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The current consideration of ESG criteria in corporate credit ratings

An empirical study on the French biggest companies

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TITLE: The current consideration of ESG criteria in corporate credit ratings

ABSTRACT:

Subject presentation:

Since the beginning of the century, credit rating agencies (CRAs) have seen their business transform. Paradoxically, their power has been reinforced as much as it has been decried (Boisseau, 2017). On one hand, the bond market has steadily increased in the last few years; and regulations based on credit ratings have been more and more put in place by governments and intergovernmental organizations. But on the other hand, on several occasions, especially during the economic crisis of 2001 and the financial crisis of 2008, the international community questioned the characteristics of this credit rating industry, and particularly its concentration, and its 'issuer pays' economic model which is highly exposed to conflicts of interests (Jeon and Lovo, 2013).

More recently, the rating agencies have once again opened up the debate on their opaque methods used to assign credit ratings to companies. Indeed, the industry dominated by three main CRAs, Standard & Poor's, Moody's and Fitch Ratings, which hold together 97% of the market in 2017 (Boisseau, 2017), has not escaped the green wave currently revolutionizing the world of finance; and under pressure from society and certain politicians, CRAs have signed the Credit Rating Statement promoted by the UNPRI (United Nations Principles for Responsible Investment). Thus, they formally committed to incorporating non-financial factors, impacting the society as a whole into their credit ratings systematically and transparently (PRI, n.d.).

Intuitively, this new measure appears to be a step forward in improving the quality of companies' credit rating. It is easily understandable that environmental, social and governance issues or opportunities can affect a company's cash flow both positively and negatively. For instance, the implementation of sustainable policies within a company can create new business opportunities or, allows this company to better control its exposure to possible new regulations in these fields. In contrast, an in-depth analysis of a company's ESG criteria can also highlight certain vulnerabilities facing the near future.

But actually, as underlined by the UN PRI itself, assessing the ESG performance of a company is not that easy: CRAs have to choose ESG indicators among an infinite list, while ensuring the comparability of those new variables from one industry to another, from one company to another. Not even speaking about the existing heterogeneity among ESG criteria measured and disclosed by companies, associating the relative credit risk and time frame to them is more than challenging.

The exercise seems to be so complex and CRAs methodologies and process are so enigmatic that in March 2018, the European Commission ordered to the ESMA (European Securities and Markets Authority) to "assess the current practice within the credit rating market concerning sustainability considerations" (European Commission, 2018), accusing CRAs not to take into account all the stakes of our century, and in particular sustainable development (HLEG, 2018) in their current credit ratings disclosed.

Problematic:

Thus, throughout this master thesis, we will try to shed light on this issue and will study the current consideration of ESG factors in the credit ratings of companies. In particular, given the European alert, at first glance at odds with the communication from rating agencies on their new consideration of ESG criteria in their models, we ask ourselves:

How ESG criteria are currently affecting the credit rating of corporate bonds?

To answer, this problematic, we will focus on two main research questions (RQ):

RQ1: To what extent do ESG criteria impact corporate credit ratings?

RQ2: Are some ESG dimensions considered as more relevant for credit rating?

Approach/methodology:

In order to study this consideration of ESG factors in corporate credit ratings, we conduct first a broad literature review to understand the functioning of the services rating industry, the democratization of ESG criteria and the link established by academics between ESG factors and credit risk.

The literature review carried out stands not only by the number of studies reviewed, but also and above all, by the links established between studies conducted in the financial field and the ones in the sustainable area. This allow us to identify very specific research gaps, summarized in the table below:

Summary of research gaps identified in the literature review.

	Credit Ratings (CRs)	ESG Criteria	ESG Integration in CRs
Main Research Gaps	Lack of Transparency in the creditworthiness assessment process from CRAs	Poor Homogeneity & Comparability of data available	Lack of unanimity in the literature concerning the nexus between ESG performance and debt financing/credit risk
		Lack of Transparency & precision over the data collected	Difficulty to assess the materiality of ESG factors in creditworthiness & to incorporate them in a timely accurate model

Source: Author |

In a second part, we perform an empirical analysis to statistically examine the systematization of ESG consideration by the three main CRAs, and look for any weight difference between each ESG performance factors on a sample of our choice. Following traditional academic methods, we run ordered logit regressions and assess the impact of ESG variables after controlling with a set of financial variables, traditionally used in the literature analysing the drivers of credit ratings.

More precisely, our empirical study has been conducted on a cross-sectorial sample of 71 firms based in France, over the fiscal year 2018, and using two different ESG databases to circumvent the rising comparability issue among ESG ratings arising in sustainable literature.

Conclusion:

Thanks to our documentary study, we learnt that while research is still mitigated on how ESG factors affect a company's credit risk, there are evidence that the Big Three CRAs do take into account all those non-financial variables in their corporate creditworthiness assessments.

However, the systematic character of this consideration and its weight in the overall grade have not been proven by our empirical study. Indeed, contrary to our expectations, this empirical analysis resulted showing no evidence that a statistical relationship exists between a company ESG performance and its credit rating. In light with our literature review, we think that our findings are not necessary the proof of that CRAs do not consider systematically ESG factors in their corporate credit risk assessments. On the contrary, this empirical analysis might suggest a special consideration of ESG factors in corporate credit ratings on the French market, which has never been analysed in this context to the best of our knowledge. Considering the limits of our study, we invite further research to run the same analysis, broadening the time frame, comparing ESG consideration between European countries, and multiplying test about ESG database or criteria to use.

KEYWORDS:

CREDIT RISK; LONG TERM CREDIT; RATING AGENCY; CORPORATE FINANCE; SUSTAINABLE DEVELOPMENT

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Then, I would also like to thank Grenoble Ecole de Management for all the learning opportunities that were offered to me during my school years. Thanks to this last exam, not only did I deepen my knowledge on a subject of my choice, but I also got to discover the world of social science research, I learnt to use new tools such as the Bloomberg terminal, or the complex features of Gretl to run non-linear regressions. It is highly appreciable that each GEM experience allowed us to gain as much.

Last but not least, I would like to address a special thanks to my dear friends, who helped me to learn the tools aforementioned, and most importantly, to maintain high motivation throughout the duration of this project. Thank you, Dylan, Flore-Anne, Jade and Joris.

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INTRODUCTION

I- Context and topic interest

Since the beginning of the century, credit rating agencies (CRAs) have seen their business transform. Paradoxically, their power has been reinforced as much as it has been decried (Boisseau, 2017). Indeed, on one hand, the bond market on which they operate, has steadily increased, from 57 trillion US dollars in 2004 to more than 100 trillion US dollars in 2017, and thereby forms the largest financial market in value (BIS, 2018). In addition, government regulators, in their desire to reform and secure the financial system, have given significant credit rating recognition, and thus increase the consideration of investors on CRAs' recommendations (White, 2010).

But on the other hand, on several occasions, especially during the economic crisis of 2001 and the financial crisis of 2008, the international community questioned the characteristics of this credit rating industry, and particularly its concentration, and its economic model which is highly exposed to conflicts of interests (Jeon and Lovo, 2013). As a consequence, regulators have finally invested the industry, whether in the U.S. with the amendment Credit Rating Agency Reform Act in 2006, whose goal is to foster "accountability, transparency, and competition in the credit rating agency industry"; or in Europe since the 2010s (Boisseau, 2017). The European Union is even ready to revolutionize the sector. After its attempts to bring out new actors, in its latest report published in 2018 and entitled "Financing a European Economy", it attacks to the methods of the rating agencies, which, according to the High-Level Expert Group on Sustainable Finance (HLEG), do not take into account all the stakes of our century, and in particular sustainable development (HLEG, 2018). Especially, CRAs are criticized on their consideration of the non-financial factors, also known as ESG (Environmental, Social and Governance) factors, in their assessments of creditworthiness of an issuer.

More precisely, the delegation in charge of the report recommends that from now, credit rating agencies systematically take into account "ESG factors and factors related to sustainability in their credit risk analysis and credit ratings" (HLEG, 2018).

Intuitively, it is a recommendation that can be easily understood considering that:

- ESG performance criteria are increasingly measured and disclosed to the public by large global companies. Indeed, the ESG approach was first initiated by the UN Global Compact and the special desire of Kofi Annan in 2004 who wanted to commit the business world to act together towards 17 Sustainable Development goals set in the UN

Agenda for 2030 (Kell, 2018). This action based on volunteering was then taken over by the local regulators who defined the first obligations in terms of ESG disclosure, as for example in France where the large listed companies, for example, are obliged to disclose, in their annual management report, standardized non-financial information on their social and environmental performance since 2017 (MEDEF, 2017).

- The recent scandals also demonstrated that ESG performance can impact a firm's creditworthiness in a positive or negative way: it can be at the origin of opportunities and risks. The recent Volkswagen diesel gate illustrated well this idea. While emission regulations remain the core focus of environmental issues, it can create new opportunities for the automobile sector, as well as it can also threaten the industry if badly managed. In the Volkswagen case, the scandal did not only damage the company's image but also its cash flows. Jod Hsu, an investment analyst, in a report on ESG criteria in the Fixed Income area, pointed out that Volkswagen has spent approximately € 30 billion on settlements, fines and recalls and suffers credit rating downgrades along the way (PRI, 2019).

In fact, officially the rating agencies, dominated by Standard & Poor's, Moody's and Fitch Ratings which holds together 97% of the market in 2017 (Boisseau, 2017), have integrated the ESG factors into their models for some years now (Kell, 2018). For example, S&P and Moody's signed the Credit Ratings Statement in 2016. Fitch has joined the group in August 2018 (PRI, 2019). By signing this Credit Rating Statement, promoted by the UNPRI (United Nations Principles for Responsible Investment), they commit to incorporating ESG into credit ratings and analysis in a systematic and transparent way (PRI, n.d.). As of 14 January 2019, the PRI counts among its signatories 16 credit rating agencies (PRI, 2019).

However, in this last 2019 report, the PRI also highlights the difficulty of taking into account these ESG factors in credit risk assessment models, pointing out two main challenges: the difficult appreciation of ESG risks with the potential credit impacts and the lack of minimum standardized ESG disclosure (PRI, 2019).

In its report to the European Commission, the HLEG is even clearer in its conclusion: credit rating agencies are currently falling "to incorporate adequate consideration of long-horizon risks or to assess the influence of transformative ESG trends on future prospects or future creditworthiness" (HLEG, 2018).

CRAs methodologies and process are so enigmatic that in March 2018, the European Commission ordered to the ESMA (European Securities and Markets Authority) to "assess the current practice within the credit rating market concerning sustainability considerations" (European Commission, 2018).

II- Problematic & Research Questions

Thereby, integration of ESG factors in corporate credit assessments seems to create once again, the debate on the integrity of the services rating industry, whose processes are quite obscure.

Some, as the HLEG (2018) are blaming CRAs for yielding to pressure from the society on sustainable development, without having the capabilities to really consider ESG factors. Indeed, a different time frame exists between the research and the market's will. While CRAs are receiving more and more solicitations from the market and regulators to participate in the creation of a more sustainable world and a rapid transformation of the financial system; the scientific domain remains sceptical. In fact, as mentioned earlier, ESG consideration is not so simple: the relevance and the method for ESG integration into the evaluation of corporate solvency are still discussed by academics.

However, meanwhile and despite this last remark, since a few years, CRAs communicate a lot on their new consideration of ESG criteria in their models.

Thus, considering all of those elements, we decided to focus our FMP on the current relationship between ESG criteria and corporate credit ratings. In particular, we ask ourselves: How ESG criteria are currently affecting the credit rating of corporate bonds?

To answer this problematic, we will focus on two main research questions (RQ):

RQ1: To what extent do ESG criteria impact corporate credit ratings?

While the literature is not unanimous on the subject, we will ask whether the CRAs systematically consider the non-financial factors in their corporate creditworthiness assessments, and in particular what is ESG factors materiality in the determination of the final credit ratings.

This question will especially be answered thanks to an empirical study conducted on the French bond market, observing the Big Three corporate ratings

RQ2: Are some ESG dimensions considered as more relevant for credit rating?

During our review of the literature, we will see that current research on ESG criteria has not reached the same stages for each E, S, G dimensions. While the linkage between the cost of debt and corporate governance have been widely studied, the research between environment or social factors and corporate performance is newer (Friede, Bush and Bassen, 2015).

Thus, after studying those differences generally in our literature review, we will try to assess if they are reflected in credit rating determination. Especially, we will empirically assess the weight of each dimensions 'performance into credit ratings on our French sample.

III- Plan: methodology and limits

To answer our research questions, we will rely on both a documentary study (Chapter I) and an empirical analysis (Chapter II and III).

In the first chapter of our dissertation, the literature review will help us to understand more deeply, the different aspects of our problematic and will also provide the first parts of the answer to our research questions. Chapter I is divided into two main parts.

In fact, we will first try to understand the specificities of the rating agency industry, its processes and why its seriousness is so quickly challenged. Face to the opacity of CRAs' methodology, we will also study the models that researchers have developed to approach their credit scoring methods as closely as possible. By doing so, we will gain the basic knowledge to carry out our own empirical study.

In a second part, we will make the link between this industry and the development of the consideration of non-financial issues in the investment market. Thus, we will define more explicitly the ESG criteria, their complexity and their recent and increasing development. Then, we will critically review the scientific work done in the area of credit risk and ESG factors, and observe the diverging opinions in this field. Finally, based on the information communicated

by the Big Three, we will provide evidence that CRAs actually take all the ESG factors into account in the assessment of corporate credit risk.

To assess the systematic nature of ESG consideration in corporate credit rating, we decided to conduct an empirical study. For obvious reasons of time limit and access to data, our research will only focus on the link between ESG performance and the evaluation of the solvency in one country, France, and for one year, 2018.

Thus, chapter 2 will be dedicated to the development of our methodology. In line with previous research, our strategy will rely on the traditional academic methods to assess this link: we will run ordered logit regressions and use ESG ratings as companies' ESG performance proxy. The four models developed will also include controls for key financial ratios known to affect credit ratings. Lastly, the uniqueness of our study, based on the biggest French companies and using two different ESG databases, Sustainalytics and RobecoSAM, will also be presented in this second part.

The third main chapter of our dissertation will display the results of the four regression models. Our findings will be compared to previous literature observations, and the limits of our research approach will be discussed.

Finally, in conclusion, we will put all into perspective and provide managerial recommendations. Further research possibilities will also be addressed.

CHAPTER I.

LITERATURE REVIEW

In order to get a deep understanding of our problematic and to lay the foundations for our research approach development, we have decided to conduct a broad literature review.

Thus, our first part will be dedicated to the credit rating industry: after reminding a few key definitions, we will try to understand the main characteristics of the credit rating sector, and finally, we will observe how academics developed credit scoring models to face agencies' opacity.

Then, in the second part of our literature review, we will take a closer look at the ESG field: what are exactly ESG criteria? How do they impact a firm's creditworthiness? And lastly, how do main credit rating agencies officially incorporate them in their credit rating process?

I- Creditworthiness and the credit rating industry

A- Key Definitions

Credit rating agencies (CRAs) provide opinions on the creditworthiness of entities, that are usually called obligators or issuers (SEC, 2017).

Note that creditworthiness refers to an entity's ability to pay its financial obligations, i.e. repaying the principal and the accrued interests, on time, as agreed upon signing the binding contract (SEC, 2013).

Assessing one's creditworthiness often implies performing a credit analysis in order to assess the credit risk associated with the entity (Berk and DeMarzo, 2016; SEC, 2017). As a recall, credit risk is often referred to as the risk of loss caused by a counterparty's or debtor's failure to make a promised payment according to the terms of the bond indenture (Allianz Global Investors, 2017).

There is not a common rule to carry out a credit analysis; however, as we will see later, various aspects are usually taken into account, notably intrinsic characteristics of the entity as well as some specificities of the environment in which it operates (Berk and DeMarzo, 2016).

From a practical point of view, those measures of credit risk are either obtained internally by financial institutions or provided directly to investors by external actors: the so-called, Credit Rating Agencies (CRAs) (Berk and DeMarzo, 2016).

Indeed, credit rating agencies provide both institutional and individual investors with a relative ranking of credit risk among all companies they rated (SEC, 2017). Their creditworthiness measure is usually expressed as a letter grade, called a credit rating (Allianz Global Investors, 2017). It allows investors to have a benchmark to make their own assessment over corporate bonds, considering among others, credit risk, and expected returns (Berk and DeMarzo, 2016).

From now on, when referring to actors estimating corporate creditworthiness in our dissertation, we will only consider CRAs.

Interest in CRAs, and especially the specificity of the industry and its role in the development of the fixed income market, is at an all-time high. Consequently, ratings service will be at the heart of our next literature review section.

