The moderating effect of Corporate Social Responsibility (CSR) on the relationship between the *need for debt* and *the actual debt level*

Master's Thesis

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1. Introduction

The capital structure continues its legacy as one of the most crucial subjects in the corporate finance debate. The capital structure is defined by the firm's combination of securities and financial resources to finance operations (Myers, 2001). The financial decision concerning capital structure provides a clear indication of how a corporation finances its overall operations and growth to meet organizational goals using a variety of financial resources (Iqbal & Javed, 2017). The importance of the financial decision is due to its organizational power in dealing with the competitive environment (Bokpin & Arko, 2009). A poor financial decision about the capital structure might be a cause of a financial distress and even bankruptcy (Chen & Chen, 2011).

Several theories have been evolved to explain capital structure. Among these theories, the irrelevance proposition of Modigliani and Miller (M&M) (1958) was the first contribution from which the trade-off theory was derived. According to the trade-off theory, firms seek the optimal capital structure through the trade-off between the benefits acquired from tax shield and costs of bankruptcy (Frank & Goyal, 2008). However, the later researches shift their focus from the trade-off theory to the pecking order theory (Chen & Chen, 2011). Following the pecking order theory, due to the adverse selection problem, firms have a preference for internal finance over external finance. When external finance is the best choice, firms prefer debt to equity due to lower information asymmetry (Frank & Goyal, 2003). Sheikh et al. (2012) provided evidence that the pecking order theory has the best explanatory power concerning capital structure discussion. A change in corporate debt should generally match the financing deficit dollar for dollar (Frank & Goyal, 2008). As a result, assuming enterprises follow the pecking order, a slope coefficient of one is observed in a regression of net debt issues on the finance deficit (Frank & Goyal, 2008). Financial managers have numerous challenges in determining the best possible and optimal capital structure in order to optimize the organization's value while lowering investment costs. Financial decisions are influenced by numerous factors such as, financial planning, Taxes, stock market, regulations (Iqbal & Javed, 2017), and CSR (Nurdiniah, 2021).

Over the last few decades, corporate social responsibility (CSR) has received a growing consideration on the international level (Midttun et al., 2006). Firms regard social responsibility as an obligation to act responsibly toward their stakeholders, and CSR reporting as a reaction to stakeholder expectations and demands (Kotonen, 2009). The majority of CEOs, as stated by the latest US Global Compact, declared the importance of CSR in their firms' success (Cheng et al., 2014). Cheng et al. (2014) provided empirical evidence on how better CSR performance, enhances the firm's value in the long term, by lowering the unsystematic constraints that negatively affect the financing operation of the firm and prevent it from undertaking profitable investments. These constraints might be credit constraints such as the inability of the firm to obtain finance through borrowing, inability to issue equity,

dependency on a bank loans or illiquidity of assets (Lamont & Saaá-Requejo, 2001). Furthermore, short-term opportunistic behavior can be eliminated through superior CSR performance because of increased engagement of stakeholders (Cheng et al., 2014; Bénabou & Tirole, 2010). Firms are more willing to disclose CSR activities in order to differentiate themselves and as a signal for long-run focus (Cheng et al., 2014; Bénabou & Tirole, 2010). CSR reporting improves the transparency of the firm around social, environmental, and corporate governance in addition to enhancing internal control that further enhances reporting quality and firm's compliance with regulations (Cheng et al., 2014). Therefore, more data disclosure and better quality of this data decreases the information asymmetry between investors and the firm, and reduces capital constraints (Cheng et al., 2014).

This paper mainly focuses on the moderating effect of corporate social responsibility on the relationship between the need for debt and the actual change in debt level. Earlier work has been done on borrowing constraints, where debt capacity for instance was operationalized as a measure of capital constraint (Lemmon & Zender, 2010). This thesis will focus on the impact of CSR in changing the access to debt finance which indicates the capability of the firm to raise money through external debt. Therefore, CSR will be used as a moderator that eases capital constraints. CSR (Corporate Social Responsibility) and ESG (Environmental, Social and Governance) are commonly used in the literature as non-financial indicators, and in this thesis, they will be used interchangeably (Fatemi et al., 2018). There is no research yet that tested the moderating effect of CSR on the relationship between the need for debt and the actual change in debt level. CSR is expected to be a moderating variable in the traditional pecking order theory since CSR might alter the magnitude of debt (Baron & Kenny, 1986).

Hence, this thesis examines the change in debt level in case of deficit (need for debt), and the role of corporate social responsibility (CSR) in moderating this relationship. Since this thesis uses the testable prediction of the pecking order theory (Shyam-Sunder and Myers, 1999), where the funding deficit demonstrates the complete reliance on external finance explained through the change in debt level, this thesis refers to the deficit as the need for debt finance. Therefore, the research question of this thesis is: '*To what extent does CSR moderate the relationship between the need for debt and the actual debt level?'.* This research question is examined for a sample of 117 firms located in 8 Western European countries over a period of 10 years using fixed-effect regression. The main finding of the analysis is that there is an indication of a moderating effect of CSR performance on the relationship between the need for debt and the level of debt, however, the result is not robust. Hence, more research is needed to determine the channels through which this occurs. This finding has the potential to have a substantial impact on management decision-making, since it might suggest that managers should disregard CSR performance in order to borrow according to their preferences. This thesis also suggests that additional research is needed on this subject. Moreover, this study is unique in examining the moderating effect of corporate social responsibility on the relationship between the need for debt and

the actual change in debt level. Previous studies usually focus on the direct impact of corporate social responsibility on capital structure.

This thesis presents the theoretical framework in the second chapter. Then in the third chapter, the research method will be discussed. The fourth chapter displays the results of the empirical test, and finally, the conclusion is presented in the fifth chapter.

2. Theoretical framework

2.1. Capital structure theories

Capital structure decisions have been widely examined in the literature. The theories of capital structure started with Modigliani and Miller's (M&M) theorem (1958). M&M theorem was the cornerstone in presenting the trade-off between debt and equity (Luigi & Sorin, 2009). Modigliani and Miller (1958) established their theorem based on assumptions like perfect markets, no taxes, all investors have the same access to finance, and no transaction costs. According to M&M's (1958) theorem, the value of the firm is independent of its capital structure. Hence, the firm value will not be affected by the level of debt that has been borrowed. Modigliani and Miller (1958) argued that the cost of capital is determined by the cost of debt (interest rate) regardless of how the firm financed its operations (using debt or equity). However, this theorem based its assumption on a perfect market which is an unrealistic assumption (Titman, 2002).

