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Do Credit Rating Changes Affect Equity Issuance/Repurchase? Case Study of the US Market

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Abstract

This dissertation analyses the relation between credit rating changes and equity *Issuance* or *Repurchase*. I consider two types of credit rating changes: *Upgrade*s and *Downgrade*s. To conduct this study the data used comprises the period between 1985 and 2016, in which I assume a lag of one month for the data to be incorporated into credit rating changes. To assess the relation between *Issuance* and *Repurchase*, I use a set of control variables and assess them in light of three different models: Linear, PROBIT and LOGIT. The results suggest that firms react more to *Upgrade*s than *Downgrade*s. In the Speculative Grade sub-sample, I find weaker empirical evidence of this relation, especially within the *Repurchase* scenario.

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Keywords: Credit Rating, *Upgrade*, *Downgrade*, Equity, *Issuance*, *Repurchase*

Resumo

A presente dissertação tenciona relacionar mudanças nas classificações de crédito com emissão ou recompra de capital próprio. Para tal, vou considerar dois tipos de mudanças nas classificações de crédito: *Upgrade* e *Downgrade.* Para realizar este estudo, os dados incluem o período entre 1985 e 2016, no qual assumo que existe um desfasamento de um mês para a informação ser incorporada nas classificações de crédito. Para analisar a relação entre a classificação de crédito e Emissão ou Recompra, utilizei um conjunto de variáveis de controlo, e analisei-as em três cenários diferentes: Linear, *PROBIT* e *LOGIT*. Os resultados sugerem que as empresas reagem mais a casos de *Upgrade* do que *Downgrade*. Na amostra de *Speculative Grade*, os resultados são empiricamente menos relevantes, especialmente dentro do cenário da Recompra.

Título: Alterações nas Classificações de Crédito Afetam Emissão/Recompra de Capital Próprio? Caso de Estudo do Mercado dos Estados Unidos.

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Palavras-chave: Emissão, Recompra, Capital Próprio, Crédito, Classificação, *Upgrade*, *Downgrade*

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1. Introduction

This dissertation aims to assess whether changes in firms' credit ratings have an impact on the *Issuance* or *Repurchase* of shares in the following year, for example, given a change in the credit rating in 2008 what is the impact on a firm's equity policy in 2009. It is relevant to assess to what extent credit ratings can influence firms' financing decisions (Almeida et al. (2017)). I define a stock *Issuance* as a positive net change in the number of outstanding shares (the effect of stock issue shares must be greater than that of repurchases in that period). Similarly, I define a stock *Repurchase* as a negative net change in the number of outstanding shares (the effect of stock *Repurchase*s is stronger). For example, if a given firm decides to issue shares at the beginning of a given year and later *Repurchase*s a bigger number of shares, I account this as a net stock *Repurchase*. For my analysis, I consider firms that have information regarding Domestic Long Term Issuer Credit rating from S&P, for a period that starts in 1985 and ends in 2016.

Most of the current literature suggests that firms' decisions regarding their capital structure are highly impacted by whether firms receive good news or bad news regarding changes in their credit rating, thus, there is an important connection to study. Nevertheless, it is important to note that there is always an added effect that lies with how each firm perceives the news and how they react to it. Such an example can be seen in Kisgen (2006), that states «…concerns about *Upgrade*s or *Downgrade*s of bond credit ratings directly affect managers' capital structure decision making…». Albeit the relation between credit risk and debt is extensively studied; this matter is not debated to the same degree when it comes to equity decisions. This might be an indicator that equity entails a greater degree of subjectivity and thus requires a more in-depth analysis, or that firms do not engage in equity adjustments as frequently as they do with debt.

Initially, I expect to find that the effects of a credit rating *Downgrade* to be more statistically relevant than those of an *Upgrade*. I find that this does not seem to be true in any of the scenarios that I analyze, that is, coefficients of the *Downgrade* variable are not statistically significant in any of the models that I have studied. The results for *Upgrade*s are significance in most models that I study and attain a higher level of significance in models that relate to Investment Grade firms. This signals that my initial expectations are not correct. Furthermore, I find some evidence that suggests that Speculative Grade rating firms react less

than Investment Grade firms, which is given by the weaker empirical findings of those models and lower significance levels.

I also expect some type of relation between the sensitivity towards changes in credit ratings and the industry in which firms are inserted. To assess this effect, I include in my main analysis industry fixed effects. According to Elsas, Flannery and Garfinkel (2014), this effect is captured by using the NAICS code, that is, the North American Industry Classification System. Due to the nature of certain industries, I expect firms that are in industries with a lower degree of disruptive technologies to be more affected by these changes. This is likely because a change in the credit rating within these industries is likely to mean a deteriorated financial standing of the company, which signals to investors the quality of the firm. In my findings I do not detect the presence of greater significance in models that include this control variable than in the other models.

Initially, I expect that regressions that assess *Repurchase*s attain a stronger significance than those that assess *Issuance*, but this is not the case. When looking at the sample, I find that there is no greater significance in the coefficients for a *Repurchase* regression than for an *Issuance* regression, thus, this expectation does not hold true.

My results are more robust on the Investment Grade sample and that they seem to indicate that there is some degree of explicability of *Issuance*/*Repurchase* with the set of controls that I use. For example, *Downgrade*, *Size*, *Debt/EBITDA* and *CAPEX/Assets* seem to explain a portion of the variation in the decision of issuing or repurchasing shares. The findings are in line with most of the traditional literature on this subject. Nevertheless, my findings are not in accordance with studies that suggest that firms react more to bad news than to good ones.

I begin this dissertation by doing an in-depth overview of past and current literature on credit ratings, capital structure and equity. Then, I present the data and methodology that I use in the regression models. After, I present the main results of my models and discuss the results considering the main research question. Lastly, I do a brief round-up of the main findings as well as indicate possible extensions and limitations of my research topic.

2. Literature Review

Firms must make critical decisions as to what type of funding they choose to undertake (Degryse, Goeij, and Kappert (2012)). The main choices for financing the expansion of operations are through debt or by issuing new equity. Traditional literature, such as the Pecking

Order Theory (Donaldson (1961)) suggests that if there are retained earnings available, this is the preferred source of funds. After this, firms usually choose to take on more debt and only see issuing new equity as the last resource available. This is because debt is seen as a lower-cost funding type. Under the Pecking Order Theory and disregarding the costs that arise with the leverage levels, firms finance most of their operations with debt. Moreover, other traditional theories, such as those suggested by Modigliani and Miller (1963), defend that firms also consider benefits, such as interest tax shield, that appear with greater use of debt in their capital structure.

However, most of this literature fails to account for several factors that are present in the real world (Zhao (2018)). More recent literature on capital structure, such as Market Timing Theory, suggested by Baker and Wurgler (2002), states that firms try to time equity *Issuance* so that they can issue equity at a high price and then *Repurchase* it at a lower price, to exploit benefits that are momentary in comparison with other forms of financing costs at the time. This is especially pertinent since it is a way of benefiting existing shareholders as opposed to those that are volatile in their positions with the company, thus, there is an added incentive for managers. Baker and Wurgler (2002) show the presence of this phenomenon on multiple regressions and find that this is a relevant point for current financial policy. The authors find that equity *Issuance* is particularly likely to occur when the market value of companies is high relative to its book value and *Repurchase*s equity otherwise. Since this is a factor that heavily affects capital structure, a variable measuring the *Size* of the company should find some correlation with equity *Issuance*/*Repurchase*. However, Hovakimian (2006) and Alti (2006), find this effect to be only relevant for a couple of years, feathering away after, which indicates that this effect might not be as prominent as stated by Baker and Wurgler (2002). That is, the authors suggest that when companies have a higher market value this leads to a few years of a higher likelihood of issuing shares, after which the effect disappears.

Kisgen (2006) and Judge and Korzhenitskaya (2021) also propose that the choice of capital structure is heavily affected by the credit ratings assigned by Credit Rating Agencies, such as Standard & Poor's or Moody's. These agencies exist to provide the market and its investors with data regarding the firm's probability of default (Haan and Amtenbrink (2011)). Kisgen (2003) and Judge and Korzhenitskaya (2021) further argue that these ratings are of the utmost importance to managers when making financing decisions. Moreover, they also find that when the ratings assigned to a firm signal that it is close to a *Downgrade*, the given firm typically issues less debt. Thus, firms with lower ratings are more likely to have a lower amount of debt in their capital structure and there is a higher likelihood of this debt being more

expensive compared to firms with better ratings (Alanis, Payne and Picard (2020)). Hovakimian, Kayhan and Titman (2009) find that "when observed ratings are below (above) the target, firms tend to make security *Issuance* and *Repurchase* decisions that reduce (increase) leverage". So, I expect to find that firms react negatively to *Downgrade*s by reducing their leverage through equity *Issuance*s but have little reaction to positive improvements in ratings. Henry, Kisgen and Wu (2015) find that rating *Downgrade*s pose an opportunity for individuals to exploit which further enables firms to change their equity levels following a *Downgrade*.

The relation between debt and credit ratings is quite direct (Faulkender and Petersen (2006)), as banks give loans to companies above a certain rating and rating positively impacts the cost of debt, nevertheless, it is important to also study this relation with regards to equity. Namely, if changes in credit rating influence change in the equity levels (number of shares) of firms, that is, if a given firm experiences a credit rating *Upgrade* or *Downgrade*, does this entail that firms *Repurchase* or issue equity.

It is important to note that Credit Rating Agencies are becoming more conservative (Baghai, Servaes and Tamayo (2014)) with the ratings given to firms, meaning that a firm that attained a AAA rating in the 90s is likely to have now a lower rating, *ceteris paribus*. According to Baghai, Servaes and Tamayo (2014), this limits the alternatives available to managers. The authors further argue that firms that are more affected by this conservatism generally issue less debt. Judge and Korzhenitskaya (2021) and Mittoo and Zhang (2010) suggest that this change in the standards followed by agencies leads firms to lower the amounts of leverage.

