Credit Ratings and Corporate Diversification: The Aftermath of the Global Financial Crisis

Diana Martins Ventura

Dissertation written under the supervision of Dr. Diana Bonfim

Dissertation submitted in partial fulfilment of requirements for the International MSc in Management with Major in Corporate Finance, at the Universidad Católica Portuguesa, December 2018.

Credit Ratings and Corporate Diversification: The Aftermath of the Global Financial Crisis

by Diana Martins Ventura

December 2018

Abstract

As ten years have passed by since the 2007-2008 world financial crisis, one of the largest ones in recent history, this thesis investigates whether credit ratings still have an informational effect on diversified firms. That is, if credit ratings still are an useful tool to counteract the diversification discount often documented in literature.

Thus, to study this research question, two main hypotheses are developed. The first one predicts that diversified rated firms are less affected by the diversification discount than unrated ones. The second one predicts that higher rated diversified firms are less affected by diversification discount than low-rated ones.

The employed approach to study these hypotheses is through OLS regressions with data for 39,174 firm-years from 1985 to 2016. These regressions are performed both for rated and unrated subsamples and then dividing the timeframe into 3 periods (pre-crisis, crisis, post-crisis). In this context, three analysis are performed differing only in the crisis period definition. The first analysis encompassed the crisis years as 2007-2008, whereas the second and third contains 2007-2009 and 2008-2009, respectively.

The results obtained indicate that both hypotheses hold true in the pre-crisis period, which denotes a mitigation in the diversification discount for rated and investment grade rated firms. Nonetheless, in the post-crisis period, only the unrated diversification coefficient is significant. Therefore, this indicates that ratings credibility was somehow undermined as a clear difference in its role before and after the crisis is denoted. These results are consistent with the intertemporal robustness regressions performed in this dissertation.

CATÓLICA-LISBON School of Business and Economics

Credit Ratings and Corporate Diversification: The Aftermath of the Global Financial Crisis

por Diana Martins Ventura

Dezembro de 2018

Resumo

Após dez anos desde a crise financeira de 2007-2008, esta tese investiga se as notações de crédito ainda têm um efeito informativo sobre empresas diversificadas. Isto é, se as notações de crédito ainda são uma ferramenta útil para contrariar o desconto de diversificação, frequentemente documentado na literatura.

Assim, para estudar esta questão científica, são desenvolvidas duas hipóteses basilares. A primeira prevê que empresas diversificadas, possuidoras de uma notação de crédito, sejam menos afetadas pelo desconto de diversificação do que as que não contêm. A segunda hipótese antecipa que empresas diversificadas com classificações mais elevadas sejam menos afetadas pelo desconto de diversificação do que as de baixa classificação.

Para conduzir este estudo, usa-se como metodologia regressões MQO com dados para 39.174 empresas-ano de 1985 a 2016. Essas regressões comparam empresas classificadas com não-classificadas durante 3 períodos: pré-crise; crise; pós-crise. Foram feitas três análises que diferem apenas nos anos definidos como crise. A primeira análise considera os anos de crise de 2007-2008, enquanto a segunda e terceira definem como 2007-2009 e 2008-2009, respetivamente.

Os resultados obtidos indicam que ambas as hipóteses são verificadas no período pré-crise, o que denota uma atenuação no desconto de diversificação para empresas classificadas e de elevada qualidade de crédito. No entanto, no período pós-crise, apenas o coeficiente de empresas diversificadas não classificadas se torna significativo. Portanto, isto sugere uma perda de credibilidade das classificações, visto que há uma clara diferença no seu papel pré-crise e pós-crise. Finalmente, estes resultados são robustos com regressões intertemporais realizadas nesta tese.

Palavras-chave: Crise Financeira, Diversificação, Desconto de diversificação, Notações de Crédito, Agências de Notação de Crédito, Informação Assimétrica

Classificação J.E.L.: G01, G24, L25

Contents List

Appendices

List of figures

List of tables

List of abbreviations

Capex – Capital Expenditures

CEO – Chief Executive Officer

CRAs – Credit Rating Agencies

EBIT – Earnings before interest and taxes

MQO – Mínimos Quadrados Ordinários

NAICS – North American Industry Classification

NPV – Net present value

OLS – Ordinary Least Squares

SEC – Securities and Exchange Commission

SIC – Standard Industrial Classification Code

S&P – Standard and Poor's

Acknowledgments

I would like to start this section by thanking Dr. Diana Bonfim for all her valuable inputs and guidance. All her comments were very much appreciated and considered.

To my close friends a special thanks for making me realize and enjoy all the life that lies beyond writing a master thesis. Having regular fun moments with you helped me keep the balance and enjoy this self-challenging path. A special word of thanks to Laura for accompanying and supporting me through every up and down in the Católica journey and to Ana Carolina for being the friend that dreams are made of. To Franziska, I would like to show my gratitude for reviewing my dissertation so carefully and altruistically.

To Eduardo, I want to thank for all his patience, critical thinking and affection throughout the entire process. I would also like to express my gratitude for him being the person I could talk with regarding my thesis, no matter the hour or the day of the week.

À minha família e em especial aos meus pais, o agradecimento que se impõe. Obrigada por fazerem dos meus sonhos, os vossos sonhos. Obrigada pelo apoio constante e o amor incondicional não só nesta, mas em todas as fases da minha vida. Como tal, dedico-vos esta tese.

Põe quanto és no mínimo que fazes.

Ricardo Reis, in "Odes"
Heterónimo de Fernando Pessoa

1. Introduction

For this dissertation, two controversial topics in literature are merged. These topics are the diversification on firm value and the role of credit ratings in the market. To take this analysis even further and make it more interesting for the present days, I specifically focus on the interaction of these two topics after the global financial crisis.

Since this was one of the most dramatic and impactful crises from 1929 onwards, it is relevant to assess in what extent do the results change after 10 years of the crisis peak. In other words, it is interesting to understand if credit ratings still are an useful tool to counteract diversification discount or if its credibility was somehow shaken due to Credit Rating Agencies (CRA's) questionable conduct.

This is because the global financial crisis helped to uncover that due to the issuer-shopping revenue model, that was in practice among the CRA's oligopolistic market, there were inflated ratings (Bolton, Freixas, & Shapiro, 2012). This was later proven at the crisis peak moment when there were massive downgrades from rated instruments. Some of them even experienced a decrease from being highly rated to turn into junk level in the same day (Soroushian, 2016). Thereby, this finding brought suspicion to the market regarding the ratings independence and trustworthiness. As one of the CRA's analysts put it "[The investment] could be structured by cows and we would rate it" (Bolton et al., 2012).

So, in the periods after the crisis there was the acknowledgment of the need of a rating refinement. This happened with the 2010 Dodd-Frank act alongside with several other measures created to eradicate any persisting conflicts of interest (Bolton et al., 2012; deHaan, 2017). On the CRA's perspective, they are also interested in recovering the reputation they had before the crisis. This is because the cornerstone of their model is dependent on the trust that different parties give to them (White, 2010). Only this way the CRA's can keep dealing with sensitive information and releasing ratings perceived as credible informational sources. Thus, it is suitable to analyze whether the effort made on rating refinement was enough to contain the reputational damage spillover effect or if the market perceives the rating notations differently than before the crisis (deHaan, 2017).

On the other hand, diversification has often been a widely debated topic in the literature. Academics are not being able to reach a consensus regarding the diversification impact on corporate value. Whether it is a value-enhancing strategy (Chandler, 1978; G.

Lewellen, 1960), if it destroys value (Jensen, 1986; Lamont & Polk, 2002; Stulz, 1990) or if it does not have an impact at all because as the shareholder value decreases, the bondholder wealth increases (Mansi & Reeb, 2002).

Therefore, the credit ratings emerge as a tool to clarify the impact that diversification has on corporate value and consequently eliminate any mispricing caused by diversification discount. In other words, rating notations contribute to understand whether firms are being more valuable as stand-alone businesses or if the sum of their segments proves to be higher (Chou & Cheng, 2012).

In this context, this dissertation aims at analyzing the impact of credit ratings on corporate diversification especially after the financial crisis. For that purpose, two main hypotheses are developed.

Firstly, if the credit ratings deliver what they promise they should be informative and unbiased public opinions regarding the firms' creditworthiness (Whited, 1992). So, intuitively, one should expect that, on average, in a *ceteris paribus* scenario rated conglomerate firms are less affected by diversification discount than unrated ones. In fact, this transparency increase brought by the rating notations should help to mitigate information asymmetry problems among distinct layers of stakeholders and, thus, rated diversified firms are less prone to diversification discount.

So, I analyze the veracity of this prediction with Campa & Kedia (2002) approach by regressing excess value on: a diversification dummy (DIV), the number of business segments reported by each firm (Segn), the firm size (Size), leverage (Leverage), Ebit/total sales (EBIT) and Capex/total sales (Capx). Moreover, I include in the regression the one and two lag variables for firm size, investment and profitability as a robustness measure since their past values could be impacting the firm's characteristics in time t.

To study the impact of ratings throughout the crisis, I split the rated conglomerate firms' sample into a pre- and post- 2007-2008 financial crisis period. In this context, its assessed whether the results remain similar, or if the crisis undermined credit ratings reputation and, thus, they are no longer an useful tool to increase transparency while mitigating asymmetry informational problems.

The second hypothesis predicts that, on average, in a *ceteris paribus* scenario, high rated conglomerate firms are less affected by diversification discount than low rated ones. It is understandable that if ratings matter, then there should be a positive relation between credit rating levels and less diversification discount. Moreover, this study is also extended

to analyze if after the financial crisis having high rating levels matters on the diversification issue or if they were somehow discredited.

Beginning with the equally weighted yearly average ratings, I find that diversified firms have, on average, better ratings. Notwithstanding, both diversified and focused firms had a notation decrease during the financial crisis which they did not recover in the years following the crisis. This finding suggests that, on average, before the crisis there were inflated ratings. However, considering the total sample, the average rated firms are found to be worthier than the average unrated ones, which indicates a positive informational effect brought by rating notations.

On the other hand, the average diversified firms are valued less than the average focused firms. Moreover, even when controlling for other factors as firm's leverage, size, EBIT, CAPEX and their one and two lag variables, there is evidence for a diversification discount. Nonetheless, this discount is attenuated for rated firms as expected.

The same result is obtained for the period before the financial crisis. Notwithstanding, during the 2007-2008 financial crisis the diversification coefficient, on average, remains negative, but it is no longer significant, as well as most of the variables analyzed in the model. So, the excess value variable is no longer suitably explained by the model and the division between rated and unrated does not cause any apparent impact on the model quality. This seems to suggest that during the financial crisis there were confounding effects, as it is common in crisis periods, which are not captured in this model.

Regarding the post-financial crisis period, the average diversification coefficients are both negative, but only the unrated one is significant. This indicates that credit ratings suffered a spillover reputational damage effect due to one of the biggest world financial crisis, that many denote as the CRA's fault. Thus, most probably the credit rating notations had, as a crisis consequence, a lack of credibility from the market and investors.

To take several approaches into consideration, I also perform the same regression as before, but with different divisions of the financial crisis timeframe. This way, I test if the results remain the same when considering the financial crisis period in 2007 to 2009 (analysis 2) and in 2008 to 2009 (analysis 3). Considering the financial crisis as in 2007-2009 is relevant since it also encompasses 2009 which is a recession year for most of the world economies, though China and India were starting to recover (Verick & Verick, 2010). Furthermore, considering it as in 2008-2009 is also valuable because the crisis only unfolded by the end of 2007 (Verick & Verick, 2010).

As in the first analysis, the pre-financial crisis period denotes, on average, a diversification discount for both rated and unrated firms, which is mitigated for the rated firms. This suggests a value-enhancing effect brought by rating notations before the crisis, (though we should acknowledge that there are costs associated with obtaining a rating, which might be disproportionately high for the smaller firms). Yet, in the post-financial crisis period the only diversification coefficient that is significant is the unrated one. So, once more, these findings indicate that the CRA's are being penalized by the questionable behavior they had before the crisis that resulted in inflated ratings.

However, these three analyses differ in the results obtained during the crisis as well as on the definition of the crisis period. In model 1, the financial crisis period is denoted as 2007-2008 while in analysis 2 the crisis period is considered solely as 2007-2009 and the third one is defined as 2008-2009.

The first and second analysis have matching results. But, on the third analysis (2008-2009), the average diversification coefficients for rated and unrated samples still have explanatory power. However, the average rated coefficient turns positive and suggests a diversification premium during the crisis. This result is in line with the literature arguing that conglomerate firms are better equipped in terms of financing and investment and also benefited from competitive advantage as opposed to focused firms when there was the financial crisis (Kuppuswamy & Villalonga, 2010). Consequently, the corporate value of diversified firms is said to have increased during the crisis.

However, this result is questioned when taking a total sample approach instead. In this case, the average coefficients are no longer significant during the crisis. This may indicate that the previous results are due to some composition effect when splitting the sample into rated and unrated. In fact, if taking the total sample approach, the three analysis coincide in the results derived. Nonetheless, regardless of the approach taken, every model shows the same clear difference between the importance of credit ratings role before and after the crisis.

Concerning hypothesis 2, and despite the fact speculative firms are insignificant in every analysis and time period, the evidence suggests a positive relation between investment grade rating levels and less diversification discount. When one inserts the financial crisis into the problematic, then the results remain unaltered for before the crisis, but are not verified for the period after the crisis. Thereby, this leads to question the

informational role of the credit ratings after the crisis since these results lead to believe that some of their reputation was undermined. Regarding the speculative firm's case, representing 33% of the rated sample, its lack of significance may indicate that the diversification discount problematic for speculative firms is not as crucial as for investment grade firms.

Finally, to ensure the robustness of my results, I perform some intertemporal regressions. To analyze H1 veracity, I constructed a dummy named "After" to capture the firms that were unrated and later became rated. So, after constructing an interaction variable between "After" and the diversification coefficient (DIV), the result obtained is that the diversification discount is attenuated when firms become rated.

For analysis 2 and 3, the interaction coefficient, on average, is still positive and significant. However, and as expected, this coefficient turns, on average, negative and insignificant for the post-crisis period in every analysis. Thus, this finding suggests that, on average, after the financial crisis, firms becoming rated or not does not impact corporate value on conglomerate firms.

For H2 cross-check analysis, I created two dummy variables named "Upgrade" and "Downgrade". Their role is to compare firms' ratings in time *t* with the ratings in time *t-1*. Therefore, a dummy interaction is created with the diversification coefficient and each of these two dummies.