The debate over the theorem of M&M led to the appearance of the trade-off theory (Luigi & Sorin, 2009). This theory explains that firms should have a debt to the level where the marginal cost of debt equals the marginal cost of financial distress (Myers, 2001). This theory, therefore, implies that firms have an optimal capital structure based on the trade-off between the benefits and costs of finance (Yapa Abeywardhana, 2017). According to the static trade-off theory, companies target their capital structures, i.e., if the actual debt level deviates from the ideal level, the firm will adjust its financing behavior to return the debt level to the optimal scale (Myers, 1984), and following Bradley et al. (1984), it is a single period capital structure. In the dynamic model, the role of time is recognized, in which the optimal financing is usually determined by the financing margin that the firm expects in the next period (Luigi & Sorin, 2009). However, there are still severe critiques that face this theory. Frank and Goyal (2007), for example, questioned the observability of the optimal capital structure since capital structure is not a straightforward interval.

The criticisms of the previous theories led to the emergence of the pecking order theory that has been developed by Myers (1984). The pecking order theory is one of the most influential theories of capital structure (Frank & Goyal, 2003). Due to adverse selection, picking order theory expects firms to follow a specific order where internal finance is preferred over external finance (Myers, 1984). When external finance is needed, debt is preferred over equity because of lower information asymmetry

(Myers, 1984). The pecking order theory focus on information asymmetry that emerges from the separation of ownership and management instead of focusing on the optimal capital structure (Shyam-Sunder & Myers, 1999). Following the order of this theory, internal finance is firstly preferred since it is free of asymmetric information, then debt is preferred over equity since it is less risky. Therefore, it shows lower information asymmetry costs. Moreover, following this theory, firms issue or keep a specific amount of debt to meet their funds' deficit, which is the inefficiency of the internal fund to meet the needs of real investments and dividend payments (de Jong et al., 2007). Myers and Majluf (1984) exhibit, that when firms' managers make investment decisions on behalf of current shareholders, they ignore investments that might benefit the new shareholders. As a result, investors will consider the investment decision without equity issuance as good news, while issuing shares as bad news. Since issuing equity will reduce the amount investors are able to pay for shares, managers will have a preference for debt over equity (de Jong et al., 2007). When the information asymmetry is at a low level, firms are able to issue debt (Shen, 2014). Whereas, when asymmetric information exceeds a certain level, firms are confronted with constraints that limit their capability to issue debt (Shen, 2014). Hence, firms need to improve their creditworthiness in order to obtain debt when it is necessary. After the crisis of asset-backed security in 2007, lenders incorporated sustainability performance in the process of risk assessment (Weber et al., 2010). The reason behind that is to evaluate the debtor's capability to meet their obligations in the future. That is consistent with the findings of Weber et al. (2010), in which they provided evidence that sustainability influences the creditworthiness of the firm.

2.2. Corporate Social Responsibility (CSR)

Firms are committed to their investors, shareholders, stakeholders, and bondholders in terms of financial performance. Meanwhile, firms have become obliged towards society as well, through their non-financial performance. Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) concerns are the most commonly used terms to describe non-financial indicators. Both terms are used interchangeably in the literature (Gillan et al., 2010), and so does this thesis. The focus on CSR has continuously grown over the last decades. There has been an increased interest in corporate social responsibility (CSR) on the international level (Midttun et al., 2006). There are two distinct aspects in the CSR field, and they are highly correlated based on previous studies. These aspects are CSR performance and CSR disclosure. Large multinational firms in Western Europe and North America, in particular, are finding it necessary to implement CSR programs and efforts in order to meet social expectations, which are typically articulated by sophisticated interest groups and receive significant media coverage (Midttun et al., 2006). Over the last three decades, corporate social responsibility (CSR) has become a common tool for modern businesses to attract new investors and engage with stakeholders (Xu and Lee, 2019). The reason behind that is that CSR performance works

as an indicator of the firm's positive social activities that are demanded in the society by the stakeholders (Sun & Cui, 2014). Therefore, CSR has been considered as a crucial firm effort to link the firms to their stakeholders. Sun and Cui (2014) also addressed that researchers found that CSR should be a fundamental factor in firms' operations in order to earn firm integrity.

Following the European Commission (2001, 2002, 2006), CSR is *"a concept whereby companies integrate social and environmental concerns in their business operations and their interaction with their stakeholders on a voluntary basis"* (Steurer, 2010, p. 1). The notion of CSR is based on the triple bottom line in which environmental and social dimensions are integrated into the economic aspects (Steurer, 2010). The definition explicitly stated environmental and social aspects. A third component is less explicitly mentioned, but it covers the firm's relations with stakeholders and might be construed as corporate governance performance, as indicated in the definition. Environmental, for instance, refers to emission reduction, the firm's resources reduction, and the innovation of products benefiting the environment (Luo et al., 2015). Social refers to diversity, human rights, training and development, health and safety, community, and firm's product responsibility (Luo et al., 2015). Corporate governance is a process that leads the firms to reduce their principle-agent conflict, increases the investor's confidence, the goodwill of the firm, and investments opportunities (Iqbal & Javed, 2017). It also gives firms the proper direction in terms of how they should work and be supervised (Iqbal & Javed, 2017).

2.3. CSR and capital structure

Both dominant capital structure theories (trade-off and pecking order theory) draw their assumptions based on a preference perspective. In the pecking order theory, the rationale behind such preferences is elaborated explicitly through agency problems, transaction costs (Chen and Chen, 2011), and adverse selection. Whereas, the trade-off theory focuses more on the optimal capital structure through the trade-off between the costs and benefits of issuing debt (Ahmadimousaabad et al., 2013). However, these theories do not address the constraints that influence the capital structure decisions, which might affect the availability of financial resources (Watson & Wilson, 2002; Stiglitz & Weiss, 1981). The reason might be that capital structure theories differ in their concerns. For instance, the trade-off theory's main concern is taxes and the cost of financial distress, while the pecking order theory's concern is information differences (Sheikh & Wang, 2011). CSR performance might be one of these constraints due to its increasing importance as a social accountability mechanism (Ali & Frynas, 2018). Capital structure is often examined by looking at changes in debt level since the issuance of equity is the last resort (De Jong et al., 2011). Therefore, it is relevant to examine the ability of the firm to raise debt finance. Many factors determine whether the banks or loan providers are willing to provide money to the firms (e.g. Myers, 1977; Andrieu et al., 2018; Nangaki et al., 2014; Chou et al., 2011). These

considerations are not adequately accounted for in the capital structure literature. Therefore, the empirical results derived from former studies have not taken into account the constraints that the firms might have faced in order to borrow money. As a result, CSR performance, i.e. a concept that indicates the firm's social accountability, should be included in the analysis to obtain a better explanatory result.