3. Methodology and Data Collection

3.1. Data Collection

The data relating to Credit Ratings is from Compustat, which reports monthly ratings issued by Standard & Poor's (S&Ps), providing the largest dataset available. The period under analysis comprises data from 1985 until 2016 for the entire set of rated firms. I choose this time frame as it comprises the entire data set available and includes a variety of events, such as the 2008 financial crisis. To assess credit rating, I use the domestic long-term issuer credit rating, as is the norm for prior work in this area (Baghai, Servaes and Tamayo (2014)). From this dataset, I remove firms that operate in the financial sector (SIC between 6000 – 6999) and government-related firms (SIC between 9000-9999), since the firms operating in the financial

and government sectors have significantly different operating procedures, and thus, would be hard to use the same controls.

S&Ps rates companies in 21 categories, ranging from AAA, AA+, AA, AA-, BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, B-, CCC+, CCC, CCC-, CC, C and D. From rating AAA until BBB- inclusive, firms are regarded as Investment Grade, and those below this point are seen as Speculative Grade. Current literature suggests that higher credit ratings entail a lower probability of default (Kisgen (2006)).

Then, to match the necessary financial statement data, I use a lag of one month, meaning that I keep the financial statement data regarding the end of the fiscal year and then keep the first available rating one month after the end of the fiscal year. I do this because credit rating agencies need time to incorporate information into their models and, according to Baghai, Servaes and Tamayo (2014), to ensure that the data for the credit rating model is available at the time that the credit rating is disclosed.

To be able to run regressions with industry fixed effects, I extract the NAICS code from Compustat. Then, I transform NAICS into a two-digit code by keeping the first two digits of each code, which indicate the industry to which it belongs (Elsas, Flannery and Garfinkel (2014)).

Table I – Summary Statistics: Credit Ratings

This table shows the distribution of credit ratings over the sample.

S&P Credit Rating	Freq.	Percent	Cum.
AAA	113	1.07	1.07
AA+	56	0.53	1.61
AA	165	1.57	3.17
AA-	250	2.38	5.55
A+	520	4.94	10.49
A	779	7.40	17.89
A-	645	6.13	24.02
BBB+	694	6.60	30.62
BBB	1001	9.51	40.13
BBB-	758	7.20	47.33
BB+	609	5.79	53.12
BB	869	8.26	61.38
BB-	1145	10.88	72.26
B+	1499	14.24	86.51
B	767	7.29	93.79
B-	311	2.96	96.75
CCC+	135	1.28	98.03
CCC	64	0.61	98.64
CCC-	33	0.31	98.95
CC	16	0.15	99.11
D	2	0.02	99.13
SD	92	0.87	100.00

Total	10523	100.00

Table I reports the distribution of credit ratings in my sample. It is possible to see that roughly 47.3% of my sample is composed of Investment Grade firms, that is, firms that have a rating higher or equal to BBB-. Of these, most firms have a rating between A+ and BBB-. Table I shows that the number of firms that attain a rating higher than AA- is low in terms of firm years (only have 250 observations that can do so). This is an indicator that attaining a high rating is difficult and is unlikely to happen to most firms. Moreover, it is possible to see that there is a large concentration of observations that fall into the BBB category, over 1000, which represents 9.5% of my sample. This indicates that firms more easily obtain this rating over any other that is considered Investment Grade.

Table II – Rating Group Over

This table shows ratings groups, in which ratings are collapsed to the middle category apart from AAA, CC, C and D. That is, category AA also comprises AA+ and AA-. The first row of each year states the number of firms that are able to obtain that rating in that year, whilst the second row represents the percentage of a given rating that was attributed that year, related to the entire sample. For example, in 2007, 10 AA ratings are assigned by S&P which represents 2.12% of AA assigned to my whole sample.

Year	AAA	AA	A	BBB	BB	B	CCC	CC	D	Total
1985	5	20	70	37	58	76	3	0	5	274
	4.42%	4.25%	3.60%	1.51%	2.21%	2.95%	1.29%	0.00%	5.43%	2.60%
1986	7	18	65	39	61	105	15	0	11	321
	6.19%	3.82%	3.34%	1.59%	2.33%	4.07%	6.47%	0.00%	11.96%	3.05%
1987	7	18	64	39	66	127	20	0	7	348
	6.19%	3.82%	3.29%	1.59%	2.52%	4.93%	8.62%	0.00%	7.61%	3.31%
1988	5	18	64	34	53	113	12	1	9	309
	4.42%	3.82%	3.29%	1.39%	2.02%	4.38%	5.17%	5.56%	9.78%	2.94%
1989	6	15	62	36	52	109	13	1	7	301
	5.31%	3.18%	3.19%	1.47%	1.98%	4.23%	5.60%	5.56%	7.61%	2.86%
1990	5	15	63	34	48	86	8	1	4	264
	4.42%	3.18%	3.24%	1.39%	1.83%	3.34%	3.45%	5.56%	4.35%	2.51%
1991	5	15	61	42	42	81	10	3	3	262
	4.42%	3.18%	3.14%	1.71%	1.60%	3.14%	4.31%	16.67%	3.26%	2.49%
1992	4	19	59	45	60	67	8	3	2	267
	3.54%	4.03%	3.03%	1.83%	2.29%	2.60%	3.45%	16.67%	2.17%	2.54%
1993	3	19	61	49	73	77	5	2	1	290
	2.65%	4.03%	3.14%	2.00%	2.78%	2.99%	2.16%	11.11%	1.09%	2.76%
1994	3	17	58	55	72	74	6	0	2	287
	2.65%	3.61%	2.98%	2.24%	2.74%	2.87%	2.59%	0.00%	2.17%	2.73%
1995	3	19	55	71	66	77	5	0	4	300
	2.65%	4.03%	2.83%	2.89%	2.52%	2.99%	2.16%	0.00%	4.35%	2.85%
1996	3	19	65	79	85	75	3	0	3	332
	2.65%	4.03%	3.34%	3.22%	3.24%	2.91%	1.29%	0.00%	3.26%	3.15%
1997	3	18	72	87	99	83	2	0	2	366
	2.65%	3.82%	3.70%	3.55%	3.77%	3.22%	0.86%	0.00%	2.17%	3.48%
1998	4	19	76	95	134	88	4	0	1	421
	3.54%	4.03%	3.91%	3.87%	5.11%	3.41%	1.72%	0.00%	1.09%	4.00%
1999	4	18	63	100	116	102	3	0	1	407

	3.54%	3.82%	3.24%	4.08%	4.42%	3.96%	1.29%	0.00%	1.09%	3.87%
2000	3	19	62	110	108	99	2	1	5	409
	2.65%	4.03%	3.19%	4.48%	4.12%	3.84%	0.86%	5.56%	5.43%	3.89%
2001	2	19	65	111	106	79	11	2	6	401
	1.77%	4.03%	3.34%	4.53%	4.04%	3.07%	4.74%	11.11%	6.52%	3.81%
2002	2	16	66	114	114	70	13	1	5	401
	1.77%	3.40%	3.40%	4.65%	4.35%	2.72%	5.60%	5.56%	5.43%	3.81%
2003	3	16	66	102	124	76	11	2	4	404
	2.65%	3.40%	3.40%	4.16%	4.73%	2.95%	4.74%	11.11%	4.35%	3.84%
2004	3	15	65	98	117	85	9	0	1	393
	2.65%	3.18%	3.34%	4.00%	4.46%	3.30%	3.88%	0.00%	1.09%	3.73%
2005	3	12	62	98	110	81	9	0	1	376
	2.65%	2.55%	3.19%	4.00%	4.19%	3.14%	3.88%	0.00%	1.09%	3.57%
2006	3	11	63	85	98	85	7	0	1	353
	2.65%	2.34%	3.24%	3.47%	3.74%	3.30%	3.02%	0.00%	1.09%	3.35%
2007	3	10	56	83	90	75	8	0	2	327
	2.65%	2.12%	2.88%	3.38%	3.43%	2.91%	3.45%	0.00%	2.17%	3.11%
2008	4	11	51	84	90	73	2	0	1	316
	3.54%	2.34%	2.62%	3.42%	3.43%	2.83%	0.86%	0.00%	1.09%	3.00%
2009	3	11	49	89	79	72	6	1	1	311
	2.65%	2.34%	2.52%	3.63%	3.01%	2.79%	2.59%	5.56%	1.09%	2.96%
2010	3	10	53	88	67	85	2	0	1	309
	2.65%	2.12%	2.73%	3.59%	2.55%	3.30%	0.86%	0.00%	1.09%	2.94%
2011	3	8	56	88	68	71	2	0	1	297
	2.65%	1.70%	2.88%	3.59%	2.59%	2.76%	0.86%	0.00%	1.09%	2.82%
2012	3	6	54	96	64	65	5	0	0	293
	2.65%	1.27%	2.78%	3.91%	2.44%	2.52%	2.16%	0.00%	0.00%	2.78%
2013	3	7	53	94	67	62	7	0	0	293
	2.65%	1.49%	2.73%	3.83%	2.55%	2.41%	3.02%	0.00%	0.00%	2.78%
2014	2	11	55	95	71	62	6	0	0	302
	1.77%	2.34%	2.83%	3.87%	2.71%	2.41%	2.59%	0.00%	0.00%	2.87%
2015	2	11	57	86	80	55	6	0	1	298
	1.77%	2.34%	2.93%	3.51%	3.05%	2.13%	2.59%	0.00%	1.09%	2.83%
2016	1	11	53	90	85	42	9	0	0	291
	0.88%	2.34%	2.73%	3.67%	3.24%	1.63%	3.88%	0.00%	0.00%	2.77%
Total	113	471	1944	2453	2623	2577	232	18	92	10523
	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %

Table II reports the number of firms by Rating Groups per year. For simplicity, each Rating Group comprises all firms whose credit rating starts with the same letter ("+" and "-" are collapsed onto the middle category). For example, the category BBB includes firms with a rating of BBB, BBB+ and BBB-. Table II shows that, over the years, there are fewer firms that can fall into the AAA, AA or A rating categories. This suggests that the quality of US corporate debt is declining over the years or that rating agencies have now stricter models to rate firms that control for more aspects.

I have changed credit ratings to fit a numerical scale from 1 until 22. From 1 until 10, firms are Investment Grade and for values higher than 10, they are regarded as Speculative Grade. That is, a numerical ranking of 1 corresponds to a rating of AAA, a 2 corresponds to AA+ and so on.

i. Variables Employed

To see how the equity levels have varied over the fiscal year, I have created two dummy variables, *Issuance* and *Repurchase*, that take a value of 1 if there was a net *Issuance* (*Repurchase*) and 0 otherwise. This net *Issuance*/*Repurchase* includes the possibility that firms can have, within the same year, *Repurchase*s and *Issuance*s of shares, and I categorize them by analyzing which effect is stronger. Table III shows that the mean of both dummies is similar, being 0.594 for the *Issuance* dummy and 0.3 for the *Repurchase* dummy.

