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Credit Rating and Capital Structure: How Concerned are Managers about Credit Ratings?

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Dissertation written under the supervision of professor Mário Henrique Machado Meira

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ABSTRACT

This dissertation answers several questions regarding managers' concerns about firms' credit ratings by using credit scoring to identify firms that are close to a change in their micro credit rating and by assessing their capital structure decisions over the following 12 months. First, the work reconfirms the existing literature by providing empirical evidence that managers adjust their capital structure based on concerns about imminent micro credit rating shifts. In addition, analysis proves that managers adjust capital structure to a greater extent when they are more likely to face a rating change. Specifically, firms reduce *DE (Debt to Equity) Issuance* by 1.6% when they are in the one-fifth (1.0% when in the one-third) of firms that are likely to face a rating downgrade in the future. Furthermore, results confirm that the use of a scoring mechanism to classify firms as close to a rating change is of little importance, as a more sophisticated approach used in this dissertation shows similar results to the literature. Next, results proof that firms classified as investment grade behave differently in terms of capital structure adjustments compared to the entire sample, by showing a 0.1 percentage point larger reduction *in DE Issuance* compared to the full sample. Finally, this dissertation investigates the key factors driving changes in *DE Issuance*, focusing on firms' behaviour regarding equity and debt instruments. Specifically, it assesses *Net Equity Issuance* and *Net Debt Issuance* separately. The findings highlight that managers prefer using debt to respond to micro credit rating changes.

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Keywords: Credit Rating, Capital Structure, Credit Rating Changes, Credit Scoring, Credit Risk, *DE (Debt to Equity) Issuance*, *Net Equity Issuance*, *Net Debt Issuance*, Managerial Behaviour

RESUMO

Esta dissertação aborda as preocupações dos gestores relativamente às notações de crédito das suas empresas, utilizando um mecanismo de pontuação de crédito para identificar as empresas que se aproximam de uma potencial alteração da micro notação de crédito. Confirma-se que os gestores ajustam a sua estrutura de capital com base em alterações de notação iminentes e fazem-no mais quando enfrentam uma maior probabilidade de alterações de notação. Nomeadamente, as empresas reduzem a emissão de dívida em relação ao capital próprio em 1.6% (1.0% no terço superior) quando são susceptíveis de enfrentar uma descida de notação. O estudo conclui que a utilização de um mecanismo de pontuação para classificar as empresas como estando próximas de uma alteração da notação de crédito é menos crítica, uma vez que uma abordagem mais sofisticada produz resultados semelhantes. Além disso, os resultados provam que as empresas com grau de investimento se comportam de forma diferente em comparação com toda a amostra, apresentando as empresas com grau de investimento uma redução 0.1% maior na emissão de dívida para capital próprio em comparação com toda a amostra. Finalmente, a dissertação analisa o comportamento individual das empresas relativamente à utilização de acções ou de dívida, com a emissão líquida de dívida a apresentar coeficientes mais fortes e esperados, indicando uma preferência pela dívida para contrariar as micro alterações de notação de crédito por parte dos gestores.

Título: Notação de crédito e estrutura de capital: Até que ponto os gestores estão preocupados com as notações de crédito?

Autor: Frederik Antonius Gödde

Palavras-chave: Notação de crédito, Estrutura de capital, Alterações de notação de crédito, Notação de crédito, Risco de crédito, *Emissão de dívida*, *Emissão líquida de acções*, *Emissão líquida de dívida*, Comportamento de gestão

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Finally, I dedicate this thesis to my parents, my brother, and my girlfriend, in the knowledge of their sacrifices and as a testimony of my feelings towards them. Nothing can express the extent of my appreciation, respect, and love for them. I would also like to thank my friends for their encouragement and moral support. I feel very fortunate to have them all in my life.

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1. INTRODUCTION

Capital structure decisions have become increasingly important in recent years, especially in the context of rising interest rates and the consequent need for companies to optimise their financial position. Many factors, such as the cost of capital or liability decisions, are commonly known to influence managers' capital structure decisions. Surprisingly, Graham & Harvey (2001) find that credit ratings themselves on the debt side are the second most important factor influencing managers' capital structure decisions. In addition, Judge and Korhenitskaya (2021) state that credit ratings are the most important factor for managers when evaluating financing decisions. Consequently, it is important to evaluate to what extent credit ratings can influence managers financing decisions (Almeida et al. (2017)). Managers instinctively adjust capital structures after a downgrade to counteract for example the increased cost of capital. Recent research delves deeper, examining proactive capital structure adjustments in anticipation of impending changes in credit rating, with the aim followed by managers of for example maintaining or achieving improved credit ratings. The starting point in this field of research is an empirical study conducted by Kisgen (2006), which examines managers' capital structure decisions across both, broad rating categories and micro rating classes based solely on the anticipation of an imminent change in the respective rating categories. While subsequent studies have partially confirmed Kisgen's so-called Credit Rating-Capital Structure Hypothesis (CR-CS) and the empirical existence of managerial behaviour prior to a rating change, also contrasting perspectives have emerged that warrant further exploration.

This dissertation focuses exclusively on managerial capital structure decisions prior to a change in micro credit rating. Overcoming the challenge of outdated data from studies in this area, most of which date back to the early 2000s, this study uses more recent information with credit ratings up to 2016 to reassess the credit rating capital structure hypothesis in the context of contemporary financial dynamics. In addition, this dissertation refines Kisgen (2006) methodology and incorporates a more sophisticated credit scoring mechanism to classify firms as being close to a change in micro in the future. I expect that a more sophisticated credit scoring mechanism will produce more accurate results than existing research. However, the overall results are consistent with previous research, showing a statistically significant reduction of *DE Issuance* of 1% for firms classified as being close to

a rating downgrade at a 1% significance level, which is in line with Kisgen (2006) original findings. Alongside reconfirmation of original findings, this dissertation seeks to add relevant research to existing literature, starting by examining the extent to which managers modify their capital structure in response to the expected likelihood of micro credit rating changes, an aspect that remains underexplored in the existing literature. I expect a greater magnitude of capital structure adjustments when a rating change is more likely. The results confirm this expectation, showing stronger capital structure activity in extreme cases with firms assigned a higher likelihood of a downgrade reducing their *DE Issuance* up to 1.6% in the subsequent financial year at a 1% significance level. Furthermore, the research will assess the existence of differences in behaviour between firms classified solely as investment grade and firms across all rating classes. I expect different activity in capital structure adjustments within a subsample of investment graded firms only. Firms indeed show a slightly stronger net effect of all firms being close to an upgrade or downgrade showing a 0.1 percentage points stronger reduction in *DE Issuance* compared to the entire sample. Individual downgrade or upgrade cases nevertheless show a weaker magnitude in *DE Issuance* reduction when facing a downgrade and do, in contrast to looking at the entire sample, also show a decrease in *DE Issuance* when being likely to receive a rating upgrade in the subsequent period. Finally, *Net Debt* and *Net Equity Issuance* is evaluated in this context individually. I expect firms and managers to be more active on the debt side than on the equity side due to easier access to debt markets and overall lower costs associated with debt financing. The results confirm this expectation and show a stronger use of debt instruments than equity instruments, alongside individual adjustments on the *Net Debt Issuance* in response to whether facing an upgrade or downgrade, whereas a positive *Net Equity Issuance* emerges in all cases. Answering these questions aims to shed light on the decision-making process of managers and its implications for firm's financial well-being. The relevance of this study lies in its potential to deepen the understanding of the complex relationship between credit ratings and capital structure decisions. As credit ratings play a central role in influencing a firm's access to and cost of capital, understanding how managers respond to expected changes can provide valuable insights for strategic planning and financial risk management.

To answer the questions systematically, this dissertation begins with a comprehensive review of the existing literature, which serves as a foundation for the empirical study,

highlighting key concepts, theories, and previous findings in this area of research. The dissertation then outlines the presentation of summary statistics, providing a detailed overview of the characteristics of the dataset and the relevant measures used to answer research questions. The methodology used in this study is structured around the research questions, individually formulated to address specific aspects of each research problem. The statistical methods chosen, the data collection process and the model specifications are described to ensure the transparency and replicability of the study. The results section then presents the findings of the empirical analysis, organised according to the research questions. Based on the results, the conclusion synthesises the findings to answer the research questions and addresses the broader implications of the study for the field of research. Despite the contributions of this research, it is important to acknowledge its limitations. A frank assessment of these limitations ensures a nuanced understanding of the scope of the study and informs future directions for improvement.

2. LITERATURE REVIEW

To date, the literature and research on the influence of credit ratings on managerial capital structure decisions, especially decisions taken in advance of a change in micro credit ratings, is rather limited and offers potential for further investigation. As mentioned above, Graham & Harvey (2001) first introduce the importance of credit ratings in managers' capital structure decisions when conducting a comprehensive survey of 392 CFOs in the US and Canada, asking them about their firms' cost of capital, capital budgeting and capital structure decisions. The results of this survey show that credit ratings are the second most important factor in managers' capital structure decision-making process, increasing the importance of credit ratings in academic research related to capital structure decisions.