According to Dhaliwal et al. (2011) and Cormier and Magnan (2014), the release of a CSR report, when combined with high CSR performance, allows analysts to better estimate future profitability and minimizes forecasting mistakes. Hamrouni et al. (2019) also argued that CSR disclosure may provide relevant non-financial information that is not stated in financial statements but represents proper CSR performance and satisfies financing providers of the firm's sustainability. Since CSR performance and disclosure are highly correlated, they have been used interchangeably. Following the assumptions of the agency theory and stakeholder theory, the implementation of firm strategies leading to superior CSR and the availability of reliable data regarding firms' CSR strategies decrease informational asymmetries and agency costs, resulting in lower capital constraints (Cheng et al., 2014). If CSR is insufficient, firms might be not able to raise capital through debt finance and use the alternative, which is equity. Previous studies examined the impact of CSR performance on the cost of debt and provided an evidence that firms with a good credit history and reputation enjoy decreases in interest rates (Diamond, 1989; Datta et al., 1999), firms' CSR performance affects its creditworthiness as a part of its financial activities (Weber et al., 2010), and that CSR performance is associated with credit rating (Attig et al., 2013; Jiraporn et al., 2014). However, there are very few studies that have examined the impact of CSR on the debt level. Xu et al. (2019) conjectured that CSR is associated with corporate finance for three reasons: the growing demand for financing, increasing creditworthiness, and reducing information asymmetry. First, they argued that more CSR involvement increases the need for a fund to finance firms' value-enhancing activities. Second, more CSR engagement improves the reputation of the firm, and that leads to an increase in the creditworthiness of the firm, which helps to obtain more debt finance (Hamrouni et al., 2019). Third, given the reduction of the level of information asymmetry, the suppliers of the fund are more willing to provide credit for firms. Cheng et al. (2014) elaborated that companies that excel at CSR will face less idiosyncratic capital constraints as a result of two mechanisms: lower agency costs and revenue/profit-generating opportunities as a result of more efficient stakeholder participation, and reduced informational asymmetry as a result of more extensive and credible CSR disclosure practices and transparency.

According to previous research, participating in CSR activities has been shown to have several advantages, ranging from improved financial results (Jo and Harjoto, 2011) to increasing competitive advantages (Fombrun et al., 2000). For example, a positive attitude toward a socially responsible firm is the primary source of consumer support, which leads to favorable product and service quality perceptions (Brown and Dacin, 1997). Firms with better CSR performance experience more access to

resources, more qualified employees, better advertise and promote their services and products, and their innovation capacity increased in comparison to lower CSR performance firms (Hamrouni et al., 2019).

The relationship between capital structure and CSR has been studied in few studies. The literature addresses this using the legitimacy theory (Suchman, 1995; Lindblom, 1994), institutional theory (Meyer and Rowan, 1977; DiMaggio and Powell, 1983), stakeholder theory (Clarkson, 1995), resource dependence theory (Pfeffer and Salancik, 2003), agency theory (Jensen and Meckling, 1976) and signaling theory (Spence, 1973).

Following the legitimacy theory, firms inform society about their CSR performance in order to improve their reputation, to obtain society's acceptance, and to show the firm's social legitimacy (Hamrouni et al., 2019). CSR disclosure is utilized as a legitimization strategy in this context (Chen and Roberts, 2010). To put it another way, businesses reveal social and environmental information in order to strengthen their reputation and obtain societal approval. Hence, CSR disclosures help a company's social legitimacy. Similarly, the legitimacy theory tries to describe the link between a corporation and its environment. From this perspective, firms adhere to institutional norms and rules in order to strengthen their stability and survival prospect (Chen and Roberts, 2010). As a result, businesses reveal social and environmental data in order to respond to institutional pressure (Levy et al., 2010). Prior research has shown that CSR reports can enhance a company's legitimacy. Consequently, the company's reputational risk associated with environmental externalities is reduced, and it has better access to debt funding (Hamrouni et al., 2019).

However, the stakeholder theory is the most common theory in this field that explains the relationship between firms and the environment by taking into account various stakeholders. The difficulties in this theory are meeting contradictory expectations of stakeholders concerning CSR activities to obtain the support of those stakeholders (Chen and Roberts, 2010; Hamrouni et al., 2019). This CSR information helps users in making their decision and satisfy credit providers to provide debt financing. Furthermore, the resource dependence theory explains the ability of firms to have access to relevant resources. According to this theory, firms need external finance to survive and grow because they are not self-sufficient (the pecking order notion). CSR is a tool to help firms improving their access to financing resources (Dhaliwal et al., 2011; Hamrouni et al., 2019). Hamrouni et al. (2019) also argued that firms with better environmental and social information are more likely to gain credit providers' support and enjoying better access to debt funding.

Hamrouni et al. (2019) considered the agency theory, firstly proposed by Jensen and Meckling (1976), as a theoretical framework for relating CSR to debt funding. They illustrate that when managers might behave in their own interest, particularly when there is information asymmetry, CSR information has a monitoring role in order to reduce information asymmetry and agency issues. In other words, CSR disclosures are expected to strengthen the relationship between the company and its stakeholders,

including its lenders (Hamrouni et al., 2019). The lenders, in turn, may reward this by giving companies with high CSR disclosure scores higher access to debt finance (Hamrouni et al., 2019). Furthermore, relying on the signaling theory (Spence, 1973), CSR reporting sends a signal to the market (Chan et al., 2017). Based on previous studies, CSR disclosure reduces the problem of adverse selection between corporations and stakeholders by increasing transparency about a company's social and environmental effect, as well as its governance framework (Dhaliwal et al., 2011; Cheng et al., 2014; Hamrouni et al., 2019). Moreover, this signal differentiates socially responsible firms from irresponsible peers (Hamrouni et al., 2019).