In this context, the results obtained suggest that, on average, when there is a rating decrease the companies are penalized for it, whereas the reverse happens for a rating upgrade. Hence, it seems that there is an additional incentive for diversified firms to pursue higher ratings as the diversification discount is reduced. Nonetheless, this result is questioned for the period after the financial crisis since that, on average, the interaction variables are no longer significant. This finding suggests that in the post-crisis period there is no distinction between rating levels.

This dissertation complements the literature on diversification intertwined with ratings, as in Chou & Cheng (2012). The results suggest the existence, on average, of the so-called diversification discount, which is attenuated for rated firms. Moreover, these findings also contribute to the literature that argues in favor of the positive benefits brought by credit ratings to the market in a *ceteris paribus* scenario. For instance, as discussed by Kisgen (2006), credit ratings are able to increase transparency while decreasing asymmetric information problems between several layers of stakeholders.

Nonetheless, this dissertation also builds on recent literature (Alp, 2013; Bolton et al., 2012; Partnoy, 2017) since the results indicate that, on average, there were inflated ratings before the crisis and that the rating refinement was not able to recover the same reliance and credibility for rating notations as there were before the crisis.

All in all, my results intertwin two hot topics that are still very controversial and relevant on corporate decisions nowadays, particularly on diversified firms that are considering their rating status.

This dissertation is distributed as follows. Section 2 discusses previous papers on the studied topic to enable a better understanding of what has been done in the past and builds on it. Section 3 gives a detailed explanation for the data and methodologies used. Section 4 provides descriptive statistics, univariate analysis and multivariate analysis aligned with some rationales behind the results. Section 5 englobes some concluding remarks and possible further extensions to this dissertation.

2. Literature Review

2.1 Corporate diversification on firm value

According to the Modigliani-Miller theorem, capital structure decisions of a company do not have an impact on its value. However, this would only hold under perfect capital markets which implies that a set of conditions would need to be satisfied (Modigliani & Miller, 1958). Thereby, it is widely acknowledged that, in the real-world setting, the diversification decision impacts the firm value. It is only controversial and debated among academics on how it does so.

One of the most suggested benefits regarding diversification on corporate value concerns the increase in efficiency obtained in the production lines as opposed to focus firms (Chandler, 1978). Not only those companies profit from scale economies (Ekkayokkaya & Paudyal, 2015), but can also enjoy corporate resources sharing, even the intangible ones such as know-how. This will then have several advantages on topics such as benefiting from improved organizational fit structure (Campa & Kedia, 2002; Matsusaka, 2001); decrease the deadweight costs of capital (Campa & Kedia, 2002; Perold, 2005) and even impact at the risk management level (Chou & Cheng, 2012; Lin, Pantzalis, & Park, 2007).

Furthermore, the value-enhancing effects of diversification are also extended to the capital structure decision. Indeed, multi-segment firms are able to create an internal capital market in order to finance themselves (Stein, 1997). So, in theory, diversified firms will have more leverage than single-segment firms due to their higher debt capacity and because of benefiting from tax shields (W. G. Lewellen, 1971).

Thus, following this line of reasoning, Servaes (1996) believes that when diversifying the main objective is to increase the shareholder wealth. By eliminating total external market dependence when financing themselves, they are also avoiding some information asymmetry problems that would have arisen on external markets.

Nevertheless, there is a stream of literature embodied by May (1995) that suggests that managers are not totally unbiased when making such type of decisions. It is even argued that when CEOs remain in the position for many years or have more personal wealth invested, they are more prone to diversify. Hence, personal risk is considered when reducing firm risk, which means that they can opt for negative net present value (NPV) projects for the firm that are actually increasing their personal wealth (Jensen & Meckling, 1976). This is because shareholders are more capable of diversifying their portfolio in the capital market, while managers are dependent on the firm level to do so (May, 1995).

Along with the perverse compensation incentives managers can have when deciding to diversify, there is plenty of literature arguing that diversification destroys firm value. The reasoning behind this is that conglomerate firms tend to invest inefficiently due to the cross-subsidization across highly performing segments to inefficient ones (Berger & Ofek, 1995; Rajan, Servaes, & Zingales, 2000). Therefore, Berger & Ofek (1995) find that diversified firms often have less profitable segments compared to focused companies. Similarly, Stulz (1990) reinforces this argument by proving that multi-segment firms overinvest in divisions characterized by a lack of investment opportunities.

The overinvestment issue may be partially explained by the fact that when firms diversify they may start laxing their investment constraints due to the disposal of several resources and so can validate projects that do not create much firm value (Stulz, 1990). Likewise, Jensen (1986) argues that multi-segment firms engage in much more wasteful investments, projects with negative NPV, than they would if they had their divisions split up.

There is also the argument that conglomerate firms because of their consolidated nature, make harder to immediately detect harmful segments (Chou & Cheng, 2012). This increased structure complexity leads to lower transparency and, thus, drives agency costs between managers and stakeholders (Hadlock, Ryngaert, & Thomas, 2001).

Notwithstanding, there is a paper by Thomas (2002) that demonstrates that diversification does not cause an increase in information asymmetries nor forecasting errors are higher. They are practically the same as matching focused firm portfolios. Therefore, it is possible to consider that there is still a long path to go to reach a consensus regarding the impact of diversification on corporate value. There is even a strand of literature that suggests that diversification does not have an impact on firms' value since the shareholder wealth decreases with diversification as the firm risk declines, while the bondholder value rises. This leads to the conclusion that all equity financed firms do not suffer from a diversification discount (Mansi & Reeb, 2002).

In this context, when companies decide to diversify, they take the risk of not being totally understood both by the market and skeptical investors concerning diversification benefits. Hence, most of the times this misalignment results in the fact that the company is not valued at its true worth. So, very often the diversifying decisions are taken as value destroying even if it is not the case (Campa & Kedia, 2002). Indeed, much of these issues are to blame to asymmetric informational problems. Thus, the insertion of credit ratings appears as an attempt to increase transparency and consequently solve the problematic of whether the firms are more valuable as stand-alone businesses or if the sum of their segments proves to be higher.

2.2 Credit Ratings

In fact, when a company asks for a rating notation it is requesting an informed and unbiased public opinion regarding its creditworthiness. By doing this, the firms are bridging the gap between managers and firm stakeholders for the sake of transparency increase without compromising their competitive advantage and strategic plans (Kisgen, 2006). As a matter of fact, the attribution of a notation is backed up by a considerable amount of sensitive information that helps improving the ratings' reliability, giving an useful measure of the firms risk as well as its future prospects (Whited, 1992).

This disclosure intention is driven by the fact that the company wants to clarify the impact that the diversification is having on the firm value and, consequently, eliminate

any mispricing caused by the diversification discount. This enhanced transparency is relevant because as argued by Campa & Kedia (2002) having a discount does not mean that diversification is synonym of value loss. The endogenous decision to diversify is affected by numerous firm characteristics. This is the reason why, in the same exogenous conditions, some companies are able to derive value from diversification and others are not. Thereby, one can easily understand the importance of credit ratings in attenuating information asymmetries caused by omitted variables between stakeholders and, thus, provide an useful tool to assess the true impact of diversification in each firm.

Yet, credit ratings also have their drawbacks that became particularly visible after the global financial crisis. The so-called sub-prime loan crisis, mainly due to unstainable debt in the market, helped to uncover that the credit rating agencies (CRA's) were not as impartial as they should have been when attributing notations due to the issuer-shopping model (Bolton et al., 2012). This behavior has led to inflated ratings in which the investors trusted without thinking twice or analyzing other indicators. This heavy dependence on ratings occurred also because the CRA's were entitled to receive classified information under the SEC's Regulation Fair Disclosure (Jorion, Liu, & Shi, 2005). Hence, they were intuitively used as an assessment tool of firm quality. But as expressed by one of the CRA's analysts "[The investment] could be structured by cows and we would rate it"(Bolton et al., 2012).

So, when the crisis crashed there were innumerable instruments previously assessed as high quality that suffered a massive downgrade, even to junk notation (Soroushian, 2016). Therefore, all these dramatic events undermined the CRA's reputation to be reliable (Utzig, 2010).

Then, after the global financial crisis there was a rating refinement to increase the information effect that notations provided, as well as stricter regulations to eliminate previous contradictory incentives (Tang, 2009). One of these measures to eradicate conflicts of interest when attributing rating notations became known as the 2010 Dodd-Frank act (Bolton et al., 2012; deHaan, 2017). This and several other measures prevented that holding a rating would become meaningless in the market and there would no longer be an informational role of ratings in companies' value. This loss of reputation would also not suit CRA's interests since confidence is the cornerstone of their revenue model (White, 2010). If the ratings go on being unreliable and an unrealistic assessment of the true firms'

net worth, then CRA's might incur into legal costs as well as a loss in their integrity that might cause spillover effects in their revenue model (deHaan, 2017).

Notwithstanding, there are recent papers that question the trustworthiness and independence of ratings after the crisis. Indeed, recent literature on this topic argues that the rating refinement, done after the financial crisis, was not enough to stop the reputational damage on ratings, due to CRA's questionable conduct in the pre-crisis period (Partnoy, 2017; Utzig, 2010).

So, it is relevant to analyze if after the financial crisis the credit ratings can still be used as an informational tool that mitigates information asymmetries problems regarding the diversification effect on firm value.

3. Data and Methodology

3.1 Data extraction:

The data demanded for this study is entirely withdrawn from North American Compustat database. This extraction was done for different layers, namely, at the firm level, segments level and the corresponding firm rating notations. The aimed timeframe

Table 1 - Definition of variables

Variable	Definition
Market Value of Equity	Common Shares*Annual Fiscal Year Price Close (Compustat: item 25*item 199)
Book Value of Debt	Long Term Debt+ Debt in Current Liabilities (Compustat: item 9+item34)
Actual Value	Market Value of Equity + Book Value of Debt (Compustat: (item 25*item 199)+(item 9+item34))
Market to Sales Ratio (MSR)	Actual Value/ Total sales (Compustat: ((item 25*item 199)+(item 9+item34))/item 12)
Market to Assets Ratio (MAR)	Actual Value/ Total Assets (Compustat: (item 25*item 199)+(item 9+item34)/item 6)
Imputed Value (I(V))	Segment sales (assets)*Median market to sales (assets)
Excess Value	Ln(Actual value/Imputed value)
Leverage	Long term debt/Total assets (Compustat: item 9 * item 6)
Size	Log(Total Assets) (Compustat: log(item 6))
EBIT	EBIT/ Total sales
Capx	Capex/total Sales (Compustat: item 128 * item 12)
Fyear	Fiscal year of the current fiscal year-end month
Diversification (DIV)	Dummy variable that takes the value of one if a firm reports more than one segment, and zero otherwise
SIC	Standard Industry Classification Code
NAICS	North American Industry Classification Code
Segn	Number of segments the firms report
Israted	Dummy variable that takes the value of one if a firm is rated, and zero otherwise
InvestmentGrade	Dummy variable that takes the value of one if a firm is rated from BBB- level onwards, and zero otherwise
DIV*Ratlvl	Interaction term between the diversification dummy and the rating levels
b.crisis	Dummy variable that takes the value of one if the year is below 2008, and zero otherwise
a1.crisis	Dummy variable that takes the value of one if the year is above 2009, and zero otherwise
b3crisis	Dummy variable that takes the value of one if the year is below 2007, and zero otherwise

The data demanded for this study was withdrawn from North American Compustat database for a timeframe from 1985 to 2016. The data was retrieved both at the firm level and segments level and the corresponding rating notations. This table reports the definition of each variable and between brackets there is explained the Compustat items used to compute each one.

was from 1985, when the ratings were initially issued, until the end of 2017, to complete ten years after the beginning of the financial crisis. However, since the ratings were only available until February 2017 the timeframe used is shortened to January 1985 until December 2016. These 31 years enable a deep analysis of the pre- and post- financial crisis period.

At the firm level, I extracted the annual fundamentals such as both long and short-term debt, total assets, capex, EBIT, sales, close price and common shares outstanding to compute the market capitalization. In addition, the same fundamentals are withdrawn but at the segments level. This culminated in the construction of the variables shown in Table 1.

Finally, I also took the S&P Long-Term Issuer Credit Rating notations for the studied timeframe. This is relevant since it is an useful tool to analyze whether firms are credit worthy or not, that is, if they are able to honor their financial obligations. The ratings are converted into numerical score as explained in Table 2.

Table 2 - Numerical Score

S&P credit rating	Compustat Code	Numerical score
AAA	2	21
AA+	4	20
AA	5	19
AA-	6	18
A+	7	17
A	8	16
A-	9	15
BBB+	10	14
BBB	11	13
BBB-	12	12
BB+	13	11
BB	14	10
BB-	15	9
B+	16	8
B	17	7
B-	18	6
CCC+	19	5
CCC	20	4
CCC-	21	3
CC	23	2
C	24	1
D or SD	27,29	0

This table reports the S&P ratings conversion into numerical score that goes from 0 to 21. The higher the rating the higher is the numerical score. This is for a total of 39174 firm-years which contain 11864 rated firm-years.

Thus, a company given an "AAA" rating is assigned a numerical score of 21, whereas the lower grade firms are converted into a 0. Therefore, the firms with higher credit ratings are also the ones with higher numerical scores.

3.2 Data universe and restrictions

After merging these three files, there are some restrictions to be satisfied. Firstly, all the financial services firms (NAICS:520000-529999; SIC:6000-6999) are eliminated due to their distinct nature on valuation methods, and also because the majority of them do not contain data on EBIT (Berger & Ofek, 1995). Likewise, all the firm-years that report negative assets and sales less than 20 million are also excluded to keep the database unbiased from the results being driven by small firms. In addition, all the years that do not provide information on capital are deleted.

Another elimination criterion excludes companies which do not have the segment sales within 1% of total firm sales. Whenever this rule applies, it means a data error or a large discrepancy occurs between the firm-level accounts and the segments data. Additionally, when a company reports the same segment more than once a year, the observations that report the most recent source-date are kept. This duplication was due to the fact that the firms' reports contain the information for the present year as well as for the past three more recent years, leading to a duplication. Hence, keeping the observations with the most recent source-date enables a more reliable analysis since the reported figures will be the most updated and, thus, they will be the ones that provide the best picture of the firm's segments shape in every point in time. Finally, the firm years that do not report whether they are rated or not, are eliminated.

Hence, after all these deletion criteria are satisfied, I remain with a total of 39,174 firm-years, which comprises 3,793 different companies. Furthermore, this sample contains 14,424 conglomerate firm-years, the ones that report more than one business segment per year, as opposed to 24,750 focused ones. A closer examination can be taken in Table 3 where the sample distribution by year is displayed.