Taking Graham & Harvey (2001) as the first research to shed light on the importance of credit ratings in the context of firm’s capital structure adjustments, a pioneer in the field of evaluating the empirical relationship between credit ratings and capital structure decisions is Darren J. Kisgen, who tests this implication based on the motivation of Graham & Harvey (2001). Kisgen (2006) first finds empirical evidence of managerial behaviour in capital structure adjustments based solely on managerial concerns about a change in credit ratings. To explain his empirical findings, Kisgen (2006) also puts forward the Credit Rating-Capital Structure Hypothesis (CR-CS), a hypothesis which posits discrete costs and benefits for a

firm associated with a change in credit rating. The costs and benefits include regulations on bond investments tied to credit ratings, the information content of ratings on firm quality, and costs directly imposed on firms tied to different levels of bond ratings. Kisgen (2006) notes that, depending on the magnitude of these costs and benefits, the CR-CS hypothesis outweighs common capital structure theories such as the trade-off or pecking order theories. As firms are moreover known to attribute benefits like the tax shield towards debt financing in general (Modigliani and Miller (1963)), showing its importance in financing decisions, this hypothesis is fundamental to the study of credit ratings and capital structure and forms the basis for further discussion in this paper.

Examining all firms with a Standard & Poor's Long-Term Domestic Issuer Credit Rating available in Compustat from 1986 to 2001, Kisgen (2006) provides empirical evidence that solely the concern for a change in credit ratings affect managers' capital structure decisions. To test for a correlation between changes in capital structure prior to a change in credit rating, Kisgen (2006) includes in his regression dummy variables that account for a firm being close to a rating change in broad ratings, i.e., BBB or BB (plus or minus test), and micro ratings, i.e., BBB- or BBB (change estimated via a credit score). This credit scoring micro rating approach is again taken up and refined in this dissertation. Kisgen (2006) results show that, on an annual basis, companies with a plus or minus broad rating issue about 1.5% less net debt minus net equity as a percentage of total assets. These results are consistent with the findings that firms in the top or bottom third of micro credit ratings issue about 1.0% less net debt minus net equity. Kisgen (2006) explains the broad rating results by managers' concern with the costs (or benefits) of ratings and the impact of regulation on bond investors. The correlation in micro ratings is explained by managers using ratings as an indicator of firm quality.

Kisgen (2007) further assesses the importance of credit ratings and capital structure and the underlying rationale for managers' concerns about maintaining targeted rating levels. Firms with lower credit ratings are known to use less debt financing, and debt is more expensive compared to well-rated firms (Alanis et al. (2020)). Kisgen (2007) argues that a higher credit rating directly benefits all a firm's shareholders by broadening the pool of eligible investors, reducing the cost of debt financing, and improves the terms of financing beyond *Net Debt Issuance*, as a high credit rating implies stability for all stakeholders. It is

further argued that a company's capital structure policy cannot be generalised and must be tailored to the company. Kisgen (2007) arguments are consistent with his empirical findings from Kisgen (2006). Firms facing a rating change make financing choices between reducing debt or issuing equity to avoid rating downgrades or to achieve rating upgrades.

Kisgen (2009) revisits the relationship between credit ratings and leverage levels of firms, complementing his earlier study. By testing the adjustment of leverage levels of all firms available in Compustat with a Standard & Poor's Long-Term Domestic Issuer Credit Rating from 1986 to 2001 after an actual rating change, he again provides statistical evidence of the influence of credit ratings on managers' capital structure decisions. The results of his study show that a rating downgrade is a better predictor of capital structure behaviour than changes in leverage, bankruptcy probability or profitability. Firms issue less net debt relative to equity after a downgrade, while they are less likely to reduce equity. This behaviour is consistent with a long-term capital structure policy that maintains a minimum credit rating and is independent of annual business cycle effects, distress concerns and timing activities. The results show that firms specifically target rating levels at which regulations affect investment in the firm's bonds and at which access to commercial paper is affected. Kisgen (2009) results are consistent with the costs and benefits associated with CS-CR and Kisgen (2007) rationale for managers targeting rating levels.

Kemper & Rao (2013) again discuss the role of credit ratings in firms' marginal financing behaviour, challenging the findings of Kisgen (2006, 2009) and the CR-CS hypothesis. They argue that the CR-CS hypothesis should not be used as a generalised description of firm behaviour. Kemper & Rao (2013) hypothesise that the CR-CS holds more for a subset of firms, which differs systematically across firms characterised by firm-level attributes. The authors empirical study of all listed firms in Compustat from 1986 to 2009, available with Standard and Poor's Long-Term Domestic Issuer Credit Rating, builds on the study of Kisgen (2006). In addition, Kemper & Rao (2013) test for different broad rating classes and use subsamples based on attributes that are correlated with managers' motivations to follow the CR-CS hypothesis. The attributes identified by Kemper & Rao (2013) include frequency of access to capital markets, firm growth opportunities, and use of commercial paper. The results show that CR-CS is not systematically related to any of these attributes. Furthermore, Kemper & Rao (2013) are unable to prove that CR-CS holds for all rating

classes. Their results show that, except for B- rated firms, no firm uses a leverage adjustment when facing a credit rating downgrade (or upgrade). Kemper & Rao (2013) justify their results by arguing that Kisgen (2006) original findings are driven by subsamples of firms with extremely low ratings. Moreover, B- rated firms use less debt, which is not a managerial attempt to adjust the capital structure, but rather a lack of access to the debt market. Therefore, Kemper & Rao (2013) conclude that Kisgen's (2006) CR-CS model is not appropriate for describing how firms make marginal financing decisions. A limiting factor in Kemper & Rao (2013) is the use of plus or minus tests, and therefore only testing for broad assessments. This has already been identified by Kisgen (2006) as a limitation due to imprecision and noise. For this reason, the results of Kemper & Rao (2013) should be treated with caution and used as a basis for further research.

Wojewodzki et al. (2018) test the role of credit ratings on capital structure and its speed of adjustment to an optimal level. In addition, the authors test for differences in the correlation between credit ratings and capital structure across countries, which has been relatively neglected prior to their study. The authors use all firms available on Compustat with a Standard and Poor's Long-Term Domestic Issuer Credit Rating that were listed on a major stock exchange in their country between 1991 and 2010. Wojewodzki et al. (2018) find that the impact of credit ratings on capital structure is negative and more significant in countries with more market-oriented systems. In these countries, firms with lower credit ratings make faster adjustments towards the target leverage level than firms with higher credit ratings. They again explain the negative relationship of CR-CS by discrete costs and benefits associated with credit ratings for firms (in line with Kisgen (2006)).

In a more recent study, Feda (2020) tests the relationship between credit rating and capital structure. He tests the correlation in capital structure after a credit rating change using firms listed on the NYSE from 2008 to 2017 with a Standard and Poor's credit rating at the beginning of the year. Feda (2020) results show that downgraded firms are more likely to either reduce debt and issue equity or reduce debt only. Feda (2020) adds that adjustments in capital structure towards a target level are due to discrete benefits associated with a higher credit rating level, which is consistent with Kisgen (2006) CR-CS hypothesis. Empirical evidence also suggests that consistent with the benefits of higher credit ratings, firms are less

likely to adjust their capital structure following a rating upgrade. The findings of Feda (2020) are consistent with Kisgen (2006) CR-CS hypothesis.

In summary, Kisgen (2006) CR-CS hypothesis has been empirically re-examined several times in recent years. The results of further studies largely confirm this hypothesis, with a single exception by Kemper & Rao (2013). This provides a basis for whether the CR-CS holds, but also leaves room for further research due to the still limited nature of the empirical studies, especially regarding the timeliness of the data and most studies testing for changes after an actual downgrade and not for managerial behaviour prior an anticipated change in credit ratings.

3. DATA COLLECTION AND SUMMARY STATISTICS

The initial dataset for this study consists of all firms with Long-Term Domestic Issuer Credit Ratings from Standard and Poor's, covering the period from 1985 to 2016, available at the beginning of a particular year in Compustat. To ensure the quality of the data, a set of necessary cleaning steps were carried out. First, observations without credit ratings were removed from the dataset. In addition, industry codes representing government and quasi-government sectors (SIC > 9000) were excluded as firms operating in government sectors operate different in capital structure decisions. The industries SIC 6000 - 6999 (Financials) and SIC 4900 - 4999 (Utilities) are often also excluded in empirical capital structure analysis due to differences in balance sheets. Nevertheless, in the following study, they were retained in the analysis to ensure a database as large as possible, in line with existing literature that has demonstrated the robustness of results with and without including these industries (Kisgen, 2006). To establish meaningful relationships, the firms Standard & Poor's Long-Term Domestic Issuer Credit Ratings were merged with the corresponding fundamental data using Stata, based on the variables Datadate and CUSIP. Some literature suggests a lag of fundamental data points of up to 3 months when merging to ensure overall availability of metrices at the point in time of the credit rating publishment. Nevertheless, Baghai et al. (2014) shows robustness to lagging fundamentals, arguing lagging does not reveal different results. Due to the goal orientation of this work and desired simplicity of the model, lagging fundamentals has been omitted at this point, merging credit ratings and fundamental ratios at the same point in time. Further following the literature, observations exceeding 10% of *Net Debt Issuance* in relation to *Total Assets* in the subsequent 12 months

were excluded from the analysis. Large debt offerings to this extent are often considered to be one-off events, such as leverage for acquisition financing, rather than reflecting management adjustments to avoid a credit rating downgrade or maintain and improve a credit rating (Kisgen, 2006), thus being irrelevant for the following analysis.

