The Effect of Credit Rating Changes on Firms' Leverage

US Firms Between 2009 and 2017

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ABSTRACT

This dissertation examines the effect of a change in credit rating on firm's Leverage decisions. I find that firms tend to undertake strong capital market activities immediately after the 2008 financial crisis, by reducing their issuance of debt in the aftermath of a downgrade. I also find that firms with higher credit ratings have less debt and more equity when compared to firms that have lower credit ratings. Firms issue approximately less 3 percentage points of debt following a downgrade, whereas upgraded firms issue more debt, following the change in their credit rating.

Esta dissertação examina o efeito de uma mudança na classificação de crédito nas decisões de Alavancagem da empresa. Acho que as empresas tenderam a realizar fortes atividades no mercado de capitais imediatamente após a crise financeira de 2008, reduzindo sua dívida de emissão. Também descobri que as empresas com classificações de crédito mais altas têm menos dívida e mais patrimônio quando comparadas às empresas com classificações de crédito mais baixas. Os rebaixamentos têm efeito negativo na emissão de dívida da empresa, as empresas emitem aproximadamente menos 3 pontos percentuais de dívida após um rebaixamento, enquanto as empresas atualizadas emitem mais dívida, após a mudança em sua classificação de crédito.

JEL Classification: G32

Keywords: Credit ratings, Leverage, Capital market activities.

Introduction

Through the last decades, companies all over the world and specifically in the United States have been changing their capital structures. These changes are generally caused by key factors that affect directly (ex: cash insolvency, cost of financing, taxation ...) and indirectly (ex: capital market conditions, government policies ...) the allocation of capital between equity and debt, harming or boosting the issuance of these two finance sources.

Researchers and financial analysts have been looking for patterns through the real-life examples of continuous changes in the capital structure by managers, in order to meet an optimal performance. One of the most determinant factors for managers when planning the capital structure is the firm's Credit Rating since the interest of investors and debtholders in companies is linked directly to its credit health (Yamin & Shuo, 2021). Kisgen (2009) shows that credit rating affects the firm's capital structure more than changes in profitability and leverage. Other papers such as Almeida, et al. (2017) has focused on Sovereign ceiling for each country and its impact on firms' performance in that market. The authors show that firms near sovereign rating bounds tend to reduce their debt and rely less on credit market, than firms with a credit rating below the ceiling, following a downgrade.

This dissertation will analyze and examine in depth the impact of rating upgrades and downgrades on US firms' capital structure, as they are a significant reason for changing the allocation of capital. The dissertation is going to run regression models that assess the net leverage, proportions of debt and equity to the capital, to access how the capital structure is affected following a shift in the firm's credit rating, following a similar methodology as Kisgen (2006). I will consider all tradable U.S. firms for the period between 2009 and February 2017, using quarterly financial data. First, I start by analyzing the data through some descriptive statistics, which describe and summarize the characteristics of the dataset and give an initial understanding of the effect of a change in credit rating on leverage decisions of firms. I then run two sets of regressions to study and analyze how firms adapt their leverage based on past changes in credit ratings and if those changes have the same impact on the financial behavior of companies. At the same time, I include firm and time fixed effects, to access if some firm's specific characteristics or time occurrence is driven the results. Finally, I study the difference between investment and speculative grade firms in the allocation of their capital after a change in credit rating.

After the 2008 global world crisis, all financial players: investors, managers, financial institutions, regulators and especially rating agencies have changed their attitudes, assumptions, and the way they were dealing with factors that influence their financial activities. This dissertation will study one of those factors to see its impact on the capital structure decisions.

Literature Review

The firm's capital structure is the combination of debt and equity used to finance its operations and investments. Many variables have a direct effect on capital structure and can lead to a change in debt or equity issuance decision. The firm's credit rating is one of the important variables that can impact the capital structure. For that reason, many authors used several models to access the relationship between capital structure and credit rating.

By analyzing the impact of credit ratings on capital structure decisions, this dissertation contributes to the leverage decision activities that managers can take due to changes in credit ratings. Kisgen (2006) examines the effect of credit ratings on firms' capital structure using the pecking order and tradeoff theories to test whether costs or benefits from upgrades and downgrades (from 1986 to 2001) have a direct effect on the issuance of debt and equity. The main findings suggest that firms that are near a credit rating upgrade or downgrade issue less debt relative to equity (firms that are near a downgrade have a "-" sign in their credit rating and firms that are near an upgrade have a "+" sign). The author finds after running regressions that firms that are near a credit rating downgrade or upgrade issue approximately less 1% of debt relative to net equity annually than firms that have stable credit rating.

Kisgen (2009) shows that a downgrade predicts capital structure behavior better than changes in leverage, profitability, or bankruptcy probability. To reach this result, the author models the value of firms as a function of leverage using the tradeoff theory with and without its credit rating effects. Without credit rating effects, the leverage value of a firm is equal to the benefits from leverage minus costs of leverage. Including credit rating effects, the value of a firm is the difference between the benefit and cost of leverage plus the cumulative rating benefits from leverage. The author finds that upgrades have no effect on firm's capital structure, and the reduce in net debt, one year after a downgrade, is between 1.5%-2% relative to the reduce in equity. Firms whose credit rating has increased (decreased) the previous year, or the year before that, are more likely to increase (decrease) their leverage the following year.

Leland (1994) shows the strong relationship between the value of corporate debt and capital structure. The author finds that optimal leverage is linked directly to firm risk, taxes, bankruptcy costs, risk-free interest rates, payout rates, and bond covenants, which show the dependency of debt and capital structure on firm's credit ratings. Ederington & Goh (1998) show that downgrades resulted in negative equity returns, and that analysts aimed to reconsider earnings predictions following the downgrade. The authors also conclude that this process is a result of the downgrade itself and not due to the negative information or the existing earnings data.

Titman et al. (1988) investigates the main determinants of an optimal capital structure decision. The authors find that the value of assets, non-debt tax shield, growth, uniqueness of the product, industry classification, size, volatility and profitability of a company are the most important determinants for debt and equity decisions. Michelsen & Klein (2011) explore empirically the importance of external credit ratings in making capital structure decisions taking into consideration an international firm sample. The authors find that firms facing a rating change issue 1.8 percent less net debt as a percentage of total assets than companies not near a rating change and they demonstrate that this effect is more economically significant for US companies. Agha and Faff (2014) study the influence of financial flexibility and credit re-ratings on corporate investment and financing decisions. The authors document that an upgrade in the credit rating of financially flexible companies is followed by a reduction in their cost of capital, an increase in their capital expenditure and an increase in their net debt versus net equity issuance. On the other hand, a rating downgrade for financially inflexible enterprises is accompanied by an increase in their cost of capital, a drop in their capital expenditure and a decrease in their net debt versus net equity issuance.