From Table 3, one can observe that the percentage of focused firms decreases considerably, particularly after 1997. Thus, one can infer a diversification trend across the years. In fact, across the sample there are 28% of firms that changed their diversification status. Particularly, 687 firms become diversified whereas 481 refocused (unreported results).

Taking the ratings into perspective, there are 1,485 rated firms which are composed by 947 diversified firms. Therefore, 64% of rated firms are diversified. On the other hand, there are 3,497 unrated companies throughout the years, which encompass 1,361 diversified firms. So, 39% of unrated firms are diversified. These statistics suggest that diversified firms consider ratings as an useful informational tool, which is in line with the argument that credit ratings insertion may be an attempt to increase transparency between stakeholders and mitigate the informational asymmetry problems.

Table 3 - Diversification distribution by year

Year	% of Focused Firms	% of Diversified Firms
1984	56.52%	43.48%
1985	62.02%	37.98%
1986	63.63%	36.37%
1987	66.31%	33.69%
1988	67.70%	32.30%
1989	68.53%	31.47%
1990	68.28%	31.72%
1991	68.75%	31.25%
1992	69.45%	30.55%
1993	72.61%	27.39%
1994	71.92%	28.08%
1995	71.64%	28.36%
1996	72.16%	27.84%
1997	72.75%	27.25%
1998	59.45%	40.55%
1999	56.27%	43.73%
2000	57.87%	42.13%
2001	56.81%	43.19%
2002	55.95%	44.05%
2003	53.91%	46.09%
2004	53.08%	46.92%
2005	51.80%	48.20%
2006	51.46%	48.54%
2007	51.85%	48.15%
2008	52.73%	47.27%
2009	51.24%	48.76%
2010	51.86%	48.14%
2011	52.36%	47.64%
2012	49.66%	50.34%
2013	49.73%	50.27%
2014	48.31%	51.69%
2015	46.96%	53.04%
2016	33.33%	66.67%

This table reports the diversification trend from 1984 to 2016 for a total of 39,174 firm-years, which 14,424 are conglomerate firm-years whereas the remaining 24,750 are focused.

Nonetheless, the unrated subsample is nearly 2.36 times larger than the rated one. Figure 1 shows the ratings distribution across the entire sample.

The rating notations that appears the most throughout the sample period is BBB and A with a weight of roughly 12% each in the rated subsample, which corresponds to a numerical score of 13 and 16. In fact, the rated sample is characterized by having

approximately 67% of the total sample as investment grade ratings. Regarding the equally weighted yearly average rating it is 12.68 which also means a BBB investment grade.

Looking at the ratings for diversified firms the distribution does not suffer major changes (Appendix 1). However, for focused firms the universe of rated firms is much smaller as well as the rating notations spectrum. There are only seven different ratings attributed and it lies from BBB+ to B (Appendix 1). This finding leads to believe that focused rated firms do not perceive the rating status as important as diversified rated firms. This is in accordance with the theory that argues that diversified firms look at ratings as a tool to reduce information asymmetries due to their complexity and opaque structure, as opposed to focused firms that do not suffer from this issue as much.

Figure 1- S&P credit rating distribution of 1485 rated companies
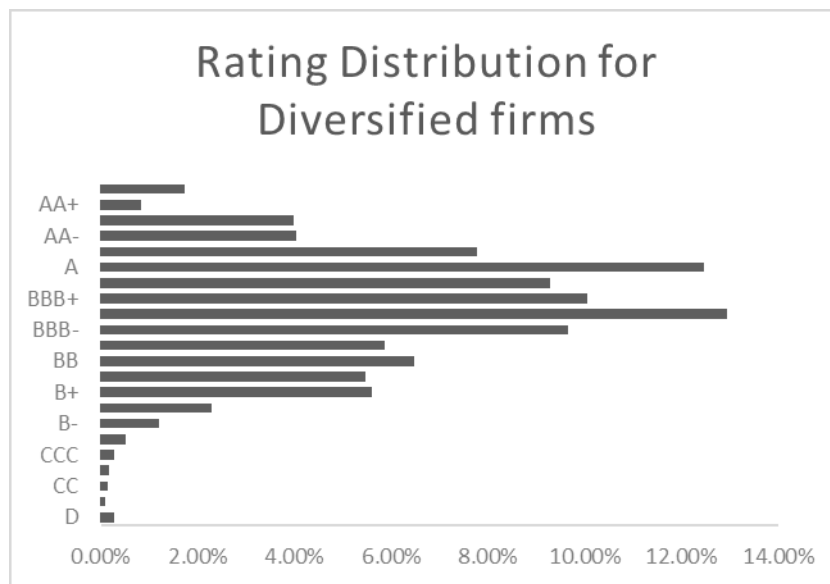
Furthermore, in Figure 2, the rated sample is sliced into diversified and focused firms for three different periods to account for the effect of the 2007-2008 financial crisis. Looking at Figure 2, one can conclude that diversified firms have, on average, better ratings. Notwithstanding, both diversified and focused firms had a notation decrease during the financial crisis which they did not recover in the years following the crisis. This finding suggests that before the crisis there were inflated ratings. The same results are obtained if considering the crisis as in 2007-2009 or 2008-2009 (Appendix 2).

Figure 2- Yearly Average Rating

Yearly Average Rating
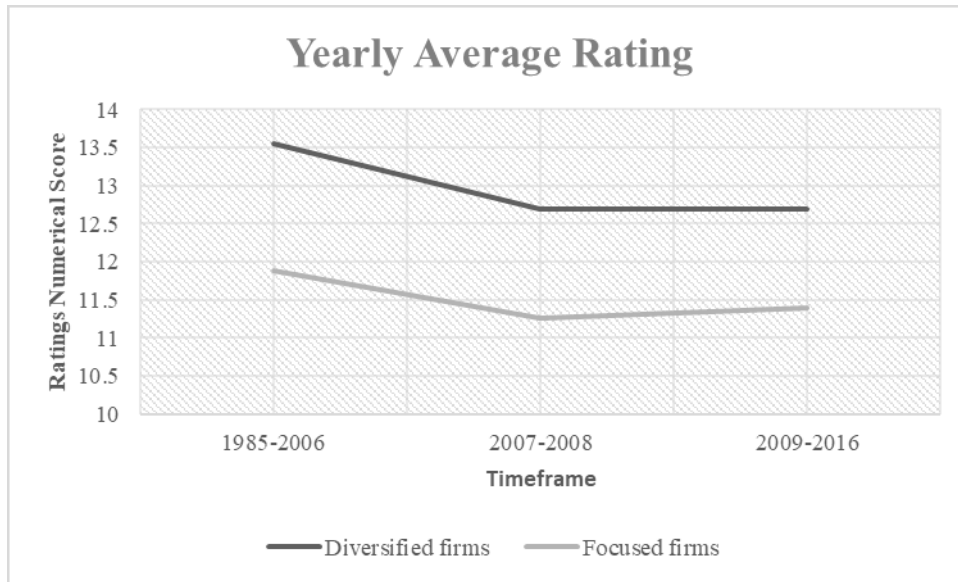
Regarding the industry dispersion, it is possible to conclude from Figure 3 that during the studied timeframe the lion share of the companies on the database are concentrated in the Manufacturing sector followed by Transports and Public Utilities industry. There are no companies in the financial services industry, due to the elimination criterions carefully explained above.

Taking this Standard Industrial Classification Code (SIC-Code) analysis even further to a subsample of diversified and non-diversified, one concludes that the industry distribution is very similar to the one presented in Figure 3. Therefore, there is not a major industry representative change between the diversified and non-diversified subsamples driving the results (Appendix 3).

Figure 3 - Industry Distribution
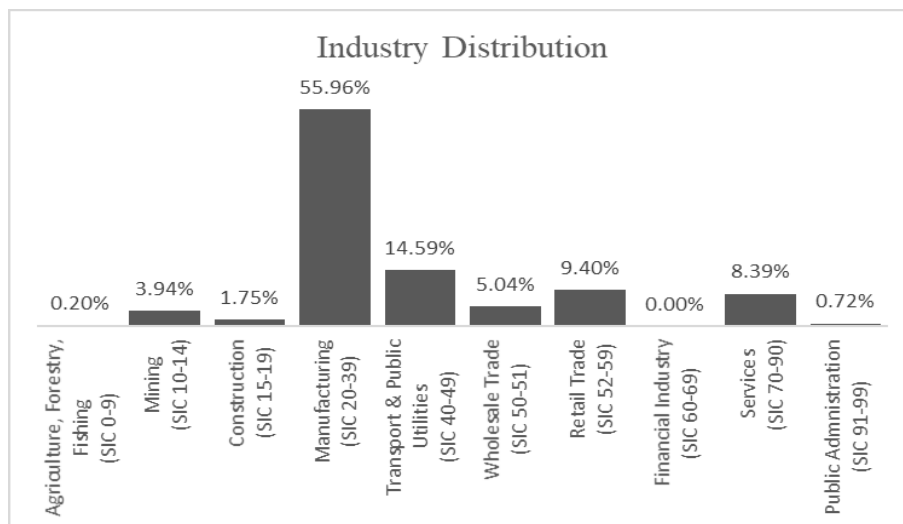
3.3 Excess value construction

As stated before, one of the persistent problematics of diversification is to perceive its true impact on firm value. Thus, I construct an excess value variable as in Berger & Ofek (1995). This methodology intends to analyze for each case if diversification is creating or destroying value. In fact, the excess value variable aims at understanding whether firms are more valuable as stand-alone businesses or if the sum of their segments are proven to be higher. In case of a positive excess value the evidence suggests that diversification is a value-enhancing strategy, while having negative excess value indicates diversification discount (Berger & Ofek, 1995). Thus, the following equations illustrate the procedure:

Excess value = ln(Actual value/Imputed value)

Imputed value(V)=$\sum_{i=1}^{n} AI_i \times Ind_i(V/AI)_{mf}$

As stated above in Table 1, the actual value (V) is composed by the sum of book value of debt and market value of equity. On the other hand, the imputed value is constructed in two steps.

First, one needs to focus on single-segment firms and compute their median market to sales (MSR) or their median market to assets (MAR) depending on the fundamental that most suits the analysis. This computation needs to be done for the same year and for comparable industries. Therefore, to be in the same industry the companies must have the same 3-digit SIC and it needs to contain at least 5 different firms. Otherwise, the same industry will be proxied by single-firms that are in the same 2-digit SIC. Thus, after complying with these criteria, one gets the $(Ind_i(V/AI)_{mf})$.

Secondly, one multiplies this result by the segment fundamental (AI_i), either sales or assets, according to the choice that was made in the first step. Then, this approach is repeated for the number of segments (n) of each firm. So, the imputed value measures the segment worth as if it was a stand-alone business. Thereby, each firm's imputed value is the sum of all its segment imputed values and yields its worth as if they were splitted up. Additionally, the excess value variable is winsorized at 1% and 99% to attenuate the influence of outliers.

A note of caution should be made regarding the choice of the accounting item to construct the multiple, that is, either sales or assets. According to Berger & Ofek (1995),

the assets fundamental is more prone to have deviations between the firm-level and segments level data. This may be due to unlocated assets. In this context, as well as for comparison sake with Chou & Cheng (2012) results, I use the sales multiplier approach.

4. Results

4.1 Descriptive statistics

Analyzing Table 4 one can understand that nearly 37% of the firm-years in the studied sample are diversified, meaning that they are composed by more than one segment. In fact, on average, the firm-years are characterized by having 1.72 business segments. If one narrows down this analysis even more, the average diversified firm-year reports 2.94 segments (result not reported).

Table 4 - Summary Statistics

Variable	All firms		Rated firms		Unrated firms		Difference	
	Mean	Median	Mean	Median	Mean	Median	t-stat	z-stat
Diversification								
DIV	0.3682	0	0.56846	1	0.26005	0	63.414***	60.391***
Segn	1.7159	1	2.24227	2	1.43158	1	68.7888***	65.362***
Firm characteristics								
Size	18.948	18.87929476	19.62	19.9554	18.5851	18.5863	50.1917***	46.254***
EBIT	0.0745	0.074078103	0.1013	0.09718	0.06004	0.06295	22.0014***	43.642***
CAPX	0.0804	0.04084916	0.10656	0.0544	0.06626	0.03489	24.7757***	43.574***
Leverage	0.21	0.186750132	0.29262	0.26929	0.16543	0.1222	65.5889***	73.638***

This table reports the mean and medians for the studied variables, which encompasses a total of 39174 firm-years. This sample is further composed by 14424 conglomerate firm-years and 24750 focused ones. Taking the ratings perspective there are 11864 rated firm-years and 19065 unrated ones. Furthermore, this table also provides parametric (T-statistics) and non-parametric (Wilcoxon z-statistics) statistical tests to evaluate the difference in means and medians, respectively. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Looking at the firm characteristics, the average size of each firm, which was computed as the natural logarithm of total assets, is $18.948 million whereas the median size is $18.8793 million. The mean (median) of the Ebit-to-sales ratio is 7.45% (7.408%), which proxies as the firm profitability. On the other hand, the mean of the Capex-to-sales ratio is 8.04% while the median is 4.085% which indicates a highly positive skewness for this variable. Finally, the mean (median) of the leverage, a ratio of long-term debt to total firm assets, is 0.21 (0.18675) which may also suggest positive skewness.

This table also provides summary statistics comparison between the rated and unrated subsample as well as parametric (T-statistics) and non-parametric (Wilcoxon z-statistics) statistical tests. These tests, computed for the differences in means and medians of the studied variables, are all significant. In fact, on average, the rated sample has more

conglomerate firms and reports more business segments than the unrated ones. For the remaining analyzed variables, the rated firms always present higher values which goes in line with the literature that rated companies benefit from better growth opportunities and are usually larger (Chou & Cheng, 2012).

4.2 Univariate analysis

On Table 5, the excess value variable is carefully analyzed both in the ratings and in the diversification dimension. Not only the means and medians are computed but so are the T-statistics and the Wilcoxon rank-sum test in order to understand whether the difference was statistically significant.