B- The Credit Rating Industry: an oligopolistic market more and more questioned

1) A powerful industry

→ **The emergence of an oligopolistic market and a singular business model**

The Credit rating activity was born in the early 20th century when John Moody published the first bond ratings for the railroad industry. Those credit ratings were sold to investors, in demand of information about more and more numerous thriving businesses. They particularly appreciated receiving a summary of key information including financial analyses, conducted by professionals, and available in a single and unique book (White, 2010). As ratings service expanded to new business sectors in an increasingly wider and complex debt market, the industry got structured and new Moody's competitors arose (Jeon and Lovo, 2013).

In the early 1970s, the credit rating industry experienced a major structural transformation, switching from an 'investor pays' business model, as created initially, to an 'issuer pays' model. Despite this new business model opened the door to potential conflicts of interest, most specialists agree that it was a necessary change for the survival of the industry. Indeed, the expensive paper books sold by the CRAs would not have survived to the development of high-speed photocopy machine at that time. Besides, CRAs had reached such a stature in the financial sector that credit ratings had become essential to any businesses seeking to raise money on the

debt market. Therefore, companies were ready to assume the cost of the assessment of their solvency by a reputable third party in the eyes of the investment market (White, 2010).

Indeed, it worth remembering that credit rating agencies operate on a two-sided market. That is to say, they play the role of an intermediary between bond issuers and investors (Duff and Einig, 2015). Thanks to a relationship of trust, CRAs have access to sensitive issuer's information, not disclosed to the public. Thereby, they fill an information gap and provide investors with a valuable opinion on the rated company (Jeon and Lovo, 2013; Kingsen, 2006). Nowadays, CRA's work has actually become indispensable to many players in the financial market: bond issuers, investors and regulators as well (Jeon and Lovo, 2013).

Figure 1.1: Credit rating agencies as an intermediary in a two-sided market.
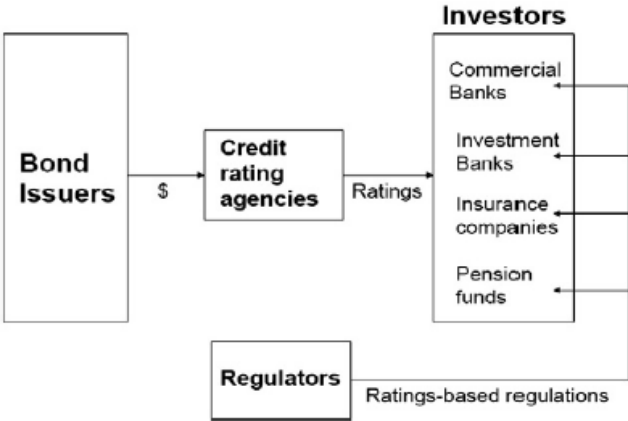
Source: Jeon and Lovo (2013) |

In 2010, White mentioned about 150 local and international credit rating agencies. Nevertheless, this figure is rather insignificant. In fact, ratings service is naturally organized around a monopoly resulting from M&A done by three main CRAs, called the Big Three: Moody's, Standard & Poor's (S&P) and Fitch (Duff and Einig, 2015; White, 2010). Those three CRAs dominate the credit rating market on each continent. In Europe, for instance, the ESMA (European Securities and Markets Authority) reports that the Big Three provided 93.4% of the total credit ratings given in the EU in 2017 (ESMA, 2018). More precisely, that year, the EU credit rating market was shared by 24 CRAs, registered by the ESMA to offer the corporate credit rating service, as follows:

Figure 1.2: Market share distribution among EU CRAs.
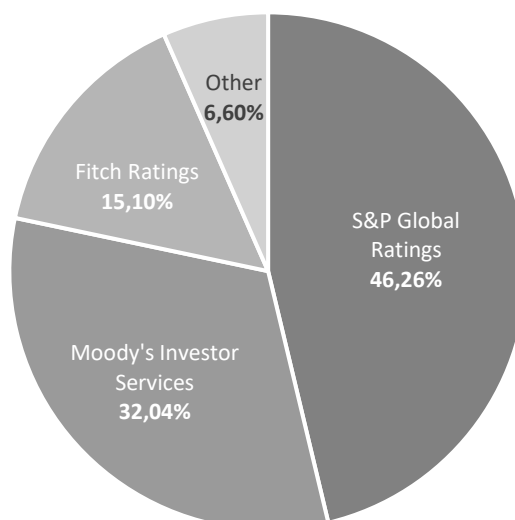
Source: ESMA (2018) |

→ **The Big Three: the most influential entities in the bond market?**

The power of these Big Three is such that in 1996, the New York Times columnist Thomas L. Friedman, declared in an interview, "There are two superpowers in the world today in my opinion. There's the United States, and there's Moody's Bond Rating Service. The United States can destroy you by dropping bombs, and Moody's can destroy you by downgrading your bonds. And believe me, it's not clear sometimes who's more powerful." (as reported by White, 2010).

Since then, CRAs' power to influence actually keeps reinforcing at different scales: on investors, on policymakers and also on the issuer itself.

Firstly, CRA's activity has allowed the debt market to strengthen. Over the years, investors granted increasing importance on CRA's credit opinions. As they have fully trusted the quality of the third-party judgement, and have been reassured by their analyses, investors have increased their investments in the corporate credit market (Dittrich, 2007).

Furthermore, the debt market has become even more dependent on CRA's opinions after the financial crises of the 2000s (White, 2010). In fact, policymakers decided to regulate the financial sector and prevent a new liquidity trap, by introducing new ratings-dependent regulations. Actually, they entirely delegated the risk assessment job of the financial market to CRAs (Jeon and Lovo, 2013). At the global level, they did through the Basel Agreements for instance (Jeon and Lovo, 2013; White, 2010). As a consequence, until the very recent debates

created around CRAs 'business, "the credit ratings had the force of law with respect to regulated financial institutions' abilities and incentives (via capital requirements) to invest in the bonds market", as summed up by White (2010).

Finally, as mention earlier, CRA's work can also have huge impacts on the issuer itself. Credit rating is often a necessary step for the company wishing to enjoy an economic interest rate on the public debt market (Duff and Einig, 2015). But, it is worth noting that from the firm's perspective, the financial impact of a credit rating is visible far beyond the mere interest rates reachable. Indeed, whatever the final result, credit ratings (attribution and monitoring) generate costs too. Regarding direct costs, in addition to the fees requested by the CRA(s), the initial creditworthiness assessment and its follow-up request investment and time from the company management, to prepare and communicate all the information needed to the selected CRA (Duff and Einig, 2015; Kisgen, 2006). Moreover, once the credit rating is obtained, according to the company's financial evolution, the credit grade can be adjusted and can result in considerable indirect costs (Kisgen, 2006). For example, a change in the company's credit rating can impact the company's ability to raise new funds, either on the debt market or the equity one (Frost, 2007). On a daily basis, a credit rating adjustment can also affect business operations in several ways: by imposing new constraints in some contracts with third parties (like new covenants for example), or by limiting its commercial or financial transactions, which may be conditional on a credit score (Kisgen, 2006).

Thus, the Big Three seem to have established a business model that allows them to enjoy considerable power of influence with almost all financial stakeholders. Nevertheless, the ratings service omnipotence might have reached a limit: more and more actors are now showing doubts about this rating system and highlight its limitations.

→ **An overwhelming power increasingly discussed**

CRAs have been deeply involved in the wave of financial crises over the past 15 years (Duff and Einig, 2015). Consequently, growing doubts are shared regarding to the industry and its operations. Particularly, on the corporate reporting side, CRAs are often criticized for their sluggishness in adjusting their ratings as reported by Jeon and Lovo (2013): "until a few days before Enron's bankruptcy in November 2001, all three major agencies rated it in the investment

category: Standard & Poor's and Fitch gave it a BBB rating and Moody's gave it a notch below Baa3 rating. The major rating agencies still had investment-grade ratings on Lehman Brothers even in the morning that Lehman declared bankruptcy in September 2008."

In 2008, CRAs were even accused of fuelling the subprime debacle, by upgrading complex structured securities (CDO mainly) to satisfy a few stakeholders. Thus, the quality and accuracy of their credit ratings have been questioned more frequently in those past few years (White, 2010).

Those scandals actually revealed the existence of CRAs to the public and multiplied research around the industry. As a result, three major concerns are often made on the credit-rating sector, as summarized by Duff and Einig (2015) in the CRA trinity of solicitude:

Figure 1.3: The CRA Trinity of Solicitude.
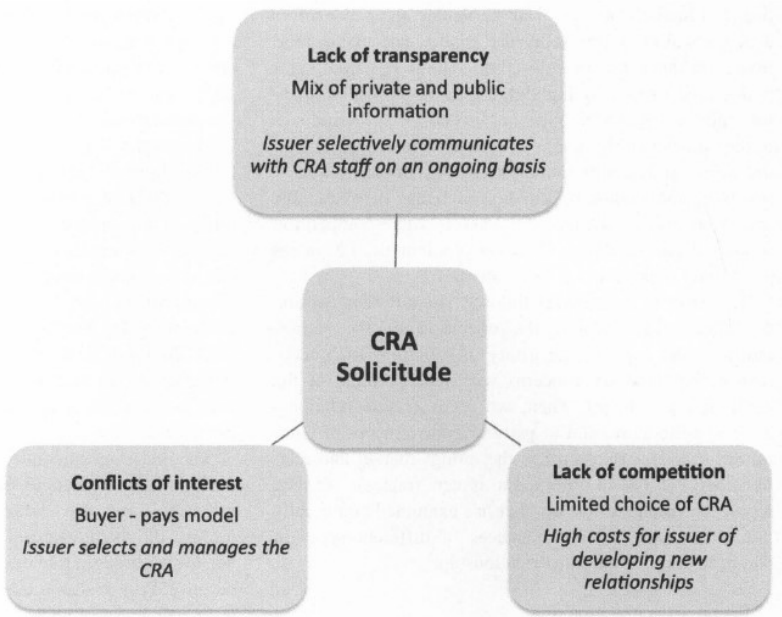
Source: Duff and Einig (2015) |

While the lack of competition and conflicts of interest issues in the industry have been mentioned previously, we will discover in the following part the relative lack of transparency of CRAs on how they establish their corporate credit ratings.

2) CRA's practices and disclosed methodologies

As underlined by Duff and Einig (2015), one of the main criticism levelled at the credit-rating industry is often its lack of transparency related to the methodologies and processes used to obtain credit ratings.

Regulators tried to address this issue by asking CRAs to reveal more details about their methodologies, hypotheses and criteria selected to formulate their creditworthiness opinions (as the SEC Commission in the U.S. did it for example in December 2008 and again in November 2009, or the European Union in April 2009).

However, solving this transparency issue is not as easy as it may seem (White, 2010). If the whole CRAs' methodology was disclosed, the industry will not be any longer viable as their process would become easily replicable (White, 2010).

Thanks to research on the Big Three websites, we have seen for ourselves the CRAs' desire to retain as much information as possible. However, we also noticed important similarities between the three main CRAs, in terms of vision, process and scale to assess creditworthiness. We will summarize those findings in this part in order to understand the functioning of ratings service and the main challenge it represents for our dissertation.

→ **What is exactly a credit rating?**

Figure 1.4: Summary Table of 'Credit Rating' definitions as of the Big Three.

Standard & Poor's	A credit rating is an educated opinion about an issuer's likelihood to meet its financial obligations in full and on time. It can help you gain knowledge of—and access to—new markets, enhance transparency, serve as a universal benchmark, and assess and demonstrate creditworthiness. It's not a guarantee or absolute measure, but is a crucial tool for investors in the decision-making process. Credit ratings provide transparent third-party information that's not only forward-looking, but standardized for consistency.
Moody's	Ratings assigned on Moody's global long-term and short-term rating scales are forward-looking opinions of the relative credit risks of financial obligations issued by non-financial corporates, financial institutions, structured finance vehicles, project finance vehicles, and public sector entities. Moody's defines credit risk as the risk that an entity may not meet its contractual financial obligations as they come due and any estimated financial loss in the event of default or impairment.

| Fitch Ratings | Fitch's credit ratings relating to issuers are an opinion on the relative ability of an entity to meet financial commitments, such as interest, preferred dividends, repayment of principal, insurance claims or counterparty obligations. Credit ratings are used by investors as indications of the likelihood of receiving the money owed to them in accordance with the terms on which they invested. Credit ratings express risk in relative rank order, which is to say they are ordinal measures of credit risk and are not predictive of a specific frequency of default or loss. Fitch's credit ratings do not directly address any risk other than credit risk. In particular, ratings do not deal with the risk of a market value loss on a rated security due to changes in interest rates, liquidity and other market considerations. |

Source: Fitch Ratings a (n.d.), Moody's (2019), S&P Global Ratings (n.d.) |

From a legal point of view, according to the EU legislation in Article 3(1)(a) of the CRA Regulation, a credit rating corresponds to "an opinion regarding the creditworthiness of an entity, a debt or financial obligation, debt security, preferred share or other financial instrument, issued using an established and defined ranking system of rating categories" (ESMA, 2018, p.2).

In fact, the juxtaposition of these four definitions points out three key features of credit ratings:

- Firstly, a credit rating is an opinion. Even though CRAs implement internal clear methodologies and procedures to assess corporate creditworthiness, the final score includes a significant amount of judgment from the analysts' team in charge.
- Particularly, a credit rating is a forward-looking opinion, which means that CRAs will make some projection over a three to five years' time horizon, based on their analysis of the company history and its environment.
- Finally, from an investor perspective, the real added-value of a credit rating is found in the consistency of the method over years, allowing them to make comparisons with the past. This consistency process also makes it possible to compare companies between them: in fact, credit ratings simply allow benchmarking on the bonds market.

Regarding these last two points, Altman and Rijken highlighted in their paper in 2004 a key perspective for our thesis: CRAs are reluctant to changes by nature and highly value consistency. Therefore, CRAs change their credit opinions only when they truly believe that new elements are likely to change the company's risk profile permanently.

→ The rating process

The Big Three do not only share a common vision of corporate creditworthiness opinion, but they also seem to use the same corporate rating process, broadly speaking.

As reported on their websites, their rating process is actually composed of the following steps. Firstly, the client itself choose a CRA to assess its creditworthiness. The credit rating agency assigns him an analysts' team, which will collect all the information, public or not, necessary to express its judgment. In particular, it will organize interviews with Management in order to fine-tune its analysis. The CRA's Rating Committee will decide on the final credit rating to be assigned. It communicates it to the client, who has the power to decide to disclose it or not. In the case of a credit rating publicly disclosed, the issuer will be continuously monitored by the CRA to keep the public informed of the evolution of its payment capacity (Fitch Ratings, 2019; Moody's, n.d.; S&P Global Ratings, 2016).

Briefly described, this process especially, highlights the proximity between the client rated and the CRA. Therefore, it can raise questions on the independence of the CRA, in such a situation. Concerning that matter, Duff and Einig (2015) have shown that the affective relations between the lead analyst and the client are highly significant when considering the final credit rating. However, Duff and Einig (2015) were not really worried by this threat of lack of independence between the CRA and its customer. According to them, a good relationship between the two parties also facilitates the communication and exchange of relevant information, and in doing so, the CRA is able to provide a creditworthiness judgment based on a maximum of factors, public or not.

→ The disclosed methodologies

Figure 1.5: Visual representation of the main components of corporate credit ratings.

CRAs generally use a scorecard encompassing the main data to take into account, both qualitative and quantitative, to estimate the issuer fixed-income risks. This scorecard, and in particular factors weights, changes according to the industry or sector considered. It can also vary under special conditions determined by the analysts' team itself (Fitch Ratings, 2019; Moody's, n.d.; S&P Global Ratings, 2016).

CRAs usually structure their corporate analysis on two main risks:

- The business risk profile, determining mainly by the sector risk profile, the country of operations, the group structure, the business profile of the company and the current strategy followed by management.
- The financial profile, relying essentially on quantitative data, measuring cash flows and profitability, the company leverage and its financial flexibility.

For the purpose of the dissertation, it is worth mentioning that the three main CRAs include governance criteria as subjective criteria that may modify the credit scoring to obtain the final credit rating (Fitch Ratings, 2019; Moody's, n.d.; S&P Global Ratings, 2016). Among other modifiers mentioned, S&P disclosed for example diversification, captive finance or comparable rating analysis (S&P Global Ratings, 2016).

Finally, several scenarios, especially stress ones over the medium-term horizon, are tested before the final credit rating is proposed. As a recall, the latter is not definitive: it evolves at the same time as the company develops and adapts to a changing environment (Fitch Ratings, 2019; Moody's, n.d.; S&P Global Ratings, 2016).