To see rating changes, I also created two dummy variables, *Upgrade* and *Downgrade*, that assess the credit change from the last year to this year. So, if a firm in 2006 has a credit rating of AA+ and then suffered in 2007 a *Downgrade* to BBB+, this counts as a *Downgrade*.

To have a vast range of explanatory variables, besides *Upgrade* and *Downgrade*, I have also collected information from Compustat concerning other crucial firm metrics. So, I have information regarding total debt and EBITDA and then construct the variable *Debt/EBITDA*, which takes a value of 0 if this ratio is negative. Then I have created a dummy variable, *Negative Debt/EBITDA* that takes a value of 1 when EBITDA is negative (and I have set *Debt/EBITDA* as 0), and 0 otherwise. Moreover, I have also collected information regarding Interest Expenses to be able to compute the *Interest Coverage Ratio*. Since *Size* is also quite relevant as to what types of opportunities firms have, I include a proxy for this with the logarithm of the book value of assets. Then, I also include *CAPEX/Assets*, *PPE/Assets*, *Cash/Assets*, *Rent/Assets* and *Convertible Debt/Assets*, in which Assets refers to the total amount of assets of a given firm. Then, I include a measure for *Profitability*, which is the ratio between EBITDA and total revenues. Lastly, I also include *Book Leverage*, which is given by total debt divided by assets.

The explanatory variables of Interest Coverage, *Debt/EBITDA* and Change in Shares Outstanding that I have in my sample include some outliers that must be treated. To do so, I winsorize them at the 1st Percentile, that is, the more extreme values are substituted by the values of the 1st and 99th percentiles.

Table III - Summary Statistics: Control Variables

This table contains the summary statistics regarding to the main variables employed in my regression models. The dependent variable, Net Share *Issuance* or Net Share *Repurchase*, reports to the net change in the number of shares from last year to the current year. *Debt/EBITDA* is total debt divided by EBITDA, when this value is negative it is set equal to 0. Neg. *Debt/EBITDA* is a dummy variable that takes the value of 1 if EBITDA is negative and 0 otherwise. *IntCov* is computed as EBITDA/Interest Expense, *Size* is the natural logarithm of the book value of assets. *CAPEX/Assets* is capital expenditures divided by assets. *PPE/Assets* are the gross property,

plant and equipment divided by assets. *Profitability* is reported as EBITDA divided by revenues, *Cash/Assets* is the total amount of cash and marketable securities divided by assets. *Rent/Assets* is the amount of rental expenditures divided by assets. *Convertible Debt/Assets* is convertible debt divided by assets, *Book_Lev* is total debt divided by assets. *Change in Shares Outstanding* reports to the absolute change between last year shares and the current year shares. Share *Issuance* is a dummy variable that takes a value of 1 if the was a net share increase and 0 otherwise. Similarly, Share *Repurchase* is a dummy variable that takes the value of 1 if there was a net share decrease and 0 otherwise. For firms that have zero interest payments I set *IntCov* equal to the 99th percentile. Variables *IntCov*, *Debt/EBITDA*, *Change in Shares Outstanding* are winsorized at the 1st Percentile.

	Obs.	**Mean**	**Std. Dev.**	**Min**	**p25**	**Median**	**p75**	**Max**	**Kurtosis**	**Skewness**
Book_Lev	6088	.36	.284	0	.171	.279	.434	4.183	34.628	3.857
ConvDebt/ Assets	10438	.036	.092	0	0	0	0	1.703	28.579	3.906
Rent/Assets	9568	.033	.052	0	.008	.015	.035	2.008	246.8	9.259
Cash/Assets	10558	.095	.116	0	.019	.053	.126	.98	9.914	2.346
Debt/EBITDA	6078	2.895	2.794	0	1.075	2.1	3.851	13.995	7.457	1.945
NegDebt/EBITDA	10566	.039	.193	0	0	0	0	1	23.811	4.776
Int_Cov	10280	11.041	18.288	-1.108	2.457	5.221	10.89	102.16	16.277	3.538
Profitability	10502	.136	.101	-.052	.068	.116	.179	.453	4.389	1.105
PPE/Assets	10492	.562	.371	0	.284	.5	.78	5.158	10.428	1.451
CAPEX/Assets	10442	.058	.055	0	.025	.045	.075	1.03	35	3.919
Size	10561	7.571	1.664	1.281	6.434	7.487	8.608	12.989	3.01	.263
ChangeSharesOutstanding	10566	4.029	24.346	-46.31	-.215	.096	1.597	124.228	16.687	3.211
Net Share Repurchase	10566	.3	.458	0	0	0	1	1	1.764	.874
Net Share Issuance	10566	.594	.491	0	0	1	1	1	1.146	-.382

On Table III, it is possible to see that, within this sample, there is a higher mean for the variable Net Share *Issuance* (referred to as *Issuance* from now on), that takes a value of 0.594, as opposed to the mean of Net Share *Repurchase* (referred to as *Repurchase* from now on). This means that there are more cases of *Issuance* than of *Repurchase* within my sample. This is reinforced by the positive mean of the variable *Change in Shares Outstanding*, 4.029, which indicates that, on average, firms increased the number of shares in their structure.

It is also possible to see that, in my sample, the average *Interest Coverage* is 11.041 which is a bit higher than what Baghai, Servaes and Tamayo (2014) find in their sample. To further understand the sample and possible differences within, I split it into Investment and Speculative Grade subsamples.

Table IV - Summary Statistics: Investment Grade

This table contains the summary statistics regarding to the main variables employed in my regression models.

The dependent variable, Net Share *Issuance* or Net Share *Repurchase*, reports to the net change in the number of shares from last year to the current year. *Debt/EBITDA* is total debt divided by EBITDA, when this value is negative it is set equal to 0. Neg. *Debt/EBITDA* is a dummy variable that takes the value of 1 if EBITDA is negative and 0 otherwise. *IntCov* is computed as EBITDA/Interest Expense, *Size* is the natural logarithm of the book value of assets. *CAPEX/Assets* is capital expenditures divided by assets. *PPE/Assets* are the gross property, plant and equipment divided by assets. *Profitability* is reported as EBITDA divided by revenues, *Cash/Assets* is the total amount of cash and marketable securities divided by assets. *Rent/Assets* is the amount of rental expenditures divided by assets. *Convertible Debt/Assets* is convertible debt divided by assets, *Book_Lev* is total debt divided by assets. *Change in Shares Outstanding* reports to the absolute change between last year shares and the current year shares. Share *Issuance* is a dummy variable that takes a value of 1 if the was a net share increase and 0 otherwise. Similarly, Share *Repurchase* is a dummy variable that takes the value of 1 if there was a net share decrease and 0 otherwise. For firms that have zero interest payments I set *IntCov* equal to the 99th percentile. Variables *IntCov*, *Debt/EBITDA*, *Change in Shares Outstanding* are winsorized at the 1st Percentile.

	Obs.	**Mean**	**Std. Dev.**	**Min**	**p25**	**Median**	**p75**	**Max**	**Kurtosis**	**Skewness**
Book_Lev	2879	.218	.131	0	.127	.21	.295	1.024	3.736	.611
ConvDebt/ Assets	4895	.013	.042	0	0	0	0	.446	24.48	4.241
Rent/Assets	4444	.024	.031	0	.007	.013	.025	.28	14.09	3.026
Cash/Assets	4976	.094	.111	0	.02	.054	.124	.782	8.975	2.213
Debt/EBITDA	2875	1.75	1.673	0	.8	1.416	2.207	13.99	19.67	3.261
Neg.Debt/EBITDA	4981	.007	.084	0	0	0	0	1	140.3	11.80
Int_Cov	4823	16.87	21.96	-1.108	5.285	9.001	16.84	102.2	9.914	2.691
Profitability	4958	.158	.1	-.052	.085	.134	.205	.453	3.823	1.057
PPE/Assets	4958	.618	.365	0	.35	.566	.834	5.158	8.284	1.139
CAPEX/Assets	4933	.062	.048	0	.031	.051	.08	1.03	46.09	3.752
Size	4976	8.541	1.471	2.554	7.515	8.42	9.476	12.99	2.949	.264
ChangeShares Outstanding	4981	4.7	30.50	-46.31	-2.238	.037	1.651	124.2	10.93	2.567
Net Share Repurchase	4981	.405	.491	0	0	0	1	1	1.149	.386
Net Share Issuance	4981	.527	.499	0	0	1	1	1	1.011	-.107

In Table IV, I have a sub-sample that only contains Investment Grade. This sub-sample is composed of 4981 observations. It is possible to see that the average *Change in Shares Outstanding* is 4.7, meaning that, throughout this sub-sample, on average firms seem to be increasing their equity levels. The *Interest Coverage* also increases to 16.871, which is a signal that firms in this category are more equipped to cover interest on their debt. The *Size* ratio is also slightly larger than previously, which is expected since this is a main finding on Almeida et al. (2017).

Table V - Summary Statistics: Speculative Grade

This table contains the summary statistics regarding to the main variables employed in my regression models.

The dependent variable, Net Share *Issuance* or Net Share *Repurchase*, reports to the net change in the number of shares from last year to the current year. *Debt/EBITDA* is total debt divided by EBITDA, when this value is negative it is set equal to 0. Neg. *Debt/EBITDA* is a dummy variable that takes the value of 1 if EBITDA is negative and 0 otherwise. *IntCov* is computed as EBITDA/Interest Expense, *Size* is the natural logarithm of the book value of assets. *CAPEX/Assets* is capital expenditures divided by assets. *PPE/Assets* are the gross property, plant and equipment divided by assets. *Profitability* is reported as EBITDA divided by revenues, *Cash/Assets* is the total amount of cash and marketable securities divided by assets. *Rent/Assets* is the amount of rental expenditures divided by assets. *Convertible Debt/Assets* is convertible debt divided by assets, *Book_Lev* is total debt divided by assets. *Change in Shares Outstanding* reports to the absolute change between last year shares and the current year shares. Share *Issuance* is a dummy variable that takes a value of 1 if the was a net share increase and 0 otherwise. Similarly, Share *Repurchase* is a dummy variable that takes the value of 1 if there was a net share decrease and 0 otherwise. For firms that have zero interest payments I set *IntCov* equal to the 99th percentile. Variables *IntCov*, *Debt/EBITDA*, *Change in Shares Outstanding* are winsorized at the 1st Percentile.