Table 5 - Excess Value Univariate Analysis

	Excess value	Rated firms	Unrated firms	Subtotal	Row test stat.: Rated-Unrated
	Mean	0.11629	-0.05325	0.03802	0.06303***
Diversified	Median	0.09255	-0.05798	0.02325	0.03457***
	Nº of firm years	7809	6615	14424	
	Mean	0.17824	-0.04230	0.01053	0.13595***
Focused	Median	0.14290	-0.03952	0.00744	0.10338***
	Nº of firm years	5928	18822	24750	
	Mean	0.14328	-0.04514	0.02058	0.09814***
Subtotal	Median	0.11633	-0.04440	0.01291	0.07193***
	Nº of firm years	13,737	25,437	39,174	
Column test stat.:	Mean	0.06195***	0.01096	0.02749***	
diversified-focused	Median	0.00546***	0.01846*	0.0158**	

This table reports the mean and medians both at the ratings and diversification dimension for the excess value, which is the dependent variable. The sample encompasses a total of 39174 firm-years which is further composed by 14424 conglomerate firm-years and 24750 focused ones. Taking the ratings perspective there are 11864 rated firm-years and 19065 unrated ones. Furthermore, this table also provides parametric (T-statistics) and non-parametric (Wilcoxon z-statistics) statistical tests to evaluate the difference in means and medians, respectively. Here, the Excess Value is computed as the natural logarithm of actual value to Imputed Value; the Actual Value is computed as the sum of Market Value of Equity with Book Value of Debt; the Imputed Value is the product between Segment Sales and the Median Market to Sales. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

The conclusions that one can draw from this table are that diversified firms have, on average, lower valuations than focused firms. The mean (median) excess value of the average rated diversified firm is 0.116 (0.093) while for the average rated focused firm it is 0.178 (0.143).

Likewise, the same happens in the unrated subsample where the mean (median) for the diversified firm is -0.053 (-0.058) and for the focused firm it is -0.042 (-0.040).

However, in the subtotal column a puzzling result is obtained since the average diversified firm (0.038) appears with a higher valuation than the average focused firm (0.010). As this is not the case in any of the subsamples, these figures lead to believe that the result is due to a composition effect. Moreover, this argument is reinforced by the fact

that further in the multivariate analysis, when controlling for several factors, this result no longer appears and a diversification discount is documented.

Secondly, there is also the fact that, on average, rated firms have higher valuations than unrated companies. For rated companies, the mean (median) excess value is 0.143 (0.116) while for unrated firms the mean (median) it is -0.045 (-0.044).

Therefore, these conclusions suggest that diversified companies would benefit from being rated since it seems to be a value-enhancing strategy (though we should acknowledge that there are costs associated with obtaining a rating, which might be disproportionately high for the smaller firms). According to the literature, the benefits from obtaining a rating might be related to their role as an informational tool, given that the enhanced transparency provides important information to market participants. Hence, the informational asymmetry problems are mitigated for diversified rated firms.

4.3   Hypothesis development

As explained in previous sections, credit ratings appear as a tool to disclose what the true impact of diversification on firm value is. This happens because credit ratings are attributed based on sensitive and confidential information that is not disclosed to the public. Therefore, under the SEC's Regulation Fair Disclosure, CRAs are given access to documents such as the company's strategic plans or future growth prospects. Thus, in theory and according to the results obtained so far, credit ratings should increase transparency and mitigate information asymmetry problems among distinct layers of stakeholders. So, it seems that rated diversified firms are less subject to diversification discount due to the informational tool provided by rating notation.

H1. In a *ceteris paribus* scenario, rated conglomerate firms are, on average, less affected by diversification discount than the unrated ones.

This hypothesis comes in line with the conclusion derived from Table 5, but there should be some control for other omitted variables that could be biasing the results. Thus, I analyze the likeness of this prediction with Campa & Kedia (2002)'s approach by regressing excess value on: a diversification dummy (DIV) that takes the value of one if a firm reports more than one segment and zero otherwise; the number of business segments reported by each firm (Segn); the firm size (Size) computed as the natural logarithm of assets; leverage (Leverage) to account for the risk-reduction hypothesis as argued by Mansi & Reeb (2002); Ebit/total sales (EBIT) which is a profitability proxy and

Capex/total sales (Capx) to account for investment. Moreover, I include in the regressions the one and two lag variables for firm size, investment and profitability as a robustness measure since their past values could be impacting the firm's characteristics in time t.

$$Excess\ value = \alpha + \beta_1 DIV_t + \beta_2 Size_t + \beta_3 EBIT_t + \beta_4 Capx_t + \beta_5 Leverage_t +$$
$$\beta_6 Size_{t-1} + \beta_7 EBIT_{t-1} + \beta_8 Capx_{t-1} + \beta_9 Size_{t-2} + \beta_{10} EBIT_{t-2} + \beta_{11} Capx_{t-2} + u$$
$$for\ t = 1985,\ldots, 2016$$

In a further analysis, the rated conglomerate firms' sample is split into a pre- and post- 2008/2009 financial crisis period. In this context, its assessed whether the results remain similar, or the crisis undermined credit ratings reputation and, thus, they are no longer an useful tool to increase transparency while mitigating asymmetry informational problems.

H2. In a *ceteris paribus* scenario, high rated conglomerate firms are, on average, less affected by diversification discount than low rated ones.

Following Chou & Cheng (2012)'s methodology, this thesis studies if there is a positive relation between credit rating levels and less diversification discount. As referred in the previous hypothesis, I also conduct a sample separation to check if the results suffer any major change after the financial crisis.

4.4   Multivariate analysis for H1

Before delving into analyzing the regressions, it is important to observe how strongly the variables are correlated with each other through the correlation coefficient. Table 6 presents the Pairwise Correlation Matrix.

Table 6 - Pairwise Correlation Matrix

	DIV	Capx	EBIT	Size	Leverage	Size (lag 1)	Size (lag 2)	EBIT (lag 1)	EBIT (lag 2)	Capx (lag 1)	Capx (lag 2)
Excess value											
DIV	1.0000										
Capx	-0.0344***	1.0000									
EBIT	0.0820***	0.0006	1.0000								
Size	0.2107***	0.1058***	0.1235***	1.0000							
Leverage	0.0606***	0.1689***	-0.0012	0.1170***	1.0000						
Size (lag 1)	0.1283***	0.0999***	0.0992***	0.7821***	0.1189***	1.0000					
Size (lag 2)	0.1190***	0.0972***	0.1008***	0.7422***	0.1248***	0.7789***	1.0000				
EBIT (lag 1)	0.1818***	0.0936***	0.5468***	0.1367***	-0.0007	0.1265***	0.1062***	1.0000			
EBIT (lag 2)	0.1954***	0.1298***	0.4107***	0.1455***	0.0124***	0.1420***	0.1368***	0.6018***	1.0000		
Capx (lag 1)	0.1174***	0.7529***	-0.0227***	0.1057***	0.1740***	0.1046***	0.0985***	0.022***	0.1108***	1.0000	
Capx (lag 2)	0.0963***	0.6567***	-0.0075	0.1045***	0.1765***	0.1055***	0.1045***	0.004***	0.048***	0.7576***	1.0000

This table reports the correlation coefficients for the studied variables for a total of 39174 firm-years. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Then, in Table 7, the regression presented in the first hypothesis development for the ratings dimension is estimated. So, the sample is subdivided into rated and unrated firms (columns 1 to 2) while regressing excess value on the diversification discount and several other control variables. If the diversification coefficient (DIV) is positive that means there is a diversification premium, whereas a negative coefficient signifies that there is a diversification discount and provides an estimation for the value loss from diversification.

Moreover, in column 3, this regression is also performed without any sample split but rather introducing an interaction variable (DIV*Israted) composed by two dummy variables. Here, *DIV* is the diversification coefficient that takes the value of one if the firm reports more than one business segment and zero otherwise while *Israted* is a dummy that takes the value of one if the firm is rated and zero otherwise. Thereby, the creation of this third column enables to ensure that there are not composition effects driving the regression results of the sample split.

To account for heteroskedasticity, I used the robust standard errors for all the analysis performed. Furthermore, there are applied firm fixed effects to control for omitted variables related to firm characteristics, as well as year fixed effects to account for time-variant variables impacting the results. This estimation is done for 30,929 firm-years.

The results displayed in Table 7, in column 1 and 2, with the excess value as the dependent variable, are in accordance with the literature that documents the existence of a diversification discount. Both rated and unrated subsamples exhibit, on average, negative diversification coefficients estimates, indicating that diversification is a value-destroying strategy for both cases.

Yet, one can observe that the unrated sample is characterized by having a more negative average diversification coefficient (-0.110) than the average rated coefficient (-0.071). Hence, this finding suggests that, on average, ratings mitigate the information asymmetry problems and, consequently, rise the value of a diversified firm.

As for the result in the third column, there is no major change in the figures of interest. As expected, the average diversification coefficient (-0.115) is negative and significant while being closer to the unrated one. This is derived by the fact that the unrated subsample is 1.6 times bigger than the rated one. Regarding the average interaction

variable (DIV*Israted), it exhibits a positive and significant coefficient (0.066) which, once more, indicates a positive impact from ratings, on average.

Table 7 - Multivariate tests for the diversification discount for ratings dimension -H1-

	Firm fixed-effects model		
	Rated firms	Unrated firms	Total sample
Intercept			
DIV	-0.071**	-0.110***	-0.115***
	(-2.87)	(-3.87)	(-5.29)
DIV*Israted			0.066**
			(2.69)
Size	0.007**	0.039***	0.022***
	(2.36)	(8.43)	(8.96)
EBIT	0.298***	0.323**	0.317***
	(4.16)	(2.15)	(4.08)
Capx	0.737***	0.769***	0.709***
	(7.55)	(8.2)	(11.69)
Size (1 lag)	0.000	0.004	-0.001
	(0.04)	(1.15)	(-0.52)
EBIT (1 lag)	0.180**	0.291***	0.255***
	(2.29)	(2.75)	(3.75)
Capx (1 lag)	0.203***	0.291***	0.232***
	(3.60)	(2.85)	(4.65)
Size (2 lag)	-0.009***	-0.008**	-0.009***
	(-3.21)	(-1.95)	(-4.15)
EBIT (2 lag)	0.556***	0.323***	0.352***
	(6.71)	(3.32)	(5.10)
Capx (2 lag)	0.188***	0.296***	0.212***
	(4.83)	(4.55)	(6.08)
Leverage	0.288***	0.285***	0.257***
	(4.26)	(4.45)	(5.61)
Firm dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	11,864	19,065	30929
Adjusted R^2	0.205	0.120	0.146

This table reports the firm fixed-effects model for the diversification reduced by the credit ratings to test hypothesis 1. The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Israted is a dummy that takes the value of one if the firm is rated and zero otherwise; Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

In Table 8 the sample is split into a pre- and post-2007/2008 financial crisis period is addressed. In fact, the aim is to test whether the results remain similar across the periods, or if the crisis undermined credit ratings reputation and, thus, they are no longer an useful tool to increase transparency while mitigating asymmetry informational problems.

For the period denoted as before the crisis in this analysis (1985-2006, column 1 to 3), the results do not experience any major change since, on average, both rated (-0.055) and unrated (-0.115) coefficient remain negative with the unrated still presenting a more negative value as expected. The total sample column results also are in line with the existence of a diversification discount attenuated for rated firms.

However, during the financial crisis (2007-2008, column 4 to 6) the average diversification coefficient is no longer significant, as well as most of the variables analyzed in the model. So, the excess value variable is no longer suitably explained by the model and the division between rated and unrated does not cause any apparent impact on the model quality. If considering the total sample instead (column 6), the results remain insignificant for all the variables of interest (DIV; DIV*Israted). This seems to suggest that during the financial crisis there were confounding effects, as it is common in crisis periods, which are not captured in this model.

Regarding the post-financial crisis period (2009-2016, column 7 to 9), the average diversification coefficients are both negative, but only the unrated one turns significant (-0.381). The same happens for the total sample (column 9) where the average diversification coefficient is negative and significant (-0.242), but the average interaction term is insignificant as during the crisis period.

This points to the fact that, on average, credit ratings suffered a spillover reputational damage effect due to one of the biggest world financial crisis, that many denote as the CRA's fault. Thus, most probably the credit rating notations had, as a crisis consequence, a lack of credibility from the market and investors. This would be explanatory for the faster recovery of the unrated diversification coefficient that becomes significant at 1%, but still more negative than it was in the periods before the crisis.

To take several approaches into consideration, I also perform the same regression as before in Table 8, but with a different division of the financial crisis timeframe. This way, it is tested if the results remain the same when considering the financial crisis period in 2007 to 2009 (analysis 2) and in 2008 to 2009 (analysis 3). Considering the financial

crisis as in 2007-2009 is relevant since it also encompasses 2009 which is a recession year for most of the world economies, though China and India were starting to recover (Verick & Verick, 2010). Furthermore, considering it as in 2008-2009 is also valuable because the crisis only unfolded by the end of 2007 (Verick & Verick, 2010).

Table 8 - Multivariate tests for the diversification discount for ratings and financial crisis dimension -H1- Analysis 1

	1985-2006			2007-2008			2009-2016		
	Rated firm	Unrated firms	Total sample	Rated firm	Unrated firms	Total sample	Rated firm	Unrated firms	Total sample
Intercept									
DIV	-0.055**	-0.115***	0.120***	0.023	0.007	0.04	-0.089	-0.339***	-0.254***
	(2.20)	(-4.29)	(-5.26)	(0.16)	(0.04)	(0.26)	(-1.62)	(-3.25)	(-3.20)
DIV*Israted			0.074**			-0.108			0.090
			(2.88)			(-0.58)			(1.26)
Size	0.001	0.030***	0.017***	0.015	-0.037	-0.023	0.002	0.156	0.008
	(0.48)	(7.35)	(6.49)	(0.68)	(-1.63)	(-1.41)	(0.35)	(1.32)	(1.33)
EBIT	0.848***	0.581***	0.632***	0.600***	0.473*	0.473**	0.046	-0.127	0.020
	(5.85)	(5.22)	(6.45)	(3.25)	(1.88)	(3.03)	(1.34)	(-0.51)	(0.47)
Capx	0.706***	0.743***	0.721***	1.431***	0.364*	0.385**	0.523***	0.757***	0.584***
	(6.83)	(8.50)	(11.01)	(3.43)	(1.74)	(2.62)	(5.14)	(3.37)	(6.03)
Size (1 lag)	-0.002	0.001	-0.004*	-0.004	-0.054**	-0.045**	0.000	-0.003	-0.003
	(-0.93)	(0.19)	(-1.86)	(-0.27)	(-2.17)	(-2.80)	(0.13)	(-0.25)	(-0.54)
EBIT (1 lag)	0.235**	0.487	0.418***	-1.472**	0.029	-0.088	-0.105**	0.210**	-0.006
	(2.71)	(6.12)	(6.94)	(-3.06)	(0.12)	(-0.46)	(-2.78)	(2.07)	(-0.13)
Capx (1 lag)	0.223***	0.354***	0.289***	0.998**	-0.326	-0.064	0.258**	0.443**	0.245***
	(4.40)	(4.13)	(5.44)	(2.60)	(-0.79)	(-0.29)	(2.47)	(2.57)	(3.34)
Size (2 lag)	-0.012***	-0.009**	-0.012***	-0.021	-0.013	-0.020*	0.008	-0.007	-0.000
	(-4.38)	(-2.40)	(-5.29)	(-1.62)	(-0.67)	(-1.67)	(1.35)	(-0.70)	(-0.06)
EBIT (2 lag)	0.480***	0.333***	0.361***	-1.188**	-0.049	-0.048	0.113	0.213	0.168
	(5.13)	(4.67)	(6.01)	(-2.43)	(-0.59)	(-0.61)	(1.20)	(1.12)	(1.57)
Capx (2 lag)	0.191***	0.203**	0.199***	0.335**	0.247	0.141	-0.066	0.245**	0.055
	(4.07)	(3.07)	(5.34)	(2.55)	(0.47)	(0.99)	(-0.59)	(2.49)	(0.73)
Leverage	0.306***	0.237***	0.296***	-0.110	-0.077	-0.055	0.159	0.344**	0.212**
	(4.53)	(4.49)	(6.27)	(-0.53)	(-0.43)	(-0.42)	(1.13)	(2.69)	(2.35)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	9,243	16,140	25,383	595	778	1,373	2,026	2,147	4,173
Adjusted R^2	0.176	0.136	0.14	0.629	0.535	0.556	0.334	0.159	0.208

This table reports the firm fixed-effects model for the diversification reduced by the credit ratings to test hypothesis 1. Furthermore, this table also introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 1). The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Israted is a dummy that takes the value of one if the firm is rated and zero otherwise Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Analysis 1 and 2 (Appendix 4) have similar results. Considering analysis 3 before the crisis, now denoted as from 1985 to 2007 in Table 9, the ratings still preserve their mitigating role of asymmetric information problems since the reported unrated coefficient (-0.134) is, on average, more negative than the rated one (-0.061). As for the total sample approach (column 3), the average diversification coefficient (-0.147) is negative and significant while the average interaction term (0.101) is positive and significant, as it was in the analysis 1 and 2.