→ **The credit rating scale**

As mentioned previously, CRAs express their final credit opinion in a scale of letters and figures. They have never provided investors with a hard number of probability of default associated with each symbol. However, they all make the distinction between the investment-grade bonds and the speculative ones, also known as 'junk bonds' and considered to be of low credit quality (Fitch Ratings, 2019; Moody's, 2019; S&P Global Ratings, 2016). More precisely, the Big Three's scale of credit rating is usually interpreted as follows:

<u>Figure 1.6: The Big Three's different scales of credit rating.</u>

	Interpretation	Fitch and S&P	Moody's
Investment-grade LT Bonds	Highest quality	AAA	Aaa
	High quality	AA+	Aa1
		AA	Aa2
		AA-	Aa3
	Strong payment capacity	A+	A1
		A	A2
		A-	A3
	Adequate payment capacity	BBB+	Baa1
		BBB	Baa2
		BBB-	Baa3
Speculative-grade LT Bonds	Likely to fulfil obligations, ongoing uncertainty	BB+	Ba1
		BB	Ba2
		BB-	Ba3
	High-risk obligations	B+	B1
		B	B2
		B-	B3
	Vulnerable to default	CCC+	Caa1
		CCC	Caa2
		CCC-	Caa3
	Near or in bankruptcy or default	CC	Ca
		C	C
		D	D

Source: Chaboud (2018) |

3) Key industry analysis takeaways

In particular, for the rest of our dissertation, this brief overview of the functioning of the Big Three allowed us to note that:

- There are a lot of apparent similarities in process and methods between the Big Three. Equivalents in terms of credit quality / credit ratings are well-known.

- Credit rating agencies enjoy considerable power and influence over both investors and companies. Initially accentuated by the regulators, the latter would like now to take advantage of these particular features of the CRA's industry, to drive the development of a more sustainable finance (ESMA, 2019; HLEG, 2018).

- Meanwhile, CRAs value consistency in their result. Furthermore, in the course of their history, CRAs have developed their own methodology, and until very recently the regulator did not provide them with any indication on how to do, or how it would like them to do. Therefore, this new regulator's request for the enhancement of the ESG factors integration represents a drastic change for the industry.

- CRAs communicate extensively with their customers and thus have access to a large amount of non-public information, which is the first hurdle to our research. However, in order to limit its impact, we chose to focus on the largest listed companies that have information disclosure and standardization obligations.

- Finally, the exact procedures and methodologies used by the CRAs are complex and not really disclosed to the general public. That is why we will prefer to mimic the credit scoring of CRAs by using simpler models developed by academic researchers.

C- Credit Scoring Models

Credit Rating and CRAs' industry have been studied in several academic research for many years now.

Most of the work on credit ratings is concentrated on the technical aspect of credit scoring. Academics started first by building predicting bankruptcy model using mainly a statistical approach and financial ratios (Beaver, 1966).

One of the most famous one in the literature is Altman's Z-score (Altman, 2000). Using only five accounting ratios, Altman's model was able to predict future bankruptcies, one year in advance in 95% of the cases. On the basis of a 66 U.S. corporations sample, it was actually able to divide all companies into two groups: bankrupted within a year, not bankrupted, using only the following equation: *1.2*(Current assets-current liabilities)/Total assets + 1.4*(Retained earnings/Total assets) + 3.3*(EBIT/Total assets) + 0.6*(Market value of stock/Book value of liabilities) + 1.0*(Sales/Total assets).*

Relying on Beaver's and Altman's methodology, Ohlson (1980) widened the spectrum of observations and analysed the so-called conditional logit model on a sample of 105 bankrupt firms and 2058 non-bankrupt firms on a six years' time frame from 1970 to 1976. He set up three models on nine quantitative variables to predict failure. Those ones showed a prediction accuracy of 96,12%, 95,55% and 92,84% respectively. As a result, Ohlson identified four major factors that significantly affect the probability of failure of a business:

- The size of the company
- A measure of the financial structure
- A measure of performance
- A measure of current liquidity (noting that the importance of this last one has not been demonstrated as clearly as for the three other ones.)

This has been confirmed by Altman in 2000, who noted that most of the time, an effective binary bankruptcy model should include "ratios measuring profitability, liquidity, and solvency". However, he left the determination of their order of importance and exact weights to use, to future research.

Five years later, Beaver, McNichols and Rhie (2005) tested different ratios in the categories previously mentioned and concluded that, in fact, all the ratios do not predict with the same degree of success. For instance, the cashflow to total debt ratio seems to have a highly significant impact on the overall result while the liquid asset ratios have a much weaker one. They noted that the ratios' accuracy depends on the time horizon considered to predict bankruptcy.

In addition, Beaver (1966) noticed that the real predictive power of ratios depends on the quality of financial information disclosed, as well. In particular, he observed that ratios and their accuracy in models are highly sensitive to FASB (Financial Accounting Standards Board, operating in the U.S.) changes in accounting standards.

Relying on those dichotomous bankruptcy prediction models (0.Failed 1.Not Failed), academic researchers started to mimic agency credit ratings at the beginning of this century. Concerning the model to use in such a case, a general consensus has been observed on the inappropriateness of linear regression, such as the ordinary least squares methods (OLS). Most predicting bond rating models actually use logistic or probit regressions (Kamstra, Kennedy and Suan, 2001).

For example, Altman and Rijken (2004) used an ordered logit regression model of six financial-ratio based variables to benchmark agency credit scoring. By doing so, they underlined that both binary default prediction model and imitation of agency credit scoring models could include the same type of variables. Only the time-horizon should be watching out as "agency ratings place less weight on short-term indicators of credit quality" (Altman and Rijken, 2004).

Gradually, non-financial information has been used to approach credit rating agencies results. Firstly, in a study over Taiwan companies, Wu (2004) observed that models combining both financial and non-financial information were better able to predict bankruptcy than the ones using only accounting ratios. His statistical model composed of 18 financial ratios and 3 governance variables (board structure, external auditor and stock price trend) got 87% of correct results, while the one without qualitative variables only got 79% of predictions right. Figlewski, Frydman and Liang (2012) drew the same conclusion when running models using macroeconomic ratings-related variables. Finally, Doumpos, et al. (2015) were one of the pioneers in testing credit scoring models on European companies. Indeed, generally, the EU market is much less studied than the U.K. or the U.S. one. They investigated the correlation between S&P credit ratings and a bunch of accounting firm-specific variables and market variables. It resulted that models using both financial and market data had a stronger correlation with the credit agency ratings than the ones using only financial inputs. Therefore, according to this academic literature, it seems that CRAs might include non-financial aspects in their credit ratings.

D- Part summary and Research Gap

In this first part of our literature review, we got a chance to get a broad picture of the credit rating industry and understand the special influence it has over a large number of stakeholders. Despite the recent efforts of policymakers to enhance competition, promote transparency, reduce conflicts of interest, we observe that the credit rating activity is still outshined by three main credit rating agencies, for which the methodology and procedures remain confused.

On the academic side, doubts about the accuracy of agency credit ratings and their trustworthiness keep rising. To overcome this CRAs' lack of transparency, which constitutes the main research gap we would like to study in this master thesis, new models to asses

corporate creditworthiness are arising. While they often have a strong dependence on financial information, more and more attempts are made to incorporate qualitative data.

Using this academic literature, regulators and public are currently trying to interfere for the first time in the credit rating business by pressuring CRAs to integrate ESG performance factors in their assessment of corporate creditworthiness. But, as the following part will highlight, this idea represents a real challenge: ESG impacts on creditworthiness are not well-established yet and ESG performances are complicated to measure.

Nevertheless, to date, all the Big Three have already claimed to take into account ESG criteria in their final corporate credit ratings. Thus, the final aim of this research is to establish a state of play on the current integration of ESG factors as variables influencing corporate credit risk. In particular, we will try to challenge Big Three's assertion by measuring the current correlation between ESG performance and corporate credit ratings; but before let's review academically how the ESG factors are processed in the debt financing area.

II- ESG factors in Credit Ratings

A- What are the ESG factors?

→ **The ESG criteria: a complex catch-all concept.**

The search for a relation between non-financial factors and corporate financial performance (CFP) can be traced back to the beginning of the 1970s (Friede, Bush and Bassen, 2015) since the Bruntland Commission had defined 'Sustainable Development' (Cubas-Díaz and Martínez Sedano, 2018).

However, for a long time, the consideration of sustainable development by investors remained a niche sector. It only widely spread at the beginning of the 2000s (Oikonomou, Brooks, and Pavelin, 2014; Sassen, Hardeck and Hinze, 2016). Since then, almost every large company is followed on its corporate social responsibility (CSR). Although different definitions exist for the CSR, for the rest of this master thesis, we will retain the EU one, for whom CSR represents "the responsibility of enterprises for their impact on society". To be socially responsible, not only must companies comply with the law, but they also have to integrate "social,

environmental, ethical, consumer, and human rights concerns into their business strategy and operations" (European Commission, n.d.).

The corporate social performance (CSP) of companies is often assessed by the so-called environmental, social, and governance factors (ESG factors) (Sassen, Hardeck and Hinze, 2016).

Exactly, ESG factors correspond to non-financial factors, often difficult to measure in monetary terms, that may have a material impact on a company's financial performance, its cash-flows and therefore its ability to repay its bondholders (Allianz Global Investors, 2017; CFA Institute, 2015).

It is especially difficult to work with ESG factors, as no rules are commonly admitted yet. For instance, it is difficult to know what precise criteria to use to assess each non-financial performance dimension. In addition, the measurement and standardization of the defined determinants are also challenging: how to measure them in a consistency way from one business to another, how to convert them in understandable figures? Lastly, ESG factors are also often long-term oriented. Thus, CRAs often struggle to deal with this non-specific time-horizon and to assess the factors' materiality according to the company and the possible impact they can have on the corporate performance before the bond maturity date (CFA Institute, 2015; PRI, 2019).

No exhaustive list of ESG criteria exists, however, the following table of examples might be useful to understand what is typically behind those perspectives:

Figure 1.7: Examples of ESG issues.

Environmental Issues	Social Issues	Governance Issues
- Climate Change - Air and water pollution - Biodiversity - Deforestation - Energy resources and management - Waste management - Natural resources scarcity	- Human Rights - Employee Relations - Labour Standards - Diversity - Communities - Health and safety - Customer relations - Product responsibility - Data protection and privacy	- Board composition - Audit committee structure - Executive compensation - Bribery and corruption - Lobbying - Political contributions - Whistle-blower schemes - Shareholders rights - Transparency and reporting

Source: Author, based on CFA Institute (2015), Orsagh, (2019), PRI (2019) |

From a logical point of view, it is quite easy to argue that good ESG practices allow any company to gain in competitivity, to mitigate the risk of highly variable cash flows and to ensure that management act according to a long-term horizon (CFA Institute, 2015).

In fact, for example, governance mechanisms, and especially an effective monitoring from the board, can reduce expropriation or misallocation of funds, improve the firm's productivity (Bhojraj and Partha, 2003).

Same regarding environmental issues, companies with good environmental practices can also gain in efficiency by reducing waste and promoting better use of resources. By being a driving force of climate change awareness, companies are also more prepared to intensifying climate change regulations. Thus, it may reduce the risk of facing fines, government penalties, or associated litigation costs (Izzo and Magnanelli, 2012; Oikonomou, Brooks, and Pavelin, 2014).

From a social perspective, it is supported, for instance, that a firm proactively responsible in its interactions with society and its treatment of the natural environment is more likely to improve customer loyalty, increase employee attraction and retain talents. Therefore, firms enhance their reputation with the public and decrease potential litigations with internal or external stakeholders (Izzo and Magnanelli, 2012; Oikonomou, Brooks, and Pavelin, 2014).

Despite all those examples, potential benefits from ESG practices must be put into perspective: implementing them also generates additional costs for companies. To be enhanced in credit risk assessment, ESG advantages should then exceed the related costs in the time frame considered by CRAs (Izzo and Magnanelli, 2012).

To evaluate this balance, CRAs can now benefit from an increasingly structured communication of non-financial data from companies, as shown in the following section.

→ **The enhancement ESG information available on the market**

To get a historical perspective, the term ESG appeared in 2005 in a UN-sponsored study entitled "Who Cares Wins". As part of this operation and based on the premise that ESG factors impact significantly financial performance, the UN Secretary-General Kofi Annan invited major financial institutions to find a way to systematically integrate ESG considerations into their decision processes; and thus put an end to their only consideration of sustainable development

through the exclusion of certain industries (e.g. tobacco, alcohol or firearms industries). The idea was to encourage all companies to take a more sustainable path (Kell, 2018).

Then, the idea of ESG consideration in the financial world has grown rapidly, mainly thanks to the efforts of two international institutions (Galbreath, 2013):

- The United Nations-supported Principles for Responsible Investment (PRI). This international network aims to help investors to integrate ESG issues into their investment decision making. In particular, in 2016, the PRI launched the ESG in Credit Rating Initiative. Since, it works in cooperation with CRAs to promote understanding of ESG practices, identify the materiality of ESG issues in credit ratings and how to incorporate them. Today, the PRI counts over 1500 signatories, among them 19 CRAs, including the Big Three (PRI, 2019).

- The GRI, Global Reporting Initiative. Established in 2001, it initially focused on environmental performance disclosure. However, in the fourth generation of the GRI principles, published in 2016, reporting recommendations have expanded to more issues in order to develop a common language between organisations and stakeholders around economic, environmental and social impacts (GRI, 2018). Recent analyses show that GRI is strengthening corporate-level ESG disclosure (Galbreath, 2013). A KPMG survey reported that 93% of the world's largest 250 corporations used the GRI reporting framework to inform their stakeholders on their sustainability performance in 2017 (KPMG, 2017).

More recently, we have also seen the development of industry-specific ESG reports and guideline, such as the one developed by the Sustainability Accounting Standard Board (SASB), whose final version was released on November 2018. It particularly helps investors to identify relevant ESG indicators depending on the industry (SASB, n.d.).

Local financial regulators have also taken the plunge in the ESG business. For example in France, in addition to governance information, since 2017, the large listed companies are also required to disclose, in their annual management report, standardized non-financial information on their social and environmental performances, following a materiality approach (MEDEF, 2017).

As a consequence, thanks to those initiatives, ESG consideration in the investment process has kept enhancing year by year (Friede, Bush and Bassen, 2015). ESG information, while still

imperfect, is getting better all the time in terms of amount of data disclosed, quality of the information provided and possibilities of utilisation by stakeholders (Kell, 2018). Therefore, whereas at its nascent history, ESG integration was only considered through qualitative approaches, ESG factors are now more and more incorporated in quantitative models (Orsagh, 2019).

→ **ESG impact on financial performance: a topic increasingly investigated by academics**

The sustained growth of ESG consideration has also been partially accelerated by the growing interest of academics in these topics. The early 2010s were marked by numerous publications showing that good corporate sustainability performance can also be associated with financial performance (Friede, Bush and Bassen, 2015; Kell, 2018).

More than 2200 studies linking ESG and financial performance were identified by Friede, Bush and Bassen in 2015. According to them, roughly 90% of these studies reported a nonnegative ESG – Corporate Financial Performance (CSP) relationship. However, no consensus has been reached yet in the scientific field. The debate on the trade-off between short-run sacrifices and long-term gains of shareholder value is still open in the academic area (Changa, Lib and Shim, 2017).

Friede, Bush and Bassen (2015) also observed a lot of differences in results across regions worldwide. While a positive ESG-CSP relationship is at majority observed in the U.S. and emerging markets; a more contrasting result hold for developed Europe.

It is also worth noting that among those 2200 studies, Friede, Bush and Bassen (2015) reported only 49 papers focusing on bonds. Indeed, most of the studies on ESG factors focused on the equity area only (Devalle, Fiandrino and Cantino, 2017; Friede, Bush and Bassen, 2015).

Now that ESG criteria have been defined and that the challenge they can represent in the bond market has been established; the next part will be devoted to these academic studies linking ESG and credit risk.

B- ESG and Credit Risk

Throughout our investigating work, we noticed that most published research linking non-financial performance to debt financing was conducted on a single, isolated dimension of the ESG variables (Galbreath, 2013). So, in this section, we will first review the impact of each ESG criteria on credit risk. Then, only, in a second phase, we will focus on studies analysing the influence of ESG factors as a whole, on corporate creditworthiness.

1) Corporate Governance & Credit Risk

As recalled by Friede, et al. in Deutsche Asset Management Investment GmbH.'s report (2015), "corporate governance is the procedure and/or processes according to which an organization is directed and controlled. Corporate governance specifies the distribution of rights and responsibilities among the different participants in the organization such as the board, managers, shareholders and other stakeholders, and lays down the rules and procedures for decision making".