	Obs.	**Mean**	**Std. Dev.**	**Min**	**p25**	**Median**	**p75**	**Max**	**Kurtosis**	**Skewness**
Book_Lev	3209	.442	.337	0	.248	.385	.555	4.183	27.87	3.55
ConvDebt/ Assets	5543	.056	.116	0	0	0	.057	1.703	18.63	3.024
Rent/Assets	5124	.04	.064	0	.009	.019	.047	2.008	197.0	8.733
Cash/Assets	5582	.097	.121	0	.018	.052	.127	.98	10.34	2.42
Debt/EBITDA	3203	3.924	3.172	0	1.791	3.288	5.147	13.99	5.103	1.398
Neg.*Debt/EBITDA*	5585	.067	.25	0	0	0	0	1	12.97	3.459
Int_Cov	5457	5.888	12.14	-1.108	1.543	2.868	5.646	102.1	41.81	5.798
Profitability	5544	.116	.098	-.052	.055	.098	.154	.453	5.308	1.268
PPE/Assets	5534	.511	.368	0	.236	.432	.717	4.775	13.26	1.816
CAPEX/Assets	5509	.055	.06	0	.021	.038	.068	.796	29.53	3.972
Size	5585	6.706	1.312	1.281	5.795	6.671	7.553	11.36	3.128	.102
ChangeShares Outstanding	5585	3.43	17.06	-46.31	0	.133	1.559	124.2	29.85	4.341
Net Share *Repurchase*	5585	.206	.404	0	0	0	0	1	3.124	1.457
Net Share *Issuance*	5585	.654	.476	0	0	1	1	1	1.416	-.645

When looking at the Speculative Grade sub-sample, it is possible to see that the *Interest Coverage* is quite smaller which is expected since firms that do not attain an Investment Grade rating are deemed to have a worse financial standing than others. Moreover, I also find that the firms that fall under this category are slightly smaller than Investment Grade firms, measured by the lower average of the variable *Size*. Then, I can also see that firms in this sample have an average *Change in Shares Outstanding* that is positive, which signals that they are more likely to issue than to *Repurchase* shares. Comparing to the statistics on the Investment Grade sample, it is possible to see that the *Debt/EBITDA* ratio is much higher for this sample.

3.2. Methodology

To understand the possible relation between changes in equity levels and credit rating, I am going to run regressions in three different formats: Linear, PROBIT and LOGIT.

Linear regressions consist of a linear approach to an attempt to model a given relation, using the ordinary least squared approach. In my case, I am using a multiple linear regression given that I have a broad set of explanatory variables. These explanatory variables are lagged by one period to mitigate endogeneity problems, that is, they are lagged so that information can be incorporated into the decision to change the equity levels of a firm. To model this relation, the linear regressions estimate from the data set the unknown parameters. In this case, my goal is not to predict the outcome of the regression but rather to assess if there is any relation between changes in equity level and any of the explanatory variables. To do so, I employ the following equation:

$$Net\ Share\ Issuance_{t,i} = \beta_1 \times Upgrade_{t-1,i} + \beta_2 \times Downgrade_{t-1,i} + \beta_3 \times Controls_{t-1,i} + \epsilon_{i,t}$$

$$Net\ Share\ Repurchase_{t,i} = \beta_1 \times Upgrade_{t-1,i} + \beta_2 \times Downgrade_{t-1,i} + \beta_3 \times Controls_{t-1,i} + \epsilon_{i,t}$$

Where *t* considers the point in time, measured in years and *i* considers the firm in analysis. However, it is important to point out that linear regressions have some key limitations. For example, they do not ensure that the probability of this occurring is between 0 and 1 which may cause trouble in trying to analyze the outcomes. Moreover, there is a constant variance in the error terms, meaning that they are not dependent on the response magnitude and the errors are assumed to be independent of each other, which might not happen in a real case scenario. Nevertheless, it is a model that is easy to apply and to interpret, which contributes to its broad use in research.

Then, I use PROBIT regressions. This type of regression assumes that the dependent variable, in my case *Issuance* or *Repurchase* of shares, only has two possible outcomes. This model then attempts to estimate the probability that a firm that has a set of characteristics falls into one of these categories. This regression uses the maximum likelihood procedure. I employ the following equations to run this regression:

$$P(Issuance = 1|X) = \phi(X^T\beta)$$
$$P(Repurchase = 1|X) = \phi(X^T\beta)$$

X comprises all the explanatory variable and follows the same structure as the equations for Linear regressions, that is, it includes *Downgrade*, *Upgrade* and all of the other independent variables, and ϕ consists of the cumulative distribution function of a standard normal distribution. Since this model uses a maximum likelihood procedure and it assumes that all observations are independent and identically distributed, the likelihood of the sample is equal to the product of each simple observation.

Lastly, I also employ LOGIT regressions that is a probability model that allows for several different outcomes if the sum of the probability of each outcome is equal to 1. In my case, it's used to assess the probability of issuing or repurchasing shares following changes in any of the control variables, with special interest in the dummy variable that assesses credit rating changes. This model uses a logistic function to model a binary dependent variable, as is my dependent variable. In this model, the log-odds for the value 1 is a linear combination of one or more explanatory variables. The probability of this log-odds is be between 0 and 1.

To use this model, I employ the following equation:

$$p(X) = \frac{1}{(1 + e^{\frac{-(x-u)}{s}})}$$

In this equation, u is used to pinpoint the location of where the observation occurs, and *s* is a scale parameter.

It is important to understand that the main difference between LOGIT and PROBIT models lies on how the error term is computed, seeing as the PROBIT model uses a normal distribution and the LOGIT model uses a standard logistic distribution.

To run the regressions, I use a lag on the independent variable, that is, I consider that these variables are set a period before the dependent variables. This is done because of endogeneity concerns, that is, firms and managers need to incorporate the news into their decision-making process which is not instantaneous. I begin by running these regressions as they are and then proceed to also include year and industry fixed-effects, measured by the two-digit NAICS code.

4.Results

My analysis comprises 10611 observations, with 47.3% being Investment Grade and the remaining being Speculative or Junk Grade. To attain a better understanding of the dynamics behind the *Issuance* or *Repurchase* of shares, I begin by assessing my sample as a whole and

then each of these groups separately. This is done because, as stated by (Choy, Gray and Ragunathan (2006)), firms that are Speculative Grade do not respond in the same manner to an equivalent change in a key variable as those that are Investment Grade. The same authors argue that these firms react more to negative news than positive news, and thus, I expect to find greater significance in analysis that regard *Downgrade*s. As I have stated in table III, the explanatory variables consist of a broad range of data that aim to categorize each firm by their main characteristics.

Table VI - *Issuance*

This table reports the coefficients of the regressions that assess the relation between equity and credit ratings. Model (1) represents an OLS regression, (2) a Probit Regression and (3) a Logit regression, all of these without fixed effects. Then, model (4) to (6) are, respectively, OLS, Probit and Logit regressions with fixed-year effects. From (7) to (8), these models follow the same order as before but include industry-fixed effects, as measured by the two-digit NAICS code. The dependent variable, *Issuance*, is calculated by using a lag that is, it is calculated based on information of the last period available. All variables are described in table III.

VARIABLES	(1) OLS	(2) PROBIT	(3) LOGIT	(4) OLS	(5) PROBIT	(6) LOGIT	(7) OLS	(8) PROBIT	(9) LOGIT
Upgrade	0.059***	0.156***	0.258***	0.064***	0.172***	0.282***	0.059***	0.158***	0.263***
	(0.0167)	(0.0453)	(0.0736)	(0.0166)	(0.0456)	(0.0745)	(0.0167)	(0.0458)	(0.0746)
Downgrade	0.0121	0.0270	0.0448	0.0103	0.0228	0.0372	0.00952	0.0205	0.0337
	(0.0217)	(0.0587)	(0.0950)	(0.0216)	(0.0593)	(0.0964)	(0.0217)	(0.0595)	(0.0966)
Book Leverage	- 0.196***	- 0.560***	- 0.904***	- 0.185***	- 0.540***	- 0.879***	- 0.189***	- 0.542***	- 0.866***
	(0.0351)	(0.101)	(0.168)	(0.0350)	(0.102)	(0.170)	(0.0358)	(0.103)	(0.171)
ConvDebtAssets	0.612***	2.035***	3.786***	0.536***	1.867***	3.380***	0.615***	2.046***	3.904***
	(0.105)	(0.329)	(0.622)	(0.105)	(0.333)	(0.622)	(0.106)	(0.334)	(0.636)
Rent/Assets	-0.218	-0.614	-0.944	-0.243	-0.686	-1.091	0.194	0.470	0.845
	(0.153)	(0.417)	(0.682)	(0.152)	(0.421)	(0.689)	(0.179)	(0.492)	(0.803)
Cash/Assets	-0.0875	-0.186	-0.382	-0.0507	-0.0926	-0.202	-0.124*	-0.289	-0.567*
	(0.0701)	(0.194)	(0.321)	(0.0701)	(0.198)	(0.328)	(0.0716)	(0.200)	(0.332)
Profitability	-0.00700	-0.0241	-0.0463	0.0111	0.0289	0.0469	-0.0812	-0.201	-0.381
	(0.0870)	(0.236)	(0.385)	(0.0864)	(0.238)	(0.390)	(0.107)	(0.294)	(0.484)
PPE/Assets	-0.0418*	-0.113*	-0.180*	-0.0345	-0.0947	-0.150	-0.0284	-0.0811	-0.116
	(0.0239)	(0.0662)	(0.108)	(0.0241)	(0.0674)	(0.111)	(0.0253)	(0.0707)	(0.116)
CAPEX/Assets	0.731***	2.045***	3.442***	0.569**	1.642**	2.738**	0.719***	2.005***	3.522***
	(0.220)	(0.618)	(1.038)	(0.226)	(0.643)	(1.077)	(0.226)	(0.643)	(1.090)
Size	- 0.055***	- 0.147***	- 0.239***	- 0.047***	- 0.127***	- 0.209***	- 0.054***	- 0.143***	- 0.233***
	(0.0053)	(0.0146)	(0.0240)	(0.0055)	(0.0152)	(0.0249)	(0.0055)	(0.0153)	(0.0252)
Interest Coverage	- 0.003***	- 0.007***	- 0.011***	- 0.002***	- 0.006***	- 0.010***	- 0.003***	- 0.007***	- 0.011***
	(0.0004)	(0.0011)	(0.0012)	(0.0004)	(0.0011)	(0.002)	(0.0004)	(0.0011)	(0.002)
Debt/EBITDA	0.025***	0.070***	0.117***	0.025***	0.072***	0.121***	0.023***	0.067***	0.112***
	(0.0036)	(0.0105)	(0.0183)	(0.0036)	(0.0106)	(0.0184)	(0.0037)	(0.0109)	(0.0189)
NegDebt/EBITDA	0.200***	0.585***	1.072***	0.197***	0.590***	1.073***	0.151***	0.452***	0.847***