During the crisis period (columns 4 to 6), from 2008 to 2009, the average unrated diversification coefficient (-0.351) remains negative and significant at 1% level. Whereas, the average rated diversification coefficient (0.176) exhibits a diversification premium significant at 1%. This goes in line with the literature arguing that conglomerate firms are better equipped in terms of financing and investment and also benefited from competitive advantage as opposed to focused firms during the financial crisis (Kuppuswamy & Villalonga, 2010). Consequently, the corporate value of diversified firms is said to have increased during the crisis.

Considering the total sample approach (column 6), none of the coefficients of interest are significant which leads to the question if the previous result is not drove by a composition effect due to the sample split into rated and unrated.

After the crisis period, 2010 to 2016, the average rated diversification coefficient is no longer significant as in analysis 1. On the other hand, the average unrated diversification coefficient (-0.381) remains negative and significant at 1%. Likewise, if considering the total sample regression instead, the results are the same as in analysis 1. Thereby, as in analysis 1, these findings suggest that, on average, ratings are suffering a reputational effect as CRA's are being penalized for the inflated ratings they provided before the crisis.

Therefore, the difference between the three analysis refers to the definition of the crisis period. In model 1, the financial crisis period was denoted as 2007-2008 while in analysis 2 the crisis period is considered solely as 2007-2009 and the third one is defined as 2008-2009. This difference led to the fact that the diversification coefficients for rated and unrated samples still have explanatory power in model 3 (2008-2009), since they are significant at 1%.

However, this result is questioned when taking a total sample approach instead. In this case, the coefficients are no longer significant during the crisis. This may indicate

that the previous results are due to some composition effect when splitting the sample into rated and unrated. In fact, if taking the total sample approach, the two analysis coincide perfectly in the results derived. Nonetheless, regardless of the approach taken, every model shows the same clear difference between the importance of credit ratings role before and after the crisis.

Table 9 - Multivariate tests for the diversification discount for ratings and financial crisis dimension H1 -Analysis 3-

	1985-2007			2008-2009			2010-2016		
	Rated firm	Unrated firms	Total sample	Rated firm	Unrated firms	Total sample	Rated firm	Unrated firms	Total sample
Intercept									
DIV	-0.061**	-0.134***	-0.147***	0.176***	-0.351**	-0.275	-0.052	-0.381***	-0.243***
	(-2.40)	(-4.41)	(-5.55)	(5.02)	(-2.66)	(-1.32)	(-0.87)	(-4.06)	(-3.36)
DIV*Israted			0.101***			0.272			0.098
			(3.23)			(0.59)			(1.46)
Size	0.002	0.033***	0.019***	0.004	0.033	0.017	0.000	0.020	0.007
	(0.73)	-6.99	(6.53)	(0.16)	(1.00)	(0.75)	(0.14)	(1.38)	(1.03)
EBIT	0.887***	0.517***	0.602***	-0.478*	-0.095	-0.184*	0.034	-0.093	0.025
	-5.670	(3.83)	(5.03)	(-1.81)	(-0.61)	(-1.87)	(1.00)	(-0.35)	(0.68)
Capx	0.744***	0.799***	0.789***	0.616	-0.800	0.114	0.553***	0.780***	0.565***
	(6.40)	(9.83)	(11.35)	(1.57)	(-0.20)	(0.44)	(5.51)	(3.35)	(5.68)
Size (1 lag)	-0.002	0.000	-0.004*	0.013	0.270	0.023	0.001	0.004	-0.000
	(-0.80)	(0.03)	(-1.91)	(0.54)	(0.83)	(1.07)	(0.18)	(0.32)	(-0.04)
EBIT (1 lag)	0.263**	0.428***	0.389***	-0.760***	-0.213	-0.446**	-0.133***	0.262**	-0.039
	(3.04)	(4.37)	(5.32)	(-3.37)	(-0.90)	(-2.67)	(-3.67)	(2.23)	(-0.80)
Capx (1 lag)	0.221***	0.353***	0.286***	-0.287	-0.184	-0.022	0.239*	0.376*	0.239**
	(4.28)	(3.64)	(4.65)	(-0.89)	(-0.59)	(-0.10)	(1.98)	(2.23)	(2.95)
Size (2 lag)	-0.123***	-0.010**	-0.013***	-0.004	-0.004	0.001	0.002	0.011	0.005
	(-4.46)	(-2.57)	(-5.14)	(-0.30)	(-0.16)	(0.09)	(0.40)	(1.08)	(0.91)
EBIT (2 lag)	0.525***	0.432***	0.454***	0.477	-0.290	-0.213	0.001	0.276	0.121
	(5.36)	(5.00)	(6.26)	(0.78)	(-1.07)	(-0.90)	(0.01)	(1.39)	(1.28)
Capx (2 lag)	0.213***	0.222**	0.218***	0.072	0.133	0.152	-0.098	0.265**	0.012
	(4.29)	(3.04)	(5.35)	(0.859)	(0.28)	(0.609)	(-0.83)	(2.73)	(0.16)
Leverage	0.324***	0.033***	0.366***	0.505	0.072	0.277	0.164	0.281	0.154
	(4.58)	(6.99)	(6.46)	(0.340)	(0.29)	(1.14)	(1.09)	(2.11)	(1.50)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	9,552	16,536	26,088	560	735	1,295	1,752	1,794	3,546
Adjusted R^2	0.173	0.124	0.131	0.514	0.234	0.308	0.345	0.171	0.214

This table reports the firm fixed-effects model for the diversification reduced by the credit ratings to test hypothesis 1. Furthermore, this table also introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 3). The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Israted is a dummy that takes the value of one if the firm is rated and zero otherwise; Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

4.5   Multivariate analysis for H2

In this section, the validity of hypothesis 2 is tested. In other words, this thesis tests if high-rated conglomerate firms experience less diversification discount than low-rated ones. Therefore, only the rated sample is considered while at the same time a new independent variable is introduced, which is the interaction between the diversification dummy and the rating levels (Div*Ratlvl).

As observed in Table 10 in column 1, the average diversification coefficient (-0.263) remains negative and significant whereas the average interaction variable (0.015) is positive and significant as expected. In this context, a positive relation between credit rating levels and less diversification discount is denoted.

To take the analysis even further and as a robustness test, the sample is splitted into investment grade firms (from BBB⁻ rating level onwards) and speculative firms. Not surprisingly, the investment grade firms show a smaller diversification discount than when there is no rated sample split. Thus, this suggests that the better graded firms are less affected from the diversification discount. Nonetheless, the speculative firms (representing 33% of the rated sample) do not exhibit a significant coefficient which may indicate that in low graded firms the diversification decision is not as relevant.

However, as referred in the hypothesis development, a sample separation is conducted of before and after the financial crisis to check if the results suffer any major change (table 10).

For analysis 1, in the period denoted as before the financial crisis, the results remain roughly the same. In other words, the average interaction term (0.008) is positive and significant while the average diversification dummy (-0.163) is negative and significant. On the other hand, on average, investment grade firms continue to exhibit a diversification coefficient (-0.084) negative and significant. Thereby, the finding that indicates that investment grade rated firms have, on average, less diversification discount is still verified.

Yet, in the period after the financial crisis the variables are no longer significant in any sample division except for the rated subsample, this may be due to a composition effect when considering all the rated firms together. Indeed, this lack of significance is in accordance with the theory of credit ratings reputation loss due to the CRA's conduct that led to inflated ratings before the crisis.

In addition, I redid these sample splits and regressions considering the crisis years as 2007-2009 (appendix 5) and 2008-2009 (appendix 6), but the results are the same as in analysis 1 for the crisis years from 2007 to 2008 (table 10). In the latter analysis, the rated coefficient is no longer significant in the post-crisis period, which reinforces the composition effect argument. Henceforth, the conclusion driven from these analyses is that, on average, there is a positive association between investment grade levels and less diversification discount. In addition, when one inserts the financial crisis into the problematic, then the results remain unaltered for before the crisis, but are not verified for the period after the crisis. Thereby, this leads to question the informational role of the credit ratings after the crisis since these results lead to believe that some of their reputation was undermined.

Yet, for both analysis and in every period considered, the speculative firms never present significant coefficients. This is a puzzling result that might indicate that for speculative firms the diversification discount problem is not as relevant as for investment grade firms since there may be other crucial factors first.

4.6 Robustness checks

As a robustness test, I perform some intertemporal regressions to understand if the results are consistent. Firstly, I construct a dummy named "After" to represent the subsample of firms that were unrated and then become rated. So, the value of 1 is attributed to the firm-years when the rating was given and the value of 0 for the remaining years.

Then an interaction dummy (DIV*After) is built between the diversification dummy (DIV) and the change in rating status (After). This new variable enables to verify if, as expressed in H1, having ratings mitigates the diversification discount. Therefore, the prediction is that this variable' coefficient is positive and significant.

Looking at Table 11, the prediction is verified since that for 30,283 firm-years observations in column 1, the average interaction dummy coefficient (0.051) is positive and significant at 10%. This result in column 3 (0.044) is maintained with even more significance, where there is represented the pre-crisis period subsample. However, in column 5, in the post-crisis period, the average interaction coefficient (0.020) is no longer significant. This result was already expected since in all post-crisis regressions, performed in this dissertation, most of the model variables turn insignificant except for the unrated diversification dummy coefficients. This again, leads to believe that, after the crisis, the

ratings are not considered as impactful tools on corporate diversification since the change

in rating status does not seem to be affected.

Table 10 - Multivariate tests for the diversification discount for ratings levels and financial crisis dimension - H2 - Analysis 1-

	Firm fixed-effects model			1985-2007			2009-2016		
	Rated firms	Investment-grade rated firms	Speculative-rated firms	Rated firms	Investment-grade rated firms	Speculative-rated firms	Rated firms	Investment-grade rated firms	Speculative-rated firms
Intercept									
DIV	-0.263***	-0.100***	-0.492	-0.163**	-0.084***	-0.026	-0.322**	-0.130	-0.058
	(-8.52)	(-3.71)	(-1.23)	(-2.23)	(-3.40)	(-0.59)	(-2.48)	(-1.28)	(-0.77)
DIV*Ratlvl	0.015***			0.008*			0.022**		
	(6.67)			(1.66)			(1.96)		
Size	0.006**	0.004	0.012*	0.001	-0.000	0.008	0.001	0.002	0.000
	(2.50)	(1.38)	(1.93)	(0.46)	(-0.04)	(1.30)	(0.23)	(0.32)	(-0.01)
EBIT	0.294***	0.840*	0.126**	0.844***	1.776***	0.371**	0.043	0.071**	0.032
	(13.71)	(2.03)	(2.85)	(5.83)	(6.16)	(3.02)	(1.26)	(2.14)	(0.68)
Capx	0.735***	0.702***	0.823***	0.705***	0.669***	0.818***	0.525***	0.538***	0.456**
	(19.22)	(7.25)	(5.50)	(6.85)	(7.21)	(5.62)	(5.30)	(4.25)	(3.01)
Size (1 lag)	0.000	0.001	-0.004	-0.002	-0.001	-0.005	0.000	0.004	0.000
	(-0.03)	(0.44)	(-0.67)	(-0.96)	(-0.20)	(-0.79)	(0.01)	(0.75)	(0.03)
EBIT (1 lag)	0.172***	0.167	0.047	0.229**	0.433**	0.0968	-0.108**	-0.142***	-0.108*
	(5.16)	(1.02)	(0.75)	(2.65)	(3.02)	(0.98)	(-2.85)	(-4.39)	(-1.93)
Capx (1 lag)	0.206***	0.443***	0.082	0.223***	0.401***	0.042	0.265**	0.384**	0.165
	(5.79)	(6.98)	(1.49)	(4.38)	(5.96)	(0.85)	(2.54)	(2.78)	(1.09)
Size (2 lag)	-0.009***	-0.010***	-0.004	-0.020***	-0.011***	-0.007	0.007	0.004	0.021*
	(-3.87)	(-3.63)	(-0.73)	(-4.44)	(-4.04)	(-1.35)	(1.27)	(0.63)	(1.70)
EBIT (2 lag)	0.536***	1.066***	0.263***	0.473***	0.702***	0.320***	0.104	0.706***	-0.017
	(13.58)	(5.76)	(3.89)	(5.06)	(5.18)	(4.29)	(1.12)	(4.26)	(-0.22)
Capx (2 lag)	0.188***	0.223**	0.113**	0.190***	0.226**	0.134**	-0.069	0.058	-0.176
	(5.86)	(2.69)	(2.76)	(4.05)	(2.70)	(2.82)	(-0.61)	(0.41)	(-1.28)
Leverage	0.320***	0.228**	0.374***	0.319***	0.214**	0.339***	0.189	0.342	0.096
	(10.73)	(2.56)	(4.28)	(4.62)	(2.11)	(3.66)	(1.34)	(2.45)	(0.45)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	11,864	7,671	4,193	9,243	6,045	3,198	2,026	1,272	754
Adjusted R^2	0.114	0.294	0.175	0.177	0.284	0.150	0.337	0.454	0.217

This table reports the firm fixed-effects model for the diversification reduced by rating levels to test hypothesis 2. Furthermore, this table also introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 1). The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Ratlvl corresponds to the numerical score of ratings that goes from 0 to 21 (the higher the rating the higher the number); Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Notwithstanding, having on average positive and significant coefficients both in

the period before the crisis and in the subsample before the crisis timeframe split, suggests

a positive impact of ratings on diversified firms. In other words, the diversification discount seems to be reduced when a diversified firm is attributed a rating notation, confirming my main results about the importance of ratings in mitigating the diversification discount. Furthermore, when done for the financial crisis period as 2007-2009 (Appendix 7) and in 2008-2009 (Appendix 8), the results and conclusions retrieved are the same.