Wojewodzki et al. (2017) investigate the significance of issuer credit ratings in explaining corporate leverage and the frequency with which companies adapt to their optimal level of leverage using an international dataset. They find that credit ratings have a greater influence on firms' capital structure in economies with a more market-oriented financial system, and that firms with a lower credit rating react more quickly. Their findings show significant differences in the speed with which speculative and investment grade companies shift their capital structures.

This dissertation examines the impact of credit rating changes on firms' capital structure after the 2008 financial crisis, to access if this financial event impacted the relation between credit ratings and the firm's capital structure. Baghai et al. (2014) show that, after 1985, credit rating agencies have become more conservative in allocating corporate credit ratings. As a result, the average rating has declined by 3 notches between 1985 and 2009. This led concerned firms to issue less debt, have lower leverage, and hold more cash. Over the period 1985 to 2009, the direct relationship between credit rating and capital structure (especially issuance of debt) was explained by the decline in default rates for both investment grade and noninvestment grade bonds.

Almeida et al. (2017) use the diff-in-diff tests in investment, debt issuance and equity issuance to compare the firms that are at the sovereign bounds and firms below the sovereign bounds around a sovereign downgrade. The authors find that firms that have equal or slightly higher credit ratings than sovereign rating reduce their investments and don't rely on credit markets following a sovereign downgrade, when compared to firms with ratings below the sovereign downgrade. The authors also show that putting a rating bound influences public debt management, and that is why governmental firms should hedge against potential adverse effects of sovereign downgrades.

Almeida et al. (2012) argue that firms that have long-term debt maturing directly after the third quarter of 2007 reduce their investment by 2.5% more than firms that have long-term debt that matures after 2008. The authors conclude that, without financial shocks, credit ratings have no effect on long-term debt and investment outcomes. Blume et al. (1998) mention that there was a drop in the quality of U.S. corporate debt due to the increase in the number of downgraded firms, compared to upgraded firms. The authors argue that the alternative reason of the decline in debt quality is the stringent standards used by rating that affect the credit rating of companies.

D'Amato, A. (2020) studies how the current global financial crisis affects SMEs' capital structure decisions and their drivers using a unique dataset of Italian small and medium-sized firms (SMEs) from 2006 to 2016. Credit supply shocks had a detrimental influence on the leverage of Italian SMEs. In comparison to the pre-crisis period, Italian SMEs dramatically reduced their leverage, particularly their short-term loan exposure, during and after the crisis. He finds that the short-term debt channel is more volatile than the long-term debt channel to credit conditions. His results show that during the crisis, riskier and more valuable companies reduced their debt more than they did before the crisis. Iqbal et al. (2015) examine the influence of the current financial crisis on capital structure decisions of UK, French, and German companies. They find that overall leverage ratios rise from pre-crisis to crisis years, then fall in post-crisis years. Their results show that firms with lower than industry average capital structure ratios in the pre-crisis period see a progressive increase in leverage during the crisis and post-crisis eras. On the other hand, firms having greater capital structure ratios than the industry average in the pre-crisis period saw a considerable fall in leverage ratios in the post-crisis period, given the difference in their equity levels.

After going into these papers, the goal is to see the effect of a downgrade and/or upgrade on firms' capital structure decisions of U.S. firms between 2009 and 2017.

Data and Methodology

I extracted the monthly Standard & Poor's Long-Term Domestic Issuer Credit Rating from COMPUSTAT of US firms for the period between 2009 and 2017.[1] As in Kisgen (2006), I didn't exclude government and financial institutions (SIC Codes 4000- 4999 and 6000-6999) because ratings implications are likely to have an impact on these firms even though they don't have the same distribution of their capital structure. Credit ratings are organized from the lowest default probability to the highest default probability as follows: AAA, AA+, AA, AA−, A+, A, A−, BBB+, BBB, BBB−, BB+, BB, BB−, B+, B, B−, CCC+, CCC, CCC−, D and SD. Firms that have a credit rating of BBB- and above are denoted investment grade firms, and firms that have a credit rating below BBB- are denoted speculative grade firms. Afterwards, I retrieved quarterly data for the same firms and during the same period from COMPUSTAT. The data is composed of number of common shares outstanding, long-term and short-term debt, market and book value of equity, total assets, total sales (Turnover) and operating income before depreciation (EBITDA). I deleted the observations where the credit ratings and quarterly data are missed to avoid misleading my results.

Then, I merged the credit ratings and the data variables according to data date (Quarterly data) and global company key (which is the unique characteristic of each company), and I

[1] 2017 is the last year in which the credit ratings were available in COMPUSTAT.

dropped the missing values. Finally, I allocated to each Credit rating an individual Rating Code from 1 to 21 to facilitate their usage as it is shown in Table 1.

Some of the notations that were used for the empirical tests are as follows (i and t are subscripts used to denote firms and quarters, respectively):

$Debt\ to\ Book_{\,i\,t}$: $Debt_{\,i\,t}$ / ($Debt_{\,i\,t}$ + $Equity_{\,i\,t}$)

$Equity\ to\ Book_{\,i\,t}$: $Equity_{\,i\,t}$ / ($Debt_{\,i\,t}$ + $Equity_{\,i\,t}$)

$NetLevAss_{\,i\,t}$: ($Debt_{\,i\,t}$ − $Equity_{\,i\,t}$) / $Assets_{\,i\,t}$

$Downgrade_{\,i\ t-1}$: Dummy variable (equal to 1) for firms that were downgraded in the last period.

$Upgrade_{\,i\,t-1}$: Dummy variable (equal to 1) for firms that were upgraded in the last period.

$Number\_Notches_{\,i\ t-1}$: The difference between the individual rating code of the last quarter and the previous quarter.

$K_{\,i\ t-1}$: Set of control variables, that include *Debt to Assets* ratio, *Debt to EBITDA* ratio, *EBITDA to Sales* ratio, *Log_Assets* of the last quarter and *Negative_EBITDA* which is a dummy variable that takes a value of 0 if EBITDA is positive and 1 If EBITDA is less or equal to 0.

Table 1: Credit Rating Codes

Credit rating codes given to each credit rating with code number 1 given to the best credit rating (AAA) and code number 21 is given to the worst credit rating (SD). Those codes will be used in indicating which firms are downgraded or upgraded the last quarter and calculating the number of notches of each company from one period to another.

	AAA	AA+	AA	AA-	A+	A	A-
Individual Rating Code	1	2	3	4	5	6	7
	BBB+	BBB	BBB-	BB+	BB	BB-	B+
Individual Rating Code	8	9	10	11	12	13	14
	B	B-	CCC+	CCC	CCC-	D	SD
Individual Rating Code	15	16	17	18	19	20	21

With:

- Debt: the book value of short-term and long-term debt.
- Equity: the book value of total equity of firms in each period.
- Assets: total book value of assets of firms in each period.