After initial cleaning and merging fundamental data with respective credit ratings, relevant financial ratios (new variables) are calculated to assess credit risk and to approximate companies facing potential micro rating upgrades or downgrades (for details please refer to the Methodology section outlined below). These ratios were selected based on the work of Kisgen (2006) and expanded with additional ratios introduced by Baghai et al. (2014), who's research extensively describes credit risk using financial ratios. To deal with missing data, observations that lack essential fundamental information necessary to subsequently derive an own credit score were dropped from the dataset. Furthermore, to mitigate the impact of extreme values, all variables except the Numerical Credit Rating are winsorized at the 99th percentile. The relevant variables to derive a credit score and the *Net Debt*, *Net Equity* and *DE (Debt to Equity) Issuance* for the subsequent regression were calculated as follows:

- $Numerical\ CR_{it} = Starting\ with\ AAA_{it} = 21\ and\ ending\ with\ C_{it} = 1$
- $BookLev_{it} = (Long\ Term\ Debt_{it} + Short\ Term\ Debt_{it}) / Total\ Assets_{it}$
- $ConvDe/\ Assets_{it} = Convertible\ Debt_{it} / Total\ Assets_{it}$
- $Rent/\ Assets_{it} = Rental\ Payments_{it} / Total\ Assets_{it}$
- $Cash/\ Assets_{it} = Cash\ \&\ Marketable\ Securities_{it} / Total\ Assets_{it}$
- $Debt/\ EBITDA_{it} = (Long\ Term\ Debt_{it} + Short\ Term\ Debt_{it}) / EBITDA_{it}$
- $IntCov_{it} = EBITDA_{it} / Interest\ Expense_{it}$
- $Profit_{it} = EBITDA_{it} / Total\ Revenue_{it}$
- $Log\ (Assets)_{it} = Log\ (Total\ Assets_{it})$
- $Tangibility_{it} = Property\ Plant\ \&\ Equipment_{it} / Total\ Assets_{it}$
- $CAPEX/\ Assets_{it} = CAPEX_{it} / Total\ Assets_{it}$
- $Income/\ Assets_{it} = Net\ Income_{it} / Total\ Assets_{it}$
- $Net\ Debt\ Issuance_{it} = (Long\text{-}Term\ Net\ Debt\ Issuance_{i,\ t+1} - Long\text{-}Term\ Debt\ Reduction_{i,\ t+1} + Change\ in\ Current\ Debt_{i,\ t+1}) / Total\ Assets_{it}$
- $Net\ Equity\ Issuance_{it} = (Sale\ of\ Common\ and\ Preferred\ Stock_{i,\ t+1}$
  - $Purchase\ of\ Common\ and\ Preferred\ Stock_{i,\ t+1})) / Total\ Assets_{it}$

- $DE\ Issuance_{it}$ = $((Long\text{-}Term\ Net\ Debt\ Issuance_{i,\ t+1} - Long\text{-}Term\ Debt\ Reduction_{i,\ t+1} + Change\ Current\ Debt_{i,\ t+1}) - (Sale\ Common\ and\ Preferred\ Stock_{i,\ t+1} - Purchase\ Common\ and\ Preferred\ Stock_{i,\ t+1}))/\ Total\ Assets_{it}$
- K_{it} = Control variables, including size: $ln\ (Sales_{i,\ t-1})$ and profitability: $EBITDA_{i,\ t-1}/\ Total\ Assets_{i,\ t-1}$

Table 1: Summary Statistics

Overview of summary statistics of variables for the years 1985 to 2016 used to calculate the credit score and dependent variables for further analysis, namely *Net Debt Issuance*, *Net Equity Issuance* and *DE Issuance*. All variables, expect Numerical CR are winsorized at 99th percentile.

Variable	N	Mean	SD	Min	p25	p50	p75	Max
Numerical CR	23,021	12.407	3.905	1	9	13	15	21
BookLev	23,021	0.341	0.206	0.006	0.208	0.308	0.417	1.175
ConvDe/ Assets	23,021	0.019	0.058	0.000	0.000	0.000	0.000	0.334
Rent/ Assets	23,021	0.020	0.028	0.000	0.005	0.010	0.020	0.173
Cash/ Assets	23,021	0.079	0.096	0.000	0.012	0.043	0.109	0.491
Debt/ EBITDA	23,021	3.317	3.616	0.000	1.324	2.427	4.025	25.395
IntCov	23,021	10.584	18.625	0.000	2.961	5.465	10.269	140.067
Profit	23,021	0.191	0.139	-0.173	0.097	0.162	0.268	0.634
Log (Assets)	23,021	8.106	1.612	4.592	6.983	8.054	9.190	12.145
Tangibility	23,021	0.403	0.258	0.009	0.178	0.363	0.625	0.900
CAPEX/ Assets	23,021	0.058	0.042	0.002	0.027	0.049	0.078	0.220
Income/ Assets	23,021	0.029	0.081	0.382	0.010	0.037	0.066	0.206
Net Debt Issuance	12,297	0.014	0.074	-0.168	-0.017	0.001	0.034	0.378
Net Equity Issuance	19,968	-0.007	0.043	-0.179	-0.011	0.000	0.001	0.194
DE Issuance	11,500	0.023	0.0881	-0.224	-0.016	0.009	0.050	0.425

Table 1 outlines summary statistics of the initial dataset for the years 1985 to 2016. The first 5 years of observations will be lost as further analysis uses a 5-year rolling window approach to describe credit risk for the following year. Observations comprise firm years of firms ranked as investment grade and speculative grade. Variables starting from *Numerical CR*, down to *Income/ Assets* are used to derive a credit score to later in analysis classify firms in their micro rating whether being close to change in micro rating or not. *Net Debt*, *Net Equity* and *DE Issuance* are finally the measures of interest. Overall, summary statistics appear in line with expectations and literature, comparing the ratios to the ratios used by Baghai et al. (2014). In addition, I am confident in capturing most observations of interest in

Net Debt, *Net Equity* and *DE Issuance*, as Kisgen (2006) uses half the time horizon of the same credit ratings with remaining also around half the amount of observations in for example *DE Issuance*.

4. METHODOLOGY

The primary objective of the empirical analysis is to gain insights into managerial behaviour with respect to capital structure adjustments prior to micro rating changes, thus being able to give an answer about how concerned managers really are about rating changes. In pursuit of this objective, the first and crucial step is to approximate the probability of micro rating upgrades or downgrades for companies each year, anticipating the subsequent rating publication. A change in micro credit rating is classified as for example an upgrade from AA to AA+. So, this analysis relies on the prediction of micro rating shifts, which is achieved using a credit score test first introduced by Kisgen (2006) and subsequently refined by Baghai et al. (2014). By employing a credit risk equation tailored to individual years, the analysis facilitates the ranking of firms within their respective micro-rating tiers, which include the top, middle and bottom thirds. In addition, this study examines the upper and lower quintiles, septiles and deciles within each micro rating, thereby comprehensively capturing extreme scenarios. Firms within a micro rating class having a higher credit score then other firms in this micro rating are ranked higher, with for example firms in the top thirds being assigned a 1 for the dummy variable CR_{high} and 0 otherwise. The analysis thus creates own credit outlooks based on the credit score. Alternatively, you could also use historical credit outlooks from rating agencies directly to capture the immense of a change in rating. As this dissertation tries to answer questions in relation to applying a credit score, historical credit outlooks are neglected at this point.