To test the robustness of H2, the Upgrade and the Downgrade dummies are constructed for the rated subsample. Their role is to compare firms' ratings in time t with the ratings in time $t-1$. A negative difference indicates that the firm suffered a decrease in the rating notation. If the difference is positive, then the firm is higher rated in time t than it was before. Therefore, when there is a rating increase (decrease) the Upgrade (Downgrade) dummy is 1, if this is not the case then its 0. Also, a dummy interaction is created between the diversification coefficient and each of these two dummies (DIV*Upgrade; DIV*Downgrade).

So, looking at the second and fourth columns of Table 11, it is suggested that, on average, when there is a rating decrease the companies are penalized for it, whereas the reverse happens for a rating upgrade. Thus, this indicates a positive informational tool for higher rated diversified firms, which offers an additional incentive to pursue higher rating levels since the diversification discount is attenuated.

However, looking at column 6, both interaction dummies do not have explicative power. This finding suggests that, on average, there is no distinction between rating levels. More substantially, after the crisis, it appears that there is no the need to increase the rating notation as it does not seem to impact the corporate value of diversified firms.

As before, the second and third analysis performed (Appendix 7 and 8) for the crisis years gets the same results as analysis 1 for hypothesis 2.

Table 11 - Robustness checks: Intertemporal Analysis - Analysis 1-

	Intertemporal Analysis		Intertemporal Analysis: 1985-2006		Intertemporal Analysis: 2009-2016	
	H1	H2	H1	H2	H1	H2
Intercept						
DIV	-0.110***	-0.057**	-0.104***	-0.044*	-0.211***	-0.086
	(-4.49)	(-2.28)	(-4.77)	(-1.70)	(-3.26)	(-1.56)
DIV*After	0.051*		0.044**		0.020	
	(1.87)		(1.94)		(0.75)	
DIV*Upgrade		0.052***		0.511***		0.016
		(4.01)		(3.22)		(0.90)
DIV*Downgrade		-0.058***		-0.048***		-0.032
		(-4.35)		(-3.23)		(-1.25)
Size	0.021***	0.005**	0.017***	0.000	0.007	0.004
	(8.69)	(1.97)	(6.52)	(0.01)	(1.22)	(0.69)
EBIT	0.385***	0.276***	0.600***	0.886***	0.053	0.038
	(4.46)	(3.93)	(5.45)	(5.73)	(0.89)	(1.05)
Capx	0.708***	0.683***	0.712***	0.685***	0.508***	0.460***
	(12.29)	(7.87)	(11.13)	(6.71)	(5.54)	(5.00)
Size (1 lag)	-0.001	0.001	-0.004*	-0.000	-0.005	-0.001
	(-0.58)	(0.53)	(-1.75)	(-0.18)	(-0.88)	(-0.12)
EBIT (1 lag)	0.288***	0.163**	0.403***	0.191**	-0.020	-0.106**
	(4.14)	(2.08)	(5.44)	(2.10)	(-0.43)	(-2.85)
Capx (1 lag)	0.253***	0.222***	0.280***	0.253***	0.176**	0.317**
	(5.44)	(3.97)	(5.38)	(5.12)	(2.31)	(2.77)
Size (2 lag)	-0.009***	-0.008**	-0.012***	-0.011***	-0.001	0.009
	(-4.06)	(-2.77)	(-5.16)	(-4.18)	(-0.29)	(1.58)
EBIT (2 lag)	0.374***	0.571***	0.395***	0.485***	0.179*	0.119
	(6.40)	(6.21)	(6.14)	(4.93)	(1.65)	(0.94)
Capx (2 lag)	0.221***	0.189***	0.214***	0.189***	0.119	-0.008
	(6.76)	(4.85)	(5.75)	(4.07)	(1.40)	(-0.07)
Leverage	0.261***	0.302***	0.285***	0.350***	0.177**	0.18
	(5.56)	(4.58)	(5.99)	(5.11)	(2.03)	(1.28)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	30,283	11,399	25,643	8,816	3,984	1,996
Adjusted R^2	0.15	0.218	0.137	0.183	0.202	0.340

This table reports the intertemporal analysis that enables to assess the robustness of the results. Thus, this table analyses each hypothesis separately and then introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 1). For H1, I am evaluating the impact of a firm changing its rating status from being unrated to turn rated. For H2, I am working solely on the rated subsample and I am studying the impact of a rating upgrade or downgrade. The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Ratlvl corresponds to the numerical score of ratings that goes from 0 to 21 (the higher the rating the higher the number); Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

5. Concluding Remarks

This thesis aims to critically study credit ratings on corporate diversification, particularly after the global financial crisis. This is relevant not only because of the lack of a consensus between researchers for decades regarding the impact of diversification on firm value, but also because there are recent papers that question the trustworthiness and independence of ratings after the crisis. Indeed, recent literature on this topic argues that the rating refinement, done after the financial crisis, was not enough to stop the reputational damage on ratings, due to CRA's questionable conduct in the pre-crisis period (Partnoy, 2017; Utzig, 2010). Hence, the study of the interaction of these two subjects, after one of the biggest world financial crisis, becomes a timely topic with respect to what has changed after 10 years of the crisis peak.

To start with, it is studied whether firms are being more valuable as stand-alone businesses or if the sum of their segments is proving to be higher. The result obtained confirms the so-called diversification discount since conglomerate firms are reported to have, on average, lower valuations than focused firms. Additionally, it is retrieved that rated firms are, on average, valued higher than unrated ones. Hence, this indicates that a plausible conclusion to take from these figures is that diversified firms would benefit from being rated as it seems a value-enhancing strategy (though we should acknowledge that there are costs associated with obtaining a rating, which might be disproportionately high for the smaller firms).

Then, the role of credit ratings on conglomerate firms before and after the financial crisis are analyzed. More specifically, it is studied if the ratings still are a reliable clarification tool to increase transparency in the market while mitigating information asymmetry problems or if its credibility was somehow undermined. Two main hypotheses are developed based on previous research.

Firstly, rated conglomerate firms were expected to be, on average, less affected by diversification discount than the unrated ones. This hypothesis holds true for the entire sample period (1985-2016) as well as for before the crisis (1985-2006). However, this is not the case during the crisis (2007-2008) nor after the crisis (2009-2016). In fact, during the crisis the diversification coefficient for both rated and unrated subsamples is insignificant. After the crisis, only the average unrated diversification coefficient becomes significant.

Taking the crisis period as from 2007 to 2009, the results are similar to the first analysis. If considering the crisis period as solely 2008 and 2009 instead, then the results remain unaltered for the entire sample period (1985-2016), for before the crisis (1985-2007) and after the crisis (2010-2016). Nonetheless, during the crisis both diversification coefficients are, on average, significant and the rated one is even positive.

Hence, these findings suggest a diversification discount that is, on average, mitigated for rated firms in the pre-crisis period for every analysis. Likewise, in the post-crisis period, all analysis exhibit solely significance for the unrated diversification dummy which may suggest that a firm becoming rated is not as important as it used to be before the crisis. Similarly, the results are validated when taking a total sample approach. In other words, instead of splitting the sample into rated versus unrated, the regression is performed for the entire sample but with a dummy variable for the rating status. The results indicate that, on average, the ratings credibility was somehow shaken as a crisis consequence.

During the crisis (2008-2009), the fact that the diversification coefficients are positive and significant denotes an interesting result. Consistent with recent literature that argues that conglomerate firms are better equipped in terms of financing and investment and also benefited from competitive advantage as opposed to focused firms when there was the financial crisis (Kuppuswamy & Villalonga, 2010). Consequently, the corporate value of diversified firms is said to have increased during the crisis.

Nonetheless, if taking the total sample approach, this result is questioned since the coefficients of interest are no longer significant, as it was the case in analysis 1 and 2. Hence, the previous result may be due to some composition effect when splitting the sample according to its rating status.

All in all, hypothesis 1 analysis seems to indicate that, on average, the rating status of a diversified firm is not as important as it used to be before the crisis for mitigation of diversification discount purposes.

Secondly, hypothesis 2 expressed the expectation that, on average, high rated conglomerate firms are less affected by diversification discount than low rated ones. Once more, this hypothesis holds true for the entire rated subsample period (1985-2016) as well as for before the crisis (1985-2006), but not the same happens in the post-crisis period (2009-2016). Yet, in every period considered, the speculative firms never present

significant coefficients. This is a puzzling result that might indicate that for speculative firms the diversification discount problem is not as relevant as for investment grade firms.

If considering the crisis period as solely 2008 and 2009, then the results remain unaltered for every sample split. Thereby, this again leads to question the informational role of the credit ratings after the crisis since these results lead to believe that, on average, diversified firms have no additional incentive to pursue higher ratings.

In addition, these results are consistent with the intertemporal robustness regressions done in this dissertation. For one, these tests showed that, on average, firms that were unrated and become rated benefit from less diversification discount except in the post-crisis period. On the other hand, these robustness tests also indicated that, apart from after the financial crisis period, firms benefit from a rating upgrade and are penalized for a downgrade.

Regarding the crisis period, and consistent with every regression performed in this dissertation, the average rated diversification interaction coefficients is insignificant. Thereby, both the hypothesis developed as well as the robustness tests show the same clear difference between the importance of credit ratings role before and after the crisis. Before, the rating status of a firm was relevant for the mitigation of the diversification discount as well as the rating levels attributed, but from 2009/2010 onwards it seems that, on average, ratings become somehow meaningless as a crisis consequence.

Naturally, there are limitations for this dissertation and room for future improvement. The limitations mentioned, are related with time constraints and the fact that only Compustat is used as database. This means that these results may incur in some bias as argued by some papers, especially regarding the attribution of SIC codes.

Another limitation present in this dissertation is that the excess value variable, which is the dependent variable, is computed using the book value of debt as in Berger & Ofek (1995) methodology. Nonetheless, this could bring some bias to the results as it could be undervaluing conglomerate firms and, thus, impacting the diversification discount.

Regarding possible future extensions, it could be deeper analyzed why the ratings are insignificant in mitigating the diversification discount after the financial crisis. Is this still a spillover effect from the world financial crisis or are there still inflated ratings due

to CRA's perverse incentives? More substantially, it would be interesting to investigate if the bigger and more loyal CRA's clients are being attributed a deserving and transparent notation or not. Besides this, it could be furtherly investigated the reason behind the lack of significance of speculative across every time period.

Furthermore, another interesting proposal would be to study if the distance between segments has impact on mitigating the diversification discount. That is, understand if a conglomerate firm composed by extremely distinct segments (unrelated diversification) suffers from less or more diversification discount than a diversified firm with more homogeneous segments (related diversification). And if it does, to what extent can credit ratings be an useful tool in counteracting these effects, particularly after the financial crisis.

Overall, this thesis provides a consistent result throughout all the analysis performed. It suggests that credit ratings have two completely different roles in before and after the financial crisis for the mitigation of the diversification discount. The results before the crisis reflect that rating notations are, on average, tied with less diversification discount for rated firms and even more for highly rated firms. On the other hand, after the crisis, the findings contemplate insignificant rated diversification coefficients. Hence, this leaves room for discussion, but the results suggest that the ratings credibility was undermined as a crisis consequence. In fact, as discussed before, this dissertation' results even suggest that ratings are not an useful tool to rely on nor clarify the impact of diversification on corporate value.

6. Reference list[1]

Alp, A. (2013). Structural Shifts in Credit Rating Standards. *Journal of Finance*, *68*(6), 2435–2470. https://doi.org/10.1111/jofi.12070

Berger, P. G., & Ofek, E. (1995). Diversification's effect on firm value. *Journal of Financial Economics*, *37*(1), 39–65. https://doi.org/10.1016/0304-405X(94)00798-6

Bolton, P., Freixas, X., & Shapiro, J. (2012). The credit ratings game. *Journal of Finance*, *67*(1), 85–112. https://doi.org/10.1111/j.1540-6261.2011.01708.x

Campa, J. M., & Kedia, S. (2002). Explaining the Diversification Discount. *The Journal of Finance*, *57*(4), 1731–1762. https://doi.org/10.1111/1540-6261.00476

Chandler, A. D. (1978). *The Visible Hand*.

Chou, T.-K., & Cheng, J.-C. (2012). Credit ratings and excess value of diversification. *Journal of Empirical Finance*, *19*(2), 266–281. https://doi.org/10.1016/j.jempfin.2011.12.003

deHaan, E. (2017). The Financial Crisis and Corporate Credit Ratings. *The Accounting Review*, *92*(4), 161–189. https://doi.org/10.2308/accr-51659

Ekkayokkaya, M., & Paudyal, K. (2015). A trade-off in corporate diversification. *Journal of Empirical Finance*, *34*, 275–292. https://doi.org/10.1016/j.jempfin.2015.07.005

Hadlock, C. J., Ryngaert, M., & Thomas, S. (2001). Corporate Structure and Equity Offerings: Are There Benefits to Diversification? *The Journal of Business*, *74*(4), 613–635. https://doi.org/10.1086/321940

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*(2), 323–329. https://doi.org/10.2307/1818789

Jensen, M. C., & Meckling, W. H. (1976). Also published in Foundations of Organizational Strategy. *Journal of Financial Economics*, (4), 305–360. Retrieved from http://ssrn.com/abstract=94043http://hupress.harvard.edu/catalog/JENTHF.html

Jorion, P., Liu, Z., & Shi, C. (2005). Informational effects of regulation FD: evidence from rating agencies. *Journal of Financial Economics*, *76*(2), 309–330. https://doi.org/10.1016/J.JFINECO.2004.05.001

Kisgen, D. J. (2006). Credit ratings and capital structure. *Journal of Finance*, *61*(3), 1035–1072. https://doi.org/10.1111/j.1540-6261.2006.00866.x

---

[1] This reference list is in accordance with the APA citation style and was done using Mendeley software.