When the value of the EBITDA is negative, I set it equal to 0 because negative values of EBITDA affect the *EBITDA to Sales* ratio. I also replaced the error values of *Debt to EBITDA* ratio by 0.

To run the regressions, I use the following set of control variable: (1) *Debt to Assets* ratio which is short-term and long-term debt divided by total assets, (2) *Debt to EBITDA* ratio which is short-term and long-term debt over the Operating Income Before Depreciation, (3) *EBITDA to Sales* ratio which is Operating Income Before Depreciation and Amortizations over total sales, (4) *Log_Assets* variable which is the log of the book value of assets. To minimize potential outliers, I winsorized the data by replacing the percentiles that are equal or higher than 96 and equal or less than 4 of the K variables by the percentile 95 and 5, respectively.

The entire sample contains 6349 firm-quarters which are distributed into the 21 credit ratings. The credit ratings that have the greater number of firm-quarters are BBB, BBB+, BBB- as it is shown in Table 2. Table 2 presents the summary statistics for the main variables used in this dissertation. Statistics of the *Debt to Book* ratio by credit ratings. The *Debt to Book* ratio averages, for credit ratings with the letter A, range between 7% and 33%. The worst seven credit ratings have an average *Debt to Book* ratio between 49% and 97%, which proves the unbalanced capital structure of the bottom rated firms. The standard deviation of the firm-quarters ranges between 3% and 29% which are high standard deviations, and this can demonstrate the high spread out of data over large range of values. The difference between the median and the mean is approximately equal to zero which proves the asymmetry of data.

Table 2: Summary Statistics – Firm-Quarters and *Debt to Book* ratio

The number of firm-quarters that have a specific credit rating at the beginning of each quarter. Means, Standard deviations, Minimums, 25 Percentiles, Medians, 75 percentiles and Maximums of Debt/ (Debt + Equity) for each credit rating within the sample. The sample is Compustat companies from 2009 to 2017. Firms that have N/As in any component were dropped. Debt/ (Debt + Equity) is equal to the book value of short-term and long-term debt over the sum of book value of total debt and book value of shareholders equity. The values of Debt/ (Debt + Equity) used are all in percentage values.

	AAA	AA+	AA	AA-	A+	A	A-
Number of Firm-Quarters	24	39	43	99	214	540	454
Debt/(Debt+Equity)							
Mean	7,7 %	32,7 %	15,2 %	11,9 %	11,8 %	17,9 %	21,7 %
Std Dev	3,1 %	28,3 %	5,3 %	6,7 %	9,2 %	14,6 %	20,1 %
Minimum	2,9 %	2,6 %	0,03 %	0,4 %	0,00 %	0,00 %	0,5 %
25 Percentile	5,7 %	4,1 %	13,7 %	7,8 %	6,4 %	9,4 %	11,3 %
Median	6,9 %	22,1 %	17,0 %	12,3 %	10,4 %	14,5 %	15,8 %
75 Percentile	9,3 %	62,3 %	18,6 %	15,2 %	14,6 %	20,9 %	24,8 %
Maximum	15,2 %	74,3 %	22,2 %	36,3 %	65,7 %	64,2 %	73,3 %

	BBB+	BBB	BBB-	BB+	BB	BB-	B+
Number of Firm-Quarters	665	930	733	547	544	551	419
Debt/(Debt+Equity)							
Mean	20,3 %	21,9 %	25,7 %	28,6 %	31,2 %	39,9 %	41,4 %
Std Dev	12,9 %	12,3 %	13,9 %	16,7 %	16,1 %	15,3 %	19,8 %
Minimum	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %
25 Percentile	12,4 %	14,2 %	14,4 %	16,8 %	19,5 %	28,3 %	27,8 %
Median	18,6 %	20,3 %	24,3 %	26,1 %	29,2 %	39,5 %	39,9 %
75 Percentile	24,3 %	27,2 %	34,5 %	38,3 %	39,7 %	51,4 %	55,2 %
Maximum	87,7 %	88,8 %	79,5 %	89,2 %	86,7 %	80,4 %	90,9 %

	B	B-	CCC+	CCC	CCC-	D	SD
Number of Firm-Quarters	336	121	59	18	3	5	4
Debt/(Debt+Equity)							
Mean	49,9 %	68,9 %	66,1 %	90,1 %	84,8 %	96,4 %	84,7 %
Std Dev	20,7 %	19,4 %	19,1 %	9,6 %	11,1 %	3,3 %	8,1 %
Minimum	10,3 %	15,1 %	36,4 %	64,2 %	76,6 %	91,1 %	78,3 %
25 Percentile	31,6 %	54,1 %	50,1 %	84,1 %	78,5 %	95,9 %	80,5 %
Median	49,8 %	73,4 %	65,5 %	93,2 %	80,4 %	96,9 %	82,1 %
75 Percentile	66,5 %	85,4 %	85,3 %	97,1 %	88,9 %	98,7 %	86,4 %
Maximum	97,7 %	97,6 %	96,3 %	99,4 %	97,5 %	99,3 %	96,6 %

Figure 1 shows the distribution of the *Debt to Book* ratio and Equity to Book ratio for each credit rating. It is possible to see that firms that have high credit ratings have relatively less debt and more equity than firms with lower credit ratings. This can be explained by the fact that those firms need to issue debt to afford more capital to invest in new projects that cannot be done through equity only, whereas firms that have ratings less than B have higher portion of debt than equity.

Figure 1: Capital Structure Distribution by Credit Rating

This figure shows the average values of *Debt to Book* ratio (the division of book value of total debt over the book value of total debt and shareholders' equity) and Equity to Book ratio (the division of book value of shareholders' equity over the book value of total debt and shareholders' equity) for each credit rating of all firms from 2009 to 2017.

