



Doing well by doing good -  
The relationship between Credit  
Ratings and Corporate Governance:  
A study on U.S. firms

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Dissertation written under the supervision of Professor Diana Bonfim

Dissertation submitted in partial fulfilment of requirements for the MSc in  
Finance, at the Universidade Católica Portuguesa, January 2022.

# Doing well by doing good - The relationship between Credit Ratings and Corporate Governance: A study on U.S. firms

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## **Abstract**

Corporate governance has become a topic of increasing relevance. In this dissertation, it is investigated whether stronger governance leads to higher credit ratings.

In this thesis, two different steps are taken. Firstly, the impact of Refinitiv's Datastream ESG Scores' Governance Pillar Score variable on the credit rating of a firm is studied. The results indicate that credit rating agencies tend to award higher ratings to firms with better governance performance. These results were obtained after controlling for firms' key characteristics, making them robust. Additionally, the methodology is in line with previous literature. Afterwards, the impact of specific governance measures is also analyzed. Here, the results are not significant.

Overall, these results suggest that there is important non-financial information on governance performance that rating agencies use in their evaluation of the creditworthiness of a firm. As a result, a company that presents stronger governance can have lower financing costs resulting from higher credit ratings.

## **Keywords:**

Corporate Governance

Credit Rating

Credit Risk

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## **Abstrato**

O Governo das Sociedades tem vindo a tornar-se um tópico de crescente relevância. Nesta dissertação, é estudado se uma governança corporativa mais forte leva a *ratings* de crédito mais altos.

Primeiramente, é estudado o impacto da variável de governo das sociedades (*Governance Pillar Score*), da base de dados Refinitiv's Datastream ESG Scores, no *rating* de crédito de uma empresa. Os resultados deste estudo indicam que as Agências de *Rating* tendem a dar pontuações mais altas a empresas que apresentam melhor governo das sociedades. Estes resultados são robustos, controlam para características específicas de cada empresa e estão de acordo com a literatura anterior. Posteriormente, o impacto de medidas específicas do governo das sociedades é analisado. Neste caso, os resultados obtidos já não são significativos.

Em geral, estes resultados sugerem que o desempenho de governo das sociedades contém informações importantes não financeiras, que as agências de *rating* usam na sua avaliação do risco de uma empresa. Consequentemente, uma empresa que apresenta um Governo das Sociedades mais forte pode ter custos de financiamento mais baixos, resultantes de *ratings* de crédito mais altos.

### **Palavras-chaves:**

Governo das Sociedades

*Rating* de Crédito

Risco de Crédito

## **Acknowledgements**

As my academic path at Católica Lisbon School of Business and Economics comes to an end, I would like to express my gratitude to the people who helped me during this journey, with whom I shared my best moments, and who also helped me overcome many hardships.

Firstly, I would like to thank my family and friends for their love and support.

I will be forever grateful to my grandparents, António and Mariana, whose many life sacrifices allowed their daughters, and then their grandchildren, to grow up and be the best versions of themselves. A big thank you to my mother, Teresa, for being my rock, and for moving mountains for me and my sister, Mariana, my companion for life.

Secondly, I would like to thank Zé Maria for supporting and encouraging me to do my best. You have made this journey far easier by filling it with love. Thank you for sharing your “tongue of gold” with me, and for reviewing every word of this dissertation.

Last but not least, I would like to thank my supervisor, Professor Diana Bonfim, for providing critical feedback and supporting me throughout this process. Her guidance and invaluable input were crucial to my work.

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# 1. Introduction

In this dissertation, it is investigated whether strong corporate governance leads to higher credit ratings. Rating agencies develop credit ratings for firms, reflecting their opinion of that entity's overall creditworthiness and its ability to satisfy its financial obligations (Standard & Poor's, 2002). These agencies consider governance in their assessment, as the financial position of a firm can be impaired due to weak governance, possibly leaving bondholders susceptible to losses (FitchRatings, 2004). As a result, it is crucial to monitor management's actions, in order to improve decision making, mitigate unprincipled behavior, and reduce information asymmetry between internal and external stakeholders. Accordingly, in recent years, the corporation's purpose, the role and composition of boards of directors, and the compensation and supervision of executives have become topics of increasing concern and core issues in firms' corporate governance structures (S&P Global, 2020).

Concerns about social, environmental, and governance issues have become increasingly present in our daily lives. Firms' accountability has gained a lot of attention and importance, making this dissertation an extremely relevant and interesting topic.

Even though this issue has attracted more awareness in recent years, companies have been acting on it for decades. The concept of Corporate Social Responsibility (CSR) was developed after World War II, alongside consumer and environmental shifts, as well as the appearance of social movements like women's and civil rights (Carroll, 2015). In 1953, Howard R. Bowen addressed the Social Responsibilities of the businessman, by stating that "Managers have a moral obligation to make decisions and act in ways that are desirable to the overall society". In 1984, R. Edward Freeman presented the Stakeholder Theory, advocating that the firm's purpose should be to create value for all its stakeholders, instead of profit maximization. Since then, there have been several adjustments to the way companies do business, and how they address all stakeholders' interests.

Quantifying the corporate social responsibility of a firm is not a straightforward task, and most of the time, ESG – Environmental, Social and Corporate Governance – metrics are used as a proxy for CSR. This happens because using ESG allows making a comparison across companies and countries. In addition, data retrieval is quite accessible, as it is available in Thomson Reuters' DataStream ESG Scores.

As the name indicates, the ESG scores methodology framework is composed of three different pillars, the Environmental, the Social, and the Governance pillars. This dissertation focuses on the latter, which is the most often forgotten, over issues such as climate change and societal implications.

Governance refers to the factors of decision-making, from policymaking to the distribution of rights and duties among the different participants of the organization, like the board of directors, managers, shareholders, and stakeholders (S&P Global, 2020).

According to Standard & Poor's (2002) framework, governance can be divided into four components – Ownership Structure and Influence, Financial Transparency, Financial Stakeholder Rights and Relations, and Board Structures and Processes. S&P Global has shown that firms that present weaker governance characteristics are more prone to misconduct and to neglect favorable business opportunities.

Instead of analyzing the influence of governance on the firm's value or performance, this thesis focuses on studying whether stronger corporate governance has an impact on credit ratings. This influence is studied in two steps. Firstly, the impact the Governance Pillar Score has on a firm's credit rating is studied using an ordered probit model. The obtained results are robust to controlling for key firm characteristics and are significant, indicating the existence of a relationship between good governance and higher credit ratings. Secondly, the impact of specific governance measures on a firm's credit rating is analyzed using an ordered probit model. These results are not significant.

The rest of this thesis proceeds as follows. In the "Data Literature" section, an overview of the existing literature on the topic of governance, as well as its impact on credit ratings is provided. In the "Data & Methodology" section, the data and research design are described, and a detailed description of the variables used, the chosen method, and the summary statistics are outlined. The analysis of the obtained results is presented in the "Empirical Results" section.

## 2. Literature

Misguided governance practices can lead to business failures. An excellent example of this was the 2008 financial crisis, which was caused, to a certain extent, by poor corporate governance (Pirson and Turnbull, 2015). Furthermore, the importance of corporate governance should also be acknowledged because credit rating agencies take it into consideration when assessing a firm's credit risk (Louizi & Kammoun, 2016).

Prior to the financial crisis of 2008, there were corporate scandals that led to these companies' demise, like the cases of Enron, Parmalat, and WorldCom. After these occurrences in the corporate world, the effectiveness of these firms' corporate governance mechanisms was questioned by policymakers. Eventually and inevitably, this led to the development of regulations and laws, whose purpose was to control corporate behavior, like the Dodd-Frank Act of 2010, which was specially designed to address risks in financial institutions (Bhagat & Bolton, 2019). Despite this, similar scandals did not cease to exist, as is demonstrated by Volkswagen's emissions tests (2015), Wells Fargo's account fraud (2016), and Facebook's misuse of data (2018). For this reason, it is imperative to keep contributing to this research field.

As stated in Alali, Anandarajan, and Jiang (2012), there are three areas that are frequently studied on the topic of corporate governance. The first is the quality of reported earnings, which Baxter and Cotter (2009) and Nazir and Afza (2018) find to be positively associated with better corporate governance. The second concerns the accuracy of forecasts, which is higher when corporate governance is better (Bhat, Hope, & Kang, 2006; Kent & Stewart, 2008). The last is bond (credit) ratings, to which this thesis contributes.

Previous studies on corporate governance have mainly focused on its impact on firm value, including John, De Masi, and Paci (2016), and Schiehl and Martins (2016). Notwithstanding, performance only partially depicts a firm's financial condition. Other factors like leverage and volatility should also be considered (Ballester, González-Urteaga, & Martínez, 2020).

In this dissertation, it is analyzed how credit ratings are impacted by corporate governance. Previous literature reaches a consensus on this matter, admitting a positive relationship between the two. For instance, Ashbaugh-Skaife, Collins, and LaFond (2006) show that higher corporate governance leads to higher bond ratings. Alali et al. (2012) find that firms with stronger

corporate governance have significantly higher credit ratings. Ali, Liu, and Je Su (2018) find that better-governed firms in Australia present lower levels of default risk.

If past studies conclude that better governance leads to better bond ratings, and consequently, lower debt financing costs, then why do firms choose not to improve their corporate governance? This can be somewhat explained by the fact that CEOs of firms with stronger governance receive less excess compensation, which gives an incentive for firms to have weaker governance (Core, Holthausen & Larcker, 1999; Ashbaugh-Skaife et al., 2006). Furthermore, CEO overcompensation is more likely to happen in firms with speculative-grade debt (Ashbaugh-Skaife et al., 2006).

When studying the impact of corporate governance on credit ratings, most of the literature modeled the cost of debt as a function of the issuer risk profile and the characteristics of the issue (Horrigan, 1966; Kaplan & Urwitz, 1979). Ashbaugh-Skaife, Collins, and LaFond (2006) contributed to the literature by controlling for agency conflicts between bondholders, management, and shareholders.

By reducing agency costs, and managing information asymmetries between the stakeholders, governance mechanisms can help minimize default risk by improving the transparency and managerial performance of firms (Bhojraj & Sengupta, 2003). Moreover, firms that present stronger governance practices and structures are considered to have reported more accurate and reliable accounting data, which is then used on the assessment of the firm's likelihood of default (Ashbaugh-Skaife et al., 2006). In addition, investors are, on average, open to paying a premium for companies with better governance practices (Newell & Wilson, 2002).