	(0.0524)	(0.153)	(0.267)	(0.0521)	(0.155)	(0.271)	(0.0549)	(0.161)	(0.280)
Industry Dummy	N	N	N	N	N	N	Y	Y	Y
Year Dummy	N	N	N	Y	Y	Y	N	N	N
Constant	0.971***	1.238***	1.994***	0.819**	0.869	1.406	0.944***	1.179***	1.946***
	(0.0520)	(0.143)	(0.234)	(0.338)	(0.890)	(1.438)	(0.144)	(0.397)	(0.635)
Observations	4746	4746	4746	4746	4746	4746	4746	4746	4746
R-squared	0.090			0.108			0.105		

Table VI, that comprises the entire sample, analyzes the relation between the Net *Issuance* of Shares and the explanatory variables described. It is possible to see that there is a strong significance of the coefficients that relate to *Upgrade*. In model (1), the coefficient of the variable *Upgrade* is equal to 0.0594 and is statistically relevant at a 1% significance level which indicates that an *Upgrade* in the credit rating positively influences the likelihood of a firm issuing shares by 5.9 percentage points. So, if a firm receives an *Upgrade* from BBB to BBB+, it is expected that its likelihood to issue more shares increases by 5.9 percentage points. When analyzing the entire sample, it is possible to see that the coefficient for *Downgrade* is not relevant in any of the regression models.

Moreover, across all models it is possible to see that there are several statistically significant coefficients at a significance level of 1%, such as: *Size*, *CAPEX/Assets*, *ConvDebt/Assets*, *Book Leverage*, *Interest Coverage*, *Neg. Debt/EBITDA*, and *Debt/EBITDA*. The variable *PPE/Assets* it's also relevant at a 10% significance level. This is an indicator that my model is likely to explain a certain part of the change in my dependent variable. Regarding how these variables influence the probability of issuing shares, it is possible to see that *Size*, *PPE/Assets, Profitability, Cash/Assets, Rent/Assets* and *Book Leverage* influence negatively the probability, that is, as firms increase their values on these variables, they decrease the likelihood of issuing more shares.

In model (2), it is possible to see that the *Upgrade* is statistically relevant at a 1% significance level and positively influence the probability of issuing shares, whilst the *Downgrade* variable is not statistically relevant and also positively influences the likelihood of issuing shares. More specifically, if a firm receives an *Upgrade* in their credit ratings then the z-score increases by 0.156, that is, the marginal effect of an increase in a firms credit ratings on the probability of issuing shares is 0.156 percentage points. Lastly, in model (3) I can also see that the coefficient of an *Upgrade* is also relevant at the 1% significance level. In this case, an *Upgrade* of a given firm increases the log-odds of issuing shares by 0.258, which translates into

ratio entails that a firm who receives a *Upgrade* is 1.29 times more likely to issue shares than a firm who does not *Upgrade* their credit rating.

In models (4), (5) and (6), in which I control for year-fixed effects, the results are like those presented before. In the remaining models, (7), (8) and (9) I control for industry-fixed effects and the results are also like the first three models.

Table VII - *Repurchase*

This table reports the coefficients of the regressions that assess the relation between equity and credit ratings. Model (1) represents an OLS regression, (2) a Probit Regression and (3) a Logit regression, all of these without fixed effects. Then, model (4) to (6) are, respectively, OLS, Probit and Logit regressions with fixed-year effects. From (7) to (8), these models follow the same order as before but include industry-fixed effects, as measured by the two-digit NAICS code. The dependent variable, *Repurchase*, is calculated by using a lag that is, it is calculated based on information of the last period available. All variables are described in table III.

VARIABLES	(1) OLS	(2) PROBIT	(3) LOGIT	(4) OLS	(5) PROBIT	(6) LOGIT	(7) OLS	(8) PROBIT	(9) LOGIT
Upgrade	-0.0232	-0.0629	-0.103	-0.0289*	-0.0812*	-0.130	-0.031**	-0.0887*	-0.149*
	(0.015)	(0.0471)	(0.0781)	(0.0156)	(0.0476)	(0.0794)	(0.0158)	(0.0478)	(0.0794)
Downgrade	0.0164	0.0509	0.0873	0.0170	0.0517	0.0898	0.00850	0.0245	0.0437
	(0.021)	(0.0606)	(0.0999)	(0.0203)	(0.0615)	(0.102)	(0.0205)	(0.0616)	(0.102)
Book Leverage	0.00255	0.0167	0.0882	-0.0114	-0.0440	-0.0239	0.00054	-0.0272	-0.0309
	(0.033)	(0.119)	(0.215)	(0.0329)	(0.122)	(0.222)	(0.0338)	(0.127)	(0.238)
ConvDebt Assets	-0.246**	-0.808**	-1.567**	-0.146	-0.519	-0.899	-0.241**	-0.769**	-1.576**
	(0.099)	(0.335)	(0.628)	(0.0986)	(0.339)	(0.626)	(0.0997)	(0.340)	(0.642)
Rent/Assets	0.137	0.370	0.587	0.150	0.390	0.617	-0.0978	-0.503	-0.942
	(0.145)	(0.452)	(0.760)	(0.143)	(0.461)	(0.781)	(0.168)	(0.557)	(0.939)
Cash/Assets	0.183***	0.462**	0.743**	0.135**	0.337*	0.505	0.221***	0.586***	0.965***
	(0.066)	(0.198)	(0.333)	(0.0660)	(0.202)	(0.342)	(0.0676)	(0.205)	(0.349)
Profitability	-0.0864	-0.306	-0.478	-0.110	-0.398	-0.650	0.0593	0.139	0.349
	(0.082)	(0.244)	(0.406)	(0.0813)	(0.246)	(0.411)	(0.101)	(0.307)	(0.515)
PPE/Assets	0.0339	0.108	0.168	0.0249	0.0783	0.109	0.0393*	0.126*	0.196
	(0.023)	(0.0702)	(0.118)	(0.0227)	(0.0718)	(0.121)	(0.0239)	(0.0747)	(0.125)
CAPEX/Assets	-0.937***	-3.149***	-5.607***	-0.720***	-2.430***	-4.262***	-0.917***	-3.141***	-5.815***
	(0.208)	(0.687)	(1.184)	(0.213)	(0.714)	(1.225)	(0.213)	(0.716)	(1.239)
Size	0.065***	0.187***	0.312***	0.055***	0.162***	0.274***	0.067***	0.193***	0.324***
	(0.0050)	(0.0153)	(0.0256)	(0.0052)	(0.0158)	(0.0266)	(0.0052)	(0.0162)	(0.0273)
Interest Coverage	0.002***	0.005***	0.007***	0.002***	0.004***	0.006***	0.002***	0.005***	0.007***
	(0.0003)	(0.0011)	(0.0019)	(0.0004)	(0.0011)	(0.0019)	(0.0004)	(0.0010)	(0.0019)
Debt/EBITDA	-0.035***	-0.130***	-0.244***	-0.036***	-0.133***	-0.251***	-0.033***	-0.124***	-0.233***
	(0.0034)	(0.0128)	(0.0251)	(0.0034)	(0.0129)	(0.0254)	(0.0035)	(0.0133)	(0.0262)
NegDebt/EBITDA	-0.271***	-0.980***	-1.773***	-0.271***	-0.999***	-1.800***	-0.219***	-0.830***	-1.515***

	(0.0495)	(0.169)	(0.305)	(0.0491)	(0.172)	(0.310)	(0.0518)	(0.178)	(0.320)
Industry Dummy	N	N	N	N	N	N	Y	Y	Y
Year Dummy	N	N	N	Y	Y	Y	N	N	N
Constant	-0.0351	-1.426***	-2.294***	0.362	-0.231	-0.277	-0.0495	-1.535***	-2.577***
	(0.0492)	(0.150)	(0.250)	(0.318)	(0.934)	(1.459)	(0.136)	(0.399)	(0.644)
Observations	4746	4746	4746	4746	4746	4746	4746	4742	4742
R-squared	0.148			0.171			0.164		

When looking at Table VII, which analyses the same models but with a different dependent variable, *Repurchase*, it is possible to see that the coefficient of *Upgrade* is statistically significant on the last 5 models (from (4) to (9), apart from (6)), at a 10% significance level, apart from (7) in which it is relevant at a 5% significance level. Regarding how this variable influences the probability of repurchasing shares, it is possible to observe that this variable has a negative coefficient in all models, so, it is expected that a firm that receives an *Upgrade* in their credit rating, decreases its probability of repurchasing shares. In model (7), when a firm receives an *Upgrade* from BB- to BB+, it decreases the likelihood of repurchasing shares by 3.09 percentage points. Contrastingly, the coefficient of the *Downgrade* variable has a positive coefficient, which indicates that it positively influences the probability of *Repurchase*s. Nevertheless, this coefficient is not relevant in any of the models.

In model (8), the coefficient for *Upgrade* is relevant at a 10% significance level and has a positive sign, thus, it is expected that the marginal effect of an increase in the ratings of a given firm has a negative impact of 0.0887.