Historically, among all the ESG issues, corporate governance has been the most covered (CFA Institute, 2015). It is also perceived as the strongest credit risk factor among all the ESG dimensions (Allianz Global Investors, 2017).

As reported by Devalle, Fiandrino and Cantino (2017) and Stellner, Klein and Zwergel (2015), the numerous works focusing on the impact of corporate governance on credit ratings seem to show a consensus: better corporate governance leads to higher credit ratings.

This has been demonstrated by Bhojraj and Partha (2003) in an empirical study focusing on the credit ratings of U.S. industrial bonds issued between 1991 and 1996. They found out that governance mechanisms participate in credit risk mitigation as they allow the firm to reduce agency costs, information asymmetry and ensure effective monitoring on the managerial performance.

Ashbaugh-Skaife, Collins and LaFond (2006) confirmed that firms with stronger corporate governance usually benefit from better credit ratings. Studying individual components of corporate governance on U.S. firms, over 5 years, they even underlined that credit ratings are

negatively associated with the number of blockholders and CEO power, and positively related to takeover defenses, accrual quality, earnings timeliness, board independence, board stock ownership, and board expertise.

Similarly, Klock, Mansi and Maxwell (2005) studying the credit spread on 678 U.S. industrial firms between 1990 -2000, showed that antitakeover governance provisions, although not beneficial to stockholders, are viewed favourably in the bond market. Antitakeover governance provisions prevent managers from pursuing high-risk strategies. Thanks to the limited M&A activity of the company, risk on the cash-flows stream is reduced for bondholders.

On the other hand, more recent research seems to digress from the consensus previously established. In 2013, Amana and Nguyen, who wanted to confirm the above-mentioned empirical results on the U.S. bond market for other regions in the world, studied the impact of governance on the credit ratings of 437 non-financial Japanese firms. They did discover that good governance is associated with higher credit ratings in Japan too. However, focusing on the timing of financial reporting, they concluded that higher credit ratings for companies with good corporate governance may be due only to the fact that better governance leads to better financial results. Therefore, while corporate governance still benefits to debtholders, according to them, it appears that credit ratings do not really reflect the implications of good governance; but only the consequences, once the financial results are already visible.

Erragragui (2018), analysing the relation between CSR initiatives and their pricing by creditors on the U.S. bond market between 2000 and 2011 also noticed a "governance paradox": while governance strengths (as defined by the database KLD) do reduce a firm's cost of debt in her panel, governance concerns do not seem to be considered by creditors.

Thereby, in our opinion, only regarding this academic literature, the extent to which governance is considered by CRAs, remains unclear.

2) Environmental Performance & Credit Risk

After corporate governance, environmental performance is the most studied ESG determinant in the ESG-related research (Delmas, Etzion and Nairn-Birch, 2013).

In fact, the environmental perspective is continuously gaining importance (Erragragui, 2018; PRI and CFA Institute, 2019); a survey on ESG integration in Europe, the Middle East and Africa released by the PRI in March 2019, even suggests that in France, environmental criteria will overtake governance as the factor most affecting corporate bonds by 2022 (PRI and CFA Institute, 2019).

However, so far, only one study investigating the relationship between environmental performance and credit rating could be found (Devalle, Fiandrino and Cantino, 2017): Bauer and Hann's one (2010).

In 2010, Bauer and Hann investigated the influence of environmental incidents on corporate credit risk. In particular, they looked at the associated legal, reputational, and regulatory risks. They run a regression on 582 U.S. public corporations and linked their credit risk (representing by both credit rating and accounting cost of debt) to their environmental profile (using KLD ESG database scores for strengths and concerns). Firstly, they noted a growing importance, over time, of the consideration of the environment by creditors between 1995 and 2006. Final results also demonstrated that environmental concerns are associated with a higher cost of debt and lower credit ratings. However, environmental strengths seem to be only priced by the market. They found no evidence that proactive environmental practices lead to higher credit ratings. For the authors, it may indicate that credit rating agencies do not yet fully take into account the full environmental profile of companies in their credit assessment.

Considering this finding, it is worth opening our literature review to the consideration of environmental issues in the broadened debt financing field. We will show that observations are actually quite disparate (Erragragui, 2018).

Examining environmental risk management on the cost of capital of 267 U.S. firms, Sharfman and Fernando (2008) found that firms with improved environmental risk management enjoy a lower cost of capital. However, they argued that this relationship is, in fact, mainly explained by the reduction of the cost of equity and not by a better appreciation of the company from the debt market. On the other hand, Schneider (2011) presented evidence that a firm's

environmental performance is reflected in bond pricing of the most polluting industries. When studying the pulp and paper, and chemical industries in the U.S., he demonstrated that environmental performance in those cases plays a role in bankruptcy risk and the latter is significantly valued by bondholders. Similarly, Chava (2014) found that corporations with several environmental concerns are penalised with higher interest rate on their bank loans. In contrast, according to the author, environmental strengths do not seem to be rewarded by the creditors.

Pragmatically studying German banks' credit scoring, Weber, Scholz and Michalik (2010) explained that even if environmental profile consideration improved the predictive assessment of a debtor default's probability, environmental data are difficult to integrate into models (Weber, Fenchel and Scholz, 2008). Moreover, the gain in accuracy of the new default prediction models while significant, might not be enough to cover the associated additional expenses incurred by banks when using those new criteria (Weber, Scholz and Michalik, 2010). Therefore, for economic reasons, it seems easy for a credit analyst to argue a preference for forgetting environmental performance consideration.

More recently, some published studies in which the environmental criterion was present without being the main subject, showed equally contrasting results. While Erragragui (2018) demonstrated that environmental concerns increase a firm's cost of debt (using the accounting measure) and environmental strengths decrease its cost of debt; Devalle, Fiandrino and Cantino (2017) studying the impacts of ESG factors as a whole on debt financing in Italy and Spain, found only a weak influence of environmental issues on corporate credit ratings.

3) Social Performance & Credit Risk

The social factor is by far the least studied in isolation in the ESG field. In addition of being most of the time disclosed by companies only on a voluntary basis, with the environmental factor (CFA Institute, 2015; Fatemi, Glaum and Kaiser, 2018), social indicators seem to be the hardest to measure among the whole ESG criteria. Indeed, it is pretty difficult to assess them using numerical representation (Delmas, Etzion and Nairn-Birch, 2013): while greenhouse gas emissions, water usage, and recycling rates are quantifiable variables, labour practices and

stakeholder engagement practices are not, for instance. Nevertheless, social performance is not to neglect.

Bauer, Derwall and Hanna (2009) demonstrated in their literature review that human capital constitutes a key asset and significantly affects an organisation performance and its competitivity on the market. They created an aggregate variable to measure the quality of employee relations within a firm, based on engagement in employment practices and policies. Comparing this new variable to 568 U.S. issuer credit ratings between 1995 and 2006, they found that firms with superior employee relations enjoy higher credit ratings.

Oikonomou, Brooks and Pavelin (2014) extended the scope of the study by using a global KLD social performance score associated with more than 700 U.S. firms in 17 industries between 1991 and 2008. Their empirical analysis suggests that overall, good performance is rewarded and corporate social transgressions are penalized through lower and higher corporate credit ratings, respectively. Especially, support for local communities, higher levels of marketed product safety and avoidance of controversies regarding the firm's workforce, can materially reduce the risk premia associated with corporate bonds.

This actually confirms the finding of Attig, et al. (2013), who proved that credit rating agencies reward firms with good social performance with high ratings. In particular, according to the authors, CRAs seem to attach importance to CSR components that relate primary stakeholder management, such as community relations, diversity, employee relations and product characteristics.

However, in the context of our thesis, the relevant literature on the social criterion does not limit itself to these few academic papers. Indeed, social performance has often been studied jointly with the environmental one, under the name of Corporate Social Responsibility (CSR).

4) CSR & Credit Risk

Within the CSR literature, Jiraporn, et al. (2014) confirmed previous Attig, et al. (2013)'s results using the same database, KLD, as a proxy for CSR scores for U.S. corporate issuers over a twelve years period, up to 2007. In fact, they also found that more socially responsible firms enjoy more favourable credit ratings, but, interestingly, they observed variations in CSR impacts on credit ratings across geographic locations. By using the companies' zip codes, they noted significant differences in this relationship within the country.

Separating CSR strengths and concerns (both extracted from KLD database), Ge and Liu (2015) nuanced the previous findings. When examining more than 4600 new public bonds issued on the U.S. market between 1992 and 2009, they discovered that if good CSR performance is associated with higher credit ratings, there is no statistically significant link between CSR concerns and credit ratings.

Changa, Lib and Shim (2017) contributed to the analysis by broadening the research scope with a sample of 1446 firms from 42 different countries over the period 2002-2014. Using CSR proxy from the database ASSET 4, they noticed that overall CSR has a positive impact on long-term credit ratings, but the magnitude of this impact varies with the country considered: the CSR effect is more significant in countries where higher perceived trust prevails.

By extending our literature review to credit risk beyond the mere credit rating measured by CRAs, we can discern even more contrasting results. While Cooper and Uzun (2015) supported previous hypotheses that U.S. firms with strong CSR benefit from a lower cost of debt, computed as bond yield spread, Menz (2010) is more sceptical. Studying also bond yield spreads and CSR (as provided by SAM database), but changing the geographical area of study for Europe, he finds that CSR is not significantly priced in corporate bonds by the European debt market.

Izzo and Magnanelli (2012)'s work also counts among the few studies covering companies outside of the U.S. Focusing on France, Germany, Italy and Japan, they studied CSR through SAM index, and associated it with the company's cost of debt, measured by the accounting ratio. Surprisingly, they found a positive relationship between CSR performance and the cost of debt, meaning that actually on their sample of 332 firms over a five years' period, CSR was not considered as a firm's value driver by debt investors, but rather like a waste of resources negatively impacting the financial performance of the firm.

However, when taking into account all ESG variables in corporate credit ratings, such discrepancies seem to disappear.

5) ESG & Credit Risk

Currently, very few studies have focused on all ESG factors and their impact on corporate credit ratings at the same time. To date, we can only count three research papers.

Stellner, Klein and Zwergel (2015) examined the relationship between ESG performance and credit risk, measured by both credit ratings and zero-volatility spread, on corporate European bonds issued between 2006 and 2012. They found no statistically significant evidence that companies that have a good CSR, are systematically rewarded with better ratings. In fact, all depends on the country in which companies are located within the Economic and Monetary Union (EMU): superior ESG performance is regarded as risk-reducing and rewarded with higher credit ratings only for the companies which corporate social performance matches the ESG performance of the countries in which they operate.

Devalle, Fiandrino and Cantino (2017) conducted a similar academic research based on the observations of 56 Italian and Spanish firms, in 2015 and, utilizing ESG performance score from ASSET4 database. Their study shows that overall ESG performance leads to higher credit ratings. However, each ESG factors does not seem to influence credit ratings with the same significance. While social and governance issues can be directly related to corporate credit ratings, the link between the latter and firms' environmental performances is significantly weaker.

Finally, Cubas-Dias and Martines Sedano (2018) studying the relationship between relative sustainable performance and corporate credit ratings worldwide, also found that companies with higher sustainability performance tend to have better credit ratings. Furthermore, they demonstrated that credit rating agencies seem to only rely on tangible CSR observations. More precisely, regarding CSR, CRAs do not seem to take into account the firm's consistency over time or the firm's ESG commitments, the focus is made only on results. Interestingly, Cubas-Dias and Martines Sedano (2018) also observed that sustainability performance is less and less valued by CRAs in their creditworthiness assessment over the period 2008- 2015.

To conclude and summarize this essential part of our literature review, we can recall that results relating to credit ratings and ESG factors are still very fragile. Plus, depending on the ESG criterion considered, observations also vary considerably. More pragmatically, the

classification of those academic papers in a summary table, Exhibit 1, allows us to highlight two interesting biases:

- Most of the studies are based on the U.S. bond market. As several researchers have warned us against the fluctuations of CSR impacts according to geography (Changa, Lib and Shim, 2017; Jiraporn, et al., 2014; Stellner, Klein and Zwergel, 2015), it results in a research gap we would like to address in this dissertation.
- A majority of researchers have used the same databases' score, mainly KLD one and to a lesser extent Thomson Reuters (Asset 4) one, as a proxy for companies' CSR performance. But recently, several researchers in the field of sustainable development, have questioned the reliability of these databases. They denounced for example, the very low correlation between ESG ratings, which seem to be lower than 0.3; when conventional credit ratings displayed a correlation higher than 0.9, meaning that they are closely aligned (Dorfleitner, Halbritter and Nguyen, 2015; Mooij, 2017; Wigglesworth, 2018).

The questioning is so important that some academics even alert on the validity of all published studies that have used the ESG ratings as a proxy (Mooij, 2017).

That is why, before reviewing the information made public by the Big Three on their consideration of the ESG criteria in their corporate credit ratings, we will try to understand how the CSR information providers work.

C- ESG performance measurement and current integration by CRAs

1) ESG ratings

Scalet and Kelly (2010) define an ESG rating agency as: "Any organization that rates or assesses corporations according to a standard of social and environmental performance that is at least in part based on non-financial data". Please note that for the rest of our dissertation, we will use the terms ESG rating agencies, sustainable rating agencies and CSR rating agencies interchangeably, without considering any difference between them.

As this definition suggests, there are no rules concerning CSR rating agencies (Dorfleitner, Halbritter and Nguyen, 2015). Some ratings are based exclusively on extra-financial information while others combine financial and extra-financial data to establish their sustainability review (Escrig-Olmedo, et al., 2019). Some use only public information, while others interact directly with the companies assessed (Saadaoui and Soobaroyen, 2018). In fact, each ESG rating agency uses its own methodology (Escrig-Olmedo, et al., 2013).

Although ESG rating agencies are less recognized than their counterpart the credit rating agencies (Escrig-Olmedo, et al., 2013), their indicators are already widely used by investors, governments, NGOs, and, as previously seen, academics (Saadaoui and Soobaroyen, 2018).

In fact, following the rising demand for quality ESG data, ESG rating agencies have multiplied in recent years (Avetisyan and Hockerts, 2017; SustainAbility, 2019); in particular in the U.S. and Eastern Europe (Mooij 2017). In a report published on February 2019, the think tank and advisory firm SustainAbility reports more than 600 ESG ratings globally. SustainAbility 's report (2019) also underlines the dominance of a few rating agencies in the market: RobecoSAM Corporate, CDP Climate, Water & Forest Scores, Sustainalytics' ESG Risk Ratings, MSCI ESG Ratings, Bloomberg ESG Performance Score and Thomson Reuters ESG. Interestingly, corporate professionals and academics perceive differently those ESG ratings in terms of quality and usefulness, as the exhibit 2 shows.

Actually, this proliferation of ESG rating systems and the high difference in perception by stakeholders, call into question the quality, the reliability and the utility of ESG scores provided on the market (Delmas, Etzion and Nairn-Birch, 2013; Saadaoui and Soobaroyen, 2018).

On one hand, the need for ESG rating has been widely accepted (Bouten, et al., 2016; Saadaoui and Soobaroyen, 2018). Indeed, like credit rating agencies, sustainability agencies have the role to provide investors with filtered company's information (Saadaoui and Soobaroyen, 2018), guarantying a more objective view of ESG performance than it would be if provided by the companies themselves (Bouten, et al., 2016; Saadaoui and Soobaroyen, 2018). Also, CSR rating agencies allow investors to better get the inherent complexity of ESG performance and they provide them with a global score enabling cross-company comparison (Delmas, Etzion and Nairn-Birch, 2013).

But, on the other hand, the processes and methodologies used by those ESG rating agencies have been increasingly denounced those past few years (Delmas, Etzion and Nairn-Birch, 2013;

Escrig-Olmedo, et al, 2013, 2019; Mooij 2017; Saadaoui and Soobaroyen, 2018). In particular, they are reproached:

- A lack of common theorization of CSR and commensurability:

As no single definition of CSR exists, different ESG rating agency can interpret the corporate social responsibility concept in different ways (Dorfleitner, Halbritter and Nguyen, 2015). Studying CSR scoring methodologies adopted by rating agencies, Saadaoui and Soobaroyen (2018) noted evidence of similarities between the examined organisations. For example, they all include the three pillars of ESG in their analyses, they all adopted quantification and exclusion criteria. Nevertheless, significant discrepancies differentiate them too. Firstly, they do not use the same criteria to assess each ESG pillar. Secondly, they have different thresholds of significance before accounting a positive or negative impact. Finally, they do not weight final indicators in their global appraisal in the same way (Dorfleitner, Halbritter and Nguyen, 2015).