Concerning capital structure, Cheng et al. (2014) elaborated that transparency in CSR performance influences the funding decision through the reduction of financial constraints. Better availability and quality of the CSR information mitigate information asymmetry between firms and investors (Hail and Leuz, 2006; Chen et al., 2009) and negatively affect capital constraints (Cheng et al., 2014). The empirical findings of Yang et al. (2018) show that when businesses face a funding deficit, CSR statements encourage them to take on more debt than businesses that do not have CSR statements. Yang et al. (2018) concluded that CSR performance negatively influences information asymmetry between credit providers and firms. Firms with better CSR ratings enjoy higher profitability, growth rate, and per employee sales in comparison to their peers with low CSR ratings (Hamrouni et al., 2019; Lins et al., 2017).

If CSR reporting is viewed as an indication of benefit to stakeholders, then active reporting of CSR data can help to eliminate adverse selection difficulties between corporations and credit providers, as well as improve the latter's reputation and confidence (Hamrouni et al., 2019). Therefore, when this information is disclosed in high quality, it might change future expectations. This change enhances the access to debt funding since CSR performance indicates a capital injection (Chan et al., 2017).

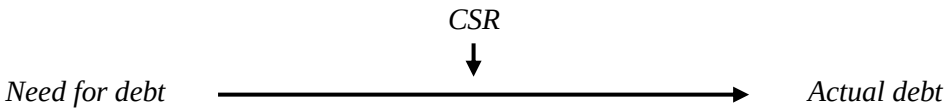
Another noteworthy element is that CSR reporting and performance is likely to negatively affect corporate risks (Hamrouni et al., 2019). Following the pecking order theory, firms with large deficits have higher debt levels, where a high level of debt leads to financial distress (e.g., Molina, 2005). That limits the ability of firms to raise finance through the issuance of debt (de Jong et al., 2007). CSR performance plays a role in determining financial distress (Goss, 2009). Relying on many previous studies, the greater the disclosure of CSR information the lower total and unsystematic risk (Orlitzky & Benjamin, 2001; Benlemlih et al., 2016). Zhong and Gao (2017) found that the positive impact of CSR disclosure is more significant for lower financial reporting quality firms. They also found that it reduces information asymmetry and improves investment efficiency. That is consistent with the findings of other studies that CSR disclosure improves firm value (Cahan et al., 2016; Gutsche et al., 2016) and enhances financial performance (Platonova et al., 2018).

Sun and Cui (2014) argued that the impact of CSR on default risk might occur in different aspects. First, and frequently discussed in the literature, CSR's capability of generating incoming cash flows. For instance, customer satisfaction is highly influenced by CSR due to its confirmed ability to enhance firm profitability. Relying on earlier behavioral studies, the preference of the customers is significantly influenced by the presence of CSR activities, which in turn improve sales (Lichtenstein et al, 2004). In the literature, default risk is defined as the possibility that a company with debt would be unable to satisfy its financial commitments, both principal and interest, on time (Sun and Cui, 2014). According to the literature, a firm's propensity to fail is directly controlled by cash flow because a sufficient cash reservoir facilitates business operations and prevents falling into distress (D'Aveni & Ilinitch, 1992). Second, another determinant of default besides cash flow is the volatility of this cash flow. The higher the volatility of the financial cash flow, the higher the probability of default. CSR helps in improving the stability of the firm's financial performance due to its role in enhancing the firm's image and reputation (Xu et al., 2019; Carter, 2005). For example, external stakeholders and shareholders penalize the firm for the occurrence of undesired events (Sun and Cui, 2014). Firms with better CSR are less likely to become accused and more likely to have their penalties mitigated and consequently less affected revenues (Godfrey et al., 2009). As a result, CSR prevents firms from falling into default by stabilizing the incoming cash flow. Third, as the literature implies, default risk is equally relevant inside the value-based approach, in addition to the above-mentioned cash-based approach (Sun and Cui, 2014). According to Merton (1974), a firm's asset value determines default, which is a predictable chain of events. As a result, an asset that contributes to the firm's value may also contribute to risk reduction (Sun and Cui, 2014). CSR performance is used as a generator of a firm's intangible assets such as reputation and customer loyalty, which contribute to a default risk reduction (Luo & Bhattacharya, 2009). Fourth, CSR performance also creates goodwill and consequently a supportive micro-environment which improves the relationships with the outsiders (e.g. communities and governments). Good relations with the outsiders encourage them to provide the resources needed with a better contract term (Sun and Cui, 2014). This last-mentioned aspect might influence the relationship with lenders as well. As a result, goodwill and a better environment help firms when seeking external finance because it supports the debt assessment process (Sun and Cui, 2014).

When seeking external funding, the bond market is the single greatest source of external funds (Anderson & Mansi, 2009). Since the increasing importance of the Euro as an international currency, the bond market has been expanding (Pagano & Von Thadden, 2004). In 1998, total issuance of private and public debt accounted for 25% of the global total debt (Pagano & Von Thadden, 2004). Hence, default risk refers to the possibility that a company will receive funding from this enormous source (Sun & Cui, 2014; Anderson & Mansi, 2009). Boubaker et al. (2020) also found that firms with better CSR performance have lower financial distress risk, arguing that a better CSR level increases the

creditworthiness and in turn, more access to financing and thus fewer financial defaults. In other words, better CSR performance is associated with less distress and default risk. Meanwhile, creating a better corporate environment, enhancing financial stability, and better crisis-resilient economies (Boubaker et al., 2020). Under the pecking order theory, firms are more willing to issue debt, in case of deficit, than equity when their internal finance is insufficient. Frank & Goyal (2008), in their paper testing the pecking order theory, elaborated that the deficit (the need for debt) should exactly match the actual level of debt raised. As a result, CSR might positively affect the relationship between the need for debt and the actual debt level by improving the firm's access to financial resources (La Rosa et al., 2018). Better information about a firm's CSR performance reduces information asymmetry and agency cost, and as a result, lowers capital constraints (Cheng et al., 2014; Jones, 1995). Several arguments are advanced in the relevant literature to explain why CSR could improve a company's access to debt financing. However, some studies show that CSR has a negative impact on access to debt funding under an argument of higher debt costs (Goss and Roberts, 2011; Magnanelli and Izzo, 2017). Based on past research, lenders may be sensitive to CSR information since the valuable non-financial information included in the CSR report is not stated in the financial statements, while this information may be beneficial for assessing a firm's risks and/or value (Hamrouni et al., 2019). The theoretical debate, however, remains unsolved (Hamrouni et al., 2019). Therefore, in the light of the previous discussion, this thesis hypothesizes that corporate social responsibility will positively moderate the relationship between the need for debt and the actual change in debt level. The moderating effect is a quantitative or qualitative variable that might strengthen or weaken the relationship between the dependent and independent variables. For instance, if having a deficit increases the debt level, incorporating ESG information strengthens this effect, and consequently, increases the level of debt even more. While, if deficit affects the level of debt negatively, incorporating ESG information weakens this relation causing an increase in the debt level. Hence, the hypothesis will be as follows:

H: Corporate Social Responsibility (CSR) has a positive moderating effect on the relationship between the need for debt and the actual debt level.