In model (9), the coefficient for the *Upgrade* variable has a coefficient of 0.149, relevant at a 10% significance level. This indicates that a firm that receives an *Upgrade* is 0.86 times less likely to *Repurchase* shares than a firm that does not receive an *Upgrade*.

On Table VII, it is possible to see that only the models that are adjusted for industry and time fixed effects are statistically relevant, which might indicate that these factors contribute to explaining the outcome of Repurchasing shares.

Regarding the remaining variables, it is possible to see that *ConvDebt/Assets, Cash/Assets, CAPEX/Assets, Size, Interest Coverage, Debt/EBITDA* and *Neg.Debt/EBITDA* are all relevant at a 1% significance level, with the exception of *ConvDebt/Assets* that is statistically relevant at a 5% significance level in 6 regression models.

4.1. Investment Grade

As per the descriptive statistics of Table IV, I can see that the Investment Grade sample has an average change in shares of roughly 4.7, which indicates that, in this sub-sample, the magnitude of firms' *Issuance*s is greater than that of *Repurchase*s. This leads me to expect that coefficients for the regressions that analyze *Issuance* are more statistically significant than those that analyze *Repurchase*s.

Table VIII – Investment Grade *Issuance*

This table reports the coefficients of the regressions that assess the relation between equity and credit ratings. Model (1) represents an OLS regression, (2) a Probit Regression and (3) a Logit regression, all of these without fixed effects. Then, model (4) to (6) are, respectively, OLS, Probit and Logit regressions with fixed-year effects. From (7) to (8), these models follow the same order as before but include industry-fixed effects, as measured by the two-digit NAICS code. The dependent variable, *Issuance*, is calculated by using a lag that is, it is calculated based on information of the last period available. All variables are described in table III.

VARIABLES	(1) OLS	(2) PROBIT	(3) LOGIT	(4) OLS	(5) PROBIT	(6) LOGIT	(7) OLS	(8) PROBIT	(9) LOGIT
Upgrade	0.065***	0.174***	0.280***	0.063***	0.174***	0.281***	0.067***	0.181***	0.293***
	(0.0238)	(0.0647)	(0.105)	(0.0236)	(0.0655)	(0.108)	(0.0240)	(0.0659)	(0.108)
Downgrade	-0.00265	-0.0135	-0.0171	-0.00644	-0.0256	-0.0393	-0.00634	-0.0211	-0.0292
	(0.0298)	(0.0815)	(0.133)	(0.0296)	(0.0829)	(0.136)	(0.0301)	(0.0834)	(0.137)
Book Leverage	- 0.511***	- 1.405***	- 2.391***	- 0.455***	- 1.279***	- 2.163***	- 0.414***	- 1.205***	- 2.081***
	(0.120)	(0.331)	(0.555)	(0.120)	(0.339)	(0.568)	(0.127)	(0.357)	(0.603)
ConvDebt Assets	0.636**	1.671**	2.693**	0.432	1.154	1.890	0.633**	1.699**	2.786**
	(0.313)	(0.837)	(1.356)	(0.313)	(0.860)	(1.397)	(0.315)	(0.856)	(1.390)
Rent/Assets	-0.488	-1.212	-1.913	-0.504	-1.374	-2.185	-0.0620	-0.0723	-0.192
	(0.380)	(1.025)	(1.683)	(0.377)	(1.044)	(1.718)	(0.460)	(1.255)	(2.055)
Cash/Assets	-0.235**	-0.620**	-1.046**	-0.164	-0.445	-0.752	-0.208*	-0.551*	-0.976*
	(0.107)	(0.294)	(0.489)	(0.107)	(0.300)	(0.500)	(0.111)	(0.310)	(0.519)
Profitability	-0.00231	0.00074	0.0198	0.0369	0.113	0.190	-0.188	-0.453	-0.719
	(0.123)	(0.336)	(0.552)	(0.121)	(0.340)	(0.559)	(0.166)	(0.461)	(0.760)
PPE/Assets	-	-	-	-0.081**	-0.240**	-0.392**	-	-	-
	0.111***	0.315***	0.506***				0.125***	0.352***	0.559***
	(0.0397)	(0.111)	(0.183)	(0.0401)	(0.114)	(0.190)	(0.0415)	(0.117)	(0.194)
CAPEX/Assets	1.835***	4.998***	8.156***	1.262***	3.576***	5.874***	2.276***	6.253***	10.25***
	(0.410)	(1.123)	(1.845)	(0.430)	(1.208)	(1.982)	(0.431)	(1.192)	(1.978)
Size	-	-	-	-	-	-	-	-	-
	0.054***	0.146***	0.241***	0.041***	0.117***	0.193***	0.055***	0.152***	0.253***
	(0.0083)	(0.0228)	(0.0376)	(0.0085)	(0.0237)	(0.0393)	(0.0092)	(0.0254)	(0.0422)
Interest	-	-	-	-	-	-	-	-	-

Coverage	0.002***	0.005***	0.009***	0.002***	0.005***	0.008***	0.002***	0.005***	0.009***
	(0.0005)	(0.0015)	(0.00249)	(0.0005)	(0.0015)	(0.0025)	(0.0006)	(0.0015)	(0.0026)
Debt/EBITDA	0.053***	0.146***	0.254***	0.048***	0.135***	0.231***	0.048***	0.138***	0.243***
	(0.0087)	(0.0254)	(0.0471)	(0.0087)	(0.0255)	(0.0464)	(0.0091)	(0.0268)	(0.0497)
NegDebt/EBITDA	0.307*	0.802*	1.344*	0.262	0.695	1.165	0.221	0.598	0.989
	(0.173)	(0.459)	(0.763)	(0.171)	(0.460)	(0.771)	(0.176)	(0.484)	(0.792)
Industry Dummy	N	N	N	N	N	N	Y	Y	Y
Year Dummy	N	N	N	Y	Y	Y	N	N	N
Constant	0.931***	1.196***	1.971***	0.277	0.745***	1.252***	0.991***	1.354***	2.277***
	(0.0822)	(0.225)	(0.370)	(0.478)	(0.274)	(0.452)	(0.164)	(0.451)	(0.727)
Observations	2239	2239	2239	2239	2238	2238	2239	2239	2239
R-squared	0.066			0.099			0.085		

In Table VIII, I can observe the coefficients of models that analyze the Investment Grade sub-sample and *Issuance*s. I can see that, similarly to when I analyze the sample as a whole, the coefficient for *Upgrade* is positive and statistically relevant at a 1% significance level for all models that I study. This means that, generally, an *Upgrade* in a firm's ratings leads to an increased probability of issuing more equity. The variable *Downgrade* is not significant in any of the models, which goes against my initial expectation that firms react more to bad news than to good ones.

In model (1), the coefficient for *Upgrade* takes a value of 0.0653, which indicates that a firm that *Upgrade*s its credit rating increases the likelihood of issuing shares by 6.5 percentage points. In model (5), which includes time fixed effects, the coefficient for *Upgrade* is 0.174 which indicates that it positively influences the likelihood of issuing shares. In this PROBIT model, if a firm receives an *Upgrade* from AA to AA+, then it increases the z-score by 0.174, meaning that the marginal effect on the probability of issuing shares increases by the coefficient amount.

Then, in model (9), which includes industry fixed-effects, *Upgrade* takes a value of 0.293, relevant at a 1% significance level and that positively influences the log-odds ratio, that is, positively influences the likelihood of increasing the Equity levels of a firm. So, when a firm receives an *Upgrade* from BBB to BBB+, it is 1.34 times more likely to issue shares than a firm that does not receive an *Upgrade*.

Regarding the remaining models, (2), (3), (4), (6), (7) and (8), they all achieve similar results in the sense that the coefficient of *Upgrade* always positively influences the likelihood of issuing shares and that the coefficient of *Downgrade* is not relevant.

In terms of the other explanatory variables, *Book Leverage, ConvDebt/Assets, Cash/Assets, PPE/Assets, CAPEX/Assets, Size, Interest Coverage, Debt/EBITDA* and *Neg.Debt/EBITDA* are relevant in most models. All of these have positive coefficients, meaning that they positively influence the likelihood of issuing shares, except for *Book Leverage, Cash/Assets, PPE/Assets* and *Size*. Regarding the significance levels, in most models these variables are significant at a 1% significance level, with the exception of models (4), (5) and (6), that further control for year fixed effects. The variable *Neg.Debt/EBITDA* is only relevant in the first three models and at a lower significance level (10%).

Table IX – Investment Grade *Repurchase*

This table reports the coefficients of the regressions that assess the relation between equity and credit ratings. Model (1) represents an OLS regression, (2) a Probit Regression and (3) a Logit regression, all of these without fixed effects. Then, model (4) to (6) are, respectively, OLS, Probit and Logit regressions with fixed-year effects. From (7) to (8), these models follow the same order as before but include industry-fixed effects, as measured by the two-digit NAICS code. The dependent variable, *Repurchase*, is calculated by using a lag that is, it is calculated based on information of the last period available. All variables are described in table III.