Moreover, as underlined by Bouten, et al. (2016), the measurement process is often highly subjective and within the same organisation, while applying the same methodology, different analysts can come out with different ratings for the same company.

As a consequence, it is almost impossible to compare result across agencies (Saadaoui and Soobaroyen, 2018).

- A lack of consistency:

Comparing 2008 and 2018 ESG ratings, Escrig-Olmedo, et al. (2019) also discovered that assessment models vary over time. While changes have been made in order to increase rating's accuracy and robustness, they make it impossible to compare ESG results in time.

- A lack of transparency:

All the above above-mentioned points represent an issue mainly because ESG rating agencies do not communicate on their methodologies, data and processes used (Bouten, et al., 2016; Escrig-Olmedo, et al., 2019), they are actually seen as 'black-boxes' (Saadaoui and Soobaroyen, 2018). The one and only exception is the Swiss ESG rating agency RobecoSAM, which published online a guide on its sustainability assessment methodology with a few examples (RobecoSAM, 2016; Saadaoui and Soobaroyen, 2018). For other companies, it is almost impossible to understand their scoring methods, which data they include in and if they verify them (Bouten, et al., 2016). It is not excluded that ESG rating

agencies using only public information might be the first victim of companies 'greenwashing' (Fatemi, Glaum and Kaiser, 2018).

Those issues are rarely mentioned in the financial literature, in which researchers fully trust ESG scores provided by the ESG rating agencies (Mooij 2017; Saadaoui and Soobaroyen, 2018). To be fair, in our literature review, Menz (2010) might be the only one to mention a possible CSR database problem in his conclusion.

But, a consensus on the lack of comparability of ESG ratings among different agencies seems to be emerging in the sustainable research area (Bouten, et al., 2016; Dorfleitner, Halbritter and Nguyen, 2015; Escrig-Olmedo, et al., 2019; Saadaoui and Soobaroyen, 2018). Sustainable literature even calls for the development of new regulations and the standardization of methods for measuring ESG data and integrating them into sustainable assessment models (Escrig-Olmedo, et al., 2013).

More importantly for the rest of our master thesis, as already mentioned, this situation generates questions regarding the validity of all academic studies that have used ESG ratings as a proxy: indeed, their results may be CSR database-dependent (Mooij, 2017).

2) ESG integration by CRAs

Returning to credit rating agencies and their way of integrating ESG factors in their methodologies, we can first notice that the consideration of the three ESG pillars increases considerably in the credit rating area, and so does the communication around them as well. For instance, all the Big Three have a dedicated page on their websites to ESG integration.

While financial strength is clearly seen by CRAs, as the most important factor affecting final credit rating, the Big Three are also reporting more and more cases in which a company's ESG performance have significantly influenced the final score (Allianz Global Investors, 2017).

For instance, S&P in its 2017 report entitled ' How Does S&P Global Ratings Incorporate Environmental, Social, And Governance Risks Into Its Ratings Analysis' disclosed that between mid-2015 and end of August 2017, environmental and climate concerns were at stake in 717 cases, which represent 10% of their corporate credit assessments, at that time. 106 times out of 717, those concerns directly resulted in a rating impact (S&P Global Ratings, 2017). Similarly, Fitch recently disclosed that 22% of corporations they rate, are actually influenced

by E, S, or G factors. Barely 3% of them had to deal with a change in their ratings due to one ESG sub-factor (Fitch Ratings b, n.d.).

This shows that ESG factors are at least sometimes, taken into account by CRAs in their creditworthiness assessments, if not systematically. Indeed, the newest press releases of the Big Three on the topic demonstrate their will to incorporate ESG criteria in their methodologies in a systematic and consistent way. Our findings are summarized in the table below, which is, actually, an updated version of the work done by Allianz Global Investors in 2017:

Figure 1.8: Comparison table of ESG integration by the Big Three.

	Key criteria	S&P	Moody's	Fitch
Environmental Factors	*Mentioned in document*	Evidence	Evidence	Evidence
	Explicitly mentioned as credit criteria	Evidence	Evidence	Evidence
	Extent of E in credit risk analysis	Considerable evidence	Evidence	-
Social Factors	*Mentioned in document*	Evidence	Evidence	Evidence
	Explicitly mentioned as credit criteria	Evidence	Evidence	Evidence
	Extent of S in credit risk analysis	Evidence	Evidence	-
Governance Factors	*Mentioned in document*	Considerable evidence	Evidence	Evidence
	Explicitly mentioned as credit criteria	Considerable evidence	Evidence	Evidence
	Extent of G in credit risk analysis	Considerable evidence	Considerable evidence	Evidence
Methodology	*Level of Consideration*	Incorporates country and industry risk and an assessment of the competitive position	Individual industry and entity specific ESG considerations	Individual industry and entity specific ESG considerations

Approach	• Risk based approach • Opportunity-based approach for E&S • Downside-scale for governance • Industry/sector differences	• Risk and downside based approach • Industry/sector differences	• Risk and downside based approach • No consideration of good governance • Industry/sector differences
Time Horizon	Long-term	Long-term (qualitative approach) Nearer-term (quantitative approach)	n/a
Integration	• E&S considered when deemed material • G is a part of the "management" assessment in the credit rating process	• E&S considered when deemed material • G is a fixed component of CR assessments	• G: considered on individual case basis • E&S considered when deemed material for non-financial corporations
Which factor is most important?	Governance, E&S will receive more prominence in the future	Governance, E will receive more prominence in the future	Governance, E&S will receive more prominence in the future
Additional information	• Regular publications on environmental & social event risks • Development of their own ESG evaluation, apart from credit rating business	• Social performance group (Moody's SRI research platform) • Majority stakeholder of a firm specializing in climate risk, Four Twenty Seven, since July 2019	• Recent launch of ESG Relevance Scores on credit ratings (2019)

Source: Author, based on Allianz Global Investors (2017); Fitch Ratings b (n.d.); Moody's (2018); Nedelec (2019); S&P Global Ratings (2017, 2019); Whieldon (2018) |

In particular, this summary table shows that in the past and until now, CRAs consider governance as the most impacting ESG factor on corporate creditworthiness. In line with academic research, environmental performance is increasingly valued, at least at the industry and region-level. Furthermore, following a principle of prudence, CRAs seem to attach more

importance to ESG concerns than to ESG opportunities at the corporate level: risk approach dominates. Finally, although the qualitative judgment regarding the ESG impact on credit risk is still present, a breakthrough of ESG quantitative integration into models is disclosed by the CRAs.

Since August 2018, all the Big Three are now part of the PRI network and committed to incorporate ESG criteria into their credit analyses in a systematic and transparent way. Indeed S&P and Moody's signed the Credit Ratings Statement in 2016. Fitch has joined the group in August 2018 (PRI, 2019).

However, despite this commitment and the reviewed communication of the Big Three, the materiality of ESG integration in corporate credit ratings by CRAs creates an open debate on the academic side. While elaborating his methodology in his research paper, Menz (2010) considered that credit ratings included ESG issues in some extent, Cash (2017) suggested that S&P and Moody's are incorporating ESG consideration in credit ratings "in name only".

This is this ending confrontation and associated pending questions that especially motivated our topic choice for this master thesis.

D- Part summary and Research Gap

To conclude, this second part of our literature review provides us with some answers to our main research questions. Indeed, we found some evidence that CRAs actively consider ESG criteria in their corporate credit ratings, and that historically environmental, social and governance factors have been incorporating differently into credit ratings. However, like for the financial perspective seen previously, the CRAs' processes for considering ESG factors remain fuzzy. That is why, we will pursue our dissertation with an empirical study to assess the systemic character of ESG integration into corporate credit ratings and the associated weights in the final score of each non-financial determinants. When planning our empirical study, we should especially consider the following elements, we also learnt in this academic review part.

Indeed, this documentary study helps us to understand the current challenge of incorporating ESG indicators in credit rating models, as:

- ESG issues are infinite, and no exhausting list can be drawn up.

- The extent and quality of ESG disclosure by companies stay heterogenous. Almost no standardized ESG data are available, in particular concerning environmental and social issues; even if ESG information is maturing and getting better.

Research relating ESG criteria and credit risk are still in its early stages, and a consensus on this topic is clearly not reached. In fact, while research on governance is the most advanced and a consensus has emerged a few years ago, recent papers seem to reject the commonly accepted positive influence of corporate governance on credit ratings. On the other hand, only a few studies have focused on the environmental and social aspects in the debt markets and no clear conclusion can be drawn to date.

To make matters worse, some researchers questioned the validity of all the ESG works based on a global score provided by CSR rating agencies. Indeed, the latter lacks robustness in the methodology they use and therefore the results disclosed might be misleading. What's more, we notice that a wide range of academic papers relied on the same CSR databases, namely KLD and to a lesser extent Thomson Reuters (Asset 4), as shown in Exhibit 1.

Lastly, while academic evidence underlines high differences in ESG impact on financial performance across regions; we note that most academics studied the U.S market in their empirical analyses.

As a consequence, we expect to contribute to current research by taking into account those last two elements, as follows:

- Our empirical research on ESG criteria consideration by credit rating agencies will be conducted outside of the U.S., on a French sample.
- We do not claim to be able to calculate a company's ESG performance better than CSR rating agencies. Thus, to take into account the alert launched by sustainable researchers in recent years, we will prefer to vary the databases used for ESG performance proxy. Therefore, we plan to use two databases, particularly recognized by professionals but yet very little used in the academic world: RobecoSAM and Sustainalytics (SustainAbility, 2019), as Exhibits 1 and 2 show.

Full details on the methodology adopted are provided in the next chapter.

CHAPTER II.

METHODOLOGY

In this chapter, we will develop the methodology adopted to conduct our empirical analysis.

Thus, after a recall of the main research gaps previously identified, we will introduce our strategy based on four ordered logit models, and we will make some hypotheses on the expected results. The choice of our sample centred on French companies and its construction will also be presented, as well as each of the variables used in our regressions.

I- Hypotheses development and methodology

As a synthesis of our literature review, Figure 3.1 presents the main research gaps that have been previously identified:

Figure 2.1: Summary of research gaps identified in the literature review.

	Credit Ratings (CRs)	ESG Criteria	ESG Integration in CRs
Main Research Gaps	Lack of Transparency in the creditworthiness assessment process from CRAs	Poor Homogeneity & Comparability of data available	Lack of unanimity in the literature concerning the nexus between ESG performance and debt financing/credit risk
		Lack of Transparency & precision over the data collected	Difficulty to assess the materiality of ESG factors in creditworthiness & to incorporate them in a timely accurate model

Source: Author |

Indeed, in the first part of our literature review, we noticed the lack of transparency of CRAs, and their attachment to consistency processes. We also observed that historically, CRAs have been quite independent and have never been under pressure to disclose such details on specific points of their methodologies, nor from regulators, or the society. Thus, it seems legitimate to observe how they react to this new request for ESG enhancement in credit risk assessment.

Besides, in the second part of our academic review, we got to understand the challenge that represents ESG integration into credit risk models. Beyond the choice of relevant indicators,

which appears to be a difficult one, as indicators might be specific to a country, an industry or even to the company itself, CRAs must know how to harmonize the data and convert them into timely usable values to assess a company's creditworthiness.

Meanwhile, research on the nexus between ESG performance and debt financing is still at its early stages. For the moment, academic work does not provide unidirectional results on the possible ESG impact on credit risk. This suggests to us how big might be the challenge of ESG integration for CRAs.

The challenge seems to be so important that, the full ESG integration in corporate credit rating, as communicated by the Big Three, is more and more questioned by the academics and financial institutions (Cash, 2017; European Commission, 2018; HLEG, 2018).

Therefore, to address those doubts and cover the research gaps aforementioned, we determined two main research questions: To what extent do ESG criteria impact corporate credit ratings? And, are some ESG dimensions considered as more relevant by CRAs? In addition to our literature review, to answer those questions, we propose to use a quantitative method and to conduct an empirical analysis on the French bond markets.

Please, note that the purpose of this research work is not to evaluate the credit agencies' approach but on the contrary, to try to establish a historical point of comparison, for future research on CRAs' progress since the moment they officially accepted the ESG challenge. Therefore, we focus on the 2018 fiscal year.

Especially, our empirical analysis will follow-up the work of Devalle, Fiandrino and Cantino (2017), made on 56 Italian and Spanish firms on the fiscal year 2015. In accordance with the findings of the first part of our literature review, we will conduct an ordered logit regression (Kamstra, Kennedy and Suan, 2001) to examine the impacts of non-financial factors on French corporate credit ratings, after controlling for key financial ratios known to affect creditworthiness assessments.

In particular, we will build four models in order to analyse ESG integration as a whole, and as individual performance component. We will also take into consideration the possible ESG database bias by working with two different ESG rating providers. Our strategy is summarised in the table below:

Figure 2.2: Summary of the four regression models and their demonstration purposes.

Models	Dependent variable	Financial Variables (Controlling Effect)	Non-Financial Variables (Tested ESG factors)	Objective
1.Basic Model	Credit Rating	Size, Leverage, Revenue, Margin, Loss, Market Capitalisation and Beta	-	Test the reliability of the model built.
2.Global_RobecoSAM	Credit Rating	Size, Leverage, Revenue, Margin, Loss, Market Capitalisation and Beta	Total Sustainability Rank established by RobecoSAM	Test global ESG impact on credit rating
3.Global_Sustainalytics	Credit Rating	Size, Leverage, Revenue, Margin, Loss, Market Capitalisation and Beta	Total ESG ranking established by Sustainalytics	Test global ESG impact on credit rating
4.Detailed ESG_Sustainalytics	Credit Rating	Size, Leverage, Revenue, Margin, Loss, Market Capitalisation and Beta	Social, environment and governance ratings established by Sustainalytics	Test each ESG pillar's impact on credit rating

Source: Author |

In the context of nascent and non-unanimous literature on the subject, it has been difficult to make assumptions on the expected outcomes of our four models.

However, when strictly focusing on the few studies analysing the nexus between ESG performance and credit ratings, we noted that they all reported a positive (Amana and Nguyen, 2013; Ashbaugh-Skaife, Collins and LaFond, 2006; Attig, et al., 2013; Bauer, Derwall and Hanna, 2009; Bhojraj and Partha, 2003; Cubas-Díaz and Martínez Sedano, 2018; Devalle, Fiandrino and Cantino, 2017; Oikonomou, Brooks, and Pavelin, 2014) or a zero relationship (Stellner, Klein and Zwergel, 2015). In particular, the zero relationships have been only found in European samples, while the positive relationship has been mainly demonstrated in the U.S. and worldwide studies. In fact, Stellner, Klein and Zwergel (2015) explained that consideration

of ESG performance into corporate credit rating seems to vary across countries, depending on how ESG matters are considered at country-level.

As no studies have been conducted on the French market yet, we rely on the sole results found at European country-level (Devalle, Fiandrino and Cantino, 2017) and formulate the following hypotheses:

H1: *ESG performance is positively associated with credit ratings: better ESG performance leads to a higher credit rating.*

H2: *Good corporate governance is positively associated with credit ratings: better corporate governance leads to a higher credit rating.*

H3: *Environmental performance is positively associated with credit ratings: better environmental performance leads to a higher credit rating.*

H4: *Social performance is positively associated with credit ratings: better social performance leads to a higher credit rating.*

Concerning the use of two different ESG databases, we anticipate a difference in the intensity of the relationship between ESG factors and credit ratings, but we think that both models 2 and 3 will lead to a positive relationship between ESG scores and credit ratings.

II- Sample determination

We decided to focus our study on a sample based on the 120 biggest French capitalizations for the year 2018.

→ The choice of a sample composed of French companies

Beyond our desire to expand research in the debt financing area outside of the U.S., France was chosen for several reasons.

Firstly, France has a large and active corporate bond market, especially at the European level. Over a total of €25.8 billion of European corporate bonds in 2016, French companies accounted

for about 10% of the new issuance, thus forming the second nationality on this market (European Commission, 2017).

Second, France is recognized worldwide to be a leading country in terms of sustainable development promotion, and especially on the corporate side. French financial investors counted among the early adopters of Socially Responsible Investment (SRI) for example, and France, as of 2018, is still the most developed SRI market in Europe (Crifo, Durand and Gond, 2019).