As mentioned, the initiation of the testing process depends on the establishment of an equation that effectively captures credit risk. This step involves the regression of fundamental ratios outlined in Table 1, recognised as predictors of credit ratings, against previously assigned *Numerical Credit Ratings (CR)*, as described in the seminal works of Kisgen (2006) and Baghai et al. (2014). These numerical assignments range from 1, corresponding to a credit rating of CCC-, to 21, indicating a credit rating of AAA+. The independent variables used in the regression analysis are derived from the criteria used by the rating agencies themselves, supplemented by findings from previous studies that have demonstrated their

effectiveness in predicting credit ratings (further details on the ratio calculations are provided in the summary statistics Table 1). It is worth noting that this analysis includes a more extensive set of descriptive variables compared to the original research by Kisgen (2006). Kisgen (2006) in addition regresses his credit score coefficients over the entire sample, neglecting the change of magnitude of coefficients over time. Kisgen (2006) postulates that the pursuit of maximum precision in deriving the credit score is of diminished importance since the subsequent analysis does not work with absolute values but rather with firm rankings. However, in view of the present empirical exercise, which seeks to investigate extreme cases and includes finer percentiles of firm rankings, it is reasonable to expect a refined scoring mechanism to be essential, promising greater accuracy in the results.

First regression analysis starts by regressing all the fundamental ratios presented in the summary statistics for the first quinquennium (1985-1989) against their corresponding *Numerical Credit Ratings (Numerical CR)*. This iterative process culminates in the derivation of a credit score characterising the credit risk for the following year (1990). A rolling window of 5 years is used, estimating the credit score betas on an annual basis due to the unavailability of earlier data points in previous periods. This 5-year rolling window framework is systematically applied to the entire sample, yielding distinct credit score betas for each year from 1990 to 2016. The period 1990 to 2016 is consequently the final dataset of credit ratings and subsequent capital structure adjustments observed in this dissertation (for distribution of S&P´s Credit Ratings please refer to Table 2 below). The individual calculation of credit score betas for each year is of paramount importance, given the temporal fluctuations in the magnitude and significance of the various explanatory variables over the extensive sample period (as evidenced by the year-specific ratios and their respective betas, as explained in Table 2).

Having determined the betas for each year, numerical credit scores are derived for each firm-year combination based on the results of the expanding window regression. Firms within each micro rating category are then stratified into upper, middle, and lower segments that span tenths, septiles, quintiles and thirds. For example, firms categorised in the B- micro rating category with credit scores that place them in the top or bottom third within B- are assigned a value of 1 for the CR_{hol} dummy variable. Similarly, companies in the top and bottom quintiles are assigned a value of 1 for the CR_{hol} dummy variable, while those in the

middle are assigned a value of 0 as dummy variables. Table 2 on the following page outlines summary statistics for the remaining credit ratings after losing first 5 years of observations due to rolling window approach.

Table 2: Overview S&P's Credit Ratings 1990 to 2016

Distribution of S&P's Long-Term Domestic Issuer Credit Rating. Credit Ratings from AAA to BBB- are investment grade, below BBB- speculative grade.

S&P's Long-Term Domestic Credit Ratings in Final Dataset Testing Capital Structure Adjustments for the Period 1990 - 2016				
S&P's Credit Rating	N	Percentage	Accumulative	Percentage Accum.
AAA	307	1,5%	307	1,5%
AA+	126	0,6%	433	2,1%
AA	507	2,5%	940	4,7%
AA-	592	2,9%	1532	7,6%
A+	993	4,9%	2525	12,5%
A	1766	8,7%	4291	21,3%
A-	1637	8,1%	5928	29,4%
BBB+	2051	10,2%	7979	39,5%
BBB	2521	12,5%	10500	52,0%
BBB-	1707	8,5%	12207	60,5%
BB+	965	4,8%	13172	65,2%
BB	1269	6,3%	14441	71,5%
BB-	1554	7,7%	15995	79,2%
B+	1787	8,9%	17782	88,1%
B	1214	6,0%	18996	94,1%
B-	678	3,4%	19674	97,4%
CCC+	271	1,3%	19945	98,8%
CCC	136	0,7%	20081	99,5%
CCC-	56	0,3%	20137	99,7%
CC	55	0,3%	20192	100,0%
C	0	0,0%	20192	100,0%
Total	20192	100,0%	20192	100,0%

Table 3 below outlines the credit score coefficients obtained for each year individually based on the previous 5 years. These coefficients are multiplied by the respective financial ratios of each firm and each year. Coefficients show the expected signs with magnitude and statistical significance variying over time, affirming the necessity to use a rolling window approach to capture credit risk on yearly basis. The signs of the coefficients are as expected and in line with literature. *Cash/ Assets* shows a counterintuitive negative sign, which despite surprise is also in line with existing literature of Acharya et al. (2012) who state that firms who are more likely to face default risks in the long run tend to hold more cash saved.

Table 3: Credit Score Coefficients by Year 1990 to 2016

Credit score coefficients for the years 1990 to 2016 used in credit scoring to assign proprietary numerical credit ratings. Coefficients are based on 5-year rolling window regressions starting with 1985 to 1989, so that the first coefficients are for 1990. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Credit Score Regression Results Rolling Window 5 years (Standard Errors clustered on firm level and Industry Dummies based on two-digit SIC codes)														
Year	Intercept	NI/ Assets	CAPEX/ Assets	Tangibility	Log (Assets)	Profit	IntCov	Debt/ EBITDA	Cash/ Assets	Rent/ Assets	ConvDe/ Assets	BookLev	R^2	N
1990	3.299***	7.353***	9.564***	1.777*	0.965***	0.0771	0.0384**	-0.117***	-0.124	-11.77**	-4.550***	-6.543***	0.6895	2829
1991	2.791***	8.870***	9.068***	1.852**	0.996***	-0.241	0.0487***	-0.121***	0.270	-11.06**	-3.878***	-5.690***	0.7072	3021
1992	3.160**	9.473***	8.273***	1.868**	1.031***	-0.888	0.0643***	-0.136***	-0.808	-12.20**	-2.749*	-5.104***	0.7135	3138
1993	4.075***	10.440***	7.895**	2.058**	1.072***	-0.843	0.0496***	-0.120***	-1.319	-13.44***	-1.938	-5.245***	0.7146	3101
1994	4.449***	10.17***	5.568*	2.102**	1.080***	0.0895	0.0359**	-0.114***	-1.814	-12.83***	-1.126	-5.459***	0.7013	2999
1995	4.495***	8.947***	6.316*	1.863**	1.045***	1218	0.0270**	-0.111***	-1.890	-10.75**	-1.818	-5.481***	0.6817	3083
1996	4.527***	7.082***	6.257**	1.565*	1.056***	2.488*	0.0210*	-0.091***	-2.512*	-10.14**	-1.833	-5.566***	0.6589	3156
1997	4.154***	6.595***	4.797*	1.543*	1.054***	3.656***	0.0171*	-0.082***	-3.384***	-8.688**	-1.299	-5.334***	0.6538	3207
1998	4.162***	5.935***	4.729*	0.972	1.041***	4.110***	0.0128*	-0.104***	-4.290***	-9.803**	-1.136	-4.805***	0.6526	3290
1999	3.719***	5.740***	6.293**	0.941	1.060***	4.134***	0.0150*	-0.115***	-4.009***	-9.478***	-0.922	-4.013***	0.6622	3376
2000	3.462***	6.166***	7.693***	0.964	1.087***	3.917***	0.0158*	-0.109***	-3.729***	-9.904***	-0.384	-3.488***	0.6753	3440
2001	2.928***	7.201***	6.018***	1.246**	1.110***	2.782***	0.0204***	-0.106***	-4.008***	-6.779**	0.0112	-3.002***	0.6850	3565
2002	2.527**	7.494***	5.112**	1.463**	1.125***	2.233**	0.0219***	-0.098***	-3.995***	-4.348*	-0.321	-2.733***	0.6863	3627
2003	2.390**	7.502***	3.938*	1.305**	1.128***	1.759**	0.0260***	-0.095***	-3.414***	-3413	-0.767	-2.782***	0.6903	3864
2004	2.607***	7.779***	4.259*	1.094**	1.115***	0.873	0.0263***	-0.094***	-3.574***	-4.706*	-1.063	-2.774***	0.6843	4039
2005	2.737***	7.995***	4.522**	0.848*	1.112***	-0.0647	0.0234***	-0.101***	-3.891***	-4.773*	-1.317	-2.642***	0.6663	4199
2006	2.514***	7.644***	4.555*	1.150**	1.115***	-0.340	0.0213***	-0.106***	-3.735***	-4.669*	-1.464	-2.700***	0.6536	4278
2007	2.157**	7.327***	1.448	1.208**	1.153***	-0.879	0.0214***	-0.133***	-3.412***	-4.911*	-1.398	-2.399***	0.6527	4390
2008	2.039**	8.644***	0.896	1.316**	1.145***	-1.671*	0.0227***	-0.144***	-3.602***	-6.332**	-1.166	-1.903**	0.6484	4278
2009	2.114**	8.041***	0.904	0.895*	1.131***	-1.029	0.0219***	-0.142***	-3.502***	-4.975*	-1.453	-2.389***	0.6561	4292
2010	1.865*	7.135***	1.789	0.691	1.124***	-0.696	0.0223***	-0.142***	-3.195***	-5.113*	-2.371**	-2.667***	0.6696	4195
2011	1.911*	6.913***	2.645	0.364	1.104***	-0.667	0.0234***	-0.132***	-2.644***	-7.293**	-3.285***	-2.870***	0.6719	4109
2012	2.346*	6.745***	3.967*	-0.0556	1.062***	-0.409	0.0250***	-0.121***	-2.065**	-8.057**	-4.197***	-3.096***	0.6747	4059
2013	2.578**	6.842***	4.104*	-0.212	1.050***	0.0881	0.0239***	-0.119***	-1.325	-8.488**	-4.945***	-3.191***	0.6796	4034
2014	2.248*	8.457***	4.415*	-0.0872	1.062***	0.188	0.0231***	-0.114***	-0.546	-8.993**	-6.118***	-3.200***	0.6859	3941
2015	1.827*	9.580***	3.432	-0.0505	1.090***	0.236	0.0229***	-0.130***	-0.0952	-8.685**	-6.868***	-2.672***	0.6939	3883
2016	1.701*	8.191***	2.732	0.0906	1.104***	0.373	0.0242***	-0.140***	0.363	-9.461**	-6.183***	-2.441***	0.7006	3812

