test for the difference in medians) [Kolmogorov-Smirnov test for equality of the distributions in Figure 1]. *** and ** indicate statistical significance at the 1% and 5% levels, respectively.

4 Discussion

As the first to examine how a firm's debt composition affects its credit rating, our results make a contribution to the literature on the link between credit ratings and debt composition. We have shown the extent to which a firm's debt structure directly impacts its corporate credit rating, by looking at a sample of firms rated by S&P. We find that this credit rating agency penalizes firms of high credit quality that use relatively more bank debt compared to those that issue bonds. By contrast, the debt mix does not seem to matter for the credit ratings of risky firms. Our results suggest that the composition of debt is foremost important for firms with good credit quality. Thus, from a credit ratings perspective, managers of such firms may consider lower their relative recourse of bank financing in favor of public debt.

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