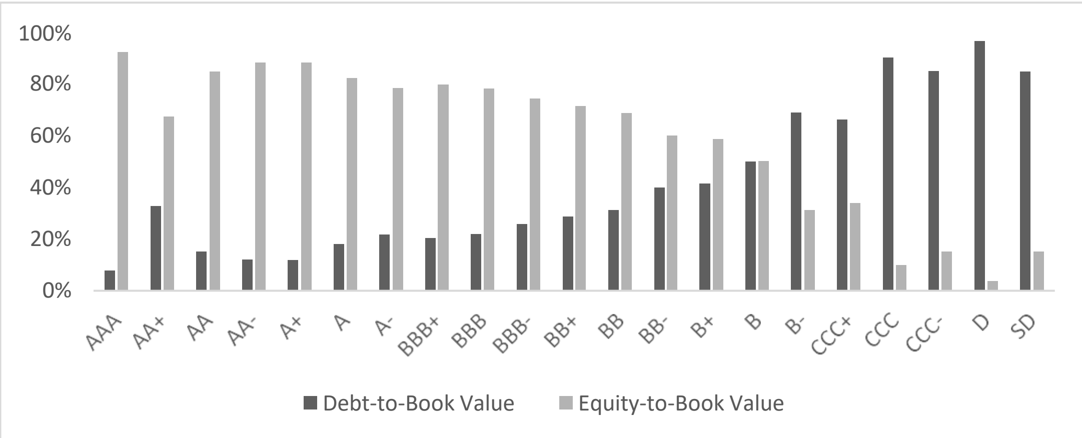
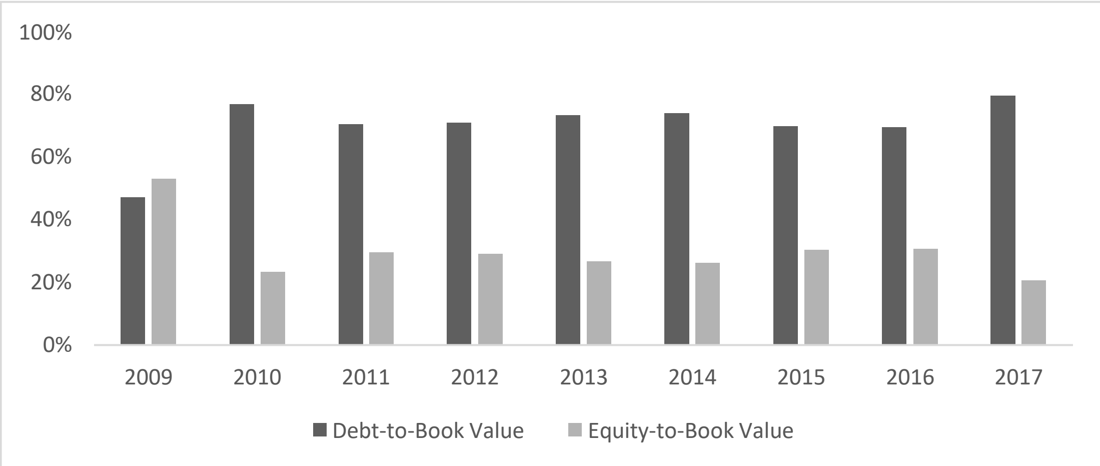


Figure 2 shows both average *Debt to Book* ratio and average Equity to Book value by year. It is shown that directly after the 2008 financial crisis, firms did not hold large amounts of debt even if they have high credit ratings because they expect a default in their debt. The equity amounts were low as well during that period, which can be due to the unwillingness of both equity holders and credit providers to afford the cash needed by firms.

Table 3 shows the number and percentage of firms that issue and reduce debt only, equity only, both debt and equity, and neither debt nor equity. The table shows that the number of firm-quarters are approximately the same for the issuance of equity only, equity and debt, and neither debt nor equity, whereas the issuance of debt only has the lower percentage which is equal to 17% of the total number of firm-quarters. This can be explained by the effects of the financial crisis on the issuance of debt, where firms were unable to issue more debt because of the strict policies taken debtholders and the drastic drop of firms with issuer credit ratings.

Figure 2: Capital Structure Distribution by Year

This figure shows the distribution of *Debt to Book* ratio (the division of book value of total debt over the book value of total debt and shareholders' equity) and Equity to Book ratio (the division of book value of shareholders' equity over the book value of total debt and shareholders' equity) of all firms for each year from 2009 to 2017.



In the second part of the table, it is shown that the net reduction of equity only has the largest percentages, and this might be a result of the reduction in the number of stocks of firms due to the financial crisis.

Table 3: Summary Statistics - Capital Market Activity

Number and Percentage of firm-quarters for each capital market activity. Issuance or reduction of debt only is the positive or negative change in the book value of total debt with no variation in number of common shares outstanding. Issuance or reduction of equity only is the increase or decrease in number of common shares outstanding with no change in the book value of total debt. Issuance or reduction of both debt and equity is the combination of a positive or negative change in the book value of total debt and an increase or a decrease of common shares outstanding. Neither issuing or reducing debt nor equity is the combination of zero change in book value of total debt and no variation in common shares outstanding.

	Issuance		Reduction	
	Number of Firm-Quarters	%	Number of Firm-Quarters	%
Debt only	1 102	16,92%	965	17,01%
Equity only	1 882	28,90%	1 615	28,46%
Debt and Equity	1 754	26,93%	841	14,82%
Neither	1 775	27,25%	2 253	39,71%
Total	6 513	100,00%	5 674	100,00%

Table 4 shows the number of firm-quarters that have debt and equity issuance and reduction activity after changes in credit ratings. Firms are grouped by three characteristics: No change in credit rating (for the firms that have the same credit rating as the previous quarter), downgrade (for the firms that have lower credit rating than the previous quarter) and upgrade (for firms that have better credit rating than the last quarter). As shown in the table, the number of downgraded firms in the last period that issue equity or reduce debt is higher than firms issuing debt and reducing equity. The number of downgraded firm quarters that reduce debt is equal to 86 and the ones that issue equity are equal to 107. On the other hand, upgraded firms are more likely to issue debt and reduce equity. For example, upgraded firms that issue debt are equal to 72 compared to upgraded firms that reduce debt which are equal to 56. The number of upgraded firms that reduce equity is greater by 69 compared to firms that issue equity. The number of firms that didn't have a change in their credit rating is the largest comparing to downgraded and upgraded firms. The number of those firms that issue debt is greater by 262 than firms that reduce debt and the number of firms with no change in credit rating that issue equity is more by 270 than firms that reduce equity.

Table 4: Capital Market Activity Following Rating Changes

Number of firm-quarters in which companies undertake one of the capital market activities according to a change in credit rating. Issuance or reduction in Debt is defined as a positive or negative change in the book value of long term and short-term debt, whereas issuance or reduction in Equity is defined as an increase or decrease in number of common shares of each company from one period to another. No change in credit rating firms is the one that have the same rating between t-1 and t. Downgrade is when firm's credit rating drop between two periods and Upgrade is the opposite.