After deriving relevant dummy variables, the main regression analysis follows. It examines *DE Issuance*, *Net Debt Issuance* and *Net Equity Issuance* as dependent variables and explores capital structure decisions over the following 12 months, in line with Kisgen (2006) approach. Regressions using Dummy Variables based on 5-year rolling window:

$$(1)\ Y_{it} = \alpha + \beta_0 CR_{hol} + \varepsilon_{it}$$

$$(2)\ Y_{it} = \alpha + \beta_1 CR_{high} + \beta_2 CR_{low} + \phi K_{i,t-1} + \varepsilon_{it}$$

$$(3)\ Y_{it} = \alpha + \beta_3 CR_{hol} + \phi K_{i,t-1} + \varepsilon_{it}$$

Y_{it} denotes *DE Issuance*, *Net Debt Issuance* and *Net Equity Issuance* respectively. CR_{hol}, CR_{high} and CR_{low} are dummy variables divided into tenths, sevenths, fifths, and thirds depending on the analysis. Control variables include *Ln (Sales)* and *EBITDA/ Total Assets*. Kisgen (2006) already mentions that control variables are critical to mitigate the effect of the financial condition of the company when the control variables are the same or similar to the variables used in the numerical score calculation. To minimise this effect, the analysis includes the two control variables *Ln (Sales)* to capture size, and *EBITDA/ Total Assets* as an additional measure of profitability, which are additional measures of the financial condition of the company but are not used to the same extent as in the scoring calculation. In addition to the above regressions, the analysis controls for firm, industry, and time fixed effects.

First, regressions are run on the full sample, including both investment grade and speculative grade companies, testing only for *DE Issuance*. In particular, the analysis tests for extreme cases, using a variety of dummies as described above, ranging from base cases in thirds to extreme cases in tenths. I expect the magnitude of *DE Issuance* to increase when testing for more extreme cases. Results and interpretation can be found in 5.1 Results across All Ratings.

Second, the analysis focuses on investment grade firms, applying the same regressions as in 5.1, but only to the sub-sample of investment grade firms. I expect *DE Issuance* activity to be higher overall in this sub-sample of firms, as firms have easier access to debt and equity markets and a greater interest in maintaining investment grade. Results and interpretation can be found in 5.2 Results across Investment Grade.

Finally, the analysis focuses on *Net Debt Issuance* and *Net Equity Issuance* individually, run on the full sample of investment and speculative grade firms, to derive an inference that managers are more likely to use debt or equity instruments to adjust their capital structure prior to a credit rating change. The regressions are identical to the previous analysis, except that the dependent variable Y_{it} is changed to *Net Debt Issuance* or *Net Equity Issuance*, respectively. I expect managers to use debt instruments rather than equity instruments because debt is an easier instrument to use. Results and interpretation can be found in 5.3 Results *Net Debt* and *Net Equity Issuance* across All Ratings.

5. RESULTS

5.1. Results *DE Issuance* across All Ratings

The empirical analysis commences by examining the entire dataset, which includes both investment grade and speculative grade firms, with respect to their *DE Issuance* behaviour preceding an expected shift in micro credit ratings. The entire dataset serves as the initial point of inquiry, aiming to address the first two key questions. First, whether employing a more advanced credit scoring mechanism yields more precise and robust results and second, whether there is a hypothesized increase in the magnitude of *DE Issuance* in relation to a higher likelihood of a micro rating change.

Table 4: Results across all Rating Classes *DE Issuance* Thirds

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *DE Issuance*. Firms are clustered into the top and bottom thirds. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom thirds of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom thirds of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *DE Issuance* Thirds

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0276*** (15.96)	-0.0213* (-3.01)	-0.0333*** (-5.36)	-0.0056 (-1.43)	-0.0421*** (-5.03)	-0.0560*** (-8.20)	0.0007 (0.03)	-0.0294 (-1.51)	-0.0463* (-2.53)
CR_{hol}	-0.0061** (-3.00)		-0.0043* (-2.19)	-0.0034 (-1.69)		-0.0018 (-0.94)	-0.0031 (-1.47)		-0.0026 (-1.30)
CR_{high}		0.0017 (0.70)			0.0029 (1.21)			0.0065** (2.61)	
CR_{low}		-0.0103*** (-4.27)			-0.0072** (-2.84)			-0.0113*** (-4.47)	
EBITDA/A		0.244*** (13.22)	0.245*** (13.36)		0.263*** (14.01)	0.262*** (14.00)		0.237*** (11.20)	0.241*** (11.47)
Ln (Sales)		0.0020* (2.43)	0.0034*** (4.75)		0.0004 (0.44)	0.0017* (2.26)		0.0004 (0.41)	0.0024* (2.57)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0010	0.0521	0.0496	0.0407	0.0920	0.0905	0.0521	0.0891	0.0844
N	9798	9671	9671	9798	9671	9671	9798	9671	9671

Table 4 presents the results for regressions (1) to (3) applied on dummy variables based on thirds, which were run on the entire sample, including all rating classes. This analysis serves as a first step in reassessing the CR-CS hypothesis. Kisgen (2006) uses solely dummy variables based on ranking firms into thirds to confirm CR-CS hypothesis. Looking at the baseline scenario by ranking firms into thirds, results are consistent with the existing literature and in line with expectations. Firms in the bottom third of their micro credit rating class (CR_{low}), indicating a higher probability of a rating downgrade, show a statistically significant reduction in *DE Issuance* of around 1.0% at a 1% significance level. In addition, firms in the top or bottom third of their micro credit rating class, implying an upcoming overall rating change (whether upgrade or downgrade (CR_{hol})), show a reduction in *DE Issuance* of around 0.6% at a 5% significance level. On the other hand, firms ranked in the highest thirds (CR_{high}), thus facing a rating upgrade are expected to issue more *Net Debt* to *Net Equity*. Results indeed show a positive sign of around plus 0.2% more *DE Issuance* among these firms. Results nevertheless in this case are not as significant as for facing a downgrade or downgrade and upgrade. Overall, these results suggest that even with a more sophisticated credit score function compared to Kisgen (2006), the magnitude and significance of the results derived remain consistent with the original approach thus can be seen as the first reconfirmation of the CR-CS Hypothesis in line with the use of a credit scoring mechanism to capture firms upcoming changes in micro credit ratings.

Table 5: Results across all Rating Classes *DE Issuance* Fifths

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *DE Issuance*. Firms are clustered into the top and bottom fifths. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom fifths of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom fifths of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *DE Issuance* Fifths

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0273***	-0.0189**	-0.0324***	-0.0039	-0.0383***	-0.0541***	0.0001	-0.0273	-0.0452*
	(19.19)	(-2.74)	(-5.34)	(-1.02)	(-4.64)	(-8.00)	(0.01)	(-1.40)	(-2.47)
CR_{hol}	-0.0094***		-0.0070***	-0.0065**		-0.0041*	-0.0073***		-0.0067**
	(-4.52)		(-3.58)	(-3.12)		(-2.14)	(-3.48)		(-3.29)
CR_{high}		0.0021			0.0030			0.0065*	
		(0.75)			(1.08)			(2.24)	
CR_{low}		-0.0156***			-0.0117***			-0.0180***	
		(-6.23)			(-4.35)			(-6.86)	
EBITDA/A		0.242***	0.244***		0.261***	0.261***		0.236***	0.241***
		(13.16)	(13.34)		(13.93)	(13.98)		(11.20)	(11.51)
Ln (Sales)		0.0017*	0.0033***		0.0002	0.0016*		0.0001	0.0022*
		(2.10)	(4.60)		(0.25)	(2.18)		(0.09)	(2.36)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0027	0.0540	0.0506	0.0417	0.0928	0.0910	0.0534	0.0909	0.0855
N	9798	9671	9671	9798	9671	9671	9798	9671	9671