3. Data and research method

In this chapter, the empirical method will be explained, after which the variables used in the analysis will be described. This chapter will end by describing the dataset, descriptive statistics, and an explanation of the tests conducted to diagnose the data on any potential problems.

3.1. Sample and Data

The dataset consists of panel data of 117 listed companies located in 8 European countries (Italy, Spain, Portugal, France, Belgium, The Netherlands, Germany, and Switzerland) over the time period 2010-2019. This sample has been used following Sapir's (2006) and Jackson & Apostolakou's (2010) classifications of European countries. In their classifications, Europe has been divided into 4 groups of countries, Anglo-Saxon countries (UK, Ireland), Nordic countries (Sweden, Norway, Finland, Denmark), Central European countries (Switzerland, Netherlands, Germany, Belgium, Austria), and Latin countries (Spain, Portugal, France, Italy, Greece). However, Sapir (2006) emphasized the importance of focusing on the last two. The consolidated GDP of the last two groups represents 66% that of the whole EU-25 and 90 percent that of the 12-member euro area (Sapir, 2006). Therefore, these countries are considered fundamental for the smooth working of the whole European Union and of the euro region (Sapir, 2006). This dataset was collected from Refinitiv Eikon Datastream ASSET4 for ESG data and Refinitiv Eikon For financial data. Since all firms with missing values in crucial variables were already excluded during the data cleaning process, the panel dataset is balanced and confined to using these 8 countries. The disadvantage of using balanced data is that the sample size is small, but the precision of the estimations does not change over time (Kerstens & Van de Woestyne, 2014). During the data cleaning process and in order to match the ISIN for all variables, additional firms were excluded. Moreover, according to the literature (e.g. Lemmon & Zender, 2010; Frank & Goyal, 2008), financial firms and regulated utilities were removed from the analysis since these businesses either have strict capital requirements or operate differently than businesses in other sectors, which might also influence the capital structure decision. Consequently, the Standards Identification Codes (SIC) that were omitted are 4000-4999 and 6000-6999. The previously illustrated process of filtering data led to this sample. Table 1 and Table 2 display the distribution of the sample per country and industry.

Table1: Distribution of sample observations by country

Country	*Frequency*	*Percent*
BELGIUM	60	5.13
FRANCE	410	35.04
GERMANY	270	23.08
ITALY	40	3.42
NETHERLANDS	130	11.11
PORTUGAL	20	1.71
SPAIN	80	6.84
SWITZERLAND	160	13.68

Total	**1170**	**100**

Frequency refers to the sum of firm-year observations per country

Table2: Distribution sample per industry

Industry	*Frequency*	*Percent*
Automobiles & Auto Parts	30	2.56
Chemicals	140	11.97
Consumer Goods Conglomerates	10	0.85
Cyclical Consumer Products	80	6.84
Cyclical Consumer Services	90	7.69
Energy - Fossil Fuels	70	5.98
Food & Beverages	50	4.27
Food & Drug Retailing	40	3.42
Healthcare Services & Equipment	60	5.13
Industrial & Commercial Services	140	11.97
Industrial Goods	110	9.40
Mineral Resources	60	5.13
Personal & Household Products & Services	10	0.85
Pharmaceuticals & Medical Research	80	6.84
Retailers	30	2.56
Software & IT Services	20	1.71
Technology Equipment	30	2.56
Telecommunications Services	50	4.27
Transportation	70	5.98
Total	1170	100

Frequency refers to the number of firms' observations per industry across the sample

3.2. Variables

This chapter will present the variables used in this thesis, as well as elaboration concerning their relevance to this research and the expected sign of the coefficients of these variables.

3.2.1. Dependent variable

The dependent variable is the change in debt level. It indicates the total debt level obtained, and it is calculated using the following formula:

$$\Delta D_{it} = TD_{it} - TD_{it-1}$$

Where ΔD_{it} is the change in debt level for company i at time t and that was calculated by computing the difference between the total debt of the current period and the total debt of previous period. This

formula is commonly used in the literature (e.g. Lemmon & Zender, 2010; Myers & Shyam-Sunder, 1999; Fama & French, 2002). This is used based on the pecking order theory, in which it indicates the entirely new debt issues (Lemmon & Zender, 2010). The change in debt level is calculated manually using total debt data collected from Refinitiv Eikon.

3.2.2. Independent variable

The independent variable according to the pecking order theory is the deficit. The deficit was calculated using data collected from Refinitiv Eikon as follows:

$$DEF_t = DIV_t + X_t + \Delta W_t + R_t - C_t$$

Where DEF_t is the deficit, DIV_t is the dividends paid at time t, X_t is a proxy of capital expenditures, ΔW_t refers to the net change in working capital, R_t is the current part of the long term debt at the beginning of the period and C_t refers to operating cash flows after tax and interest. It indicates the full need for debt finance and that a unit change in deficit must have the same impact on the change in debt level (Frank & Goyal, 2003).

3.2.3. Moderating variable

The independent variable used in this thesis is Corporate Social Responsibility (CSR) represented as ESG's Combined score. This data has been collected using Refintiv Eikon Datastream ASSET4 database. Refinitiv is a database that includes one of the biggest ESG databases of more than 10000 companies globally (Refinitiv, 2020). Refinitiv covers more than 80% of the global market (Refinitiv, 2020).