Rating Change	Number of Firm-Quarters			
	Issue Debt	Reduce Debt	Issue Equity	Reduce Equity
No change In Credit Rating	1 910	1 648	2 561	2 291
Downgrade	51	86	107	105
Upgrade	72	56	60	129

I run the 3 models to estimate the *Debt to Book* ratio, which is total book value of debt over the sum of the book value of debt and equity, and 3 other regression models to estimate the *NetLevAss* ratio, which is total book value of debt minus total book value of equity over total book value of assets. The three main regressions preformed to model the *Debt to Book* ratio are:

$$Debt\ to\ Book_{i,t} = \alpha + \beta_1 K_{i,t-1} + \varepsilon_{i,t} \tag{1}$$

$$Debt\ to\ Book_{i,t} = \alpha + \beta_1 Downgrade_{i,t-1} + \beta_2 Upgrade_{i,t-1} + \beta_3\ K_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

$$Debt\ to\ Book_{i,t} = \alpha + \beta_1 Number\_Notches_{i,t-1} + \beta_2\ K_{i,t-1} + \varepsilon_{i,t} \tag{3}$$

I then preform the same three regressions but applied to *NetLevAss*. The preformed regressions are:

$$NetLevAss_{i,t} = \alpha + \beta_1 K_{i,t-1} + \varepsilon_{i,t} \tag{4}$$

$$NetLevAss_{i,t} = \alpha + \beta_1 Downgrade_{i,t-1} + \beta_2 Upgrade_{i,t-1} + \beta_3 K_{i,t-1} + \varepsilon_{i,t} \tag{5}$$

$$NetLevAss_{i,t} = \alpha + \beta_1 Number\_Notches_{i,t-1} + \beta_2 K_{i,t-1} + \varepsilon_{i,t} \tag{6}$$

I also consider the impact of year and firm fixed effects in the previous equations. To further explore the results, I run the previous regression models while conditioning for investment grade and speculative grade firms.

Empirical Results

I run the six linear regressions to estimate the *Debt to Book* ratio and the *NetLevAss* using three groups of independent variables. Table 5 shows the coefficients resulted from the regressions with p-values in parentheses. Regression 1 shows that all the variables are significant at 1% significance level. The *Debt to Assets* ratio and *Debt to EBITDA* ratio have positive coefficients, whereas *EBITDA to Sales*, *Log_Assets* and *Negative_EBITDA* variables have negative coefficients which is aligned with previous literature. This can be explained as an increase in sales leads companies to issue more debt (Kisgen Darren (2006)). In regression 2, the *Downgrade* variable and the lagged control variables are significant at 1% significance level. However, the *Upgrade* variable is not statistically significant. The *Upgrade* variable coefficient has a positive sign, and the *Downgrade* coefficient is negative. If the *Upgrade* variable takes a value of 1 *Debt to Book* ratio increases by 5.75 percentage points. If the *Downgrade* variable takes the value of 1 *Debt to Book* ratio will decrease by 0.15 percentage points, meaning that firms will issue more debt if they are upgraded in the last period, and they will reduce its debt following a downgrade. The control variables coefficients have the same sign as the first regression. The *Debt to Assets* ratio has the higher coefficient of 0.5243. The third regression shows that, contrasted to all other variables that are significant at 1% significance level, the *Number_Notches* variable is significant at 5% level. The sign of *Number_Notches* coefficient is negative and low, which means that a downgrade of a firm by one credit rating from one quarter to another will decrease *Debt to Book* ratio by 0.04 percentage points and this can explain the fact that firms reduce their debt one period after the downgrade. All the other variables have the same sign as the previous regression. In the second part, when I run the regressions on net leverage to assets (*NetLevAss*), all the independent variables in regression 4 are statistically significant at 1% significance level. The control variables have the same sign of their coefficients as the last regression models. In regression 5, all variables are statistically significant at 5%, and the sign of the coefficients are, for the most part, the same as the regression when estimating *Debt to Book* ratio. The exception is the sign of the intercept. *Upgrade* variable has a positive impact on the *NetLevAss* and *Downgrade* variable has a negative effect. If *Upgrade* variable takes a value of 1, the debt will increase by 24.76 percentage points compared to equity, whereas if *Downgrade* variable takes the value of 1, debt will be reduced by 19.4 percentage points. For regression 6, unlike the other variables which are significant at 1% significance level, *Number_Notches* is significant at 5% level. The coefficients of the variables are high compared to regression 1,2 and 3.

Table 6 shows the regressions conducted using equation 1,2 and 3 while employing firm and year fixed effects. Table 6 shows that except *Upgrade* variable which is not significant when estimating the *Debt to Book* ratio with year fixed effects, all the independent variables of these regressions are significant at 1% significance level. The signs of the coefficients of *Debt to Assets* ratio and *Debt to EBITDA* ratio variables are positive (Baghai et al. (2014)) and *Debt to Assets* ratio has the greatest coefficient. If the *Debt to Assets* increases by one percentage point, the *Debt to Book* ratio increases by 0.4278 percentage points. The *EBITDA to Sales*, *Log_Assets* and *Negative_EBITDA* have negative effect on debt. Regression 2 shows that the sign of the *Upgrade* coefficient is positive, the *Downgrade* has a negative effect on debt and both coefficients have low values. The control variables have the same sign as the first regression.

Table 5: Credit Rating Effect on Capital Structure Decision

Coefficients and P-values for OLS regressions of *Debt to Book* ratio (book value of debt over sum of book value of debt and shareholders' equity) and *NetLevAss* (book value of debt minus book value of equity divided by beginning of quarter total book value of assets) on credit rating dummy variables and control variables. *Downgrade* and *Upgrade* are dummy variables with a value of 1 if the firm was downgraded or upgraded the previous quarter. *Number_Notches* is the difference between the credit rating of a quarter and the previous quarter. *Debt to Assets*, *Debt to EBITDA*, *EBITDA to Sales*, *Log_Assets*, *Negative_EBITDA* are control variables. P-values are used to check the significance of the variables.

	Debt to Book ratio			*NetLevAss*		
	1	2	3	4	5	6
Intercept	0,1412	0,1373	0,1411	-1,1293	-1,1451	-1,1362
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Upgrade $_{i\,t\text{-}1}$		0,0575			0,2476	
		(0,8980)			(0,0460)	
Downgrade $_{i\,t\text{-}1}$		-0,0015			-0,194	
		(0,0000)			(0,0000)	
Number_Notches $_{i\,t\text{-}1}$			-0,0004			-0,0365
			(0,0490)			(0,0260)
Debt to Assets $_{i\,t\text{-}1}$	0,5311	0,5243	0,531	1,2175	1,1881	1,2087
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Debt to EBITDA $_{i\,t\text{-}1}$	0,00007	0,00007	0,00007	0,0002	0,0002	0,0002
	(0,0000)	(0,0000)	(0,0000)	(0,0020)	(0,0020)	(0,0020)
EBITDA to Sales $_{i\,t\text{-}1}$	-0,0521	-0,0496	-0,0521	-0,688	-0,6777	-0,6836
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Log_Assets $_{i\,t\text{-}1}$	-0,0093	-0,0091	-0,0093	-0,0308	-0,0297	-0,0308
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Negative_EBITDA $_{i\,t\text{-}1}$	-0,1089	-0,1026	-0,1088	-0,2114	-0,1844	-0,2044
	(0,0000)	(0,0000)	(0,0000)	(0,0010)	(0,0030)	(0,0010)
N	6348	6348	6348	6348	6348	6348
Adj. R^2	0,301	0,304	0,301	0,077	0,079	0,077