Standard & Poor's was one of the pioneer agencies to assess the firms' corporate governance systems (CGS) and reflect it on a distinct rating. When grading a company, S&P considers the misuse of company resources for personal purposes, unregulated compensation of directors, bonus systems that are unsustainable for the long-term sustainability of the firm, and the poor control of accounting data (Standard & Poor's, 2006).

Even though the relation between the rating and firm governance is unanimous in past research, the governance mechanisms used to measure this connection and the results obtained differ across publications.

Ballester et al. (2020) summarize past research papers that study the effect internal corporate governance has on firms' credit risk, presenting the governance measures used by each one and

the results obtained: either a positive, a negative, or a non-significant relation with the credit rating. They focus on three corporate governance topics: board structure, ownership structure, and financial stakeholders' rights and relations.

As shown in Table 4 of Ballester et. al (2020), in the board composition topic, the analyzed papers study board independence (prevalent negative relation between it and credit risk), board size (dominant negative relation), and CEO duality (positive relation). Considering ownership structure, a great part of the analyzed papers studies the impact of institutional ownership, state ownership, and insider ownership on credit risk, but the significant results are not consensual, as, in all three, half of the papers yields a positive relation, and the other a negative one.

After analyzing how different researchers study this topic and what surrogates they use for corporate governance, it is also helpful to examine how credit agencies incorporate it in their assessments, as they act as a third party, and presumably do not have any conflict of interests.

Louizi and Kammoun (2016) use a sample of five rating agencies (S&P, Moody's, Fitch, RiskMetrics/Institutional Shareholder Services, and Governance Metrics International), and study their different approaches when calculating the score of corporate governance quality. Each agency uses a substantially different number of topics and distinct measures from one to another. All five agencies amount to 51 criteria grouped into six topics - shareholders' rights external, board of directors, audit process and quality of financial reporting, conflicts of interest and related-party transactions, the interests of employees and relations with the social environment, and compensation policy convergence of interests and shareholders leaders. From these topics, four include criteria used by all agencies.

Firstly, in the Board of Directors topic, all five agencies consider board independence, outside directors, the board size, board composition, and board missions. Secondly, in the topic of Shareholders' Rights External, every agency considers takeover provisions, and the transparency of the ownership structure. In the Topic Audit Process and Quality of Financial Reporting, all consider the audit committee, as well as committee size. Finally, in the Topic Compensation policy convergence of interests and shareholders leaders, they consider the compensation committee, and the compensation policy of administrators and managers.

An important aspect of the past literature is that the mechanisms used to measure governance seem to vary across research papers. As such, this research will be focused on using the proxies that are more often used by both the research papers, and credit agencies.

## **3. Data & Methodology**

### **3.1. Sample & Data**

To analyze the relationship between Corporate Governance and firms' Credit Ratings, data is merged from the following sources: Compustat, which provides credit ratings and financial statement data needed to compute the control variables; and Refinitiv's Eikon Datastream ESG, which contributes with the corporate governance data.

In order to create an unbiased regression model, firm specificities must be controlled for. For this purpose, this sample's firms need to have total assets, long-term debt, net income, income before extraordinary items, and earnings before interest and taxes available in Compustat. Inevitably, the final sample is the result of the intersection of firms for which this data, the corporate governance measures, and the ratings' data, is available.

The most relevant literature on corporate governance and its impact on default risk and credit ratings is set from the early nineties to before 2005 (Bhojraj & Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Alali et al., 2012). To evaluate if their findings continue to hold, this paper uses a more recent sample, between 2005 and 2016. The end of the sample is set to 2016 because it is the last year for which Compustat has rating data available.

Finally, in order to mitigate the influence of extreme values in the data, all continuous variables are winsorized to the 1st and 99th percentiles (Bradley & Chen, 2011; Cao, Leng, Feroz, & V. Davalos, 2015).

The final sample contains 1446 firm-year observations, representing 286 unique firms from 2005 to 2016.

### **3.2. Variables**

In the following sections, the dependent, independent, and control variables are presented. Appendix 1 describes each variable used in this thesis, including its definition, how it is measured, and where they are retrieved from.

### 3.2.1. Dependent Variable

Following some of the most prominent studies on this subject (e.g. Bhojraj & Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Attig, El Ghouli, Guedhami, & Suh, 2013), RATING is created. This is the measure of firms' credit ratings, and it is obtained by transforming the S&P long-term issuer credit ratings available in Compustat, into an ordinal scale. Hence, a value of 8 is assigned to firms that have an AAA S&P rating, 7 if AA, 6 if A, 5 if BBB, 4 if BB, 3 if B, 2 if CCC, and 1 if CC or below. Table 1 reports the S&P credit rating categories, as well as the correspondent ordinal scale used in this thesis.

**Table 1** - S&P credit rating categories and respective ordinal scale

Ordinal Scale	Letter Grade	Grade	Capacity to Repay
8	AAA	Investment	Extremely strong capacity to meet financial commitments
7	AA+, AA, AA-	Investment	Very strong capacity to meet financial commitments
6	A+, A, A-	Investment	Strong capacity to meet financial commitments, but somewhat susceptible to economic conditions and changes in circumstances
5	BBB+, BBB, BBB-	Investment	Adequate capacity to meet financial commitments, but more subject to adverse economic conditions
4	BB+, BB	Speculative	Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions
3	B	Speculative	More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments
2	CCC	Speculative	Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments
1	CC	Speculative	Highly vulnerable; default has not yet occurred, but is expected to be a virtual certainty
1	C	Speculative	Currently highly vulnerable to non-payment, and ultimate recovery is expected to be lower than that of higher rated obligations
1	D	Speculative	Payment default on a financial commitment or breach of an imputed promise; also used when a bankruptcy petition has been filed

*Note.* Adapted from *A Credit Rating is an Informed Opinion*. (n.d.). S&P Global Ratings. Retrieved November 29, 2021, from <https://www.spglobal.com/ratings/en/about/intro-to-credit-ratings>

In Table 2, the sample breakdown by S&P credit rating and year is reported, with a color filter by the number of observations. A darker shade of blue corresponds to a greater number of observations having a certain rating on a specific year. As it can be observed, the color scheme from 2005, 2006, and 2011 differs from the rest of the years, which is not due to a different distribution among the credit ratings, but to a smaller sample in these years.

Table 2 shows that the most common grade in the sample is BBB+, BBB, or BBB- (5 in the ordinal scale), which corresponds to the last Investment Grade Category, being attributed to companies with an adequate capacity to meet their financial obligations (Table 1). In 2006, the firms in the sample registered the highest average rating (5.25), with most of the firms having an investment-grade credit rating due to either an adequate or a strong capacity to meet their financial obligations. On the other hand, 2015 had the lowest average rating (4.69), due to the numerous speculative grades, especially due to B (3) and BB (4) ratings.

**Table 2** - Sample breakdown by S&P credit rating and year

Years	RATING								Total	Mean
	D, C, CC	CCC	B	BB	BBB	A	AA	AAA		
	1	2	3	4	5	6	7	8		
2005	0	0	0	6	11	8	1	0	26	5.15
2006	0	0	0	4	11	8	1	0	24	5.25
2007	0	0	5	26	51	35	11	1	129	5.19
2008	1	0	6	38	65	42	11	1	164	5.08
2009	0	0	11	37	75	34	10	1	168	4.99
2010	0	1	12	35	77	38	8	1	172	4.97
2011	0	0	2	6	11	8	1	0	28	5.00
2012	2	1	13	24	76	34	3	1	154	4.88
2013	0	1	9	26	75	40	3	1	155	5.01
2014	0	2	10	35	82	42	5	1	177	4.97
2015	1	0	38	53	89	50	4	1	236	4.69
2016	0	0	2	3	5	2	1	0	13	4.77

This table presents the number of S&P ratings by year. Standard & Poor's long-term issuer credit ratings are converted to an ordinal scale according to the following schedule: 8 (AAA), 7 (AA), 6 (A), 5 (BBB), 4 (BB), 3 (B), 2 (CCC), 1 (CC). The sample comprises 1,446 US firm-year observations representing 286 unique firms over the 2005–2016 period.

### 3.2.2. Independent Variables

Research on corporate governance was first started by focusing on a single governance attribute (e.g. Sengupta, 1998; Bhagat & Black, 2001; Bhojraj & Sengupta, 2003). Since then, and following S&P's development of a corporate governance framework in 2002, studies have focused on a broader set of governance attributes, minimizing the omitted variables problem.

In this thesis, the independent variable of primary interest is the Governance Pillar Score (GOVSCORE), which is obtained from Refinitiv’s DataStream ESG Scores. It refers to a firm’s governance rating, based on its disclosed information. Refinitiv developed this score by joining 3 distinct areas – corporate social responsibility strategy, management, and shareholders. The Governance Score is computed as a weighted average of the three areas’ scores, and these weights are kept constant no matter the industry. Refinitiv also uses the country of incorporation as the benchmark when computing the governance categories, because governance practices are more consistent within countries. Table 3 includes a short explanation of the areas included on the Governance Score, as well as the weights they hold.