Table 5 presents the results for regressions (1) to (3) applied on dummy variables based on fifths, which were run again on the entire sample, including firms of all rating classes. A further examination of more extreme scenarios in terms of expected rating changes, assessed by ranking companies in the highest and lowest fifths rather than in thirds of their micro credit rating class, shows that companies facing more pronounced scenarios in an anticipated micro credit rating change exhibit capital structure adjustments in the same direction, but with greater magnitude and significance, compared to testing for firms ranked in thirds. Firms in the lowest fifths of their credit micro rating class (CR_{low}), indicating an even higher probability of a rating downgrade than firms in the lowest third, show a stronger reduction in *DE Issuance* of around 1.6% per year at a 1% significance level, exceeding the 1.0% reduction in *DE Issuance* observed by firms ranked in lowest third. In addition, firms

in the highest or lowest fifths (CR_{hol}), which are more likely to experience an overall micro rating change than firms in the baseline scenario of top and bottom thirds, show a notable reduction in *DE Issuance* of up to 1.0% per year at a 1% significance level, exceeding the 0.6% observed in the top and bottom thirds. Firms ranked into the highest fifths (CR_{high}) also show a positive sign in *DE Issuance* as firms ranked into the highest thirds do, with similar magnitude, when here in basic case also still being non-significant. Introducing time, industry, and firm fixed effects in extreme cases, leads to same results as classifying in on thirds. Firms facing a rating upgrade (CR_{high}) thus appear to behave in the same way on capital structure behaviour, regardless the immense of facing an upgrade. But on the other hand, firms facing a downgrade (CR_{low}), show stronger adjustments in *DE Issuance* when facing a more likely downgrade than firms ranked in thirds. These results highlight the increased magnitude and significance associated with more extreme micro credit rating scenarios, in particular the reduction in *DE Issuance*, to managers aiming for holding a rating when more being more likely facing a downgrade in the subsequent year.

In addition, regressions (1) to (3) were applied based on classifying firms in top and bottom sevenths and tenths (see Table 8 and Table 9 in Appendices). Results based on dummy variables using top and bottom sevenths only reveal slightly stronger results in CR_{hol} coefficients alongside a moderate increase in magnitude compared to using fifths. Results using tenths do not show a structural significance in coefficients. Looking individually at CR_{high} and CR_{low} in these cases these scenarios capture stronger magnitude of for example a reduction in *DE Issuance* of up to 2% for firms close to a rating downgrade (CR_{low}) at a 1% significance level for firms calssified in top sevenths and top tenths respectively. Firms classified into sevenths and top tenths (CR_{high}) individually show a stronger *DE Issuance* of around 0.7% at a 10% significance level than firms ranked in thirds or fifths, showing no significance and only weaker magnitude in *DE Issuance*. As the net effect CR_{hol} being the major variable of interest remains rather unaffected when ranking firms beyond top and bottom fifths, this approach appeals as the most efficient way to capture firms' behaviour and is based on this applied in further analysis.

To the best of my knowledge, this is the first paper to provide empirical evidence on the increased magnitude of managerial capital structure behaviour when faced with extreme scenarios of expected micro rating changes alongside showing that the net effect of CR_{high}

and CR_{low} captured as CR_{hol} does not increase significantly, whereas evaluating effects individually, show an increase in magnitude up to a certain extent.

5.2.Results *DE Issuance* across Investment Grade

This section focuses exclusively on capital structure behaviour of firms prior to a change in micro credit rating classified as investment grade (firms with a Standard and Poor´s Long-Term Domestic Issuer Credit Rating > BB+). By applying the same regressions as outlined in the previous section, I address the question whether firms ranked as investment grade do show different behaviour in capital structure adjustments compared to the entire sample comprising firms of all rating classes.

Table 6: Results across Investment Grade *DE Issuance* Fifths

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *DE Issuance*. Firms are clustered into the top and bottom fifths. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom fifths of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom fifths of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms ranked as investment grade only. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across Investment Grade *DE Issuance* Fifths

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0374*** (19.87)	-0.0195 (-1.96)	-0.0266** (-3.12)	0.0010** (2.74)	-0.0312** (-2.79)	-0.0406*** (-4.69)	0.0523*** (17.44)	0.0270 (1.66)	0.0035 (0.24)
CR_{hol}	-0.0108*** (-4.18)		-0.0083*** (-3.53)	-0.0083** (-3.12)		-0.0059* (-2.51)	-0.0044 (-1.85)		-0.0051* (-2.18)
CR_{high}		-0.0050 (-1.44)			-0.0027 (-0.77)			0.0063 (1.76)	
CR_{low}		-0.0116*** (-3.84)			-0.0095** (-2.78)			-0.0141*** (-4.64)	
EBITDA/A		0.280*** (11.14)	0.284*** (11.61)		0.310*** (11.84)	0.312*** (12.08)		0.263*** (8.15)	0.281*** (8.97)
Ln (Sales)		0.0017 (1.60)	0.0025** (2.64)		-0.0010 (-0.85)	-0.0001 (-0.15)		-0.0022 (-1.46)	0.0000 (0.02)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0045	0.0667	0.0664	0.0557	0.1220	0.1218	0.1081	0.1389	0.1352
N	5116	5071	5071	5116	5071	5071	5116	5071	5071

Table 6 presents the regression results for the regressions (1) to (3) focusing exclusively on investment grade firms, excluding all observations below a BBB- Standard and Poor´s Long-Term Domestic Issuer Credit Rating. This narrowed investigation is important given the prevailing research and literature suggesting that investment graded firms exhibit different behaviour due to their privileged access to commercial paper markets (Kisgen, 2006). Additionally, investment grade firms are known not to respond in the same way to a change in a key variable as speculative grade firms do (Choy et al. (2006). As such, these firms are expected to be particularly motivated to maintain their credit ratings, resulting in potentially different behaviour in this sub-sample compared to the entire sample. The results of the baseline scenario are consistent with managerial capital structure adjustments prior to credit rating changes across all rating classes. Investment graded firms ranked in top and bottom fifths show a reduction of 1.1% *DE Issuance* at a 1% significance level when facing a downgrade (CR_{hol}). Initially, it was expected that these firms would respond by increasing rather increasing *DE Issuance* compared to the entire sample. This is proven by results, as firms do indeed also show a reduction of *DE Issuance* but with lower magnitude, thus showing a higher *DE Issuance* compared to the entire sample (around 1.6% reduction, as detailed in Section 5.1 for firms of all credit rating classes). Furthermore, looking at both the high and low scenarios within investment grade (CR_{hol}), there is a decrease in *DE Issuance* of around 1.1% in the following year at a 1% significance level, thus showing a slightly stronger reduction in *DE Issuance* compared to the entire sample (around 1.0% reduction, as detailed in Section 5.1 for firms of all credit rating classes). CR_{high} has counterintuitive signs, also showing a reduction in *DE Issuance* for firms classified as likely facing an upgrade in credit micro rating in the future of around 0.5%, not being significant at this point. These results might indicate that firms even being classified as facing an upgrade, still show a reduction in *DE Issuance*, might be based on overall better financial health of firms classified as investment grade. Managers of investment graded firms thus to seem to reduce *DE Issuance* in all cases, especially also when being classified in the top of their micro credit rating group, which this effect counteracting the also weaker reduction when said to be facing a downgraded, leading to only a slight deviation in the net effect CR_{hol}. Moreover, the inclusion of additional controls for firm size (*Ln (Sales)*), time, industry and fixed effects does not lead to significantly different results, in line with the overall analysis.

Consequently, based on the empirical data and the model construction in this paper, the hypothesis that investment grade firms exhibit significantly different behaviour can be confirmed. The effect of firms attributed on overall change in their micro credit rating thus is only slightly affected, as behaviour of worse ranked firms counteracts higher ranked firms in their micro rating class and vice versa.

5.3. Results *Net Debt* and *Net Equity Issuance* across All Ratings

The following paragraph focuses exclusively on testing capital structure adjustments based on *Net Equity* and *Net Debt Issuance* individually. Results for *DE Issuance* in the investment grade sub-sample do not show a large difference in the net effect for firms facing an overall change in their micro credit rating. In addition, results for *DE Issuance* across the entire sample show the intuitive positive sign in CR_{high}, which the sub-sample of investment grade firms only does not show. For that reason, *Net Equity* and *Net Debt Issuance* is tested again for the entire sample of firms to give a general answer about how firms use access to equity and access to debt individually across all rating classes.