The last regression to estimate the *Debt to Book* ratio with firms fixed effects shows that *Number_Notches* coefficient has a negative sign which is accurate because when a credit rating of a firm goes down from one period to another, the debt of that firm goes down. The value of the coefficient of *Number_Notches* variable is very low (less than 0.01). Regarding year fixed effects, the signs of the coefficients are the same as the first regression with firm fixed effects and *Debt to Assets* ratio coefficient has the highest value. Regression 2 with year fixed effects indicates that the signs of the coefficients of all independent variables in this regression are the same as regression 2 with firm fixed effects and, unlike *Debt to Assets* ratio coefficient, *Upgrade* and *Downgrade* coefficients are low. The variables of the last regression model are all significant at 1% significance level. The sign of *Number_Notches* variable coefficient is negative and low.

Table 7 shows the results from regressions 4, 5 and 6 for *NetLevAss* from Table 6 while employing firm and year fixed effects. In regression 4, with firm fixed effects, all the variables are significant at 5% significance level, and they have the same sign as the regression used to estimate the *Debt to Book* ratio. *EBITDA to Sales* value has the highest effect on the *NetLevAss* variable. If the firm was upgraded in the previous quarter (the *Upgrade* variable takes a value of 1), *NetLevAss* increases by 20.85 percentage points, and if the firm is downgraded in the previous quarter (the *Downgrade* variable takes a value of 1), *NetLevAss* decreases by 2.13 percentage points. In regression 5, using firm fixed effects, all variables are significant at 1% significance level, except the variable *Upgrade* that has a 10% significance level, and *Debt to EBITDA* which is significant at 5% significance level. The control variables coefficients have the same sign as the previous regressions. The *Upgrade* coefficient is positive, and the *Downgrade* variable has a negative effect on *NetLevAss*. Both coefficient values are low compared to *EBITDA to Sales* coefficient absolute value. The last regression using firm fixed effects shows that the *Number_Notches* variable coefficient has a negative sign and a low value. All the variables are significant at 5% significance level with the same coefficient signs as the two previous regression models using firm fixed effects. By analyzing the three regressions for estimating the *NetLevAss* using year fixed effects, it is proven that the results regarding the significance of the independent variables are similar to the previous analysis. The exception is the significance of the *Upgrade* variable.

Table 6: The Impact of Credit Rating Change on Book Value of Debt – Fixed Effects

Using firm and year fixed effects, Coefficients and P-values for OLS regressions of *Debt to Book* ratio (book value of debt over sum of book value of debt and shareholders' equity) on credit rating dummy variables and control variables. *Downgrade* and *Upgrade* are dummy variables with a value of 1 if the firm was downgraded or upgraded the previous quarter. *Number_Notches* is the difference between the credit rating of a quarter and the previous quarter. *Debt to Assets*, *Debt to EBITDA*, *EBITDA to Sales*, *Log_Assets*, *Negative_EBITDA* are control variables. The sample is Compustat firms from 2009 to 2017. P-values are used to check the significance of the variables.

	Firm FE			Year FE		
	1	2	3	1	2	3
Intercept	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Upgrade $_{i\,t\text{-}1}$		0,0571			0,1022	
		(0,0000)			(0,6180)	
Downgrade $_{i\,t\text{-}1}$		-0,0213			-0,0051	
		(0,0000)			(0,0000)	
Number_Notches $_{i\,t\text{-}1}$			-0,0108			-0,0272
			(0,0000)			(0,0000)
Debt to Assets $_{i\,t\text{-}1}$	0,4278	0,4109	0,4202	0,6469	0,6360	0,6406
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Debt to EBITDA $_{i\,t\text{-}1}$	0,00001	0,00001	0,00001	0,00007	0,00007	0,00007
	(0,0300)	(0,0160)	(0,0260)	(0,0000)	(0,0000)	(0,0000)
EBITDA to Sales $_{i\,t\text{-}1}$	-0,1390	-0,1319	-0,1371	-0,0898	-0,0856	-0,0866
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Log_Assets $_{i\,t\text{-}1}$	-0,0757	-0,0761	-0,0765	-0,0115	-0,0111	-0,0115
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Negative_EBITDA $_{i\,t\text{-}1}$	-0,0222	-0,0174	-0,0205	-0,1186	-0,1078	-0,1135
	(0,0000)	(0,0030)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
N	6348	6348	6348	6348	6348	6348
Adj. R^2	0,3100	0,3310	0,3130	0,4340	0,4410	0,4360

Regression 5 of the year fixed effects shows that the *Upgrade* variable is not significant at 10%. It is also observed that the absolute value of the *Upgrade*, *Number_Notches*, *Debt to Assets*, *Debt to EBITDA*, *Log_Assets* and *Negative_EBITDA* coefficients values are higher when using year fixed effects than using firm fixed effects.

Table 7: The Impact of Credit Rating Change on Net Leverage to Assets – Fixed Effects

Coefficients and P-values for OLS regressions using firm and year fixed effects of *NetLevAss* (book value of debt minus book value of equity divided by beginning of quarter total assets) on credit rating dummy variables and control variables. *Downgrade* and *Upgrade* are dummy variables with a value of 1 if the firm was downgraded or upgraded the previous quarter. *Number_Notches* is the difference between the credit rating of a quarter and the previous quarter. *Debt to Assets*, *Debt to EBITDA*, *EBITDA to Sales*, *Log_Assets*, *Negative_EBITDA* are control variables. The sample is Compustat firms from 2009 to 2017. P-values are used to check the significance of the variables.