**Table 3** - Governance Pillar Score categories, weights, and definitions

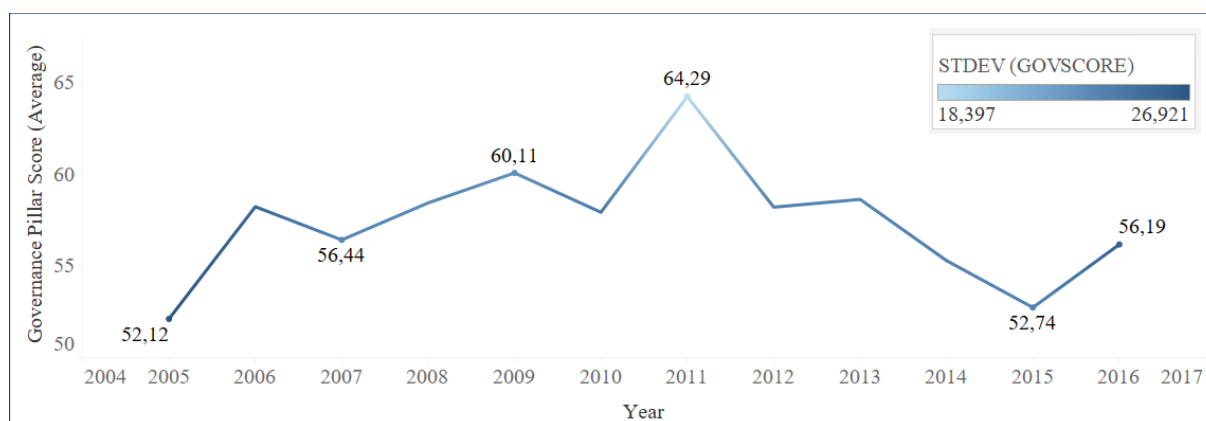
Category	Weight	Definition	Themes
Refinitiv ESG <b>CSR strategy</b> score	13%	The CSR strategy score reflects a firm’s practices to communicate that it integrates economic/ financial, social and environmental dimensions into its daily decision-making processes.	<ul style="list-style-type: none"> <li>▪ CSR Strategy</li> <li>▪ ESG reporting and transparency</li> </ul>
Refinitiv ESG <b>management</b> score	67%	The management score measures a firm’s commitment and how effective it is in following best practice corporate governance principles.	<ul style="list-style-type: none"> <li>▪ Structure: autonomy, diversity, committees</li> <li>▪ Compensation</li> </ul>
Refinitiv ESG <b>shareholders</b> score	20%	The shareholders score measures how effective a firm is regarding equal treatment of shareholders and the use of anti-takeover devices.	<ul style="list-style-type: none"> <li>▪ Shareholder rights</li> <li>▪ Takeover defenses</li> </ul>

Note. Explanations to supplement or clarify information in the table. From *Environmental, social and governance (ESG) scores from Refinitiv*. Refinitiv. (2021, February), from [https://www.refinitiv.com/content/dam/marketing/en\\_us/documents/methodology/refinitiv-esg-scores-methodology.pdf?elqCampaignId=14159](https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf?elqCampaignId=14159).

Figure 1 represents the evolution of the Governance Pillar Score over time.

It is possible to see that the average score during the sample’s years considerably changed, not seeming to exist any particular tendency. It ranged from 52.12 to 64.29 in 2011, the period after which it decreased to a 52.74 score in 2015.

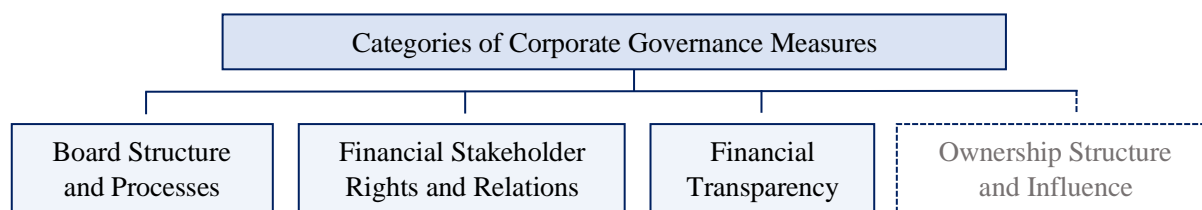
**Figure 1 - Evolution of the Governance Pillar Score (Average)**



This figure presents the evolution of the Governance Pillar Score. The sample comprises 1,446 US firm-year observations representing 286 unique firms over the 2005–2016 period.

The other independent variables used in this process are divided into three categories - Board Structure and Processes, Financial Stakeholder Rights and Relations, and Financial Transparency. This follows the work of Ashbaugh-Skaife et al. (2006), except for the fact that this thesis does not study the category “Ownership Structure and Influence”, due to data unavailability. Figure 2 depicts this structure.

**Figure 2 - Categories of Corporate Governance Measures**



Based on Ashbaugh-Skaife, H., Collins, D. W., & LaFond, R. (2006). The effects of corporate governance on firms’ credit ratings. *Journal of accounting and economics*, 42(1-2), 203-243. Based on S&P 2002 Framework.

Firstly, the component “Board Structure and Processes” addresses the board’s role and its capacity to be independent in decision-making.

Board independence (BOARD\_IND) is the percentage of independent (nonaffiliated) directors on the board. Some authors have argued that a greater proportion of outside directors leads to better supervision of management actions (Ashbaugh-Skaife et al., 2006; Bradley & Chen, 2011). On the other hand, Klein (1998), Chen and Ling (2016), and Switzer, Tu, and Wang (2017) find a negative relation between board independence and credit ratings, which might be explained by the specialized knowledge an inside board member has, and which might lead to

the better selection of long-term investments and financing strategies. Based on this more recent literature, a negative relation between BOARD\_IND and credit ratings is expected.

Board Size (BOARD\_SIZE) is defined as the number of directors on the board. According to Cao et al. (2015), Chen and Ling (2016), and Switzer et al. (2017), smaller boards can be more efficient and faster in decision-making because arranging meetings and reaching a consensus is easier for smaller groups. On the contrary, Andres and Vallelado (2008), Wang and Hsu (2013), Upadhyay (2015), and Lu and Boateng (2018) argue that larger boards are normally composed of individuals with different expertise who help managers make better administrative decisions, including on credit risk. Following the latter assumption, a positive relation between BOARD\_SIZE and credit ratings is expected.

CEO Power is measured by CEO\_DUALITY, which is a binary variable equal to one when a CEO is also part of the board of directors, and zero otherwise. CEO Power should reduce the management's objectivity, because when a CEO is board chair, they prefer lower risk (Ashbaugh-Skaife et al., 2006; Chen & Ling, 2016; Switzer et al., 2017). Therefore, a negative relation between CEO\_DUALITY and credit ratings is expected.

Secondly, the component "Financial Stakeholders Rights and Relations" reflects the balance of power between management and stakeholders. A key element of the corporate governance dimension is whether the company promotes equality in corporate control and if it is willing to make changes that increase shareholder value. Related to this topic, previous research analyzes firms' takeover defenses, since hindering the removal of entrenched self-serving management conditions shareholders' rights. Firms with stronger anti-takeover provisions are consequently weaker on shareholders' rights. According to Ballester et al. (2020), when there are not anti-takeover provisions, credit risk should decrease, due to a heightened monitoring role, which reduces managerial opportunistic behavior. However, the contrary could also happen, since shareholders might engage in takeovers, increasing the agency cost of debt, which increases credit risk. In this paper, it is studied whether there is a relation between ANTI\_TAKEOVER (number of anti-takeover devices in place in excess of 2) and credit ratings. Past literature does not reach significant and consistent results, so it is not possible to make a grounded prediction on this relationship's signal.

Lastly, the component "Financial Transparency" refers to transparent financial reporting, which is crucial in reducing information asymmetry between the firm and its credit suppliers. According to Sengupta (1998), firms that make informative disclosures in a timely manner are

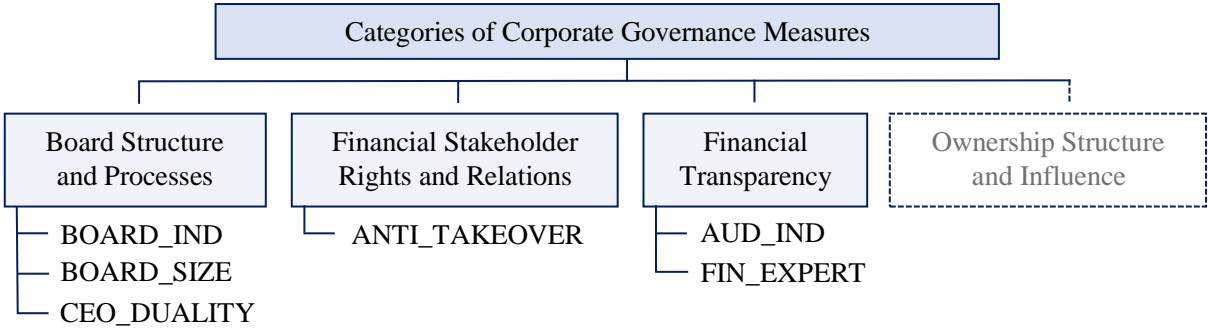
perceived as less likely of withholding pejorative data. Therefore, they are expected to be charged less by creditors and have higher credit ratings. Financial information’s reliability depends, in part, on the quality of the audit process. To measure this quality and integrity, two measures are used: the audit committee independence (AUD\_IND); and the financial expertise of the firm’s audit committee (FIN\_EXPERT).

AUD\_IND is the percentage of outside independent directors in the audit committee. Klein (2002) provides evidence that audit committees are more efficient in their financial reporting oversight process if they have a strong base of independent outside directors. As such, a positive relationship is expected between this variable and credit ratings.

FIN\_EXPERT is a dummy variable equal to one when the firm’s audit committee has at least three members and at least one “financial expert” within the Sarbanes-Oxley definition, and zero otherwise. Firms have a lower probability of earnings restatements when there are independent directors with a professional background in accounting or law (Klein, 2002; Agrawal & Chadha, 2005), ergo a positive relation between FIN\_EXPERT and credit ratings is expected.

Below, on Figure 3, it is possible to see the different independent variables of governance measures organized by category.

**Figure 3 - Independent Variables by Category of Corporate Governance Measures**



Based on Ashbaugh-Skaife, H., Collins, D. W., & LaFond, R. (2006). The effects of corporate governance on firms’ credit ratings. Journal of accounting and economics, 42(1-2), 203-243. Based on S&P 2002 Framework.

The evolution of these explanatory variables, through the period 2005-2016, can be observed on Appendix 2, 3, 4, 5, 6, and 7.

### 3.2.3. Control Variables

The control variables were selected based on previous studies and their purpose is to isolate the effects of the Corporate Governance variables.

These additional explanatory variables could affect the default risk (and hence, the credit rating) of a firm, thus it is imperative that these are considered in the analysis.

The accounting figures are retrieved from Compustat.

Firstly, LEVERAGE and ROA accounting-based ratios are used as surrogates of firms' default risk (Bhojraj and Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Alali et al., 2012).

LEVERAGE is used as a proxy for default risk because the higher the proportion of debt in a capital structure, the less probable a firm is to pay its creditors. As a result, a negative relationship between a firm's leverage (long-term debt divided by total assets) and credit ratings is expected. For the most part, a lower-performing company is more probable to experience higher levels of default risk. ROA is the variable that measures firm performance (net income before extraordinary items divided by total assets), and its relationship with credit ratings should be positive.

Apart from these accounting ratios, LOSS is also used to control for default risk. LOSS is a dummy variable equal to one when the net income before extraordinary items is negative and zero otherwise. According to Ashbaugh-Skaife et al. (2006), the likelihood of an unprofitable firm to pay off creditors is lower, and so this is more likely to default. The LOSS coefficient should be negative.