VARIABLES	(1) OLS	(2) PROBIT	(3) LOGIT	(4) OLS	(5) PROBIT	(6) LOGIT	(7) OLS	(8) PROBIT	(9) LOGIT
Upgrade	-0.0426*	-0.111*	-0.177*	-0.0430*	-0.115*	-0.185*	-0.055**	-0.146**	-0.238**
	(0.0241)	(0.0641)	(0.104)	(0.0239)	(0.0649)	(0.106)	(0.0240)	(0.0658)	(0.108)
Downgrade	0.0181	0.0519	0.0823	0.0200	0.0578	0.0957	0.0105	0.0301	0.0458
	(0.0301)	(0.0806)	(0.131)	(0.0299)	(0.0820)	(0.134)	(0.0301)	(0.0829)	(0.136)
Book Leverage	0.563***	1.528***	2.647***	0.501***	1.385***	2.384***	0.390***	1.151***	2.051***
	(0.121)	(0.328)	(0.554)	(0.121)	(0.335)	(0.565)	(0.127)	(0.357)	(0.605)
ConvDebtAssets	-0.431	-1.155	-1.854	-0.237	-0.655	-1.080	-0.427	-1.174	-1.955
	(0.316)	(0.838)	(1.356)	(0.317)	(0.861)	(1.393)	(0.316)	(0.859)	(1.398)
Rent/Assets	0.0187	-0.00702	-0.160	0.0123	0.0159	-0.114	0.0759	0.109	0.194
	(0.385)	(1.025)	(1.654)	(0.381)	(1.046)	(1.700)	(0.461)	(1.259)	(2.049)
Cash/Assets	0.270**	0.716**	1.186**	0.202*	0.556*	0.914*	0.236**	0.642**	1.101**
	(0.108)	(0.293)	(0.485)	(0.109)	(0.298)	(0.494)	(0.112)	(0.308)	(0.516)
Profitability	-0.187	-0.519	-0.898*	-0.223*	-0.631*	-1.057*	0.0880	0.151	0.187
	(0.124)	(0.332)	(0.543)	(0.122)	(0.336)	(0.551)	(0.167)	(0.459)	(0.757)
PPE/Assets	0.0272	0.0728	0.100	-0.00497	-0.00995	-0.0280	0.0599	0.163	0.246
	(0.0402)	(0.108)	(0.176)	(0.0406)	(0.111)	(0.182)	(0.0416)	(0.115)	(0.188)
CAPEX/Assets	-1.903***	-5.046***	-8.212***	-1.265***	-3.459***	-5.666***	-2.530***	-6.934***	-11.45***
	(0.415)	(1.124)	(1.839)	(0.435)	(1.202)	(1.966)	(0.432)	(1.211)	(2.011)
Size	0.046***	0.124***	0.204***	0.034***	0.093***	0.154***	0.057***	0.157***	0.263***
	(0.0084)	(0.0226)	(0.0370)	(0.0086)	(0.0235)	(0.0388)	(0.0092)	(0.0254)	(0.0422)
Interest	0.002***	0.007***	0.011***	0.002***	0.006***	0.009***	0.002***	0.006***	0.009***

Coverage									
	(0.0005)	(0.0014)	(0.0024)	(0.0005)	(0.0015)	(0.0025)	(0.0005)	(0.0015)	(0.0025)
Debt/EBITDA	-0.056***	-0.155***	-0.278***	-0.051***	-0.143***	-0.251***	-0.049***	-0.145***	-0.264***
	(0.0088)	(0.0255)	(0.0489)	(0.0088)	(0.0256)	(0.0479)	(0.0091)	(0.0271)	(0.0521)
NegDebt/EBITDA	-0.309*	-0.811*	-1.386*	-0.270	-0.716	-1.233	-0.210	-0.572	-0.956
	(0.175)	(0.456)	(0.772)	(0.173)	(0.456)	(0.782)	(0.177)	(0.485)	(0.784)
Industry Dummy	N	N	N	N	N	N	Y	Y	Y
Year Dummy	N	N	N	Y	Y	Y	N	N	N
Constant	0.156*	-0.926***	-1.516***	0.838*	-0.441	-0.749*	0.0471	-1.231***	-2.071***
	(0.0832)	(0.222)	(0.361)	(0.483)	(0.271)	(0.443)	(0.164)	(0.449)	(0.724)
Observations	2239	2239	2239	2239	2238	2238	2239	2239	2239
R-squared	0.065			0.098			0.100		

Table IX describes the Investment Grade sub-sample that analyzes *Repurchase*s. It is possible to observe that the *Downgrade* coefficient remains not significant in all models that I study. Nevertheless, the *Upgrade* variable is relevant in all models with a negative sign. This entails that firms' likelihood of repurchasing shares when they suffer an *Upgrade* is lower. Regarding the significance level, all models until (6), including, are relevant at a 10% significance level. Models (7), (8) and (9) are relevant at a 5% significance level.

Model (4) has a coefficient of -0.043 for the variable *Upgrade*, indicating that firms who experience this phenomenon have their likelihood of repurchasing shares decreased by 4.3 percentage points. Similarly, model (8) coefficient for *Upgrade* is -0.146, which indicates that a firm that increases their rating from BBB+ to AA- has a negative impact on the marginal effect of repurchasing shares of 0.146.

In model (9), the log-odds of the *Upgrade* variable is -0.238, which entails that a firm that gets an *Upgrade* is 0.78 times less likely to *Repurchase* shares.

In terms of explanatory variables, *Book Leverage, CAPEX/Assets, Size, Interest Coverage* and *Debt/EBITDA* are all relevant at a 1% significance level, indicating that there is a low likelihood of observations in my sample not being explained by these coefficients. From the variables mentioned, *Book Leverage, Size* and *Interest Coverage* have a positive coefficient, signaling a positive influence on the likelihood of repurchasing shares. From the remaining explanatory variables, there is a lower degree of significance on *Cash/Assets*, with a significance level of 5% in the first three and last three models, and 10% in models (4), (5) and (6). *Neg.Debt/EBITDA* also has a low degree of significance, 10%, on models (1), (2) and (3), not attaining significance in the remaining.

My initial expectation that the models that analyze *Issuance* attain greater significance holds true when comparing Table VIII and Table IX, in which it is possible to see a lower significance level on the coefficient of the *Upgrade* variable of the models that study *Repurchase*s rather than the ones that analyze *Issuance*s.

4.2. Speculative Grade

Then, it is also important do understand if there are different drivers of these main research variables if I look at the Speculative Grade sample. Within this sample, my expectations lead me to believe that the models are less accurate and attain less relevance.

Table X – Speculative Grade *Issuance*

This table reports the coefficients of the regressions that assess the relation between equity and credit ratings. Model (1) represents an OLS regression, (2) a Probit Regression and (3) a Logit regression, all of these without fixed effects. Then, model (4) to (6) are, respectively, OLS, Probit and Logit regressions with fixed-year effects. From (7) to (8), these models follow the same order as before but include industry-fixed effects, as measured by the two-digit NAICS code. The dependent variable, *Issuance*, is calculated by using a lag that is, it is calculated based on information of the last period available. All variables are described in table III.

VARIABLES	(1) OLS	(2) PROBIT	(3) LOGIT	(4) OLS	(5) PROBIT	(6) LOGIT	(7) OLS	(8) PROBIT	(9) LOGIT
Upgrade	0.0446*	0.119*	0.201*	0.049**	0.136**	0.228**	0.0441*	0.119*	0.204*
	(0.0237)	(0.0660)	(0.108)	(0.0238)	(0.0668)	(0.109)	(0.0237)	(0.0672)	(0.110)
Downgrade	0.0266	0.0664	0.110	0.0212	0.0541	0.0896	0.0167	0.0429	0.0686
	(0.0325)	(0.0899)	(0.146)	(0.0325)	(0.0908)	(0.148)	(0.0323)	(0.0910)	(0.149)
Book Leverage	-0.195***	-0.547***	-0.865***	-0.184***	-0.525***	-0.841***	-0.186***	-0.529***	-0.828***
	(0.0389)	(0.112)	(0.186)	(0.0389)	(0.114)	(0.189)	(0.0397)	(0.116)	(0.192)
ConvDebt Assets	0.531***	1.835***	3.490***	0.482***	1.732***	3.180***	0.473***	1.654***	3.464***
	(0.116)	(0.373)	(0.728)	(0.116)	(0.378)	(0.725)	(0.119)	(0.386)	(0.768)
Rent/Assets	-0.179	-0.520	-0.790	-0.210	-0.602	-0.941	0.281	0.723	1.245
	(0.170)	(0.473)	(0.773)	(0.170)	(0.477)	(0.781)	(0.203)	(0.571)	(0.928)
Cash/Assets	0.0364	0.163	0.161	0.0354	0.169	0.211	0.000963	0.0653	-0.0586
	(0.0986)	(0.287)	(0.484)	(0.0988)	(0.293)	(0.496)	(0.101)	(0.295)	(0.495)
Profitability	0.316**	0.892**	1.422**	0.319**	0.906**	1.477**	0.312**	0.949**	1.494*
	(0.136)	(0.384)	(0.637)	(0.136)	(0.387)	(0.644)	(0.157)	(0.457)	(0.770)
PPE/Assets	0.0248	0.0750	0.121	0.0326	0.0953	0.158	0.0440	0.132	0.233
	(0.0315)	(0.0892)	(0.147)	(0.0319)	(0.0909)	(0.150)	(0.0344)	(0.0994)	(0.165)
CAPEX/Assets	0.172	0.459	0.836	0.0750	0.210	0.413	-0.0435	-0.217	-0.140

	(0.266)	(0.758)	(1.278)	(0.273)	(0.784)	(1.321)	(0.272)	(0.787)	(1.327)
Size	-	-	-	-0.00968	-0.0261	-0.0493	-0.022**	-0.061**	-0.104**
	0.025***	0.070***	0.119***						
	(0.0094)	(0.0261)	(0.0428)	(0.0103)	(0.0288)	(0.0474)	(0.0096)	(0.0273)	(0.0449)
Interest	-	-	-	-	-	-	-	-	-
Coverage	0.003***	0.008***	0.012***	0.003***	0.007***	0.011***	0.003***	0.008***	0.012***
	(0.0009)	(0.0025)	(0.0040)	(0.0009)	(0.0025)	(0.0041)	(0.0009)	(0.0025)	(0.0042)
Debt/EBITDA	0.015***	0.044***	0.070***	0.014***	0.044***	0.071***	0.014***	0.044***	0.070***
	(0.0043)	(0.0125)	(0.0211)	(0.0043)	(0.0126)	(0.0214)	(0.0044)	(0.0131)	(0.0222)
NegDebt/EBITDA	0.186***	0.559***	1.004***	0.177***	0.541***	0.973***	0.158**	0.486**	0.921***
	(0.0613)	(0.182)	(0.318)	(0.0615)	(0.185)	(0.322)	(0.0643)	(0.195)	(0.340)
Industry Dummy	N	N	N	N	N	N	Y	Y	Y
Year Dummy	N	N	N	Y	Y	Y	N	N	N
Constant	0.773***	0.711***	1.163***	1.155**	0.195	0.351	0.900***	1.115***	1.920***
	(0.0809)	(0.226)	(0.370)	(0.474)	(0.289)	(0.472)	(0.135)	(0.413)	(0.720)
Observations	2375	2375	2375	2375	2374	2374	2375	2375	2375
R-squared	0.040			0.055			0.065		

Table X portraits the coefficients for models that analyze the effect of *Issuance*s on the sub-sample of Speculative Grade firms. In the models presented, I can see a lower degree of relevance in the variable *Upgrade*, which attains a 10% significance level in all models apart from models (4), (5) and (6) in which it attains a 5% significance levels. This indicates that my initial expectation of lower accuracy does not hold and there is a degree of explicability in these models. Moreover, these coefficients have a positive sign, indicating that when a firm that has a BB rating manages to secure an *Upgrade* do BB+ there is an increased likelihood of issuing more shares. Similarly to the other sets of models, the coefficient for *Downgrade* does not present any type of relevance.