Table 7: Results across all Rating Classes *Net Equity Issuance* Fifths

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *Net Equity Issuance*. Firms are clustered into the top and bottom fifths. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom fifths of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom fifths of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *Net Equity Issuance* Fifths

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	-0.0094***	0.0500***	0.0504***	0.0049***	0.0581***	0.0563***	-0.0021	0.0556***	0.0593***
	(-13.07)	(17.65)	(18.06)	(2.93)	(17.26)	(17.61)	(-0.15)	(5.64)	(6.09)
CR_{hol}	0.0040***		0.0031***	0.0023*		0.0018*	0.0017*		0.0009
	(4.38)		(3.81)	(2.55)		(2.20)	(2.05)		(1.12)
CR_{high}		0.0028*			0.0027*			-0.0020	
		(2.49)			(2.30)			(-1.89)	
CR_{low}		0.0033***			0.0008			0.0036***	
		(3.43)			(0.75)			(3.66)	
EBITDA/A		-0.123***	-0.123***		-0.128***	-0.128***		-0.106***	-0.106***
		(-13.55)	(-13.56)		(-13.91)	(-13.91)		(-12.15)	(-12.21)
Ln (Sales)		-0.0055*	-0.0055***		-0.0049***	-0.0047***		-0.0057***	-0.0061***
		(-16.48)	(-17.17)		(-14.31)	(-14.55)		(-14.41)	(-16.24)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0019	0.0973	0.0975	0.0353	0.1216	0.1215	0.0873	0.1581	0.1570
N	17515	17250	17250	17515	17250	17250	17515	17250	17250

Table 7 presents the empirical results of regressions (1) to (3) above, focusing on the exclusive regression of *Net Equity Issuance* over the next 12 months as the dependent variable. Firms again are clustered into top and bottom fifths of their credit micro rating before testing for the subsequent 12 months equity adjustments. The intention is to gain deeper insights into whether firms adjust their capital structure predominantly by turning to debt instruments or by accessing equity capital markets. This distinction helps to identify the main driver behind the shifts in *DE Issuance* observed in previous chapters. The regression analyses are analogous to those used to examine *DE Issuance*, with the only difference that *Net Debt* and *Net Equity Issuance* are assessed individually as dependent variables. Looking at the baseline scenario with firms again being classified in the top and bottom fifths of their micro credit rating class, noted by CR_{hol} dummy variable, shows an increase in *Net Equity*

Issuance of up to 0.4% at a 1% significance level over the subsequent 12 months. Firms clustered in top fifths (CR_{high}) show an increase in *Net Equity Issuance* of 0.3% at a 10%. Firms ranked in the bottom fifths (CR_{low}), thus classified as likely facing a rating downgrade, do also show an increase in *Net Equity Issuance* in the subsequent 12 months of up to 0.35% at a 1% significance level. Results reveal that *Net Equity Issuance* is applied by managers in both cases, an anticipated upgrade or downgrade in micro rating and subsequently also results in positive *Net Equity Issuance* for firms facing an overall change in rating (upgrade or downgrade). These results already support the idea, that the net effect of *DE Issuance* variance, especially the variance in issuance between firms classified as likely to upgrade versus firms classified as likely to downgrade must be driven rather by adjustments on the liability side than equities of firms, hypothesizing *Net Debt Issuance* as the main driver behind adjustments.

Table 8: Results across all Rating Classes *Net Debt Issuance* Fifths

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *Net Debt Issuance*. Firms are clustered into the top and bottom fifths. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom fifths of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom fifths of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *Net Debt Issuance* Fifths

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0158*** (17.00)	0.0311*** (5.85)	0.0194*** (4.35)	-0.0022 (-0.73)	0.0195** (3.05)	0.0042 (0.83)	-0.0025 (-0.21)	0.0180 (1.25)	0.0050 (0.37)
CR_{hol}	-0.0044** (-2.97)		-0.0044** (-2.97)	-0.0030* (-2.03)		-0.0029 (-1.94)	-0.0050** (-3.09)		-0.0054*** (-3.41)
CR_{high}		0.0034 (1.68)			0.0040* (1.98)			0.0042 (1.86)	
CR_{low}		-0.0119*** (-5.74)			-0.0102*** (-4.58)			-0.0138*** (-5.62)	
EBITDA/A		0.0707*** (5.99)	0.0726*** (6.17)		0.0779*** (6.40)	0.0784*** (6.45)		0.0874*** (5.89)	0.0917*** (6.17)
Ln (Sales)		-0.0030*** (-4.92)	-0.0016** (-3.15)		-0.0038 (-5.61)	-0.0024*** (-4.39)		-0.0037*** (-4.72)	-0.0022** (-3.11)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0008	0.0101	0.0064	0.0230	0.0326	0.0299	0.0195	0.0314	0.0271
N	10482	10351	10351	10482	10351	10351	10482	10351	10351

Table 8 presents the empirical results from regressions (1) to (3), focusing exclusively on *Net Debt Issuance* in the 12 months following an expected micro credit rating change. Overall, results are in line with expectations. Looking again at the baseline scenario, firms in the bottom fifths (CR_{low}) that are expected to experience a micro credit rating downgrade show an approximate 1.2% decrease in *Net Debt Issuance* over the following 12 months at a 1% significance level. For companies experiencing an overall rating change, those in the top and bottom fifths, noted by CR_{hol} dummy variable, experience a reduction in *Net Debt Issuance* relative to assets of around 0.4%, at a 5% significance level. Subsequently, also in line with expectations, firms ranked in top fifths (CR_{high}), thus expected to increase their micro credit rating in the following period, show an increase in *Net Debt Issuance* of up to

0.4% at a 10% significance level when adding control variables and controlling for year fixed effects. Evaluating debt adjustments by managers individually, solely based on their concerns for a future change in rating, shows empirically, as you would expect, that when being more likely to downgrade in credit rating in the future, firms issue less *Net Debt* in the subsequent 12 months while at the same time tend to issue *Net Debt* when being likely to upgrade in the near future.

The results confirm that firms actively adjust their *Net Debt Issuance* in both directions. Specifically, managers reduce *Net Debt Issuance* when facing a downgrade, while conversely, they increase *Net Debt Issuance* when anticipating an upgrade. Relating the results for *Net Debt Issuance* to those observed for *Net Equity Issuance*, firms tend to use debt and equity instruments in opposite ways. Indeed, firms facing a downgrade issue less debt than firms facing an upgrade. In addition, some firms facing a downgrade can issue more equity as a counterpart. Looking at the underlying data, however, firms tend to use equity in both cases, whether facing a downgrade or an upgrade. However, the magnitude of issuance is strongest for firms facing a downgrade that subsequently react by reducing *Net Debt Issuance*. These results seem reasonable in the overall context of how companies can access financing instruments. It is much more difficult to adjust capital structures by using equity instead of debt. This is also reflected in the results, as it appears that companies prefer to adjust debt when adjusting the overall capital structure. Nevertheless, both equity and debt are adjusted, but debt seems to be more important.

6. CONCLUSION AND IMPLICATIONS

This dissertation was written with the motivation to answer several research questions on the relationship between credit ratings and capital structure decisions made by managers based solely on their concerns about an imminent micro credit rating change. This is an area of research of great interest as the existing literature only mostly confirms pioneering work. In addition, this field of study offers some interesting, yet unexplored questions to be answered.

Starting with the first question to be answered, namely whether the CR-CS hypothesis (Kisgen, 2006) holds with an updated and extended dataset and a more sophisticated credit scoring mechanism, can be confirmed. The results of this study are consistent with those of the original Kisgen (2006) work. Moreover, despite a more advanced scoring mechanism,

this analysis does not show significantly different results. Thus, the fact that Kisgen (2006) mentions that the credit scoring approach is not of outrageous importance, as companies are just ranked in subsequent analysis, can be confirmed.

Secondly, to further develop the existing literature, this dissertation attempts to answer the question of the extent to which managers behave in the face of a more pronounced change in micro credit rating. It is observed that managers facing a more imminent change make larger adjustments in their firm's capital structure.

Third, this dissertation answers the question of whether a sub-sample of investment grade firms shows different behavior compared to the entire sample of firms with credit ratings of all grades. Indeed, results show that firms classified as investment grade do show different behaviour in capital adjustments alongside a higher *DE Issuance*.

Finally, as *Net Debt Issuance* and *Net Equity Issuance* are the two main drivers of capital structure adjustments, it is logical to further contribute to the existing research by assessing their importance and magnitude individually. Surprisingly, a positive, but not large, *Net Equity Issuance* can be observed in all cases, be it an imminent downgrade, an upgrade or both. Considering the debt side, firms classified as facing an upgrade do indeed reduce their *Net Debt Issuance* significantly, while firms facing an upgrade tend to increase their *Net Debt Issuance*.

The assertion that the CR-CS applies and that credit scoring in the context of this study consistently produces desirable results is not to be questioned. If the CR-CS is accepted as a basic premise, many new avenues for investigation open. It is worth noting that this dissertation, like pioneering work in the field, draws on Compustat data as well as North American data and Standard and Poor's credit ratings. It would therefore be interesting to apply the same analytical framework to a different geographical region and in addition to consider ratings produced by a different rating agency. Furthermore, it is interesting to empirically support the previously assumed relationship between CR-CS and industry dynamics, which is an assumption that has not yet been empirically confirmed. Lastly, this dissertation gives empirical evidence that a sub-sample of investment grade firms behaves different compared to the entire sample. Consequently, it is equally important to assess the behaviour of speculative grade companies in isolation to uncover possible differences in their behaviour.