Firm size (SIZE), which is measured through the natural log of total assets, is included as a control variable because larger firms usually face lower risk (Bhojraj and Sengupta, 2003; Alali et al., 2012). Thus, it is expected that the higher the size, the higher the credit rating.

Since default risk may vary across industries, it is imperative to include industry-fixed effects in the model. Using the North American Industry Classification System (NAICS) codes retrieved from Compustat, it is possible to identify in which line of business a company is inserted in and study its impact on credit ratings. By doing so, the model will control any variation that is attributed to industries' idiosyncrasies, and not to the independent variables.

Finally, year-fixed effects are used to control for any variation that is attributed to time and not to the independent variables being studied. For instance, this control considers the effect the subprime crisis might have on the firms' default risk.

### 3.3. Methodology

The purpose of this thesis is to analyze and understand how a firm's credit rating is affected by its corporate governance decisions and actions. In order to analyze this impact, a two-step approach will be employed, using the statistical software Stata.

Since the dependent variable (RATING) has an ordinal (discrete) nature, an ordered probit model is used, instead of the standard linear regression model (Bhojraj & Sengupta, 2003; Attig et al., 2013).

It is known that heteroskedasticity poses a threat to regression analysis. To mitigate the issue of having untrustworthy standard errors, robust standard errors were used.

The first regression will solely estimate Credit rating (RATING) against the firms' Governance Pillar Score (GOVSCORE). The control variables exposed before will also be used.

#### Regression 1:

$$RATING_{it} = \alpha_i + \beta_0 GOVSCORE_{it} + \gamma_i X_{it} + \varepsilon_{it}$$

This first regression will show if there is any relation between Corporate Governance and Credit Ratings, its impact, and its signal.

The second regression uses six independent variables described above - BOARD\_IND, BOARD\_SIZE, CEO\_DUALITY, ANTI\_TAKEOVER, AUD\_IND, and FIN\_EXPERT. This regression should provide more information about which governance measures are the most and the least important in obtaining a higher credit rating. Once more, the regression includes a set of control variables.

#### Regression 2:

$$RATING_{it} = \alpha_i + \beta_0 BOARD\_IND_{it} + \beta_1 BOARD\_SIZE_{it} + \beta_2 CEO\_DUALITY_{it} + \beta_3 ANTI\_TAKEOVER_{it} + \beta_4 AUD\_IND_{it} + \beta_5 FIN\_EXPERT_{it} + \gamma_{it} X_{it} + \varepsilon_{it}$$

From the findings of this regression, conclusions will be drawn about which corporate governance practices are the most advantageous for companies to undertake, in order to have higher ratings, allowing firms to do well by doing good.

### **3.4. Summary Statistics**

Table 4 presents the summary statistics for all variables included in this paper's model.

The descriptive statistics refer to the 286 U.S. companies, from 2005 to 2016, for which the required data is available.

By analyzing the dependent variable (RATING), it is possible to see that this sample's average credit rating is equal to 4.96, which corresponds to a S&P rating between BB and BBB, between speculative and investment grade. Moreover, the sample includes at least one observation with the lowest possible ordinal rating (1) – D, C, or CC credit rating -, and one with the highest credit score (8) – AAA credit rating.

The independent variable used in Regression 1 (GOVSCORE) is the governance pillar score, that ranges from 0 to 100 (perfect corporate governance score). It shows that the average firm presents a Governance Pillar Score equal to 57.07, and the best performing firm yields a 94.94 score.

Considering BOARD\_IND and BOARD\_SIZE, one can state that in the average firm, 76% of the board members are independent (nonaffiliated) directors, and that the average board has approximately 11 members. In these firms, 97% of the CEOs are also part of the board of directors. The average business in this sample has approximately 6 anti-takeover devices (4.33 above 2), and the audit committee is composed of 97% of outside independent directors. Still regarding the audit committee, 88% of the firms in this sample have at least three members and at least one “financial expert” within the Sarbanes-Oxley definition.

Finally, regarding the control variables, the companies in this sample have an average logarithm of total assets (SIZE) of 4.32, leverage of 27%, ROA of 3%, and 15% of firms present a negative income before extraordinary items, registering a loss.

**Table 4** - Descriptive statistics for regression variables

Variables	N	Mean	SD	Min	Median	Max
RATING	1446	4.96	1.01	1	5	8
<b>Governance Pillar Score</b>						
GOVSCORE	1446	57.07	23.98	2.21	59.77	94.94
<b>Board Structure and Processes</b>						
BOARD_IND	1446	0.76	0.20	0	0.83	0.95
BOARD_SIZE	1446	11.19	3.12	1	11	20
CEO_DUALITY	1446	0.97	0.17	0	1	1
<b>Financial Stakeholder Rights and Relations</b>						
ANTI_TAKEOVER	1446	4.33	2.54	0	4	9
<b>Financial Transparency</b>						
AUD_IND	1446	0.97	0.15	0	1	1
FIN_EXPERT	1446	0.88	0.32	0	1	1
<b>Firm Characteristics</b>						
LEVERAGE	1446	0.26	0.17	0	0.25	0.81
ROA	1446	0.03	0.06	-0.26	0.03	0.18
LOSS	1446	0.15	0.36	0	0	1
SIZE	1446	4.32	.68	3.06	4.26	6.37

This table provides the number of observations (N), mean, standard deviation, minimum, median, and maximum of the regression variables. The sample comprises 1,446 US firm-year observations representing 286 unique firms over the 2005-2016 period. "Appendix 1" provides definitions and data sources for all these variables.

Appendix 8 presents correlations among the firm-characteristic variables. By analyzing the correlation matrix, it is possible to state that the governance pillar score (GOVSCORE) and the number of directors on the board (BOARD\_SIZE) are positively correlated with credit ratings at a statistically significant level, as expected. In contrast, the percentage of independent directors on the board (BOARD\_IND), the anti-takeover devices above two (ANTI\_TAKEOVER), the percentage of outside independent directors in the audit committee

(AUD\_IND), and its expertise (FIN\_EXPERT) are significantly negatively correlated with ratings. This was, except for the board independence, surprising considering the results of past studies, and the assumptions made before.

Regarding the accounting characteristics, the results are as expected and coincide with previous papers (Bhojraj and Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Alali et al., 2012). The leverage ratio and negative net income are significantly negatively correlated with ratings, while the ROA ratio and firm size are significantly positively correlated with credit ratings.

## 4. Empirical Results

### 4.1. Results

In this section, an empirical analysis of the effect of corporate governance on credit ratings is conducted.

Table 5 reports regression outputs for the first hypothesis, which studies the relationship between Credit Ratings and the Governance Pillar Score (GOVSCORE) over the 2005-2016 period.

In this table, four models are represented. The first (1) includes both time and industry fixed effects, the second (2) only includes time fixed effects, the third (3) only includes industry fixed effects, and the fourth (4) does not include any fixed effects.

All models present extremely similar coefficients and statistical significance, and each presents a positive statistically significant GOVSCORE coefficient ( $p < 0.01$ ), coinciding with the findings of Alali et al. (2012).

The first model, which includes both time and industry fixed effects, features the coefficients with the smallest p-values (except for LEVERAGE), which translates into the most significant results. In this model (1), which considers both time and the industry to which the firm belongs to, the GOVSCORE coefficient equals to 0.011, which means that when the Governance Pillar Score changes by 10 percentage points, the credit rating changes by 0.11, *ceteris paribus* on average.

Consistent with prior research (Bhojraj and Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Alali et al., 2012), it is found that credit ratings are positively related to return on assets (ROA) and the firm's size (SIZE), and negatively related to the percentage of debt in the capital structure (LEVERAGE) and to a firm's negative net income (LOSS). However, results are not significant for this last coefficient.

**Table 5 - Ordered Probit results on the effect of Governance Pillar Score on credit ratings**

RATING	Predicted	Estimated Coefficient			
		(1)	(2)	(3)	(4)
GOVSCORE	+	0.011*** (0.001)	0.011*** (0.001)	0.010*** (0.002)	0.010*** (0.001)
LEVERAGE	-	-2.26** (0.013)	-2.112** (0.011)	-2.845*** (0.001)	-2.710*** (0.000)
ROA	+	2.193* (0.077)	2.133* (0.079)	2.276* (0.078)	2.208* (0.081)
LOSS	-	-0.290 (0.165)	-0.285 (0.172)	-0.260 (0.211)	-0.256 (0.217)
SIZE	+	2.474*** (0.000)	2.449*** (0.000)	2.150*** (0.000)	2.143*** (0.000)
Industry Effects		Yes	No	Yes	No
Year Effects		Yes	Yes	No	No
N		1446	1446	1446	1446
Chi2		157.998	144.577	99.521	92.392

This table presents results of ordered probit regressions of the Governance Pillar Score (GOVSCORE) and controls on credit ratings (RATING). Standard & Poor's long-term issuer credit ratings are converted to an ordinal scale according to the following schedule: 8 (AAA), 7 (AA), 6 (A), 5 (BBB), 4 (BB), 3 (B), 2 (CCC), 1 (CC). P-values are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 % levels, respectively. The sample comprises 1446 US firm-year observations representing 286 unique firms over the 2005-2016 period. "Appendix 1" provides definitions and data sources for all variables.

Table 6 reports regression outputs for the second hypothesis, which studies the relationship between Credit Ratings and the different corporate governance measures (BOARD\_IND, BOARD\_SIZE, CEO\_DUALITY, ANTI\_TAKEOVER, AUD\_IND, FIN\_EXPERT) over the 2005-2016 period.

In this table, four models are represented. The first (1) includes both time and industry fixed effects, the second (2) only includes time fixed effects, the third (3) only includes industry fixed effects, and the fourth (4) does not include any fixed effects.

All of these coefficients' signs meet the expectations risen by previous literature. However, due to very low p-values, it cannot be stated that these are statistically and economically relevant.

Similar to the first hypothesis, the accounting coefficients are consistent with prior research. Credit ratings are positively related to ROA and SIZE, and negatively related to LEVERAGE and LOSS, even though the ROA and LOSS results are not very significant.