Kuppuswamy, V., & Villalonga, B. (2010). *Does Diversification Create Value in the Presence of External Financing Constraints? Evidence from the 2007-2009 Financial Crisis*. Retrieved from https://pdfs.semanticscholar.org/29fe/fda5d4988cbb23b0cff707d2a3c7aa8f695f.pdf

Lamont, O. A., & Polk, C. (2002). Does diversification destroy value? Evidence from the industry shocks. *Journal of Financial Economics*, *63*(1), 51–77. https://doi.org/10.1016/S0304-405X(01)00089-7

Lewellen, G. (1960). Conglomerate Merger. Retrieved from http://www.investopedia.com/terms/c/conglomerate.asp

Lewellen, W. G. (1971). A PURE FINANCIAL RATIONALE FOR THE CONGLOMERATE MERGER. *The Journal of Finance*, *26*(2), 521–537. https://doi.org/10.1111/j.1540-6261.1971.tb00912.x

Lin, J. B., Pantzalis, C., & Park, J. C. (2007). Corporate use of derivatives and excess value of diversification. *Journal of Banking & Finance*, *31*(3), 889–913. https://doi.org/10.1016/j.jbankfin.2006.07.005

Mansi, A., & Reeb, D. M. (2002). Corporate Diversification: What gets Discounted? *The Journal of Finance*, *57*(5), 2167–2183. https://doi.org/10.2307/3094508

Matsusaka, J. G. (2001). Corporate Diversification, Value Maximization, and Organizational Capabilities. *The Journal of Business*, *74*(3), 409–431. https://doi.org/10.1086/321932

May, D. O. (1995). Do Managerial Motives Influence Firm Risk Reduction Strategies? *The Journal of Finance*, *50*(4), 1291. https://doi.org/10.2307/2329353

Modigliani, F., & Miller, M. H. (1958). *American Economic Association*. *Source: The American Economic Review* (Vol. 48). Retrieved from https://gvpesquisa.fgv.br/sites/gvpesquisa.fgv.br/files/arquivos/terra_-_the_cost_of_capital_corporation_finance.pdf

Pacces, A. M., & Heremans, D. (2011). *Regulation of Banking and Financial Markets*. *The Journal of Finance* (Vol. 52). Wiley/Blackwell (10.1111). https://doi.org/10.1111/j.1540-6261.1997.tb03810.x

Partnoy, F. (2017). *What'S (Still) Wrong With Credit Ratings? Legal Studies Research Paper Series*. Retrieved from https://corpgov.law.harvard.edu/2017/05/31/whats-still-wrong-with-credit-ratings/

Perold, A. F. (2005). Capital Allocation in Financial Firms. *Journal of Applied Corporate Finance*, *17*(3), 110–118. https://doi.org/10.1111/j.1745-6622.2005.00051.x

Rajan, R., Servaes, H., & Zingales, L. (2000). The Cost of Diversity: The Diversification Discount and Inefficient Investment. *The Journal of Finance*, *55*(1), 35–80. https://doi.org/10.1111/0022-1082.00200

SERVAES, H. (1996). The Value of Diversification During the Conglomerate Merger Wave. *The Journal of Finance*, *51*(4), 1201–1225. https://doi.org/10.1111/j.1540-6261.1996.tb04067.x

Soroushian, J. (2016). *Credit Ratings in Financial Regulation: What's Changed Since the Dodd-Frank Act?*

Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of Financial Economics*, *26*(1), 3–27. https://doi.org/10.1016/0304-405X(90)90011-N

Tang, T. T. (2009). Information asymmetry and firms' credit market access: Evidence from Moody's credit rating format refinement. *Journal of Financial Economics*, *93*(2), 325–351. https://doi.org/10.1016/j.jfineco.2008.07.007

Thomas, S. (2002). Firm diversification and asymmetric information: evidence from analysts' forecasts and earnings announcements. *Journal of Financial Economics*, *64*(3), 373–396. https://doi.org/10.1016/S0304-405X(02)00129-0

Utzig, S. (2010). *The Financial Crisis and the Regulation of Credit Rating Agencies: A European Banking Perspective*. *ADBI Working Paper Series*. https://doi.org/10.2139/ssrn.1592834

Verick, S., & Verick, S. (2010). The Great Recession of 2008-2009: Causes, Consequences and Policy Responses. *Institute for the Study of Labor*, (4934), 1–61.

White, L. J. (2010). Markets: The Credit Rating Agencies. *Journal of Economic Perspectives*, *24*(2), 211–226. https://doi.org/10.1257/jep.24.2.211

Whited, T. M. (1992). Debt, liquidity constraints, and corporate investment: Evidence from panel data. *Journal of Finance*, *47*(4), 1425–1460. Retrieved from http://www.jstor.org/stable/2328946

7. Appendices

Appendix 1: Ratings distribution for diversified and non-diversified firms
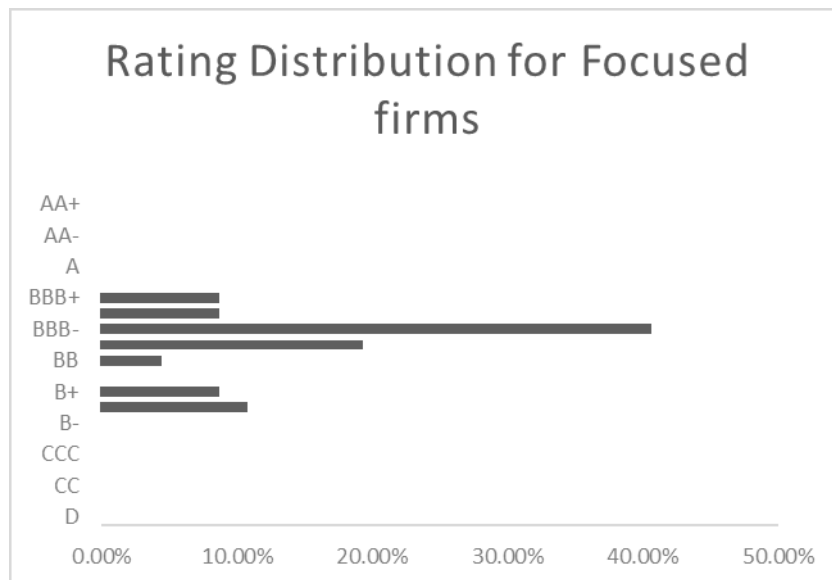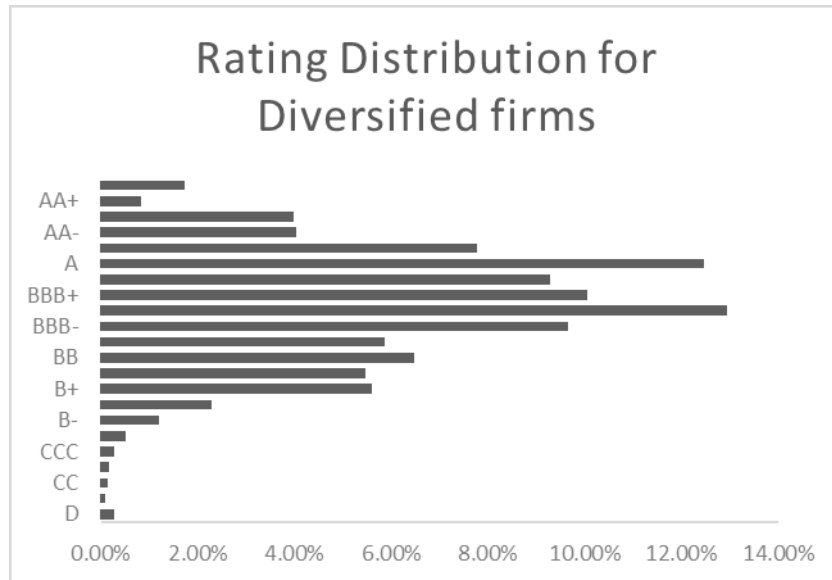
Appendix 2: Yearly Average Ratings for analysis 2 (2007-2009) and analysis 3 (2008-2009)
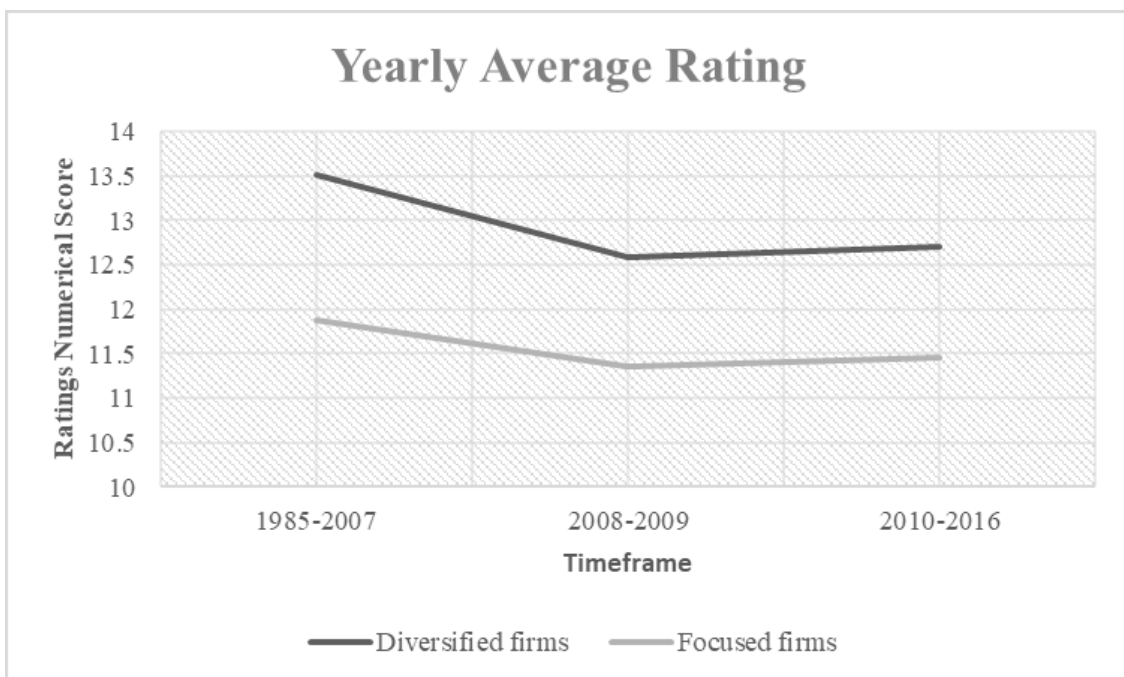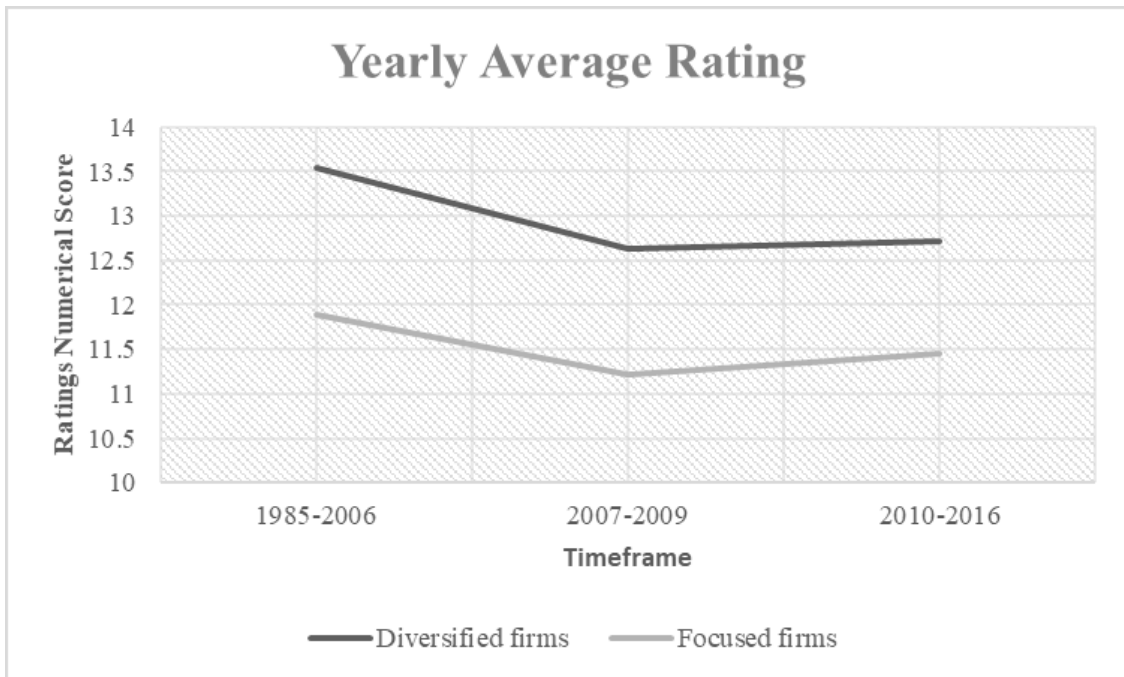
Appendix 3: Industry distribution for diversified and non-diversified firms

Industry Distribution for Diversified firms

Industry	%
Agriculture, Forestry, Fishing (SIC 0-9)	0.27%
Mining (SIC 10-14)	3.73%
Construction (SIC 15-19)	1.98%
Manufacturing (SIC 20-39)	59.56%
Transport & Public Utilities (SIC 40-49)	17.11%
Wholesale Trade (SIC 50-51)	5.22%
Retail Trade (SIC 52-59)	3.93%
Financial Industry (SIC 60-69)	0.00%
Services (SIC 70-90)	7.38%
Public Administration (SIC 91-99)	0.81%

Industry Distribution for Focused Firms

Industry	%
Agriculture, Forestry, Fishing (SIC 0-9)	0.15%
Mining (SIC 10-14)	3.90%
Construction (SIC 15-19)	1.53%
Manufacturing (SIC 20-39)	51.38%
Transport & Public Utilities (SIC 40-49)	12.43%
Wholesale Trade (SIC 50-51)	4.72%
Retail Trade (SIC 52-59)	12.35%
Financial Industry (SIC 60-69)	0.00%
Services (SIC 70-90)	12.91%
Public Administration (SIC 91-99)	0.64%

Appendix 4: Multivariate tests for the diversification discount for ratings and financial crisis dimension -H1- Analysis 2