	Firm FE			Year FE		
	4	5	6	4	5	6
Intercept	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Upgrade $_{i\ t-1}$		0,2085			0,5539	
		(0,0790)			(0,4550)	
Downgrade $_{i\ t-1}$		-0,0809			-0,0479	
		(0,0000)			(0,0000)	
Number_Notches $_{i\ t-1}$			-0,0665			-0,2026
			(0,0020)			(0,0000)
Debt to Assets $_{i\ t-1}$	0,1244	0,1218	0,1202	0,3802	0,3659	0,3671
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Debt to EBITDA $_{i\ t-1}$	0,00004	0,00004	0,00004	0,0004	0,0004	0,0004
	(0,0473)	(0,0449)	(0,0466)	(0,0000)	(0,0000)	(0,0000)
EBITDA to Sales $_{i\ t-1}$	-0,5175	-0,4790	-0,4953	-0,4834	-0,4742	-0,4698
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Log_Assets $_{i\ t-1}$	-0,0050	-0,0050	-0,0050	-0,0223	-0,0219	-0,0219
	(0,0010)	(0,0000)	(0,0168)	(0,0000)	(0,0000)	(0,0000)
Negative_EBITDA $_{i\ t-1}$	-0,0153	-0,0332	-0,0260	-0,3786	-0,3151	-0,3354
	(0,0000)	(0,0000)	(0,0330)	(0,0000)	(0,0000)	(0,0000)
N	6348	6348	6348	6348	6348	6348
Adj. R^2	0,0270	0,0420	0,0320	0,0410	0,0510	0,0470

In Table 8, I run regressions to compare the impact on *Debt to Book* ratio following a change on the firm's credit rating while conditioning the firms on investment and speculative grade firms. For investment grade firms, it is shown, from the first regression, that *Debt to Assets* ratio, *EBITDA to Sales*, *Log_Assets* and *Negative_EBITDA* are significant at 1% significance level, whereas *Debt to EBITDA* ratio is significant at 5% significance level. *Debt to Assets* ratio has the highest positive coefficient, if its value increases by 1 percentage point the value of *Debt to Book* ratio increases by 0.4364 percentage points. In regression 2, all the variables are significant at 1% significance level except the variable *Upgrade*. *Downgrade* variable coefficient is negative, whereas *Upgrade* variable has a positive sign. Both *Upgrade* and *Downgrade* variables have low coefficients. This proves that the impact of credit ratings on firms' *Debt to Book* ratio is not strong. The third regression shows that all variables are significant at 5% significance level. The *Number_Notches* variable coefficient has a negative sign and a low value. Regarding the speculative grade firms, it is shown from regression 1 that all lagged control variables are significant at 1% significance level except *EBITDA to Sales* ratio which is not significant. Regression 2 shows the significance of *Downgrade*, Debt to Asset ratio, *Debt to EBITDA* ratio, *Log_Assets* and *Negative_EBITDA* variables at 5% significance level, whereas *Upgrade* and *EBITDA to Sales* variables are not statistically significant. The values of the coefficients of the speculative grade regression models are lower than the investment grade ones which means that investment grade firms react more to changes in credit ratings. Finally, in the third regression of speculative grade firms, the table indicates that the *Number_Notches* is significant at 5% significance level, and *EBITDA to Sales* variable is not statistically significant. The signs are the same as the other two regressions.

Table 9 replicates equations 4, 5 and 6 on *NetLevAss* from Table 7 while segmenting the sample into speculative and investment grade firms. For investment grade firms, regression 4 shows that all the variables are significant at 1% significance level. *EBITDA to Sales* ratio, *Log_Assets* and *Negative_EBITDA* coefficients have negative signs, whereas *Debt to Assets* and *Debt to EBITDA* coefficients have positive signs which is the same as the previous regressions. The negative sign of *Log_Assets* can be explained as an increase in assets in the last period will affect negatively *NetLevAss* variable in the next period (which has total book value of assets in the denominator). *EBITDA to sales* ratio has the most remarkable effect on *NetLevAss* since the absolute value of its coefficient is the highest and *Debt to EBITDA* ratio has the lowest coefficient. In regression 5, all the variables are significant at 1% significance level, except the *Upgrade* variable which is not statistically significant, this can be explained as firms react to bad news more than good news.

Table 8: The Impact of Credit Rating Change on Book Value of Debt – Investment and Speculative Grades

Coefficients and P-values for OLS regressions of *Debt to Book* ratio (book value of debt over sum of book value of debt and shareholders' equity) on credit rating dummy variables and control variables classified by investment grade and speculative grade firms. *Downgrade* and *Upgrade* are dummy variables with a value of 1 if the firm was downgraded or upgraded the previous quarter. *Number_Notches* is the difference between the credit rating of a quarter and the previous quarter. *Debt to Assets*, *Debt to EBITDA*, *EBITDA to Sales*, *Log_Assets*, *Negative_EBITDA* are control variables. Investment grade firms are firms that have a credit rating higher or equal to BBB-, whereas speculative grade firms are firms that have a credit rating lower or equal to BB+. P-values are used to check the significance of the variables.

	Investment Grade			Speculative Grade		
	1	2	3	1	2	3
Intercept	0,0560	0,0523	0,0580	-0,1068	-0,1061	-0,1074
	(0,0310)	(0,1030)	(0,0710)	(0,0000)	(0,0000)	(0,0000)
Upgrade $_{i\,t-1}$		0,0552			0,0258	
		(0,0410)			(0,8320)	
Downgrade $_{i\,t-1}$		-0,0362			-0,0024	
		(0,0020)			(0,0490)	
Number_Notches $_{i\,t-1}$			-0,0152			-0,0086
			(0,0450)			(0,0250)
Debt to Assets $_{i\,t-1}$	0,4364	0,4284	0,4414	0,4583	0,4565	0,4580
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Debt to EBITDA $_{i\,t-1}$	0,00003	0,00003	0,00003	0,0005	0,0005	0,0005
	(0,0220)	(0,0230)	(0,0220)	(0,0000)	(0,0000)	(0,0000)
EBITDA to Sales $_{i\,t-1}$	-0,0988	-0,0960	-0,1013	-0,0049	-0,0053	-0,0053
	(0,0000)	(0,0000)	(0,0000)	(0,7050)	(0,6790)	(0,6830)
Log_Assets $_{i\,t-1}$	-0,0300	-0,0298	-0,0301	-0,0277	-0,0275	-0,0277
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Negative_EBITDA $_{i\,t-1}$	-0,0690	-0,0614	-0,0723	-0,0710	-0,0702	-0,0705
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
N	6348	6348	6348	6348	6348	6348
Adj. R^2	0,2450	0,2490	0,2460	0,3260	0,3260	0,3260

The coefficient of *Upgrade* variable is high compared to the absolute value of the coefficient of *Downgrade* variable. If a firm is upgraded the value of *NetLevAss* increases by 38.91 percentage points meaning that the net debt will increase when compared to equity, following an upgrade in the last period. Regression 6 of table 9 for investment grade firms shows that all variables are significant at 1% significance level and the absolute value of *EBITDA to Sales* has the highest effect on *NetLevAss*.