**Table 6** - Ordered Probit results on the effect of corporate governance measures on credit ratings

RATING	Predicted	Estimated Coefficient			
		(1)	(2)	(3)	(4)
BOARD_IND	-	-0.368 (0.530)	-0.322 (0.590)	-0.521 (0.363)	-0.473 (0.417)
BOARD_SIZE	+	0.043 (0.195)	0.040 (0.239)	0.047 (0.148)	0.043 (0.182)
CEO_DUALITY	-	-0.016 (0.938)	-0.031 (0.879)	-0.109 (0.571)	-0.135 (0.485)
ANTI_TAKEOVER	?	0.035 (0.425)	0.035 (0.433)	-0.078*** (0.006)	-0.079*** (0.006)
AUD_IND	+	1.110* (0.077)	1.138* (0.076)	1.109* (0.080)	1.140* (0.074)
FIN_EXPERT	+	0.220 (0.276)	0.231 (0.254)	0.296 (0.133)	0.304 (0.121)
LEVERAGE	-	-2.381** (0.011)	-2.191** (0.010)	-2.599*** (0.033)	-2.435*** (0.002)
ROA	+	1.921 (0.122)	1.866 (0.124)	1.814 (0.148)	1.750 (0.152)
LOSS	-	-0.330 (0.116)	-0.326 (0.121)	-0.348* (0.090)	-0.343* (0.095)
SIZE	+	2.497*** (0.000)	2.450*** (0.000)	2.216*** (0.000)	2.189*** (0.000)
Industry Effects		Yes	No	Yes	No
Year Effects		Yes	Yes	No	No
N		1446	1446	1446	1446
Chi2		179.416	163.868	105.481	97.409

This table presents results of ordered probit regressions of the corporate governance measures (BOARD\_IND, BOARD\_SIZE, CEO\_DUALITY, ANTI\_TAKEOVER, AUD\_IND, FIN\_EXPERT) and controls on credit ratings (RATING). Standard & Poor's long-term issuer credit ratings are converted to an ordinal scale according to the following schedule: 8 (AAA), 7 (AA), 6 (A), 5 (BBB), 4 (BB), 3 (B), 2 (CCC), 1 (CC). P-values are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 % levels, respectively. The sample comprises 1446 US firm-year observations representing 286 unique firms over the 2005-2016 period. "Appendix 1" provides definitions and data sources for all variables.

As this second hypothesis does not generate significant conclusions, a third set of regressions was implemented in order to understand how the credit rating of a firm is affected by each corporate governance measure separately. These results are reported in Table 7, which compared with Table 6, presents very similar coefficients. As shown in Appendix 8, the correlation among these governance measures' variables is not strong. This explains why the

coefficients of the different measures presented in Table 7 do not differ a lot from Table 6. When looking at Table 7 it is possible to conclude that only the percentage of outside independent directors in the audit committee (AUD\_IND) has a significant impact on the credit rating of a firm. Increasing AUD\_IND by 0.1 (10 percentage points) leads to an increase of 0.1079 on the credit rating, assuming all other variables are kept constant.

**Table 7** - Ordered Probit results on the effect of each corporate governance measure on credit ratings

RATING	Predicted	Estimated Coefficient					
		(1)	(2)	(3)	(4)	(5)	(6)
BOARD_IND	-	0.056 (0.918)					
BOARD_SIZE	+		0.044 (0.158)				
CEO_DUALITY	-			0.006 (0.976)			
ANTI_TAKEOVER	?				0.031 (0.487)		
AUD_IND	+					1.079* (0.081)	
FIN_EXPERT	+						0.286 (0.147)
LEVERAGE	-	-2.362*** (0.010)	-2.327** (0.011)	-2.363** (0.010)	-2.387*** (0.009)	-2.402*** (0.009)	-2.344** (0.012)
ROA	+	2.056* (0.094)	2.096* (0.089)	2.041* (0.099)	2.063* (0.097)	1.986 (0.109)	1.982 (0.11)
LOSS	-	-0.309 (0.133)	-0.308 (0.142)	-0.311 (0.139)	-0.303 (0.154)	-0.319 (0.129)	-0.318 (0.133)
SIZE	+	2.561*** (0.000)	2.459*** (0.000)	2.560*** (0.000)	2.575*** (0.000)	2.587*** (0.000)	2.560*** (0.000)
Industry Effects		Yes	Yes	Yes	Yes	Yes	Yes
Year Effects		Yes	Yes	Yes	Yes	Yes	Yes
N		1446	1446	1446	1446	1446	1446
Chi2		166.54	161.166	162.238	169.24	163.531	166.610

This table presents results of ordered probit regressions of each corporate governance measure (BOARD\_IND, BOARD\_SIZE, CEO\_DUALITY, ANTI\_TAKEOVER, AUD\_IND, FIN\_EXPERT) and controls on credit ratings (RATING). Standard & Poor's long-term issuer credit ratings are converted to an ordinal scale according to the following schedule: 8 (AAA), 7 (AA), 6 (A), 5 (BBB), 4 (BB), 3 (B), 2 (CCC), 1 (CC). P-values are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 % levels, respectively. The sample comprises 1446 US firm-year observations representing 286 unique firms over the 2005-2016 period. "Appendix 1" provides definitions and data sources for all variables.

Although these governance measures' impact on credit ratings is not being significant, the first hypothesis shows that corporate governance does have a relevant impact on the credit rating of a firm.

Doing good does seem to be related to doing well. However, the separate governance indicators do not have a meaningful value when considered individually. It is the aggregate governance perception that seems to matter in terms of the credit rating agencies assessment, rather than each specific component seen in isolation. Furthermore, this may signal that the governance score captures subjective dimensions that are not perfectly captured by the components for which there is verifiable data.

Even though corporate governance brings value to the estimation of credit ratings, it cannot be estimated by the average person, as it is shown by the second hypothesis. Measuring corporate governance is not a mechanical, straightforward task. It is not enough to consider only a few measures, but additional ones are hard to measure due to their subjectivity and sometimes intangibility. There is value in the credit agencies that develop the models that do so.

## **4.2. Robustness**

Table 8 shows that credit agencies tend to give BBB category ratings to firms. A prime example is the year 2012, in which 49% of firms received a BBB rating. Even in 2015 and 2016, which presented the lowest BBB rating percentage, 38% of firms were granted this grade. Between 2005 and 2016, 43% of this sample's firms reported a rating in this category.

When interpreting the high proportion of BBB category ratings, distinct explanations can be given. On the one hand, these could be true ratings and these firms can all present an "adequate capacity to meet financial commitments, but more subject to adverse economic conditions". On the other hand, this could show a tendency to resist downgrading firms to a speculative grade, since BBB is the last investment-grade category. If this were to be true, it would mean that the dominant 5 grade in the ordinal scale contains junk bonds, which would distort the regression results of this thesis.

Following this premise, this thesis' regressions are re-run, disregarding the observations that have a BBB rating, in order to obtain more accurate results, based on probably less biased observations.

**Table 8** - Sample breakdown by S&P credit rating and year, with BBB Rating Percentage

Years	RATING								Total	BBB Rating Percentage
	D, C, CC	CCC	B	BB	BBB	A	AA	AAA		
	1	2	3	4	5	6	7	8		
<b>2005</b>	0	0	0	6	<b>11</b>	8	1	0	26	42%
<b>2006</b>	0	0	0	4	<b>11</b>	8	1	0	24	46%
<b>2007</b>	0	0	5	26	<b>51</b>	35	11	1	129	40%
<b>2008</b>	1	0	6	38	<b>65</b>	42	11	1	164	40%
<b>2009</b>	0	0	11	37	<b>75</b>	34	10	1	168	45%
<b>2010</b>	0	1	12	35	<b>77</b>	38	8	1	172	45%
<b>2011</b>	0	0	2	6	<b>11</b>	8	1	0	28	39%
<b>2012</b>	2	1	13	24	<b>76</b>	34	3	1	154	<b>49%</b>
<b>2013</b>	0	1	9	26	<b>75</b>	40	3	1	155	48%
<b>2014</b>	0	2	10	35	<b>82</b>	42	5	1	177	46%
<b>2015</b>	1	0	38	53	<b>89</b>	50	4	1	236	38%
<b>2016</b>	0	0	2	3	<b>5</b>	2	1	0	13	38%
									Average	<b>43%</b>

This table presents the number of S&P ratings by year. Standard & Poor's long-term issuer credit ratings are converted to an ordinal scale according to the following schedule: 8 (AAA), 7 (AA), 6 (A), 5 (BBB), 4 (BB), 3 (B), 2 (CCC), 1 (CC). The sample comprises 1,446 US firm-year observations representing 286 unique firms over the 2005–2016 period.

Table 9 reports regression outputs for the first hypothesis, which studies the relationship between Credit Ratings and the Governance Pillar Score (GOVSCORE) over the 2005-2016 period, disregarding observations that present a BBB category rating.

In this table, four models are represented. The first (1) includes both time and industry fixed effects, the second (2) only includes time fixed effects, the third (3) only includes industry fixed effects, and the fourth (4) does not include any fixed effects.

Similar to the first time this regression was run, all models present extremely similar coefficients and significances, and each one of them presents a positive statistically significant GOVSCORE coefficient ( $p < 0.01$ ), coinciding with the existing literature.

In all models, the GOVSCORE coefficient is equal to 0.014, which confirms past literature's claim that better corporate governance is related to better credit ratings. This coefficient means that when the Governance Pillar Score changes by 10 percentage points, the credit rating changes by 0.14, *ceteris paribus* on average. This is a better result than the one reached the first time, since it is still significant at the 1% level, but the economical relevance is greater this time ( $0.014 > 0.011$ ).

**Table 9 - Ordered Probit results on the effect of Governance Pillar Score on credit ratings**

RATING	Predicted	Estimated Coefficient			
		(1)	(2)	(3)	(4)
GOVSCORE	+	0.014*** (0.006)	0.014*** (0.005)	0.014*** (0.008)	0.014*** (0.006)
LEVERAGE	-	-3.140** (0.012)	-2.971** (0.012)	-3.578*** (0.001)	-3.460*** (0.001)
ROA	+	3.594** (0.050)	3.804** (0.035)	3.324* (0.085)	3.484* (0.068)
LOSS	-	-0.327 (0.285)	-0.253 (0.404)	-0.266 (0.362)	-0.194 (0.499)
SIZE	+	2.702*** (0.000)	2.682*** (0.000)	2.282*** (0.000)	2.267*** (0.000)
Industry Effects		Yes	No	Yes	No
Year Effects		Yes	Yes	No	No
N		818	818	818	818
Chi2		146.527	131.909	57.666	54.085

This table presents results of ordered probit regressions of the Governance Pillar Score (GOVSCORE) and controls on credit ratings (RATING), without BBB category rating. Standard & Poor's long-term issuer credit ratings are converted to an ordinal scale according to the following schedule: 8 (AAA), 7 (AA), 6 (A), 5 (BBB), 4 (BB), 3 (B), 2 (CCC), 1 (CC). P-values are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 % levels, respectively. The sample comprises 818 US firm-year observations over the 2005-2016 period. "Appendix 1" provides definitions and data sources for all variables.