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8. APPENDICES

Table 9: Results across all Rating Classes *DE Issuance* Seventhes

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *DE Issuance*. Firms are clustered into the top and bottom seventhes. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom seventhes of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom seventhes of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *DE Issuance* Seventhes

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0263***	-0.0173*	-0.0332***	-0.0046	-0.0353***	-0.0548***	-0.0001	-0.0257*	-0.0456*
	(19.35)	(-2.54)	(-5.50)	(-1.20)	(-4.38)	(-8.10)	(-0.00)	(-1.30)	(-2.49)
CR_{hol}	-0.0093***		-0.0067**	-0.0063**		-0.0037	-0.0068**		-0.0060**
	(-4.01)		(-3.04)	(-2.70)		(-1.69)	(-2.96)		(-2.69)
CR_{high}		0.0067*			0.0070*			0.0123***	
		(2.04)			(2.14)			(3.75)	
CR_{low}		-0.0189***			-0.0148***			-0.0211***	
		(-6.89)			(-5.13)			(-7.27)	
EBITDA/A		0.239***	0.244***		0.259***	0.261***		0.233***	0.241***
		(13.08)	(13.33)		(13.89)	(13.99)		(11.10)	(11.48)
Ln (Sales)		0.0015	0.0033***		-0.0001	0.0016*		-0.0001	0.0022*
		(1.78)	(4.61)		(-0.05)	(2.18)		(-0.13)	(2.38)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0023	0.0556	0.0503	0.0414	0.0941	0.0908	0.0530	0.0929	0.0851
N	9798	9671	9671	9798	9671	9671	9798	9671	9671

Table 10: Results across all Rating Classes *DE Issuance* Tenths

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *DE Issuance*. Firms are clustered into the top and bottom tenths. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom tenths of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom tenths of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *DE Issuance* Tenths

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0253*** (20.12)	-0.0229*** (-3.51)	-0.0343*** (-5.68)	-0.0060 (-1.58)	-0.0438*** (-5.69)	-0.0561*** (-8.21)	-0.0003 (-0.01)	-0.0309 (-1.60)	-0.0461* (-2.51)
CR_{hol}	-0.0087** (-3.14)		-0.0060* (-2.25)	-0.0051 (-1.84)		-0.0026 (-0.97)	-0.0060* (-2.22)		-0.0053* (-2.04)
CR_{high}		0.0072 (1.81)			0.0066 (1.65)			0.0127** (3.27)	
CR_{low}		-0.0177*** (-5.20)			-0.0117** (-3.28)			-0.0201*** (-5.62)	
EBITDA/A		0.240*** (13.10)	0.245*** (13.37)		0.259*** (13.87)	0.262*** (14.02)		0.233*** (11.13)	0.241*** (11.50)
Ln (Sales)		0.0020** (2.61)	0.0034*** (4.62)		0.0007 (0.80)	0.0017* (2.21)		0.0005 (0.55)	0.0023* (2.42)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0015	0.0533	0.0498	0.0409	0.0922	0.0906	0.0525	0.0900	0.0848
N	9798	9671	9671	9798	9671	9671	9798	9671	9671

Table 11: Results across Investment Grade *DE Issuance* Thirds

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *DE Issuance*. Firms are clustered into the top and bottom thirds. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom thirds of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom thirds of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms ranked as investment grade only. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across Investment Grade *DE Issuance* Thirds

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0361***	-0.0218*	-0.0306***	0.0052	-0.0353**	-0.0474***	0.0512***	0.0226	-0.0014
	(14.93)	(-2.01)	(-3.49)	(1.29)	(-2.88)	(-5.28)	(78.13)	(1.39)	(-0.09)
CR_{hol}	-0.0044		-0.0021	-0.0014		0.0006	0.0033		0.0024
	(-1.64)		(-0.83)	(-0.52)		(0.25)	(1.25)		(0.93)
CR_{high}		0.0009			0.0037			0.0108***	
		(0.27)			(1.12)			(3.47)	
CR_{low}		-0.0053			-0.0030			-0.0057	
		(-1.67)			(-0.86)			(-1.76)	
EBITDA/A		0.281***	0.285***		0.312***	0.314***		0.262***	0.281***
		(11.10)	(11.66)		(11.83)	(12.12)		(8.13)	(8.97)
Ln (Sales)		0.0018	0.0027**		-0.0012	0.0000		-0.0018	0.0005
		(1.54)	(2.87)		(-0.85)	(0.05)		(-1.22)	(0.38)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0005	0.0644	0.0638	0.0532	0.1210	0.1205	0.1078	0.1386	0.1346
N	5116	5071	5071	5116	5071	5071	5116	5071	5071

Table 12: Results across all Rating Classes *Net Equity Issuance* Thirds

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *Net Equity Issuance*. Firms are clustered into the top and bottom thirds. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom thirds of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom thirds of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *Net Equity Issuance* Thirds

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	-0.0094***	0.0508***	0.0506***	0.0057***	0.0591***	0.0570***	-0.0019	0.0564***	0.0597***
	(-10.82)	(17.52)	(17.87)	(3.30)	(17.35)	(17.72)	(-0.14)	(5.65)	(6.08)
CR_{hol}	0.0023**		0.0016*	0.0010		0.0006	0.0001		-0.0003
	(2.62)		(2.03)	(1.16)		(0.81)	(0.10)		(-0.41)
CR_{high}		0.0017			0.0015			-0.0023*	
		(1.70)			(1.44)			(-2.39)	
CR_{low}		0.0015			-0.0030			0.0016	
		(1.62)			(-0.31)			(1.76)	
EBITDA/A		-0.123***	-0.123***		-0.128***	-0.128***		-0.106***	-0.106***
		(-13.56)	(-13.58)		(-13.89)	(-13.94)		(-12.16)	(-12.19)
Ln (Sales)		-0.0056***	-0.0056***		-0.0050***	-0.0047***		-0.0057***	-0.0061***
		(-16.46)	(-17.17)		(-14.13)	(-14.49)		(-14.46)	(-16.32)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.005	0.0965	0.0965	0.0348	0.1213	0.1212	0.0870	0.1578	0.1570
N	17515	17250	17250	17515	17250	17250	17515	17250	17250

Table 13: Results across all Rating Classes *Net Debt Issuance* Thirds

OLS regression coefficients applying regressions (1) to (3) with the dependent variable Y_{it} being *Net Debt Issuance*. Firms are clustered into the top and bottom thirds. The credit rating dummy variable CR_{hol} equals 1 if the firm's credit rating is in the top or bottom thirds of its micro rating, and 0 otherwise. CR_{high} and CR_{low} are credit rating dummy variables equal to 1 if the firm is in the top or bottom thirds of its micro rating, respectively, and 0 otherwise. Control variables include a measure of profitability as *EBITDA/ Total Assets (EBITDA/A)* and *Ln (Sales)* as a measure of size. The sample includes observations from 1990 to 2016 from firms in all rating classes. In addition, year dummies based on fiscal year and industry dummies based on 4-digit SIC codes are applied individually. Standard errors are clustered at the firm level using Gvkey. 1% significance is denoted by ***, 5% significance is denoted by ** and 10% significance is denoted by *.

Regression Results across all Rating Classes *Net Debt Issuance* Thirds

Regressions	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	0.0163*** (13.47)	0.0302*** (5.55)	0.0195*** (4.24)	-0.0025 (-0.82)	0.0178** (2.78)	0.0038 (0.73)	-0.0016 (-0.14)	0.0174 (1.21)	0.0050 (1.21)
CR_{hol}	-0.0034* (-2.26)		-0.0035* (-2.28)	-0.0021 (-1.39)		-0.0021 (-1.40)	-0.0033* (-2.07)		-0.0036* (-2.22)
CR_{high}		0.0018 (1.05)			0.0027 (1.49)			0.0032 (1.66)	
CR_{low}		-0.0089*** (-4.59)			-0.0075*** (-3.70)			-0.0100*** (-4.90)	
EBITDA/A		0.0722*** (6.08)	0.0727*** (6.15)		0.0797*** (6.50)	0.0786*** (6.44)		0.0882*** (5.92)	0.091*** (6.09)
Ln (Sales)		-0.0029*** (-4.67)	-0.0016*** (4.24)		-0.0037*** (-5.52)	-0.0024*** (-4.35)		-0.0035*** (-4.52)	-0.0021*** (-2.94)
Year Dummies	N	N	N	Y	Y	Y	N	N	N
Industry Dummies	N	N	N	N	N	N	Y	Y	Y
Adj. R^2	0.0004	0.0090	0.0060	0.0228	0.0319	0.0297	0.0189	0.0301	0.0264
N	10482	10351	10351	10482	10351	10351	10482	10351	10351