But more importantly, the French government asked early on, to companies on its territory, to commit in corporate social responsibility. France is one of the pioneers in terms of ESG regulations (Aureli, Magnaghi and Salvatori, 2018). In 1977, social reporting addressed to works council (or 'Bilan social') was implemented as a legal requirement (Aureli, Magnaghi and Salvatori, 2018; MEDEF, 2017). Nowadays, the largest French companies must disclose numerous extra-financial information in their management report, publicly available. Each year, they have to communicate information on corruption (Loi Sapin II), on their duty of vigilance vis-à-vis their suppliers and subcontractors (Loi relative au devoir de vigilance, du 27 mars 2017), and on the risks and policies adopted in diverse areas: social, environmental and respect of human rights (Transposition of the European Non-Financial Reporting Directive) (MEDEF, 2017). Not only French regulation enters quite in detail in terms of information to be provided in relation to each of the topic (Aureli, Magnaghi and Salvatori, 2018), but it also pays attention to the quality of the information disclosed. All ESG disclosure by the companies with a balance sheet of at least 100 million Euros or net turnover of 100 million Euros and 500+ employees should be especially audited by an auditing firm or any other assurance provider (Aureli, Magnaghi and Salvatori, 2018). French law also requires companies to specify the methods of calculation retained when they use quantitative indicators and to be as consistent as possible over the years (MEDEF, 2017). More importantly for our dissertation, as ESG performance is disclosed in the management report, it means that this information is accessible for the public at the same time as the financial data and is related to the same time period.

As a result, in France, ESG data quality has significantly increased over the years (Chauvey, Giordano-Spring and Cho, 2015), and according to Aureli, Magnaghi and Salvatori (2018), France even "seems to have gone the furthest in terms of reliability of the information", among all European countries.

Thus, as large French companies might produce, under regulatory supervision, the most harmonized and detailed ESG information on the European market, France appeared to us as the ideal candidate to conduct this empirical study at a country-level.

→ **The final companies' sample construction**

More pragmatically, based on the SBF120 we create our final French companies sample as follows:

- Firstly, on the basis of financial data, we check that no outliers are in the considered sample.
- Secondly, in order to have the most complete sample possible, we eliminate all companies for which one variable is missing. While concerning credit ratings, the data was missing for only four companies, most of the filtering process occurred when considering the ESG data availability. The data selection and collection processes will be precise in the next section.

As a result of the data cleaning phase our final sample is reduced to 71 companies, spread by sector as follows:

Figure 2.3: Sample breakdown by industry.

Sector	Number of companies	Sample shared in %
Consumer	24	34%
Industrial	12	17%
Financial	14	20%
Communications	8	11%
Energy	2	3%
Utilities	3	4%
Basic Materials	4	6%
Technology	4	6%
TOTAL	71	100%

Source: Author |

III- Variables selection and data collection

As a reminder, in the models we previously introduced, three kinds of data are needed: ESG rating data, credit rating data and lastly financial data. For all of them, we use the Bloomberg terminal as the main source to collect them. In this section, the exact variables selected for our four models will be presented one by one, and statistically observed in a fourth and last sub-part.

→ **ESG data selection and collection**

Academics often rely on ESG rating providers to construct their models investigating the impacts of ESG dimensions on credit rating, as did Attig, et al. (2013), Devalle, Fiandrino and Cantino (2017) or Stellner, Klein and Zwergel (2015) for example. We follow their examples and choose to work with two different ESG databases, which provide ratings through the Bloomberg terminal: RobecoSAM and Sustainalytics. We argue that this choice of those two ESG databases brings diversity to the literature and also allows us to circumvent the rising comparability issue among ESG ratings. In order to understand what exactly constitute the ESG ratings considered, we research on both ESG data providers:

❖ **RobecoSAM sustainability ratings**

The SAM Group is a Swiss investment company which has focused since its creation in 1995, on sustainability investments, and corporate sustainability assessment (RobecoSAM, 2016). In particular, we use in our model the RobecoSAM company's total sustainability score. In our regression, this variable is named SAM_Sustainability.

This score is established on the basis of both public information (through annual reports, media and stakeholders analysis) and special information provided by the rated company through an online questionnaire. The industry-specific questionnaire is composed of 80 to 120 questions about financially relevant environmental, economic and social factors. Specialized analysts evaluate those surveys and convert them into quantitative scores. It is worth mentioning, that according to the disclosed methodology, RobecoSAM is especially attentive to company's progress over time and the quality of the answers provided. In fact, when filling the

questionnaire, companies must provide to RobecoSAM the adequate documentation to support their answers. In the end, companies receive a Total Sustainability Score between 0 and 100, which is the sum of all weighted questions scores. The higher the score disclosed, the better the company's ESG performance (RobecoSAM, 2016).

Among the disclosed sustainability score provided by RobecoSAM, we can also find some assigned to companies that did not fill the questionnaire, and therefore only based on public information (RobecoSAM, 2016). This can represent a hurdle to our research, as under a caution principle defined by RobecoSAM, in such cases, companies are penalized when the answers to the questionnaire are not publicly disclosed. However, as seen in our first part of our documentary study, CRAs usually maintain close relations with their customers and they will not have to deal with the same problem of access to ESG information.

Even so, RobecoSAM is particularly recognized for its ESG rating quality by both financial professionals and academics (SustainAbility, 2019). Besides, Izzo and Magnanelli (2012) and Menz (2010) used its ratings in their studies for example.

❖ **Sustainalytics' ratings**

Sustainalytics is an international leading ESG research and rating company, based in the Netherlands. The CSR rating agency evaluates a company's sustainability performance distinguishing three main issues: environmental, social and governance (Huber and Comstock, 2017). In particular, Sustainlytics focuses on the risk those issues might represent for a business. Since 2018, the firm has stood out from industry-specific topics, and it promotes ratings that reflect "the relevance of each ESG issue in the unique context of each company within its subindustry", and by doing so, it authorizes cross-sectoral comparison (Sustainalytics, 2018). Compared to RobecoSAM, the company discloses much less information on its methodology and rating process. Indeed, while its website does indicate that the rating firm looks at a company's policies, programs, practices and controversies to build its ratings, it does not indicate, for example, the extent of its interactions with the assessed company (Sustainalytics, n.d.). This lack of transparency on sources and processes used by the rating agency could explain why, despite the call from academics to diversify databases by including new leading ones, such as Sustainlytics (Bouten, et al., 2016), no research paper studying the nexus between debt financing and ESG factors using the Dutch database, has been conducted yet, at least to the best of our knowledge.

However, it appears in the top 3 ESG databases valued by financial professionals for its ESG ratings quality and usefulness (SustainAbility, 2019). It also presents the advantage of offering both a global corporate ESG score and three detailed ratings for each ESG component. Therefore, we utilise Sustainalytics'data for two of our models by including the following variables:

-   The Sustainalytics rank, called in our model SS_ESG, which represents an overall percentile rank assigned to the company, based on its ESG total score relative to its industry peers. The top 1% receives a mark of 99 (99% percentile), and the bottom 1% a mark of 1 (1% percentile). Hence, the better the company's ESG performance, the higher its Sustainalytics rank (Definition available on Bloomberg Terminal, as of 30/07/2019).

-   The Sustainalytics Social Percentile, named in our model SS_SOC, which ranks for the company's management of its social impact compared to its industry peers. Social performance is here determined by the quality of the company's policies, programs and management systems concerning employees, suppliers, customers and society. Related controversies are also taken into account. Basically, the top 1% receives a mark of 99 (99% percentile), and the bottom 1% a mark of 1 (1% percentile). Hence, the higher the company's social performance, the higher its Sustainalytics social rank (Definition available on Bloomberg Terminal, as of 30/07/2019).

-   The Sustainalytics Environment Percentile, named in our model SS_ENV, which ranks for the company's management of its environmental record compared to its industry peers. Environmental performance is here determined by the level of environmental-related preparedness and disclosure. Related environmental controversies are also taken into account. Basically, the top 1% receives a mark of 99 (99% percentile), and the bottom 1% a mark of 1 (1% percentile). Hence, the higher the company's environmental performance, the higher its Sustainalytics environment rank (Definition available on Bloomberg Terminal, as of 30/07/2019).

-   The Sustainalytics Governance Percentile, named in our model SS_GOV, which ranks for the company's management of its governance activities compared to its industry peers. Basically, the top 1% receives a mark of 99 (99% percentile), and the bottom 1% a mark of 1 (1% percentile) (Definition available on Bloomberg Terminal, as of 30/07/2019).

→ **Credit ratings collection and process**

We use company's credit ratings from S&P, as reported by Bloomberg. When S&P long-term issuer credit rating is missing, we exploit Moody's one instead. Following related studies (Devalle, Fiandrino and Cantino, 2017; Ge and Liu, 2015 among others) and using the ratings equivalent table seen in our literature review, we transform the alphabetical credit ratings into an ordinal scale: for AAA we assign the value 20, 19 for AA+.. etc.

→ **Financial data selection and collection**

To isolate the effects of the ESG variables, we control for a set of financial variables traditionally used in the literature analysing the drivers of credit ratings (Attig, et al., 2013; Devalle, Fiandrino and Cantino, 2017). They are introduced in the following table:

Figure 2.4: Overview of control variables: definitions and data sources.

Variables	Definition	Source
SIZE	Logarithm of total assets	Author' calculations based on Bloomberg provided data.
LEVERAGE	Ratio of long-term debt to total assets	Author' calculations based on Bloomberg provided data.
REVENUE	Logarithm of total sales	Author' calculations based on Bloomberg provided data.
MARGIN	Ratio of operating income to sales	Author' calculations based on Bloomberg provided data.
LOSS	Indicator variable set to 1 if net income before extraordinary items is negative in the current and previous year, and 0 otherwise	Author' calculations based on Bloomberg provided data.
MARKET CAPITALIZATION	Logarithm of total market value of the company's outstanding shares at the fiscal year-end date.	Author' calculations based on Bloomberg provided data.
BETA	Market beta over the 2018 fiscal year	Bloomberg

Source: Author |

→ **A global overview of regression variables**

Overall, our final sample includes 13 variables for 71 French companies, the distribution of those regression variables, for the 2018 fiscal year, is reported in the table below:

Figure 2.5: Summary table of the regression variables descriptive statistics.

VARIABLES	Mean	Median	Minimum	Maximum	Standard Deviation
Dependent Variables					
CREDIT RATING	18.58	20.00	4.00	20.00	3.07
Control Variables					
SIZE	4.45	4.39	2.92	6.31	0.66
LEVERAGE	0.18	0.18	0.00	0.45	0.11
REVENUE	4.06	4.13	2.65	5.27	0.56
MARGIN	0.16	0.11	-0.15	1.41	0.25
LOSS	0.01	0.00	0.00	1.00	0.12
MARKET CAP	4.09	4.06	2.97	5.15	0.48
BETA	1.20	1.20	-2.32	6.95	1.43
Tested Variables					
SAM_Sustainability	71.15	74.00	15.00	100.00	21.41
SS_ESG	81.20	89.36	15.63	100.00	18.59
SS_ENV	79.66	82.00	18.75	100.00	17.63
SS_SOC	78.84	84.62	28.13	100.00	19.23
SS_GOV	73.55	80.77	14.89	100.00	24.74

Source: Author |

As this table suggests, our sample is widely dispersed, especially when regarding maximum and minimum of ESG ratings; but it is also well balanced: for each variable mean and median values are quite close.

Lastly, we finalize our regression variables observation with the establishment of a correlation matrix:

Figure 2.6: Correlation matrix of regression variables, as computed by Gretl.
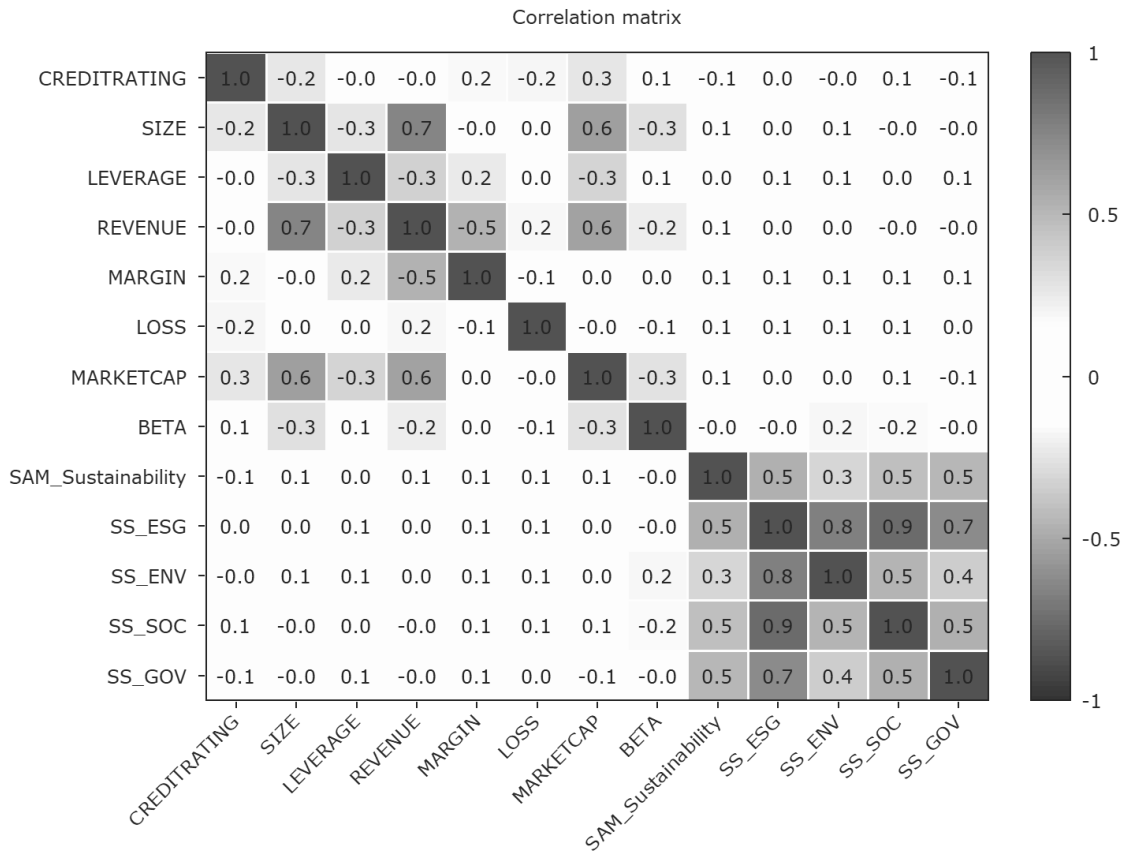
As a recall, multicollinearity occurs when two or more independent variables in a regression model are highly correlated, which means when the correlation coefficients are higher than 0.8. In line with our expectations, only the Sustainalytics scores present multicollinearity between them; which is logical. Interestingly, we can observe that total ESG score provided by the two different databases are correlated at 53%. We also note that market capitalization, company's size and sales are quite connected but multicollinearity concerns are disproven. Actually, more generally, we report low pairwise correlation coefficients among the control variables.

Lastly, only regarding at the correlation matrix, we can observe that the correlation coefficient between CREDIT RATING and ESG ratings are very low, plausibly reflecting a nil impact of ESG factors on the studied credit ratings.

CHAPTER III.

RESULTS & DISCUSSION

Now that the methodology has been presented, this chapter will focus on the results of our empirical study and their discussion.

First of all, we will recall the specificities of our four models, before analysing the results of the associated regressions. Then, in a second phase, the empirical observations will be related to the current literature. Finally, we will discuss the limits of our approach.

I- Regression results

A- Models' specifications

As explained earlier, since our dependent variable, CREDIT RATING, is categorical and ordered, we follow prior research (e.g. Devalle, Fiandrino and Cantino, 2017; Ge and Liu, 2015; Stellner, Klein and Zwergel, 2015) and use ordered logit regression models. More precisely, the four models analysed hereinafter, follow the equations below:

#1: Baseline Model
$\text{Credit Rating}_t = \beta_0 * \text{Size}_t + \beta_1 * \text{Leverage}_t + \beta_2 * \text{Revenue}_t + \beta_3 * \text{Margin}_t + \beta_4 * \text{Loss}_t + \beta_5 * \text{MarketCap}_t + \beta_6 * \text{Beta}_t + \varepsilon_t$

#2: Model using Total Sustainability Score from RobecoSAM
$\text{Credit Rating}_t = \beta_0 * \text{Size}_t + \beta_1 * \text{Leverage}_t + \beta_2 * \text{Revenue}_t + \beta_3 * \text{Margin}_t + \beta_4 * \text{Loss}_t + \beta_5 * \text{MarketCap}_t + \beta_6 * \text{Beta}_t + \beta_7 * \text{SAM\_Sustainability}_t + \varepsilon_t$

#3: Model using Total ESG Score from Sustainalytics
$\text{Credit Rating}_t = \beta_0 * \text{Size}_t + \beta_1 * \text{Leverage}_t + \beta_2 * \text{Revenue}_t + \beta_3 * \text{Margin}_t + \beta_4 * \text{Loss}_t + \beta_5 * \text{MarketCap}_t + \beta_6 * \text{Beta}_t + \beta_7 * \text{SS\_ESG}_t + \varepsilon_t$

#4: Model using detailed ESG scores from Sustainalytics
$\text{Credit Rating}_t = \beta_0 * \text{Size}_t + \beta_1 * \text{Leverage}_t + \beta_2 * \text{Revenue}_t + \beta_3 * \text{Margin}_t + \beta_4 * \text{Loss}_t + \beta_5 * \text{MarketCap}_t + \beta_6 * \text{Beta}_t + \beta_7 * \text{SS\_ENV}_t + \beta_8 * \text{SS\_SOC}_t + \beta_9 * \text{SS\_GOV}_t + \varepsilon_t$

With $t = 2018$, and following the name given to the variables in the previous chapter.