Table 10 reports regression outputs for the second hypothesis, which studies the relationship between Credit Ratings and the different corporate governance measures (BOARD\_IND, BOARD\_SIZE, CEO\_DUALITY, ANTI\_TAKEOVER, AUD\_IND, FIN\_EXPERT) over the 2005-2016 period, disregarding observations that present a BBB category rating. In this table, once more four models are represented. The first (1) includes both time and industry fixed effects, the second (2) only includes time fixed effects, the third (3) only includes industry fixed effects, and the fourth (4) does not include any fixed effects.

Contrary to the first time this regression was run, it can now be inferred that the size of the board of directors does have an impact on the firm's credit rating. One could state that this relation is mostly related to the size of the company, since best-performing companies have a chance in the market and grow more. However, one of this regression's control variables is the firm's size (logarithm of the book value of total assets). Even when controlling for the firm's size, the board size continues to be an important determinant of credit risk. When comparing two different companies of the same size, having a larger board of directors is still associated with lower credit risk.

When the board size of a company increases by 1 member, the credit rating of this company should increase by 0.083, ceteris paribus on average. This result is statistically significant, but its economic significance is not great: increasing the board by 50 members is associated with an increase of 4.15 in the risk rating. However, such a board increase is unrealistic. Indeed, this coefficient simply tells us that there seem to be some gains in having a larger/stronger board.

**Table 10** - Ordered Probit results on the effect of corporate governance measures on credit ratings

RATING	Predicted	Estimated Coefficient			
		(1)	(2)	(3)	(4)
BOARD_IND	-	-0.371 (0.619)	-0.358 (0.649)	-0.652 (0.371)	-0.649 (0.393)
BOARD_SIZE	+	0.083** (0.046)	0.085** (0.044)	0.089** (0.02)	0.092** (0.018)
CEO_DUALITY	-	-0.080 (0.761)	-0.157 (0.608)	-0.187 (0.515)	-0.278 (0.358)
ANTI_TAKEOVER	?	0.056 (0.313)	0.048 (0.399)	-0.109*** (0.005)	-0.119*** (0.003)
AUD_IND	+	1.161 (0.152)	1.134 (0.185)	1.319* (0.074)	1.263 (0.100)
FIN_EXPERT	+	-0.084 (0.741)	-0.089 (0.727)	0.024 (0.929)	0.020 (0.943)
LEVERAGE	-	-3.316*** (0.009)	-3.058** (0.011)	-3.416*** (0.004)	-3.216*** (0.004)
ROA	+	3.254* (0.077)	3.517** (0.050)	2.764 (0.148)	2.937 (0.118)
LOSS	-	-0.367 (0.245)	-0.293 (0.354)	-0.387 (0.198)	-0.323 (0.285)
SIZE	+	2.761*** (0.000)	2.658*** (0.000)	2.315*** (0.000)	2.216*** (0.000)
Industry Effects		Yes	No	Yes	No
Year Effects		Yes	Yes	No	No
N		818	818	818	818
Chi2		213.783	196.213	76.093	71.082

This table presents results of ordered probit regressions of the corporate governance measures (BOARD\_IND, BOARD\_SIZE, CEO\_DUALITY, ANTI\_TAKEOVER, AUD\_IND, FIN\_EXPERT) and controls on credit ratings (RATING), without BBB category rating. Standard & Poor's long-term issuer credit ratings are converted to an ordinal scale according to the following schedule: 8 (AAA), 7 (AA), 6 (A), 5 (BBB), 4 (BB), 3 (B), 2 (CCC), 1 (CC). P-values are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 % levels, respectively. The sample comprises 818 US firm-year observations over the 2005-2016 period. "Appendix 1" provides definitions and data sources for all variables.

## 5. Conclusion

This thesis aims to understand the impact corporate governance has on the credit ratings obtained by firms. It contributes to the existing literature (Bhojraj & Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Alali et al., 2012) by studying the same subject on a different time interval, starting in 2005. This thesis also stands out from previous research by using the Governance Pillar Score from Thomson's Reuters ESG Scores, instead of using Gompers G-Score.

The obtained results allow inferring that there is a positive relationship between a firm's governance score and its credit rating. Firms with a higher score obtain higher credit ratings. This is observable at a significant level ( $p < 0.01$ ) in the global sample, but also in the robust test sample, in which the observations with a BBB credit rating are dropped due to bias concerns.

Another conclusion of this research is that there is no significant and observable impact of the different corporate governance measures on the credit score. Despite corporate governance bringing value to the estimation of credit ratings, this value cannot be estimated by selecting a few measures and testing their impact. Furthermore, these variables are extremely hard to obtain due to data unavailability, along with the high prices of the databases they are available at.

One important remark is that Credit Agencies seem to add value by developing models that better capture the benefits of corporate governance. These agencies filter through dozens of dimensions, most times intangible and/ or subjective, which are mostly unobtainable by the average person, and combine them in a way that captures all the corporate governance's importance.

In conclusion, good corporate governance practices are associated with lower credit risk. Firms should change their governance decisions in order to obtain better credit ratings from Credit Agencies, which will then allow them to decrease their spending on funding.

A firm can in fact do well by doing good.

## 6. Limitations & Further Research

Even though this thesis provided interesting findings and conclusions, it is naturally subject to some limitations.

The first limitation concerns data, and its accessibility.

Firstly, the best way of studying the impact of corporate governance on credit ratings would be to have access to the credit agencies' models on this subject. However, this information is understandably not made public, which forced the assessment of other options.

In this thesis, it is concluded that firms that present a higher governance score are awarded better credit ratings. However, the only information available to the public regarding the used variable GOVSCORE is its three major categories, not the specific governance measures inside each category. This constrains further research of understanding what specific actions should be taken by firms, in order to do better. Since it is impossible to study the GOVSCORE variable's elements, the solution was to follow the steps of past literature and try to study the same variables on a different time period, but this was not a simple task.

Ashbaugh-Skaife et al. (2006) and other following papers divide governance into four categories, but in this research, there are only explanatory variables for three of these categories (Board Structure and Processes, Financial Stakeholder Rights and Relations, and Financial Transparency), due to data unavailability. The data concerning Ownership Structure and Influence was unobtainable, which limited the research.

The second limitation is the size of the sample, which might be a shortcoming of this study. Merging accounting and governance data from Compustat and Refinitiv's Datastream reduces the number of observations and restrains the inclusion of more control variables. There are several control variables that could have been included, for instance, the interest coverage ratio. However, the inclusion of these variables would entail an 85% drop in the number of observations. As such, they had to be dropped.

The final limitation concerns reverse causality. In this thesis, it is proved that there is a correlation between doing good and doing well. The assumption is that strong corporate governance (doing good) leads to higher credit ratings (doing well). However, it is possible that the causal relation between the two variables is the inverse. It might be the case that doing good is a product of doing well. For instance, a company with an excellent performance has

incentives to have good corporate governance, as they are more exposed to governing agencies, such as the SEC, and public scrutiny.

Considering the latter limitation regarding causality, one possible solution could be doing a temporal analysis, to understand what comes first: good governance or good credit ratings.

One avenue of future research direction is to study the evolution of corporate governance on firms awarded with BBB category ratings. Another direction is to obtain the composite ratings developed by Standard & Poor's, Board Analyst, Moody's Investor Services, FitchRatings, and others, and investigate whether this aggregation of corporate governance practices are in fact useful determinants of credit ratings.

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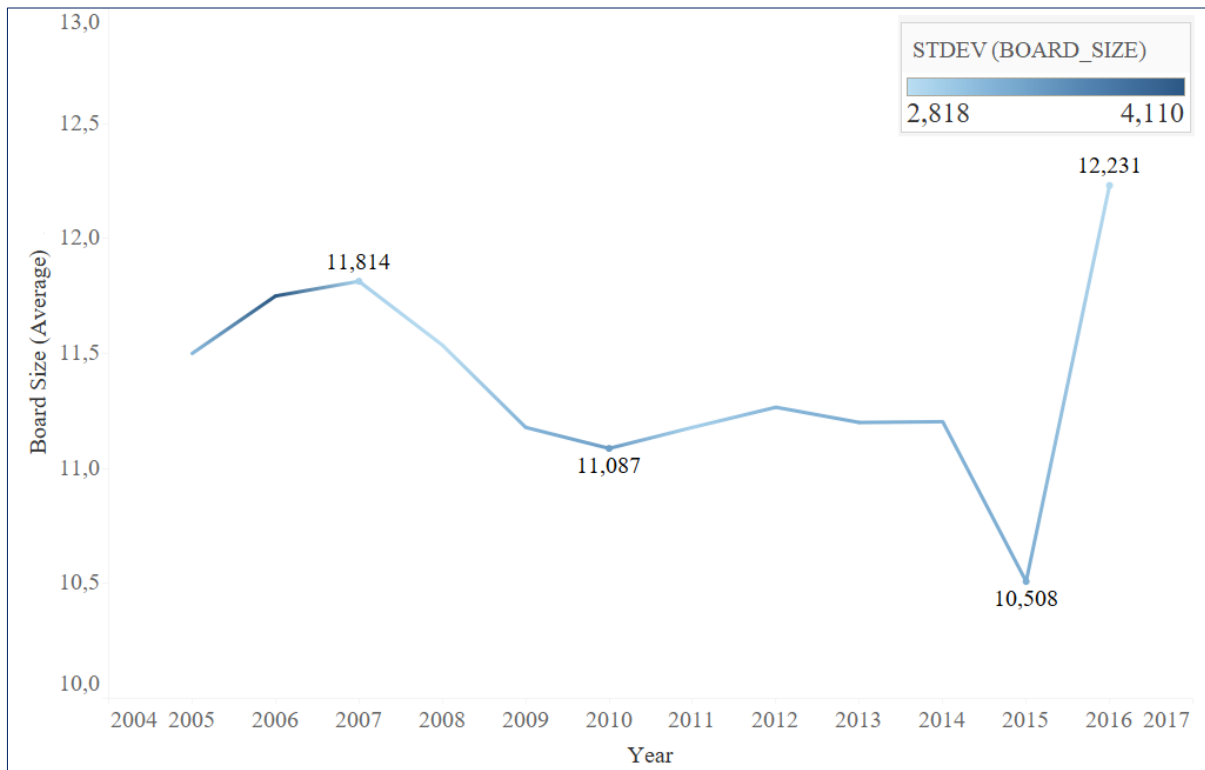
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# Appendices