" ESGC scores provide a rounded and comprehensive scoring of a company's ESG performance, based on the reported information pertaining to the ESG pillars, with the ESG controversies overlay captured from global media sources." (Refinitiv, 2020, p.7). Therefore, it measures the ESG performance based on the ESG information publicly disclosed. The rationale behind using the ESG combined score is that it merges controversy overlay, in which 23 ESG controversy topics were added to the ESG rating. These topics, for instance, are scandals, lawsuits, ongoing legislation disputes and negative media stories (Refinitiv, 2020). This ESG controversy concept is crucial to be included to show the firm's commitment to the social aspects. Since the ESG rating is based on voluntary disclosure, the controversy aspects helps in assessing the sustainability practices of the firm (Lindkvist & Saric, 2020).

3.2.4. Control Variables

A number of control variables are included in the regression. These variables are, to a large extent, determinants of capital structure, and they are frequently used in the literature. A detailed overview of

these variables and their relevant literature is presented in this section and table (1). The incorporated control variables are tangibility, market-to-book value, firm size, profitability, and liquidity. All these variables are collected from the Eikon database.

Tangibility (TANG): is a ratio of total fixed assets to total assets. More tangible assets improve the ability of the firm to collateralize its debt, which leads to a higher level of debt financing (Sharpe and Stadnik, 2007). This ratio is considered a basic and important measure of collateral in capital structure studies (Hall, 2012).

Market-to-book ratio: is often used as a proxy of a firm's growth opportunity (Song, 2005) and as a measure of information asymmetry (e.g. McLaughlin et al., 1998, Clarke and Shastri, 2001 and Van Ness et al., 2001). The increase of growth opportunities leads to higher financial distress costs and lower cash flow concerns (Jensen, 1986). Therefore, firms with higher growth opportunities have a preference for debt financing (Lewis et al., 2003). While, some studies provide evidence of a negative relationship (Huang & Song, 2006; Deesomsak, Paudyal & Pescetto, 2004), others found a positive relationship (Ozkan, 2001; Titman & Wessels, 1988; Chen, 2004), and the latter is the majority.

Firm size: is a proxy of a firm ability to meet its obligations in case of bankruptcy. The larger the firm, the better diversified. Thus, the probability of its financial distress is lower. As a result, its potential bankruptcy costs lower which lead to higher debt level (Rajan & Zingales, 1995). The measure used as a proxy of firm size is the natural logarithm of total assets (Titman & Wessels, 1988).

Profitability: is a crucial variable in capital structure studies, and it might change the desired level of debt and equity finance. Since the increase in profitability might increase the retained earnings (which is the first preference in financing the firm's operations following the pecking order theory) and consequently decrease the leverage, which means decreasing in debt finance (Hovakimian, Opler & Titman, 2001; Lipson & Mortal, 2009). On the other hand, companies with higher free cash flow are more willing to allocate financing for CSR activities (Lindkvist & Saric, 2020). Therefore, the profitability proxy is ROA (Return On Asset), and the expected sign is negative between the profitability and debt level.

Liquidity: is a proxy of a firm ability to meet its financial obligations, and it is proxied by current assets divided by current liabilities. Following the pecking order theory, increasing the firm's liquidity reduce the amount of borrowing because it will initially prefer to finance its operation using internal finance. Prowse (1990) argued that managers can manipulate this measure at the expense of debtholders and in favor of shareholders.

Country: there are a significant differences between countries in terms of ESG rating, therefore, it plays an important role as control variable. These differences may expand to the level the society value sustainability issues, which will influence the interests of stakeholders and the expectations following both legitimacy and stakeholder theories (Lindkvist & Saric, 2020). According to Lindkvist and Saric (2020) this variable might have indirect or direct explanatory value to the impact of ESG rating on debt level. Adding this variable might help providing better picture of the dynamic relationship between ESG and debt level (Lindkvist & Saric, 2020).

Industry: this variable is represented following the Global Industry Classification Standard (GICS) Sector Name. This classification refers to the sector the firms operating in. Table 2 provided an overview of these industries.

Table 3: Variables summary

Variable	Symbol	Definition	Expected sign
Change in Debt	ΔD_{it}	$TD_{it} - TD_{it-1}$	*N/A*
Funding Deficit	$DEFit$	$DIV_t + X_t + \Delta W_t + R_t - C_t$	+
Corporate Social Responsibility	*ESG*	*Environmental, Social and corporate Governance accountability data based on publicly reported data*	+
Tangibility	*TANG*	*Total fixed assets to total assets*	+
Growth opportunity	*MTB*	*Market-to-book value*	+
Firm size	*Ln Assets*	*Natural logarithm of total Assets*	+
Profitability	*ROA*	*Return on assets*	−
Liquidity	*LIQ*	*Current assets / current liabilities*	−
Country	*COU*	*Country of incorporation*	*N/A*
Industry	*IND*	*Industry classifications*	*N/A*

The dependent variable indicates the change in debt level at time t for a company i. The main independent variable is Deficit that indicates the need for debt finance following the pecking order theory. ESG combined score (Environmental, Social, and corporate Governance) indicates the firm's corporate social responsibility based on information reported. The control variables are used according to the previous literature. Tangibility (TANG) is defined as the fixed assets to total assets, Market to Book value (MTB) as a proxy for corporate growth opportunity, the natural logarithm of total assets (Ln Assets) as a proxy of firm size, Return On Assets (ROA) indicates firm's profitability, and liquidity (LIQ) is defined as the current assets divided by current liabilities. Country of incorporation (COU) and Industry (IND) are both used to control for the differences in corporate social responsibility among countries and industries.

3.3. Empirical model

The methodology used to test the hypothesis is inspired by the Shyam-Sunder & Myers (1999) pecking order theory. The rationale behind that is that, after controlling for operating cash flows (internal

finance), any financing deficit that might exist is absorbed by debt. That is based on the following equation:

$$DEF_t = DIV_t + X_t + \Delta W_t + R_t - C_t$$

Where DEF_t is the deficit, DIV_t is the dividends paid at time t, X_t is a proxy of capital expenditures, ΔW_t refers to the net change in working capital, R_t is the current part of the long term debt at the beginning of the period and C_t refers to operating cash flows after tax and interest. The financing deficit is a useful tool since it controls internal finance by excluding the operating cash flows. As a result, the financing deficit in the pecking order settings shows the full need for external finance. That can be defined by the following empirical model:

$$\Delta D_{it} = a + \beta DEF_{it} + \varepsilon_{it}$$

Where ΔD_{it} is the changing in debt level at time t for company i, a is a constant, βDEF_{it} captures the impact of financing deficit of company i at time t, and ε_it is the company-specific error term. This model is commonly used in the literature (e.g. Lemmon & Zender, 2010; Myers & Shyam-Sunder, 1999; Seifert & Gonenc, 2008). For this thesis's purposes, some changes will be made. These changes have been made in order to incorporate the determinants of the capital structure mentioned above, the moderating effect of CSR, and some control variables to mitigate the omitted variable bias.