Regarding the rest of the explanatory variables, these models can attain a significance level of 1% on the variables that relate to *Book Leverage, ConvDebt/Assets, Interest Coverage, Debt/EBITDA* and *Neg.Debt/EBITDA*. From these, only the *Book Leverage* variable negatively influences the probability of issuing shares, meaning that when firms have a debt heavy capital structure, there is an added incentive not to increase equity levels. Then, some models also attain a lower level of significance in other variables which does not hold for all models.

Regarding model (1), from Table X, I can see a positive coefficient of 0.0446 for the variable *Upgrade*, which indicates that firms who receive an *Upgrade* are 4.6 percentage points more likely to issue shares than those that do not. Then, model (5) shows a PROBIT model with an *Upgrade* coefficient of 0.136, indicating that the z-score increases by this coefficient and thus firms are closer to issuing shares. Then in model (9), I have a LOGIT model that displays

a log-odds of 0.204, relevant at a 10% significance level. This model displays that a firm that increases their rating is 1.23 times more likely to issue shares than a firm that does not receive a rating increase. The remaining models find similar results as those described previously, and to those of the other samples.

Despite my initial expectation of models being less accurate due to the different nature of this sub-sample, the vast majority of explanatory variables seems to be relevant and so does the variable *Upgrade*, which is consistent with the Investment Grade sub-sample and with the analysis of the entire sample.

Table XI – Speculative Grade *Repurchase*

This table reports the coefficients of the regressions that assess the relation between equity and credit ratings. Model (1) represents an OLS regression, (2) a Probit Regression and (3) a Logit regression, all of these without fixed effects. Then, model (4) to (6) are, respectively, OLS, Probit and Logit regressions with fixed-year effects. From (7) to (8), these models follow the same order as before but include industry-fixed effects, as measured by the two-digit NAICS code. The dependent variable, *Repurchase*, is calculated by using a lag that is, it is calculated based on information of the last period available. All variables are described in table III.

VARIABLES	(1) OLS	(2) PROBIT	(3) LOGIT	(4) OLS	(5) PROBIT	(6) LOGIT	(7) OLS	(8) PROBIT	(9) LOGIT
Upgrade	0.00605	0.0222	0.0378	0.00018	0.00343	0.0121	0.00719	0.0209	0.0394
	(0.0206)	(0.0734)	(0.127)	(0.0204)	(0.0751)	(0.131)	(0.0207)	(0.0748)	(0.130)
Downgrade	0.0170	0.0524	0.0896	0.0234	0.0733	0.120	0.0208	0.0592	0.108
	(0.0282)	(0.0993)	(0.170)	(0.0279)	(0.102)	(0.175)	(0.0282)	(0.101)	(0.173)
Book Leverage	-0.0194	-0.0894	-0.170	-0.0349	-0.155	-0.274	-0.0260	-0.114	-0.268
	(0.0337)	(0.143)	(0.275)	(0.0334)	(0.146)	(0.280)	(0.0346)	(0.149)	(0.294)
ConvDebt Assets	-0.128	-0.433	-0.876	-0.0482	-0.198	-0.236	-0.0800	-0.250	-0.730
	(0.100)	(0.384)	(0.748)	(0.0999)	(0.391)	(0.735)	(0.103)	(0.400)	(0.791)
Rent/Assets	0.247*	0.764	1.324	0.269*	0.852	1.497	-0.0903	-0.603	-1.228
	(0.148)	(0.520)	(0.885)	(0.146)	(0.532)	(0.915)	(0.176)	(0.676)	(1.158)
Cash/Assets	0.0958	0.240	0.344	0.0919	0.267	0.399	0.141	0.406	0.718
	(0.0855)	(0.299)	(0.526)	(0.0848)	(0.308)	(0.542)	(0.0876)	(0.310)	(0.542)
Profitability	-0.275**	-0.942**	-1.494**	-0.289**	-1.041**	-1.775**	-0.186	-0.673	-0.888
	(0.118)	(0.419)	(0.735)	(0.117)	(0.427)	(0.757)	(0.137)	(0.498)	(0.875)
PPE/Assets	0.0332	0.114	0.196	0.0250	0.0903	0.128	0.0379	0.120	0.187
	(0.0273)	(0.0989)	(0.170)	(0.0274)	(0.102)	(0.175)	(0.0300)	(0.110)	(0.189)
CAPEX/Assets	-0.421*	-1.597*	-3.053*	-0.291	-1.106	-2.100	-0.258	-0.804	-1.755
	(0.231)	(0.889)	(1.585)	(0.234)	(0.922)	(1.646)	(0.237)	(0.918)	(1.639)
Size	0.043***	0.149***	0.270***	0.022**	0.077**	0.151***	0.037***	0.130***	0.233***
	(0.0081)	(0.0289)	(0.0500)	(0.0088)	(0.0318)	(0.0549)	(0.0084)	(0.0304)	(0.0526)
Interest Coverage	0.003***	0.005**	0.007*	0.002***	0.00398	0.00499	0.002***	0.005*	0.00631
	(0.0008)	(0.0025)	(0.0042)	(0.0008)	(0.0026)	(0.0043)	(0.0008)	(0.0025)	(0.0043)

Debt/EBITDA	-0.025***	-0.105***	-0.201***	-0.026***	-0.108***	-0.209***	-0.025***	-0.106***	-0.201***
	(0.0037)	(0.0160)	(0.0319)	(0.0037)	(0.0162)	(0.0322)	(0.0038)	(0.0167)	(0.0333)
NegDebt/EBITDA	-0.236***	-0.938***	-1.721***	-0.233***	-0.951***	-1.753***	-0.216***	-0.873***	-1.640***
	(0.0532)	(0.207)	(0.383)	(0.0528)	(0.212)	(0.390)	(0.0560)	(0.220)	(0.407)
Industry Dummy	N	N	N	N	N	N	Y	Y	Y
Year Dummy	N	N	N	Y	Y	Y	N	N	N
Constant	0.0311	-1.354***	-2.300***	0.0382	-0.313	-0.545	-0.0532	-1.699***	-2.931***
	(0.0702)	(0.252)	(0.435)	(0.407)	(0.317)	(0.542)	(0.118)	(0.453)	(0.823)
Observations	2375	2375	2375	2375	2374	2374	2375	2371	2371
R-squared	0.078			0.111			0.095		

In Table XI, it is possible to see the coefficients for models that analyze the Speculative Grade sub-sample and *Repurchase*s. Differently from all the other models that I have analyzed, in this Table I do not find significance within the *Downgrade* or *Upgrade* coefficients. This indicates that these variables do not aid in explaining the decision to *Repurchase* within these models. Even so, I can see that both these variables have a positive sign, indicating that, if relevant for the models, the impact on the probability of repurchasing shares is positive.

Regarding the remaining explanatory variables, I can see that *Book Leverage* is not statistically relevant in any levels, which goes against what I have seen in all other models. Nevertheless, there is a high degree of significance, 1%, on the *Neg.Debt/EBITDA*, *Debt/EBITDA* variables. Both of these variables have a negative signal, which indicates that as firms increase these ratios, they are less likely to *Repurchase* shares. Then, there is also a varying level of significance on the variable *Interest Coverage, Size*, *Profitability* and *CAPEX/Assets*, which indicates that, within this sub-sample, firms do not react in the same way as in other samples.

In terms of models, I cannot interpret the coefficient for *Upgrade* or *Downgrade* as they are not significant. In this scenario, my initial expectation of the Speculative Grade models being less accurate and attaining lower significance does hold true.

All in all, it is possible to see that my explanatory variables find more significance in models that analyze the Investment Grade sub-sample than what I find on the Speculative Grade sub-sample. This case is especially evident when analyzing the *Repurchase* cases.

When I look at the sample as a whole, my results are mixed due to the fact that the Speculative Grade sample adds a lot of noise to my results, seeing as they do not follow the majority of patterns as investment-grade firms do. Thus, analyzing the results by group gives insight into how results may vary drastically.

It is important to note that, although I analyze these groups separately, there are still some limitations within my analysis that could be further developed in future research. For example, I use the net effect of the change in shares as the measure for determining if firms issue or *Repurchase* shares, but an extension that analyzes this effect separately would be able to better understand which variables influence each effect more strongly.

Other possible extension is to analyze if firms in different areas, for example Europe, react to these changes in Ratings and if they are sensitive to the same variables or if there are other factors that contribute to their decisions. Also, there is a possibility to do in-depth analysis within certain industries, to see if there are changes across industries or if these variables are always considered.

5. Conclusion

This dissertation aims to assess the relationship between equity changes and credit ratings, by running different models on these variables, with several different iterations. This is an important field of study as it allows to gain a deeper understanding as to what factors impact firms' decisions to issue or *Repurchase* shares, and how sensitive is the market to news, specifically those related to credit ratings.

Over my analysis, I have seen that there is evidence that firms react to *Upgrade*s in their credit rating, both in *Repurchase*s and *Issuance*s. I do not find this effect on *Downgrade*s, indicating that my main expectation that firms react more strongly to bad news was not correct. The findings suggest that firms are more prone to make decisions based on good news than bad ones. I also find some evidence suggesting that firms with Speculative Grade ratings do not react as strongly as firms with ratings above BBB-, which confirms my initial expectation. Despite including analysis with industry and time fixed effects, my models find similar results to those that do not include these effects, which indicates that the variables that I have chosen to use as controls are relevant to study across industries and time.

To continue to develop literature on this matter, it is interesting to decompose the *Issuance* and *Repurchase* variable, as I have assumed the net effect and might be mixing the effects of *Repurchase*s and *Issuance*s in the same analysis. Moreover, seeing see how these findings hold in different markets, that are not as reactive as the US, is very important. It is also interesting to do an in-depth analysis on firms that attain a Speculative Grade rating, as these react differently to news and are not thoroughly studied as of now.

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