For speculative grade firms, it is shown in regression 4 of table 9 that all the independent variables are significant at 1% level with a highest absolute value for *EBITDA to Sales* variable. *Debt to Assets* and *Debt to EBITDA* coefficients have positive signs, whereas *EBITDA to Sales*, *Log_Assets* and *Negative_EBITDA* betas have negative signs. In regression 5 of speculative grade firms, the *Upgrade* is not statistically significant comparing to all other control variables, which are significant at 1% significance level. The *Upgrade* variable has a positive effect on *NetLevAss* with high coefficient value, and *Downgrade* coefficient is negative and low which proves that upgraded firms are faster at adjusting their debt than downgraded firms. The control variables have the same signs as the previous regression model, with *EBITDA to Sales* ratio as the highest coefficient value. Finally, regression 6 of speculative grade firms shows that the sign of *Number_Notches* coefficient is negative, meaning that a one-notch downgrade decreases *NetLevAss* by 12.43 percentage points, thus the debt in proportion to equity will be reduced following a downgrade. All the variables are significant at 1% significance level, and *EBITDA to Sales* has the highest coefficient absolute value.

To sum up, the regressions show that *Upgrade* and *Downgrade* variables affect the *Debt to Book* and *NetLevAss* variables. *Downgrade* variable is significant in all regression models, whereas *Upgrade* is not significant in most of the regressions. This is consistent with other literature since market and firms react to bad news more than good news. The coefficients of the *Downgrade* variable are negative for all models, which shows that this variable negatively affects firm's *Debt to Book* and *NetLevAss* variables. Downgraded firms reduce its debt in proportion to equity by an average of 3 percentage points. Whereas *Upgrade* variable coefficients are all positive which shows that it influences positively *Debt to Book* and *NetLevAss* variables. As a result, if a firm that is upgraded in the previous period, its *Debt to Book* ratio will increase by an average of 5 percentage points in the next period. In contrast to the previous literature, *Upgrade* variables present higher coefficients than *Downgrade* variables in all regression models.

Table 9: The Impact of Credit Rating Change on Net Leverage to Assets – Investment and Speculative Grades

Coefficients and p-values for OLS regressions of *NetLevAss* (book value of debt minus book value of equity divided by beginning of quarter total assets) on credit rating dummy variables and control variables classified by investment grade and speculative grade firms. *Downgrade* and *Upgrade* are dummy variables with a value of 1 if the firm was downgraded or upgraded the previous quarter. *Number_Notches* is the difference between the credit rating of a quarter and the previous quarter. *Debt to Assets*, *Debt to EBITDA*, *EBITDA to Sales*, *Log_Assets*, *Negative_EBITDA* are control variables. Investment grade firms are firms that have a credit rating higher or equal to BBB-, whereas speculative grade firms are firms that have a credit rating lower or equal to BB+. P-values are used to check the significance of the variables.

	Investment Grade			Speculative Grade		
	4	5	6	4	5	6
Intercept	-0,3545	-0,4083	-0,3845	-0,3552	-0,4083	-0,3854
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Upgrade $_{i\,t-1}$		0,3891			0,3891	
		(0,5350)			(0,5630)	
Downgrade $_{i\,t-1}$		-0,0405			-0,0326	
		(0,0000)			(0,0000)	
Number_Notches $_{i\,t-1}$			-0,1041			-0,1243
			(0,0010)			(0,0015)
Debt to Assets $_{i\,t-1}$	0,2880	0,2767	0,2810	0,2875	0,2753	0,2765
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Debt to EBITDA $_{i\,t-1}$	0,0004	0,0004	0,0004	0,0004	0,0004	0,0004
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
EBITDA to Sales $_{i\,t-1}$	-0,4078	-0,4018	-0,4005	-0,4089	-0,4023	-0,4016
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Log_Assets $_{i\,t-1}$	-0,0228	-0,0225	-0,0225	-0,0246	-0,0225	-0,0236
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
Negative_EBITDA $_{i\,t-1}$	-0,3277	-0,2811	-0,3052	-0,3264	-0,2811	-0,3054
	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)	(0,0000)
N	6348	6348	6348	6348	6348	6348
Adj. R^2	0,0290	0,0300	0,0310	0,0290	0,0340	0,0310

This dissertation has some limitations that can be addressed in future research. There are other control variables that might affect the capital structure of firms. For my analysis, I used most control variables that have a direct effect on debt and equity which are used in previous literature. However, many other numerical variables like capital expenditures divided by total assets (CAPEX/Assets) and net property, plant, and equipment divided by total assets (PPE/Assets) can be used to estimate the impact on *Debt to Book* ratio and *NetLevAss*, following a change in the firm's credit rating. Some other qualitative variables can affect the capital structure of firms (e.g., economic and financial decisions taken by governments that can be related to interest rates and government bonds issuance like changing the Federal Fund Rate).

The results of this dissertation show that credit rating changes affect capital structure of US firms for the period between 2008 until 2017. Long-Term Domestic Issuer Credit Rating data from Compustat is available until February 2017 so the impact of credit rating on capital structure for 2018 and 2019 is not shown in this dissertation. Those two years can have a different relationship between credit rating changes and the issuance of debt by firms especially at the end of 2019 when the COVID-19 started to spread.

Conclusion

Many researchers have worked on the key drivers for Capital Structure changes, and how it is affected by the overall economy factors, performance and more specifically the rating assigned by Credit Rating Agencies. For such purpose, several papers look at the relationship between Credit Rating and Capital Structure as a main and paramount topic for their empirical studies. Some of them focused on the relationship between debt and equity financing in the way their capital allocation reacts to internal and external factors, such as financial crisis, managing decisions, financial performance, and credit risk of the firm. Consequently, several outcomes have been built from their research that I tried to go through in this dissertation.

This dissertation examines the effect of changes in credit ratings on firm's capital structure. I find that firms that have high credit ratings hold more equity and less debt than firms with low credit ratings and, right after the financial crisis of 2008, even firms with high credit ratings hold less equity and debt due to the decline in the overall economic activities. For the period between 2009 and 2017, most downgraded firms issue equity or reduce debt, and are less likely to issue debt and reduce equity. However, upgraded firms are more likely to increase debt in proportion to equity.

The empirical results show that both upgrades and downgrades influence capital structure by changing the *Debt to Book* ratio and *NetLevAss*. Unlike the *Upgrade* variable, the *Downgrade* and control variables are statistically significant, and the results are sensitive to various econometric models. If a firm is downgraded in the previous quarter, its *Debt to Book* ratio will be reduced by an average of 3 percentage points in the next period as a conservative decision to adjust its capital allocation. The results prove that *Debt to Book* ratio and *NetLevAss* of upgraded firms increase after one period. The shift from speculative grade to investment grade is significant and consistent. The effect of downgrades is stronger for investment grade than for speculative grade firms.

Finally, this dissertation provides a deeper understanding of capital structure activities. It illustrates that the sensitiveness of managers to credit ratings have real implications for decision making. Credit ratings should be included as part of the capital structure framework in future research, both to assure consistency in capital structure decision making and, more broadly, to provide a more thorough description of capital structure behavior.

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