$$\Delta D_{it} = a + \beta_1 DEF_{it} + \beta_2 CSR + \beta_3 CSR_{it} * DEF_{it} + \beta_x X_{it} + \varepsilon_{it}$$

As mentioned above, ΔD_{it} is the changing in debt level for at time t for company i, a is a constant, DEF_{it} capture the impact of financing deficit of company i at time t, CSR is the direct impact of social responsibility on the change in debt level, $CSR_{it} * DEF_{it}$ capture the moderating effect of CSR at time t for company i, X_{it} is a proxy for control variables, and ε_it is the company-specific error term. The control variables are profitability, tangibility, liquidity, firm size, market-to-book value, in addition to country and industry as dummies. A control for year-specific effects is included in the model. These variables are commonly used in the literature on capital structure (e.g. Rajan & Zingales, 1995; Lemmon & Zender, 2010; Hall, 2012; de Jong et al., 2011).

One of the most typical issues encountered during result interpretation, when working with (continuous) interaction terms, is that the interaction term makes interpretation rather difficult. Hence, both interaction terms (deficit and ESG) are centered. This technique is commonly used in the literature to avoid conducting multilevel analysis (Aiken & West, 1991). Centering is the process of subtracting the mean from each observation (Robinson & Schumacker, 2009). There will be no concerns about multicollinearity between the variables utilized in the interaction, and correlations with other variables

will not be harmed (Belsley, Kuh, & Welsch, 1980). Due to centering, the interpretations of the coefficients indicate the impact of one variable when the other one is at its mean value.

4. Main analysis

4.1. Descriptive statistics

Examining the correlations and descriptive statistics is the most basic analysis to discover whether there are any issues of concern with the data.

Table 3: Descriptive Statistics

Variable	*Observations*	*Mean*	*SD*	*Min*	*Max*
Debt change	1170	479000	3220000	-1.92e+07	7.08e+07
DEF_C	1170	-.012	1.33e+07	-1.19e+07	9.00e+07
ESG_C	1170	0	14.762	-40.334	30.486
LIQ	1170	1.447	.64	.297	5.014
Ln Assets	1170	16.39	1.271	13.265	19.312
MTB	1170	2.76	1.969	.49	15.74
TANG	1170	6910000	1.26e+07	44544	1.06e+08
ROA	1170	6.246	4.902	-10.47	53.58
Country	1170	3.812	2.246	1	8
INDUSTRY	1170	9.256	5.206	1	19

The dependent variable indicates the change in debt level at time t for a company i. Both the independent variable and the moderator are centered. The main independent variable is DEF_C that indicates the deficit or the need for debt finance(after centering) following the pecking order theory. ESG_C (Environmental, Social, and corporate Governance) indicates the firm's corporate social responsibility after centering. The control variables are used according to the previous literature. Tangibility (TANG) is defined as the fixed assets to total assets, Market to Book value (MTB) as a proxy for corporate growth opportunity, the natural logarithm of total assets (Ln Assets) as a proxy of firm size, Return On Assets (ROA) indicates firm's profitability, and liquidity (LIQ) is defined as the current assets divided by current liabilities. Country of incorporation (COU) and Industry (IND) are both used to control for the differences in corporate social responsibility among countries and industries.

Table 3 shows that the data does not contain outliers. It is worth noting that tangibility and the dependent variable are a statistical outlier in terms of magnitude. Additionally, due to the interaction term and the main predictor variable (DEF_C) are centered, the means have very low or even zero values.

Table 4: Matrix correlation

Variables	*Debt change*	*DEF_C*	*ESG_C*	*LIQ*	*Ln Assets*	*MTB*	*TANG*	*ROA*	*COU*	*IND*
Debt change	1.000									
DEF_C	0.159	1.000								
ESG_C	-0.036	0.043	1.000							
LIQ	-0.074	-0.189	-0.062	1.000						
Ln Assets	0.202	0.705	0.258	-0.386	1.000					
MTB	-0.014	-0.146	0.088	0.114	-0.166	1.000				

TANG	0.202	0.846	0.056	-0.207	0.626	-0.153	1.000			
ROA	-0.080	-0.162	0.058	0.337	-0.215	0.491	-0.155	1.000		
COU	-0.068	-0.072	0.109	0.166	-0.150	0.311	-0.029	0.226	1.000	
IND	0.003	0.032	-0.005	-0.135	0.047	0.042	-0.021	-0.013	0.073	1.000

The dependent variable indicates the change in debt level at time t for a company i. Both the independent variable and the moderator are centered. The main independent variable is DEF_C that indicates the deficit or the need for debt finance(after centering) following the pecking order theory. ESG_C (Environmental, Social, and corporate Governance) indicates the firm's corporate social responsibility after centering. The control variables are used according to the previous literature. Tangibility (TANG) is defined as the fixed assets to total assets, Market to Book value (MTB) as a proxy for corporate growth opportunity, the natural logarithm of total assets (Ln Assets) as a proxy of firm size, Return On Assets (ROA) indicates firm's profitability, and liquidity (LIQ) is defined as the current assets divided by current liabilities. Country of incorporation (COU) and Industry (IND) are both used to control for the differences in corporate social responsibility among countries and industries.

There is a correlation between deficit and both tangibility and Ln Assets (which is a proxy of firm size) 0.846 and 0.705 respectively, however, multicollinearity is not expected to be an issue. To confirm this, a VIF test will be conducted to prove that multicollinearity is not a concern.

Table 5: Variance inflation factor (VIF)

	VIF	***1/VIF***
DEF_C	4.551	.22
ESG_C	1.166	.858
Interaction term	1.046	.956
LIQ	1.358	.737
Ln Assets	2.643	.378
MTB	1.432	.698
TANG	3.657	.273
ROA	1.484	.674
COU	1.181	.847
IND	1.044	.958
Mean VIF	1.956	.

The Variance Inflation Factor (VIF) was conducted after the linear regression model (OLS), and the result is shown in table 5. Both DEF_C and TANG have 4.551 and 3.657 VIF respectively. However, since these numbers are below 5, multicollinearity will not be considered an issue of concern.