Note that ε stands for residuals. It represents the part of credit rating not explained by the independent variables considered in the model. The lower ε, the more accurate is the model.

B- Regressions 'results analysis

All the regressions have been performed on a cross-sectorial sample of 71 firms. We presented the results for the 2018 fiscal year in the table hereunder:

Figure 3.1: Ordered logit regression results about the effect of ESG performance on corporate credit ratings.

Model #	1	2	3	4
Independent Variables				
SIZE	−6.44219 ***	−7.06022 ***	−6.44364 ***	−6.15181 ***
	<0.0001	*<0.0001*	*<0.0001*	*<0.0001*
LEVERAGE	−4.34779	−5.86045	−4.36602	−4.22465
	0.2106	*0.1348*	*0.2350*	*0.2394*
REVENUE	2.49562 *	3.00438 **	2.49517 *	2.28937
	0.0744	*0.0326*	*0.0745*	*0.1113*
MARGIN	4.58540 *	4.97500 **	4.58767 *	4.61538
	0.0998	*0.0355*	*0.0999*	*0.1104*
LOSS	−5.33156 ***	−5.26774 ***	−5.32766 ***	−4.65345 **
	0.0066	*0.0076*	*0.0071*	*0.0229*
MARKETCAP	7.30425 ***	7.89167 ***	7.30441 ***	7.46354 ***
	<0.0001	*<0.0001*	*<0.0001*	*<0.0001*
BETA	−0.325108	−0.345480	−0.325813	−0.118526
	0.2027	*0.1721*	*0.2092*	*0.6945*
SAM_Sustainability		−0.0310396 *		
		0.0583		
SS_ESG			−0.000266541	
			0.9879	
SS_ENV				−0.0317894
				0.2614
SS_SOC				0.0174841
				0.4464
SS_GOV				0.00605376
				0.7245
Model specification tests				
N	71	71	71	71
Cases 'correctly predicted'	74.6%	71.8%	74.6%	73.2%
Likelihood ratio test, Chi-square	61.0342 ***	64.9566 ***	61.0345 ***	62.7664 ***

Source: Author |

In this table, the logistic regression coefficients are reported for each variable. They give the change in the log odds of the variable CREDIT RATING for a one unit increase in the predictor variable. Each logistic regression coefficients is presented with its level of significance within the model. ***, ** and * indicate significance on the 1%-, 5%- and 10%-level, respectively. Robust standard errors, also called p-values, are reported below each coefficient in grey and italic.

Overall, we can first notice that all of our models are globally significant, since for each of them, the p-value of the likelihood ratio test is below 1%. The four models are effective with a rate of 70% of correct predictions. Exactly, depending on the model considered, they predicted between 51 and 53 correct scores.

We start by analysing our first regression, related to the baseline model in which we only included the control variables defined earlier. Globally, the results reported in Model 1, are consistent with prior research (Attig, et al., 2013; Devalle, Fiandrino and Cantino, 2017; among others): REVENUE and MARGIN positively and significantly impact credit ratings, suggesting that higher revenue and more importantly higher operating margin reduce default risk and in turn enhance firm credit ratings. On the contrary, LEVERAGE and LOSS are negatively related to credit ratings, which implies that firms highly leveraged are seen as riskier by CRAs, as well as, the one not able to make profits two years in a row. Concerning market risk, we observe that CRAs tend to agree with equity investors expectations: MARKET CAPITALILSATION is significantly positively associated to credit rating, while BETA, indicating equity risk, has a negative impact on credit rating. Surprisingly, and in contrast with literature, SIZE is negatively impacting CREDIT RATING in our sample, meaning that CRAs do not believe that larger firms are less risky. Larger companies even seem to be penalized for higher risk of default. We think this is a particularity of our sample. We do not judge this difference as significant since all SIZE values, in our final sample are relatively similar with a standard deviation around the mean (at 4.45) of 0.66.

Then, to test the relation between global ESG performance and credit ratings, we augment the baseline model by introducing ESG ratings provided by RobecoSAM and Sustainalytics, in model 2 and 3 respectively.

In contrast with our initial hypothesis, Model 2 suggests a negative impact of sustainability performance on credit ratings for French companies. The related coefficient is significant at 10%. However, in absolute term, the impact of SAM_Sustainability is quite weak, as the coefficient presented is lower than 0.04. As a consequence, holding all the parameters constant, SAM_Sustainability is the variable with the least impact on corporate credit ratings. While still significant overall, Model 2 also slightly lose in ability to correctly predict credit ratings compared to Model 1: Model 2 shows 71.8% of cases correctly predicted vs. 74.6% for Model 1.

Results of Model 3, which incorporated the Sustainalytics ESG rating, insinuate that ESG performance is not considered at all in credit ratings. Indeed, the p-value of 0.9879 (while the maximum is 1) shows that undoubtedly, there was no significant relationship between the dependent variable CREDIT RATING and the independent one SS_ESG for the French biggest companies in 2018.

Despite this result, accordingly to our initial strategy, we examine the individual impact of each ESG dimensions in the assessment of creditworthiness. Hence, in our fourth model, we added to the baseline three new variables provided by Sustainalytics, namely SS_ENV, SS_SOC, and SS_GOV. It comes as no surprise that while the model is still overall significant, the three new variables only bring confusion in it. None of them significantly influences CREDIT RATING, as their p-value show: 0.26, 0.45 and 0.73 respectively.

In summary, contrary to our hypotheses, we do not find a statistically significant relationship between ESG performance and corporate credit ratings, on our sample composed of the biggest French public companies. Indeed, in two of our three models examining this nexus, ESG variables are not significant. In the third model, using RobecoSAM total sustainability score, while the coefficient is significant at 10%, it is so low compared to the ''hard'' financial variables that we cannot conclude that corporate non-financial performance plays a role in the corporate credit rating determination.

We will use the next section to try to understand this quite divergent finding with literature and discuss the limits of our research approach.

II- Empirical study discussion

A- Results discussion

The above result contrasts with most of the few scientific studies carried out on the subject, that underlined a positive relationship between ESG criteria and corporate credit ratings (Amana and Nguyen, 2013; Ashbaugh-Skaife, Collins and LaFond, 2006; Attig, et al., 2013; Bauer, Derwall and Hanna, 2009; Bhojraj and Partha, 2003; Cubas-Díaz and Martínez Sedano, 2018; Devalle, Fiandrino and Cantino, 2017; Oikonomou, Brooks, and Pavelin, 2014). It can be interpreted in different ways. Indeed, the localisation of our empirical study, the time considered and the data used could explain the puzzling observations.

First, we should notice that our observation is not an isolated case either. As a recall, Bauer and Hann (2010) demonstrated that while environmental concerns lowered credit ratings, environmental strengths did not seem to impact the creditworthiness assessment done by CRAs. More generally, when observing the European market as the whole, Stellner, Klein and Zwergel (2015) reached the same conclusion as we did, arguing that no statistical evidence could be found that higher CSR was rewarded by better credit ratings. Looking deeper in their results, Stellner, Klein and Zwergel (2015) actually underlined that CSR is considered differently across countries: companies' ESG performance is rewarded in credit ratings, mainly compared to the relative ESG performance of the country where they are located. And, precisely, we have seen previously that Europe and France more specifically, attach a lot of importance to ESG matters. So, this might partially explain our result. Our sample companies' ESG performance might not be high enough for the high standards expected in France.

Consistent with this assumption, we can mention that at the best of our knowledge, only three studies examining ESG impact on debt financing include France in their samples, when excluding worldwide analyses: Menz (2010), Izzo and Magnanelli (2012) and Stellner, Klein and Zwergel (2015). In the last quoted study, France was even the most representative European country with 319 corporate bonds included over a total of 872. Interestingly, all those academic research concluded that CSR practices are not systematically rewarded by creditors. Izzo and Magnanelli (2012) even showed that European companies seem to be financially penalized by CSR investments.

In addition, Friede, Bush and Bassen (2015) reviewing more than 2000 academic studies, also remarked unclear results related to the link between financial and non-financial performance within Europe, especially in comparison with North America. More explicitly, when interpreting their results, Oikonomou, Brooks and Pavelin (2014) noted that Europe might lag in the recognition of the risk-reducing benefits of corporate social performance compared to the U.S.

Therefore, our shaded result might underline a specificity of France in ESG consideration.

While the geography difference constitutes our main explanation of this empirical result in contradiction with the prevailing thinking in literature, we should also note that our study is the first one using data post- Big Three commitments with the UNPRI. Indeed, the most recent research on our topic did not study credit ratings after 2016: Devalle, Fiandrino and Cantino (2017) used 2015 data and Cubas-Díaz and Martínez Sedano (2018) observed ESG consideration in corporate credit ratings over the period 2008-2015.

As a consequence, the difference in results compared to previous studies, could also illustrate high changes in the Big Three methodologies regarding ESG integration. Indeed, as the second part of our literature review showed, following their signature of the Credit Rating Statement with the UNPRI, all the Big Three have intensified research to take ESG criteria into account more significantly in their credit scoring models. The Allianz Global Investors' study (2017) also pointed out that rating agencies have reinforced their skills in assessing ESG determinants, over the years. Contrary to what we have done in our model, CRAs apparently do not rely on ESG global scores, to evaluate a firm's non-financial risks or strengths. They would rather analyse ESG risks related to a business, an industry or a country in more details (Allianz Global Investors, 2017).

Therefore, our empirical study could also demonstrate the change in methodology regarding ESG integration from CRAs. If true, this leads us to call academics for the development of new methodologies, in the scientific area, using desegregated ESG data, rather than global score, to assess the linkage between credit ratings and ESG factors.

Lastly, to a lesser extent, we should also underline that the use of different ESG databases compared to the majority of academic studies may also partially explain our results. Indeed, as

we have seen in our literature review, Mooij (2017) warns the scientific community on results that may be CSR database-dependent. However, this last point must be moderated as we used two different ESG databases to confirm our analysis, and pointed out that even if the incorporation of their scores in models revealed a material impact which is statistically different, both lead to the same conclusion: ESG factors do seem not to be considered in corporate credit ratings in France.

Whatever, this result discussion also suggests some limits of our research approach.

B- Research approach limits

The first limit of our study lies in the low possibilities it offers for comparisons with previous literature. Indeed, as we underlined multiple times through this dissertation, ESG ratings provided by external parties show very low correlation. While we decided to work with two different ESG databases used by the professionals to anticipate this issue, those two databases chosen are not yet really present in academic research. Considering the probability that findings might be ESG data-providers dependent, there is a high risk of misleading when comparing studies not using exactly the same type of ESG performance score. As most academics used KLD database, it will be wise to run again the same empirical analysis but using the KLD database for our ESG performance proxy. Holding most of parameters constants, it will allow us to test the new assumption we made to explain the above result and answer the question: theoretically, are ESG criteria considered differently by CRAs in corporate credit ratings in France, compared to the U.S.?

Then, the fact that we decided to use the ESG performance score to assess ESG consideration in credit ratings by CRAs forms a second limit to our study. We are aware that this practice is widely accepted by academics, and not all research works make the distinction between ESG strengths and concerns. However, the last part of our literature review, relying on the newest CRAs 'documentation publicly released, showed that CRAs tend to consider non-financial criteria more like sources of additional risks than possible opportunities which might strengthen a company's cash flows. As a consequence, we think that incorporate in models analysing credit rating's drivers, the firm's ESG risks scores, rather than global ESG performance score, might be more relevant to examine current consideration of ESG factors by CRAs in their creditworthiness assessment of corporations.

Obviously, the smallness of our sample also limits the study's conclusion. We can consider this research work as a first step and invite further research to extend the sample in terms of number of companies included and time period considered.

Finally, related to the above, we recognize the lack of robustness of our analysis, technically speaking. Indeed, due to some data unavailability, the small size of our initial sample and also time constraints, it was impossible for us to perform tests through alternative sample periods or by sector breakdown. While not all academics who studied the same subject did these robustness checks (Devalle, Fiandrino and Cantino, 2017), we sincerely believe that they add considerable value to the conclusion, and the examples of Cubas-Díaz and Martínez Sedano (2018) or Attig, et al. (2013), among others, should be followed in further research.

In conclusion, in contrast with our initial hypotheses, our empirical analysis does not reveal hard evidence that ESG performance impacts significantly corporate credit ratings. Due to some literature results previously commented and the limits of our research approach, we think that our findings are not necessary the proof of that CRAs do not consider systematically ESG factors in their corporate credit risk assessments. On the contrary, this empirical analysis might suggest a special consideration of ESG factors in corporate credit ratings on the French market. Hence, even if we do not reveal strong evidence, our research opens up several avenues for deeper investigations as discussed previously.

CONCLUSION

I- Study summary

In this master thesis, we examined to what extent ESG factors are considered by credit rating agencies, and in particular the Big Three. Thanks to our documentary study, we learnt that while research is still mitigated on how ESG factors affect a company's credit risk, there are evidence that the Big Three CRAs do take into account all those non-financial variables in their corporate creditworthiness assessments.

To evaluate the systematic character of this consideration and its weight in the overall grade, we perform an empirical study, for the first time on the French market, using classical methods. On a sample constituted of 71 of the biggest French public companies, we run four ordered logit regressions, we controlled for key financial variables and we approximated ESG corporate performances with ESG ratings provided by two different databases: Sustainalytics and RobecoSAM. Contrary to our expectations, this empirical analysis resulted showing no evidence that a statistical relationship exists between a company ESG performance and its credit rating. In the four models investigated, the relationship between those variables was not significant; which may suggest that CRAs do not systematically deem a company's non-financial determinants in their corporate credit rating processes on the French market.

In light with literature, we think that this result could be mainly explained as a specificity of the European actors in considering ESG factors, and particularly the French representants of the Big Three. We believe that on this territory, CRAs might be more demanding on the level of performance for non-financial criteria required for companies. Especially in France, they might apply a precautionary principle that would result in a more significant consideration of ESG risks than the overall ESG performance of companies.

Beyond this empirical result, we argue that by taking a large perspective in our documentary study, our work also reveals some important features of the industry, not always looked at in the credit risk literature. Indeed, we underlined the growing importance of ESG factors in the debt market, as well as their complexity. We also highlighted the lack of transparency of the rating industry: both the credit rating industry and the ESG rating industry. Finally, regarding this last point, we questioned the relative weakness of current academic works that might be ESG database dependent too.

II- Managerial recommendations

Despite our puzzling results, we think that the issues discussed above are important at a managerial level, from both a company and an investor perspective.

Indeed, in spite of our observations, we think companies should consider non-financial performance in a centred position and even include it in their long-term strategy. ESG consideration has gained momentum since a few years: while first concerning the equity market, it expands quickly to the debt one. Thus, it is expected that a company's ESG performance will affect more and more significantly its financing capacity and cost of capital. Moreover, the regulators seem to want to accelerate environmental awareness by trying to promote a more sustainable financial framework. Thus, new requirements, regulations and fines are expected to be implemented regarding corporate environmental, social and governance issues. Consequently, this will leave no other choice to companies than entering into this non-financial game.

More importantly, we should also notice that in fact, the non-financial factors can play a role in a company's ability to repay its debt. Even if, on the academic side, hard evidence is still expected; anecdotal stories demonstrate this intuitive feeling, as shows the Volkswagen example seen in introduction. This implies that managers should actually take into account the firm non-financial performance beyond the mere regulatory framework, only aiming at satisfying third-parties. Indeed, they should also view it as a new strategic area to explore, in order to secure as much as possible the company's cash flows.

Lastly, directly linked to our interpretation of the empirical study results, we think that in France, managers should, even more, accentuate corporate ESG performance communication, compared to other countries. Indeed, it is possible that French companies have to highly highlight their ESG achievements to benefit from a lower cost of debt, here especially a higher credit rating, as it seems to be usually the case in the U.S.

To summary, our study suggests to managers to pay more attention to ESG issues within their companies and particularly to closely manage the implementation of ESG related policies, the measurement of their performances and the related communication to the different stakeholders, including CRAs.