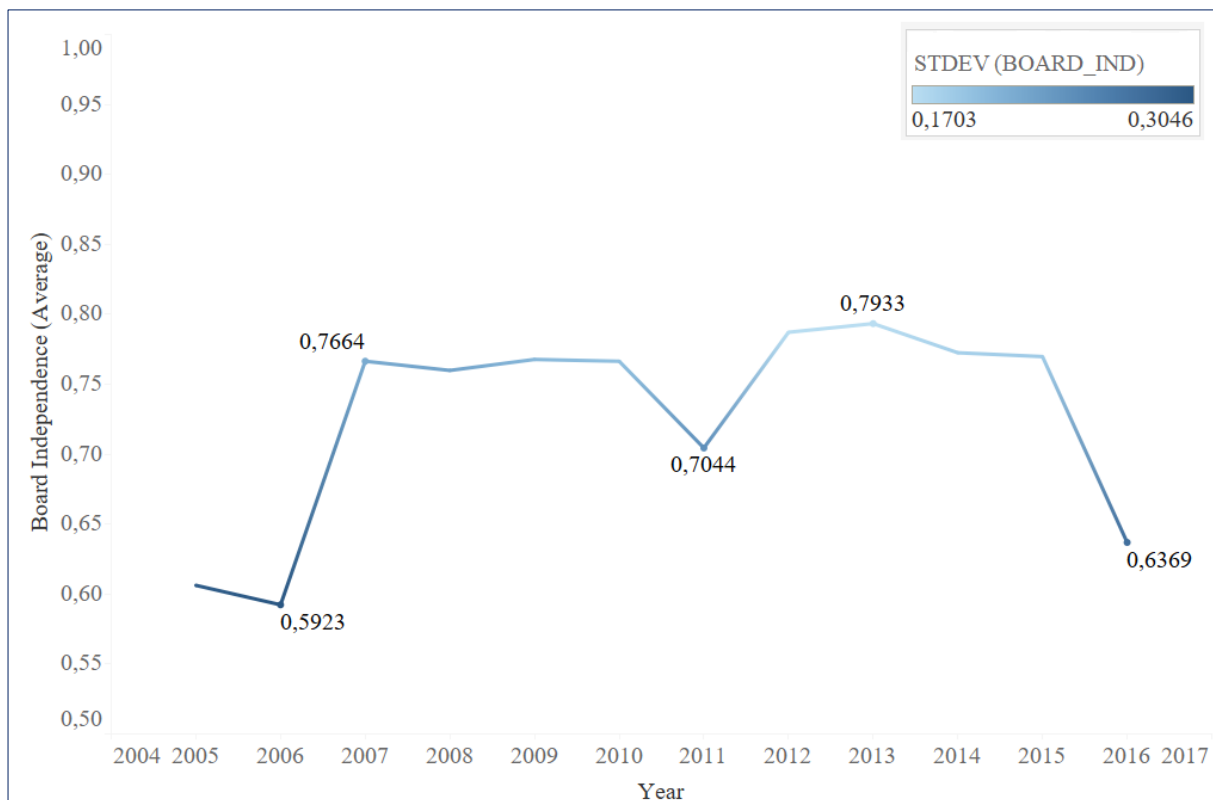
## Appendix 1 – List of Variables

Variable	Abbreviation	Description	Source
<b>Dependent Variable</b>			
Credit Rating	RATING	Measure of firms' credit ratings. It is obtained by transforming the S&P long-term issuer credit ratings into an ordinal scale. A value of 8 is assigned to firms that have an AAA S&P rating, 7 if AA, 6 if A, 5 if BBB, 4 if BB, 3 if B, 2 if CCC, and 1 if CC or below.	Compustat
<b>Independent Variables</b>			
Governance Pillar Score	GOVSCORE	Weighted average relative rating of a company based on the reported governance information and the resulting three governance category scores.	Revinitiv's Datastream ESG Scores
Independent Board Members	BOARD_IND	Percentage of independent (nonaffiliated) directors on the board.	Revinitiv's Datastream ESG Scores
Board Size	BOARD_SIZE	Number of directors on the board.	Revinitiv's Datastream ESG Scores
CEO Power	CEO_DUALITY	Dummy variable equal to 1 when a CEO is also part of the board of directors, and 0 otherwise.	Revinitiv's Datastream ESG Scores
Anti-Takeover Devices above 2	ANTI_TAKEOVER	Number of anti-takeover devices in place in excess of 2.	Revinitiv's Datastream ESG Scores
Audit Committee Independence	AUD_IND	Percentage of outside independent directors in the audit committee.	Revinitiv's Datastream ESG Scores
Audit Committee Expertise	FIN_EXPERT	Dummy variable equal to 1 when the firm's audit committee has at least 3 members and at least 1 "financial expert" within the Sarbanes-Oxley definition, and 0 otherwise.	Revinitiv's Datastream ESG Scores
<b>Control Variables</b>			
Proportion of Debt	LEVERAGE	Calculated as long-term debt divided by total assets.	Compustat
Firm Performance	ROA	Ratio of net income before extraordinary items divided by total assets.	Compustat
Unprofitability	LOSS	Dummy variable equal to 1 when the net income before extraordinary items is negative and 0 otherwise.	Compustat
Total Assets	SIZE	The logarithm of the book value of total assets.	Compustat
Industry	IND	Dummy variables to control for industry effects based on the North American Industry Classification System (NAICS) codes.	Compustat

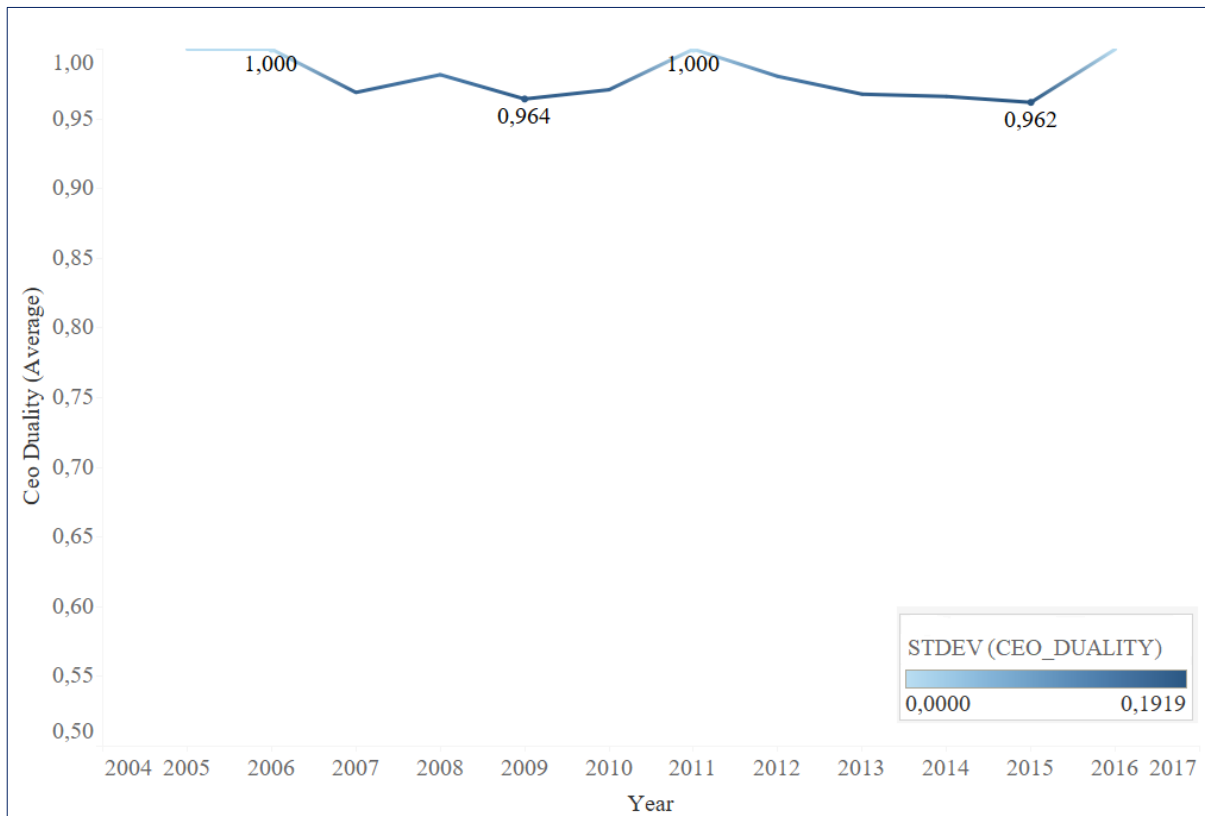
**Appendix 2 – Evolution of the average number of directors on the board**