	1985-2006			2007-2009			2010-2016		
	Rated firm	Unrated firms	Total sample	Rated firm	Unrated firms	Total sample	Rated firm	Unrated firms	Total sample
Intercept									
DIV	-0.062**	-0.136***	-0.120***	-0.062	-0.081	-0.132	-0.052	-0.381***	-0.242***
	(-2.41)	(-4.40)	(-5.26)	(-0.48)	(-0.79)	(-1.22)	(-0.87)	(-4.06)	(-3.34)
DIV*Israted			0.074**			0.085			0.099
			(2.88)			(0.41)			(1.46)
Size	0.002	0.032***	0.017***	0.012	0.012	0.012	0.000	0.020	0.006
	(0.55)	(7.04)	(6.49)	(0.97)	(0.71)	(1.04)	(0.14)	(1.38)	(0.93)
EBIT	0.859***	0.573***	0.632***	0.303*	0.132	0.053	0.034	-0.093	0.023
	(5.42)	(4.72)	(6.45)	(1.67)	(1.13)	(0.58)	(1.00)	(-0.35)	(0.61)
Capx	0.747***	0.804***	0.721***	0.683*	0.353*	0.358**	0.553***	0.780***	0.572***
	(6.32)	(9.56)	(11.01)	(2.13)	(2.14)	(2.83)	(5.51)	(3.35)	(5.84)
Size (1 lag)	-0.002	0.000	-0.004	-0.004	-0.011	-0.012	0.001	0.004	-0.001
	(-0.87)	(-0.09)	(-1.86)	(-0.28)	(-0.64)	(-1.08)	(0.18)	(0.32)	(-0.19)
EBIT (1 lag)	0.254**	0.504***	0.418***	-0.706***	0.099	-0.178	-0.133***	0.262*	-0.047
	(2.89)	(6.27)	(6.94)	(-4.47)	(0.58)	(-1.56)	(-3.67)	(2.23)	(0.325)
Capx (1 lag)	0.229	0.373***	0.289***	0.295**	-0.229	0.106	0.239**	0.376*	0.224**
	(4.20)	(3.66)	(5.44)	(2.33)	(-1.06)	(0.74)	(1.98)	(2.23)	(2.83)
Size (2 lag)	-0.012***	-0.011**	-0.012***	-0.019**	-0.016	-0.014	0.002	0.011	0.005
	(-4.41)	(-2.66)	(-5.29)	(-2.12)	(0.287)	(-1.59)	(0.40)	(1.08)	(0.92)
EBIT (2 lag)	0.508***	0.378***	0.361***	0.252	-0.126	-0.086	0.000	0.276	0.107
	(5.18)	(4.59)	(6.01)	(-0.72)	(-1.83)	(-1.46)	(0.01)	(1.39)	(1.17)
Capx (2 lag)	0.201***	0.226**	0.199***	0.295**	0.451	0.151	-0.098	0.265**	0.003
	(4.09)	(2.85)	(5.34)	(2.33)	(1.36)	(1.13)	(0.83)	(2.73)	(0.04)
Leverage	0.342***	0.317***	0.296***	0.213	0.024	0.182	0.164	0.281**	0.171*
	(4.74)	(5.03)	(6.27)	(0.97)	(-0.16)	(1.27)	(1.09)	(2.11)	(1.68)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	9,243	16,140	25,383	869	1,131	2,000	1,752	1,794	3,456
Adjusted R^2	0.172	0.128	0.140	0.478	0.345	0.380	0.345	0.171	0.222

This table reports the firm fixed-effects model for the diversification reduced by the credit ratings to test hypothesis 1. Furthermore, this table also introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 2). The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Israted is a dummy that takes the value of one if the firm is rated and zero otherwise; Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Appendix 5: Multivariate tests for the diversification discount for ratings levels and financial crisis dimension - H2 - Analysis 2-

	1985-2006			2010-2016		
	Rated firms	Investment-grade rated firms	Speculative-rated firms	Rated firms	Investment-grade rated firms	Speculative-rated firms
Intercept						
DIV	-0.210**	-0.085***	-0.043	-0.154	-0.107	0.031
	(-2.82)	(-3.43)	(-0.97)	(-0.99)	(-1.16)	(0.30)
DIV*Ratlvl	0.011**			0.009		
	(2.25)			(0.74)		
Size	0.002	0.000	0.009	0.000	-0.002	0.005
	(0.51)	(0.02)	(1.30)	(0.09)	(-0.37)	(0.42)
EBIT	0.855***	1.820***	0.392**	0.033	0.586	0.023
	(5.40)	(6.12)	(2.81)	(0.97)	(1.82)	(0.49)
Capx	0.745***	0.685***	0.894***	0.553***	0.539***	0.474**
	(6.34)	(7.18)	(4.98)	(5.57)	(4.74)	(3.04)
Size (1 lag)	-0.002	0.000	-0.006	0.001	0.005	-0.005
	(-0.90)	(0.02)	(-0.96)	(0.12)	(0.80)	(-0.37)
EBIT (1 lag)	0.246**	0.421**	0.129	-0.134***	-0.143***	-0.117**
	(2.82)	(2.91)	(1.24)	(-3.69)	(-7.60)	(-2.05)
Capx (1 lag)	0.228***	0.412***	0.039	0.241*	0.277**	0.143
	(4.17)	(5.95)	(0.74)	(2.00)	(1.89)	(0.85)
Size (2 lag)	-0.012***	-0.012***	-0.008	0.002	0.000	0.015
	(-4.49)	(-4.07)	(-1.42)	(-0.350)	(0.14)	(1.16)
EBIT (2 lag)	0.499***	0.706***	0.372***	-0.003	0.307	-0.088
	(5.09)	(5.16)	(4.48)	(-0.03)	(1.56)	(-1.09)
Capx (2 lag)	0.200***	0.236**	0.154**	-0.100	0.130	-0.207
	(4.06)	(2.79)	(2.95)	(-0.84)	(0.90)	(-1.51)
Leverage	0.360***	0.229**	0.398***	0.173	0.378**	0.098
	(4.88)	(2.17)	(3.84)	(1.15)	(2.73)	(0.42)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	9,243	6,045	3,198	1,752	1,106	646
Adjusted R^2	0.1732	0.27	0.152	0.346	0.481	0.225

This table reports the firm fixed-effects model for the diversification reduced by rating levels to test hypothesis 2. Furthermore, this table also introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 2). The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Ratlvl corresponds to the numerical score of ratings that goes from 0 to 21 (the higher the rating the higher the number); Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Appendix 6: Multivariate tests for the diversification discount for ratings levels and financial crisis dimension - H2 - Analysis 3-

	1985-2007			2010-2016		
	Rated firms	Investment-grade rated firms	Speculative-rated firms	Rated firms	Investment-grade rated firms	Speculative-rated firms
Intercept						
DIV	-0.216**	-0.083***	-0.044	-0.154	-0.107	0.031
	(-2.97)	(-3.37)	(-0.99)	(-0.99)	(-1.16)	(0.30)
DIV*Ratlvl	0.012**			0.009		
	(2.42)			(0.74)		
Size	0.002	0.001	0.009	0.001	-0.002	0.005
	(0.69)	(-3.37)	(1.38)	(0.09)	(-0.37)	(0.42)
EBIT	0.882***	1.823***	0.419**	0.033	0.059**	0.023
	(5.64)	(6.44)	(3.03)	(0.97)	(1.82)	(0.49)
Capx	0.743***	0.697***	0.900***	0.553***	0.539***	0.474**
	(6.43)	(7.40)	(5.08)	(5.57)	(4.74)	(3.04)
Size (1 lag)	-0.002	0.001	-0.006	0.001	0.005	-0.005
	(0.408)	(0.21)	(-0.95)	(0.12)	(0.80)	(-0.37)
EBIT (1 lag)	0.254**	0.428**	0.132	-0.134***	-0.143***	-0.117**
	(2.96)	(3.03)	(1.28)	(-3.69)	(-7.60)	(-2.05)
Capx (1 lag)	0.221***	0.423***	0.047	0.241**	0.277*	0.143
	(4.26)	(6.21)	(0.93)	(2.00)	(1.89)	(0.85)
Size (2 lag)	-0.013***	-0.012***	-0.008	0.002	0.001	0.015
	(-4.56)	(-4.16)	(0.147)	(0.35)	(0.14)	(1.16)
EBIT (2 lag)	0.515***	0.705***	0.383***	-0.003	0.307	-0.088
	(5.26)	(5.13)	(4.58)	(-0.03)	(1.56)	(-1.09)
Capx (2 lag)	0.211***	0.241**	0.163**	-0.100	0.130	-0.207
	(4.26)	(2.84)	(3.14)	(-0.84)	(0.90)	(-1.51)
Leverage	0.344***	0.212**	0.379***	0.173	0.378**	0.098
	(4.75)	(2.03)	(3.73)	(0.251)	(2.73)	(0.42)
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	9,552	6,229	3,323	1,752	1,106	646
Adjusted R^2	0.175	0.272	0.151	0.346	0.481	0.225

This table reports the firm fixed-effects model for the diversification reduced by rating levels to test hypothesis 2. Furthermore, this table also introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 3). The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Ratlvl corresponds to the numerical score of ratings that goes from 0 to 21 (the higher the rating the higher the number); Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Appendix 7: Robustness checks: Intertemporal Analysis - Analysis 2-

	Intertemporal Analysis: 1985-2006		Intertemporal Analysis: 2010-2016	
	H1	H2	H1	H2
Intercept				
DIV	-0.122***	-0.044*	-0.144	-0.044
	(-5.04)	(-1.70)	(-1.49)	(-0.74)
DIV*After	0.071**		-0.075	
	(2.61)		(-0.81)	
DIV*Upgrade		0.051***		0.013
		(3.22)		(0.74)
DIV*Downgrade		-0.048***		-0.035
		(-3.23)		(-1.25)
Size	0.165***	0.000	0.007	0.003
	(6.35)	(0.01)	(1.06)	(0.46)
EBIT	0.630***	0.886***	0.060	0.028
	(6.15)	(5.73)	(1.11)	(0.78)
Capx	0.709***	0.685***	0.465***	0.522***
	(10.87)	(6.71)	(5.27)	(5.56)
Size (1 lag)	-0.004	-0.000	-0.003	0
	(-1.88)	(-0.18)	(-0.56)	(0.01)
EBIT (1 lag)	0.451***	0.191**	-0.061	-0.145
	(6.93)	(2.10)	(-1.26)	(-4.04)
Capx (1 lag)	0.296***	0.253***	0.148	0.277**
	(5.65)	(5.12)	(1.81)	(2.20)
Size (2 lag)	-0.012***	-0.011***	0.004	0.004
	(-5.10)	(-4.18)	(0.78)	(0.66)
EBIT (2 lag)	0.339***	0.485***	0.117	-0.035
	(6.19)	(4.93)	(1.34)	(-0.31)
Capx (2 lag)	0.209***	0.189***	0.056	-0.030
	(5.50)	(4.07)	(0.67)	(-0.24)
Leverage	0.293***	0.350***	0.129	0.189
	(6.03)	(5.11)	(1.32)	(1.27)
Firm dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Number of observa	24,951	8,816	3,371	1,723
Adjusted R^2	0.139	0.183	0.216	0.350

This table reports the intertemporal analysis that enables to assess the robustness of the results. Thus, this table analyses each hypothesis separately and then introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 2). For H1, I am evaluating the impact of a firm changing its rating status from being unrated to turn rated. For H2, I am working solely on the rated subsample and I am studying the impact of a rating upgrade or downgrade. The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Ratlvl corresponds to the numerical score of ratings that goes from 0 to 21 (the higher the rating the higher the number); Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.

Appendix 8: Robustness checks: Intertemporal Analysis - Analysis 3-

	Intertemporal Analysis: 1985-2007		Intertemporal Analysis: 2010-2016	
	H1	H2	H1	H2
Intercept				
DIV	-0.121***	-0.044*	-0.144	-0.044
	(-5.04)	(-1.73)	(-1.49)	(-0.74)
DIV*After	0.069**		-0.075	
	(2.54)		(-0.81)	
DIV*Upgrade		0.051***		0.013
		(3.25)		(0.74)
DIV*Downgrade		-0.047***		-0.035
		(-3.20)		(-1.25)
Size	0.017***	0.000	0.007	0.003
	(6.58)	(0.26)	(1.06)	(0.46)
EBIT	0.600***	0.916***	0.060	0.028
	(5.45)	(6.01)	(1.11)	(0.78)
Capx	0.712***	0.680***	0.465***	0.522***
	(11.11)	(6.79)	(5.27)	(5.56)
Size (1 lag)	-0.004*	-0.000	-0.003	0.000
	(-1.75)	(-0.14)	(-0.56)	(0.01)
EBIT (1 lag)	0.403***	0.199**	-0.061	-0.145***
	(5.44)	(2.22)	(-1.26)	(-4.04)
Capx (1 lag)	0.280***	0.246***	0.148	0.277**
	(5.38)	(5.36)	(1.81)	(2.20)
Size (2 lag)	-0.012***	-0.012***	0.004	0.004
	(-5.13)	(-4.23)	(0.78)	(0.66)
EBIT (2 lag)	0.394**	0.506***	0.117	-0.035
	(6.14)	(5.14)	(1.34)	(-0.31)
Capx (2 lag)	0.214***	0.201***	0.056	-0.030
	(5.75)	(4.28)	(0.67)	(-0.24)
Leverage	0.283***	0.333***	0.129	0.189
	(5.97)	(4.94)	(1.32)	(1.27)
Firm dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Number of observat	25,643	9,120	3,371	1,723
Adjusted R^2	0.137	0.184	0.216	0.350

This table reports the intertemporal analysis that enables to assess the robustness of the results. Thus, this table analyses each hypothesis separately and then introduces the financial crisis into the problematic, dividing the timeframe in 3 periods (analysis 3). For H1, I am evaluating the impact of a firm changing its rating status from being unrated to turn rated. For H2, I am working solely on the rated subsample and I am studying the impact of a rating upgrade or downgrade. The dependent variable is Excess Value and its computed following the sales multiplier approach. Here, DIV is a dummy variable that takes the value of one if the firm reports more than one business segment and zero otherwise; Ratlvl corresponds to the numerical score of ratings that goes from 0 to 21 (the higher the rating the higher the number); Segn is the number of segments each firm report; Size is computed as the natural logarithm of total assets; EBIT are the earnings before interest and taxes divided by total sales; CAPX are the capital expenditures divided by total sales and Leverage is the ratio of long-term-debt to total assets. These estimations were computed with both firm and year fixed effects. To account for heteroskedasticity there were used robust standard errors. The values in brackets correspond to the t-statistics computed for each estimated coefficient. The significance legend corresponds *, **, *** to 10% ,5% and 1%, respectively.