On the other side, our study also warns users of corporate credit ratings. Indeed, face to the industry's opacity, it is difficult to objectively assess the materiality of ESG factors in the creditworthiness evaluation process of the main CRAs. Thus, for the moment, it is preferable to take a step back on ESG integration in credit ratings. In any case, the new methodology adopted by the Big Three concerning companies' non-financial perspectives should not substitute one's own judgement if a sustainable investment is sought. Indeed, it is worth reminding that a credit rating reflects an opinion about a company's solvability; therefore ESG criteria may be considered only when assessed as impacting significantly a company's creditworthiness. Credit ratings are not sustainability appraisals.

III- Limits of the study and further research

As mentioned earlier, our research approach has several limits. In particular, it lacks comparability with previous literature. The smallness of the sample also limits the robustness check possibilities of our empirical analysis, as well as the opportunities to examine possible industry differences or the evolution in time of the relationship between corporate ESG performance and credit ratings assigned by the Big Three.

But, in our opinion, these limitations invite for further research attention. Indeed, there are several natural possible extensions of this study. First, to confirm our assumption of special consideration of ESG criteria by the French actors, the same regression could be performed but using KLD database and on a longer period. Indeed, with observations relying on the same ESG database, the comparison with previous studies lead in the U.S. will be facilitated.

To investigate more deeply geographical differences in terms of ESG consideration, it will also be obviously interesting to extend this study to other European countries and compare the results.

Other research works could also investigate the differences in ESG consideration among the different industries. Indeed, Schneider (2011) suggested that ESG factors might be more actively analysed by the market, for the most polluting industries.

Finally, another line of research to think of, could be more related to the methodology we used. Indeed, our study underlines that CRAs seem to pay more attention to a company's, an industry's or a country's disclosed ESG risks than ESG opportunities or global sustainable performance. Working on a new methodology using desegregated ESG data would make it possible to evaluate this first-hand observation, as well as to circumvent the use of proxy, based on ESG rating agency scores, which reliability is increasingly questioned.

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EXHIBITS

I- Exhibit 1: Summary table of 20 main papers studying ESG performance and corporate credit risk

In the table below, we summarize our review of 20 main studies that link the ESG performance of companies to their credit risk. The final aim of this summary table is to demonstrate that most of the empirical analyses were performed on the U.S. market and used similar ESG rating providers, as the shorter recap table below shows:

	The U.S.	Others	**Total**
KLD	8	1	**9**
Thomson Reuters (Asset 4)	0	4	**4**
Others	4	3	**7**
Total	**12**	**8**	**20**

Source: Author |

Concerning our summary of studies in the table below, please note that the term KLD is mainly used in literature that but the associated database is most known by the public as MSCI, ESG Intangible Value Assessment. We should also notice that Thomson Reuters acquired Asset 4 in 2009, which was an ESG agency that provided independently ESG ratings before 2009 ; however, for the purpose of this summary, we did not find relevant to make a difference between the two periods, pre-2009 and post-2009. Thus, we gather the two eras under the name Thomson Reuters (Asset 4).

Regarding ESG databases, we distinguish studies, based on a CSR global score as computed by the ESG provider and, studies relying on some ESG provider data but making their own ESG total score computations according to their needs.

Please also note that in the table below, we consider the impact of ESG performance for a firm's risk is:

- positive when the stakeholders analysed believe that ESG policies can improve a company's financial performance,
- mixed when the study does not result in any clear tendency,
- negative when the academic paper demonstrates that the stakeholders analysed believe that ESG policies reduce a company's financial performance.

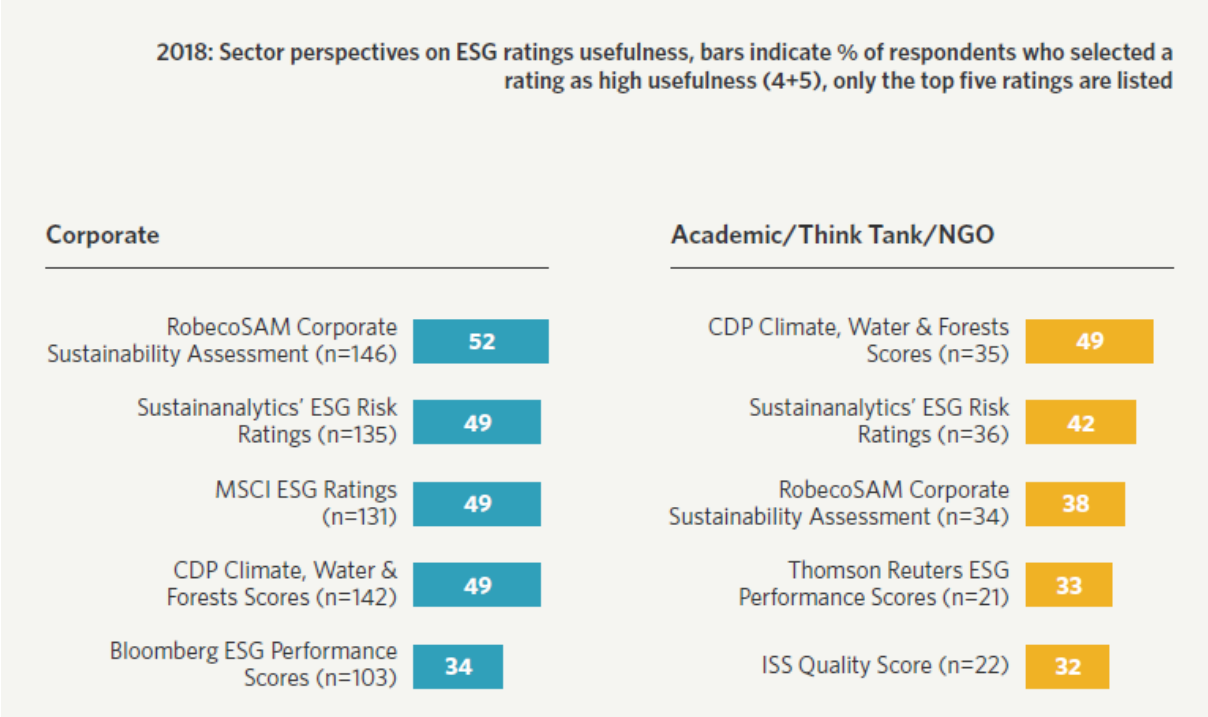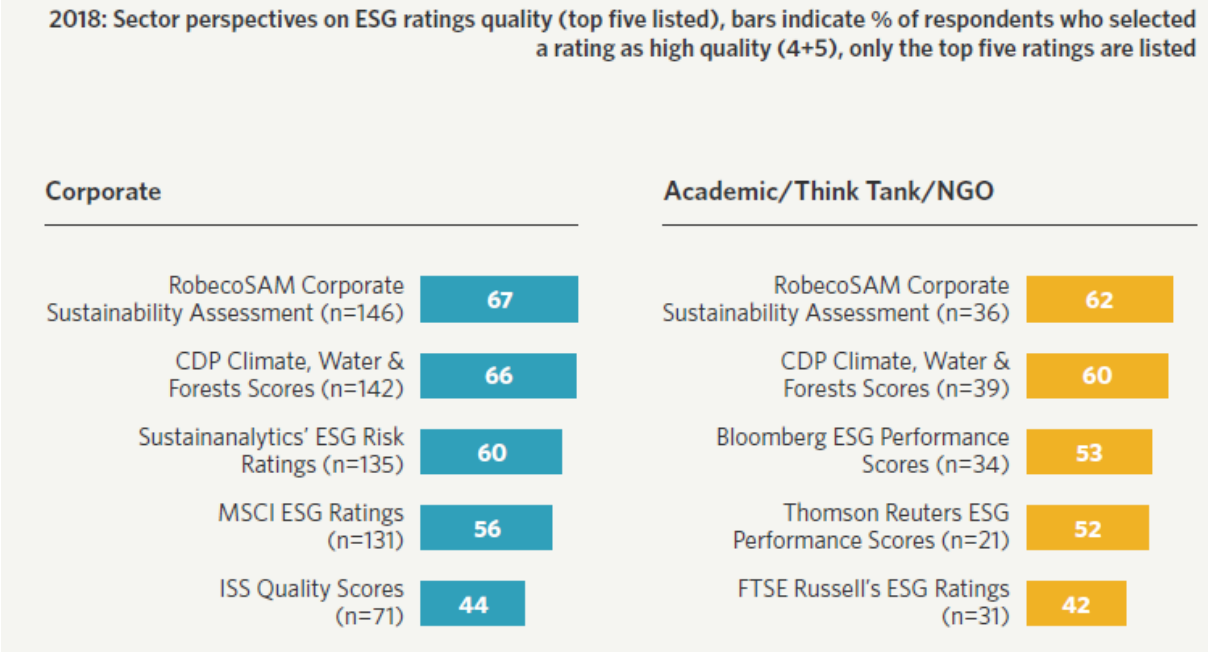| Study	Time Period	Region	ESG Dimension Tested	Debt Financing Measure	ESG data collection (Data Base + Measures Type)	Findings (Impact of ESG performance for a firm's risk)
ESG impacts on credit ratings studies.						
Amana and Nguyen (2013)	2003	Japan	G	Credit Rating (R&I, a leading Japanese CRA)	Nikkei Corporate Governance Evaluation System (CGES). *(Governance score as computed by the database)*	POSITIVE. - Good governance is associated with higher credit ratings.
Ashbaugh-Skaife, Collins and LaFond (2006)	2002	The U.S.	G	Credit Ratings (S&P)	Board Analyst Database -	POSITIVE. - Credit ratings are negatively associated with the number of blockholders and CEO power, and positively related to takeover defenses, accrual quality, earnings timeliness, board independence, board stock ownership, and board expertise.
Attig, El Ghoul, Guedhami and Suh (2013)	1991-2010	The U.S.	S	Credit Ratings (S&P)	KLD *(ESG scores as computed by the database + analysis of some individual CSR components)*	POSITIVE. - Credit rating agencies tend to award relatively high ratings to firms with good social performance.
Bauer and Hann (2010)	1995-2006	The U.S.	E	Credit Ratings (S&P)	KLD *(Environmental scores as computed by the database)*	POSITIVE. - Environmental concerns are associated with lower credit ratings. - Only a weak non-significant link on firms with a proactive environmental engagement.

Bauer, Derwall and Hanna (2009)	1995-2006	The U.S.	S	Credit Ratings (S&P)	KLD *(Social score created by the authors)*	POSITIVE. - Firms with stronger employee relations enjoy a statistically and economically lower cost of debt financing, higher credit ratings, and lower firm-specific risk.
Bhojraj and Sengupta (2003)	1991-1996	The U.S.	G	Credit Ratings (Moody's)	Compact Disclosure -	POSITIVE. - Stronger external monitoring through effective governance mechanisms are rewarded with superior bond ratings.
Changa, Lib and Shim (2017)	2002-2014	World	ESG	Credit Ratings (S&P)	Thomson Reuters (Asset 4) *(ESG score as computed by the database)*	POSITIVE. - Overall CSR has a positive effect on long-term credit rating and such effect varies with country- and firm-level trust.
Cubas-Díaz and Martínez Sedano (2018)	2009-2015	World	ESG	Credit Ratings (S&P)	Thomson Reuters (Asset 4) *(ESG score created by the authors)*	POSITIVE. - Companies with higher sustainability tend to have higher CRs. - Commitment of companies are not taking by CRs. - Sustainability value by CRAs tend to decrease over the time period.
Devalle, Fiandrino and Cantino (2017)	2015	Italy, Spain	ESG	Credit Ratings (S&P)	Thomson Reuters (Asset 4) *(ESG score as computed by the database)*	POSITIVE. - ESG performance leads to better credit ratings. Note meaningful significance for social and governance issues, whereas with reference to environmental matters, the influence on credit ratings is weaker, rejecting the null hypothesis at a 90% confidential level.

Jiraporn, Jiraporn, Boeprasert and Chang (2014)	1995 - 2007	World	ESG	Credit Ratings (S&P)	KLD *(ESG score as computed by the database)*	POSITIVE. - More socially responsible firms enjoy more favourable credit ratings.
Oikonomou, Brooks and Pavelin (2014)	1991-2008	The U.S.	E & S	Credit Ratings (S&P)	KLD *(CSR score as computed by the database)*	POSITIVE.- Good performance is rewarded and corporate social transgressions are penalized.
Stellner, Klein and Zwergel (2015)	2006-2012	Europe	ESG	Credit Ratings (S&P and Moody's)	Thomson Reuters (Asset 4) *(ESG score as computed by the database)*	MIXED. - No statistically significant evidence that companies that are performing well in CSR are systematically rewarded with better ratings. - Companies benefit from better ratings if they show superior CSP in a country with above average ESG.
ESG impacts on cost of debt, broadly speaking, studies.						
Izzo and Magnanelli (2012)	2005-2009	The U.S., France, Germany, Italy & Japan	ESG	Cost of Debt (Accounting one)	RobecoSAM *(ESG score as computed by the database)*	NEGATIVE. - CSR is not considered a value driver with an impact on the firm's risk profile, but a sort of waste of resources that can negatively affect the performance of the firm, independently from the country in which the firm operates.
Chava (2014)	1992-2007	The U.S.	E	Bank loans data from Loan Pricing Corporation	KLD *(Environmental scores as computed by the database)*	POSITIVE. - Firms that have net environmental concerns (more environmental concerns than environmental strengths) are charged a higher interest rate on their bank loans.
Cooper and Uzun (2015)	2006-2013	The U.S.	ESG	Yield Spread	KLD *(CSR score as computed by the database)*	POSITIVE. - Firms with strong CSR have a lower cost of debt.

Schneider (2010)	1994-2004	The U.S.	E	Yield Spread	TRI (Toxic Release Inventory) *(Raw data used)*	POSITIVE. - Bondholders demonstrated an interest in environmental concerns of companies in a polluting industry.
Klock, Mansi and Maxwell (2005)	1990-2000	The U.S.	G	Yield Spread	Lehman Brothers -	POSITIVE. - Antitakeover governance provisions, although not beneficial to stockholders, are viewed favourably in the bond market.
Menz (2010)	2004-2007	Europe	ESG	Yield Spread	RobecoSAM *(ESG score as computed by the database)*	NEUTRAL. - No clear conclusion can be drawn from the study.
Sharfman and Fernando (2008)	2002	The U.S.	E	Cost of Debt (Accounting one)	KLD *(Environmental scores as computed by the database)*	MIXED. - Better environmental risk management is rewarded by the financial markets, and translated in the company's WACC. However, the efforts seem to come more from the equity market than the debt one.
Ge and Liu (2015)	1992-2009	The U.S.	ESG	Yield Spread	KLD *(ESG scores as computed by the database)*	MIXED. - Higher CSR strength score is significantly associated with better credit ratings but the estimated coefficient of the CSR concern score is not statistically significant.

Source: Author |

II- Exhibit 2: ESG ratings perception by professionals and academics in 2018, according to quality and usefulness criteria.

2018: Sector perspectives on ESG ratings quality (top five listed), bars indicate % of respondents who selected a rating as high quality (4+5), only the top five ratings are listed

Corporate

Rating	%
RobecoSAM Corporate Sustainability Assessment (n=146)	67
CDP Climate, Water & Forests Scores (n=142)	66
Sustainanalytics' ESG Risk Ratings (n=135)	60
MSCI ESG Ratings (n=131)	56
ISS Quality Scores (n=71)	44

Academic/Think Tank/NGO

Rating	%
RobecoSAM Corporate Sustainability Assessment (n=36)	62
CDP Climate, Water & Forests Scores (n=39)	60
Bloomberg ESG Performance Scores (n=34)	53
Thomson Reuters ESG Performance Scores (n=21)	52
FTSE Russell's ESG Ratings (n=31)	42

2018: Sector perspectives on ESG ratings usefulness, bars indicate % of respondents who selected a rating as high usefulness (4+5), only the top five ratings are listed

Corporate

Rating	%
RobecoSAM Corporate Sustainability Assessment (n=146)	52
Sustainanalytics' ESG Risk Ratings (n=135)	49
MSCI ESG Ratings (n=131)	49
CDP Climate, Water & Forests Scores (n=142)	49
Bloomberg ESG Performance Scores (n=103)	34

Academic/Think Tank/NGO

Rating	%
CDP Climate, Water & Forests Scores (n=35)	49
Sustainanalytics' ESG Risk Ratings (n=36)	42
RobecoSAM Corporate Sustainability Assessment (n=34)	38
Thomson Reuters ESG Performance Scores (n=21)	33
ISS Quality Score (n=22)	32

Source: SustainAbility (2019) |