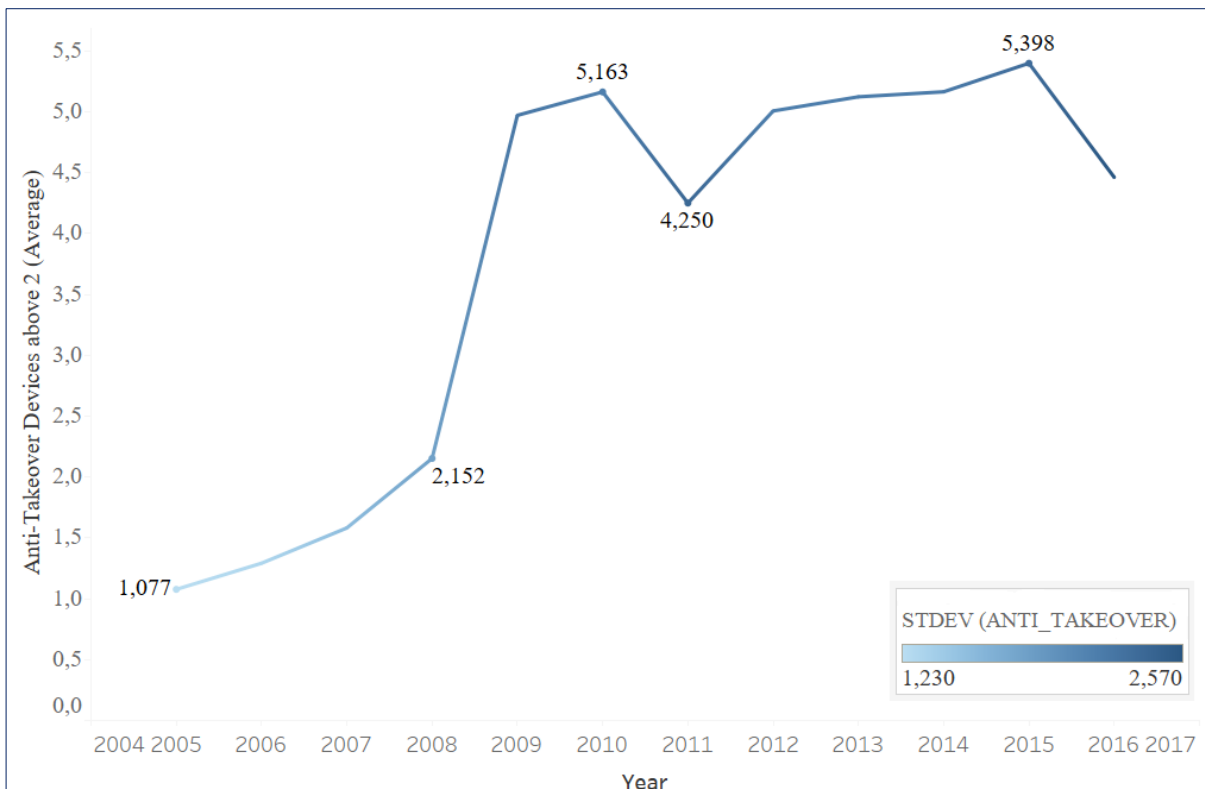
**Appendix 3 – Evolution of the average percentage of independent directors on the board**



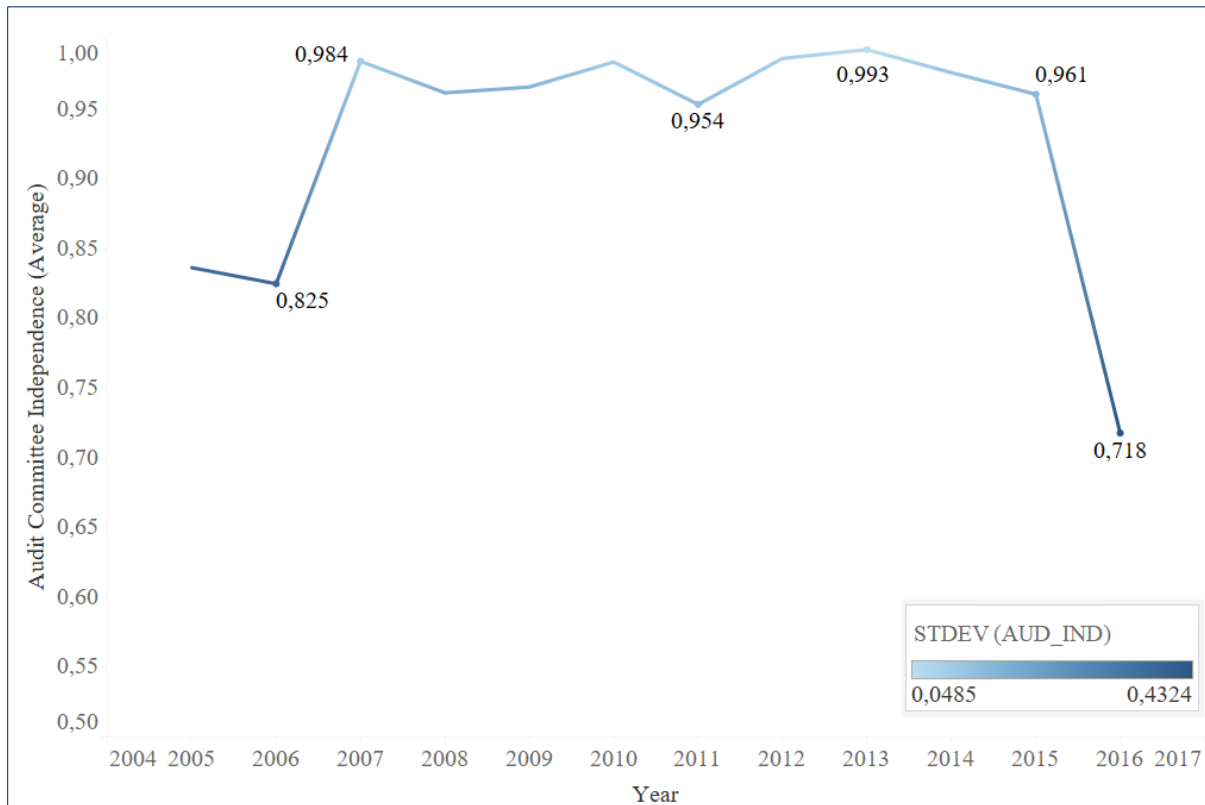
**Appendix 4 - Evolution of CEO Duality (Average)**



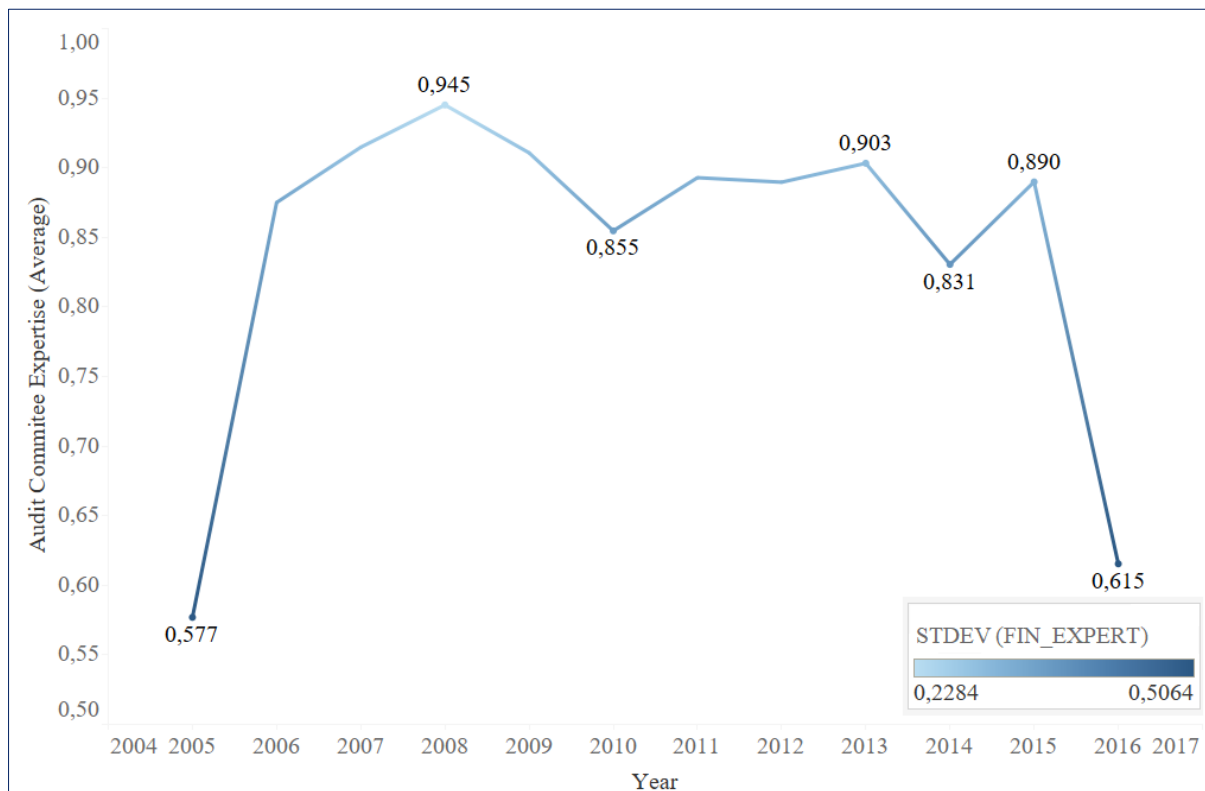
**Appendix 5 – Evolution of the average number of anti-takeover devices in excess of 2**



**Appendix 6** – Evolution of the average percentage of outside independent directors in the audit committee



**Appendix 7** – Evolution of the average Audit Committee Expertise



## Appendix 8 – Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) RATING	1.00											
(2) GOVSCORE	<b>0.21</b>	1.00										
(3) BOARD_IND	<b>-0.09</b>	<b>0.20</b>	1.00									
(4) BOARD_SIZE	<b>0.30</b>	<b>0.15</b>	-0.03	1.00								
(5) CEO_DUALITY	0.01	0.02	0.03	-0.01	1.00							
(6) ANTI_TAKEOVER	<b>-0.13</b>	<b>-0.17</b>	<b>0.16</b>	<b>-0.20</b>	0.00	1.00						
(7) AUD_IND	<b>-0.07</b>	0.03	<b>0.57</b>	<b>-0.11</b>	0.03	<b>0.16</b>	1.00					
(8) FIN_EXPERT	<b>-0.06</b>	<b>0.16</b>	<b>0.35</b>	<b>0.15</b>	<b>0.11</b>	<b>0.06</b>	<b>0.33</b>	1.00				
(9) LEVERAGE	<b>-0.45</b>	<b>-0.06</b>	<b>0.08</b>	<b>-0.27</b>	<b>0.06</b>	<b>0.12</b>	<b>0.08</b>	<b>0.10</b>	1.00			
(10) ROA	<b>0.23</b>	0.03	0.04	-0.02	-0.04	-0.05	<b>0.08</b>	<b>0.06</b>	<b>-0.15</b>	1.00		
(11) LOSS	<b>-0.33</b>	<b>-0.07</b>	<b>-0.06</b>	<b>-0.10</b>	0.00	0.04	-0.01	-0.01	<b>0.22</b>	<b>-0.64</b>	1.00	
(12) SIZE	<b>0.57</b>	<b>0.25</b>	<b>-0.19</b>	<b>0.52</b>	0.02	<b>-0.12</b>	<b>-0.17</b>	<b>-0.06</b>	<b>-0.31</b>	<b>-0.07</b>	<b>-0.11</b>	1.00

This table presents pairwise correlation coefficients between the regression variables. Coefficients represented in bold are statistically significant at the 5% level. The sample comprises 1446 US firm-year observations representing 286 unique firms over the 2005–2016 period. “Appendix 1” provides definitions and data sources for all variables.