Furthermore, the Hausman test was also conducted. The Hausman test is used to determine whether a fixed-effects or a random-effects model is required for the analysis (Hausman, 1978). Based on the data, the Hausman test, presented in table 6, revealed that a fixed-effects model would be preferable as the P-value is significant (P-value < 0.05). Hence, the null hypothesis has been rejected. As a result, Fixed-effects should be used to estimate the model, which is a common strategy for analyzing panel data. The fixed-effects model generates a dummy for each firm that already accounts for industry and country effects.

Table 6: Hausman test

Hausman (1978) specification test	
	Coefficients
Chi-square test value	156.488
P-value	0.00

Ho: difference in coefficients not systematic (Random effect preferred)
Ha: Fixed effect is preferred

Furthermore, Breusch-Pagan/Cook-Weisberg test was conducted to test for heteroskedasticity. As shown in APPENDIX A, the null hypothesis that there is constant variance had to be rejected (P-value = 0.000). This suggested that heteroskedasticity was an issue in the model.

Serial correlation in a linear panel-data leads to standard errors biases and consequently less efficient results (Drukker, 2003). Hence, a Wooldridge test for serial correlations (APPENDIX B) was used as the final analysis to diagnose any flaws with the data. This study yielded a negative result, indicating that the data is free of serial correlation issues.

4.2. Testing hypothesis

The results of the statistical analysis will be reported in this section. Because the variable structure makes direct interpretation problematic, the coefficients will not be explicitly interpreted as " 1 unit change in the amount of x independent variable leads to a change in the dependent variable in a specific direction and a particular amount ". Rather, the main interpretations will be based on the coefficients' sign and significance. Furthermore, because these are continuous interaction terms, the interpretation of the moderator variable is complicated.

The empirical test shown in table 7 contains 3 models: the first model is the fixed effects regression without the inclusion of the interaction term. The second model is the fixed effects model including the interaction term. The third model is the fixed effects model with interaction term and robust standard error in order to correct for heteroscedasticity. Moreover, the year dummies are included within all models to control for the time effect. The result indicates the same expected sign presented in the literature concerning the control variables, and it is consistent in the 3 models except for liquidity. The contradictory liquidity sign probably indicates liquidity as collateral. In other words, the higher the liquidity, the more solvent the firms to meet their obligations. Consequently, more access to debt finance. Furthermore, the sign of both deficit and ESG is not as predicted, indicating that the higher the deficit or the ESG score, the lower the debt level. Both deficit and ESG are significant within all 3 models.

With regard to interaction term, it is significant at 0.05 level indicating, that indeed there is a moderating effect of ESG. However, after conducting a robust standard error test, the result indicated

an insignificant effect with the main effect of both deficit and ESG kept its significance level. This might be due to that the CSR disclosure is based on a variety of ESG information, and the lenders' sensitivity varies according to the type of CSR data (Hamrouni et al., 2019). Hence, this might have led to the insignificant impact of the ESG on the relationship between the need for debt and the change in debt level.

The negative interaction effect with the negative main effect of both variables indicates that when there is a 1 euro increase in the deficit (the need for debt finance according to pecking order theory), the debt level will decrease (0.2504975). Whereas, when ESG information is incorporated, the level of debt will decrease even more by (0.0013157). Incorporating ESG information when there is an increase in the need for debt finance might decrease the firm's access to debt finance or lead the firm to use another source. As the sign of deficit, ESG, and their interaction term contradicts the hypothesis that there is a positive moderating effect, the hypothesis should be rejected. Meaning, there is no positive moderating effect of CSR on the relationship between the need for debt and the change in debt level. Rather there is a negative moderating effect. However, this effect is insignificant after the robust standard error test, so a robust conclusion cannot be drawn from this effect.

Table 7 : Fixed effects regression (Testing the hypothesis)

	Model (1)		*Model (2)*		*Model (3)*	*Robust*
	Δ Debt	*Standard Error*	***Δ Debt***	*Standard Error*	***Δ Debt***	*Standard Error*
DEF_C	-.2456703***	.0236761	-.2504975***	.0237148	-.2504975***	.0485464
ESG_C	-33508.99**	10235.95	-28199.45**	10462.53	-28199.45*	12913.22
Interaction term	-	-	-.0013157*	.0005618	-.0013157	.0013675
LIQ	960233.8**	293668	969043.5***	293059.3	969043.5	502897.1
Ln Assets	3034639***	492260.5	2946832***	492628.9	2946832**	1110963
MTB	124832.6	96725.13	126985.1	96521.07	126985.1	81993.53
TANG	.3511349***	.0362921	.3617268***	.0364953	.3617268**	.1286491
ROA	-65808.31*	26684.76	-66945.82*	26631.69	-66945.82*	33755.56
Year	Yes	-	Yes	-	Yes	-
Constant	-5.28e+07***	8018980	-5.14e+07***	8024421	-5.14e+07**	1.86e+07
R-squared	**.192488**		**.1967398**		**.1967398**	
N. of cases	**1170**		**1170**		**1170**	

Note: * p < 0.05, ** p < 0.01, *** p < 0.001 (The stars indicate the level of significance)

Model (1) is a fixed-effects model before the inclusion of the interaction term. Model (2) is the fixed effects regression containing the interaction term. Model (3) is rousted standard error fixed effect regression including the interaction term. The dependent variable indicates the change in debt level at time t for a company i. Both the independent variable and the moderator are centered. The main independent variable is DEF_C that indicates the deficit or the need for debt finance(after centering) following the pecking order theory. ESG_C (Environmental, Social, and corporate Governance) indicates the firm's corporate social responsibility after centering. The control variables are used according to the previous literature. Tangibility (TANG) is defined as the fixed assets to total assets, Market to Book value (MTB) as a proxy for corporate growth opportunity, the natural logarithm of total assets (Ln Assets) as a proxy of firm size, Return On Assets (ROA) indicates firm's profitability, and liquidity (LIQ) is defined as the current assets divided by current liabilities. Country and industry dummy variables are not included because the fixed effects model automatically controls for their effects. Year dummies are included for the years 2010 till 2019 in order to control for year effects.

Contextual variables frequently affect (strengthen or weaken) causal relationships (interaction effects) between two variables x and y. The most recent additions to the literature place a strong emphasis on visually depicting the marginal effect of x on y at various values of z (along with a confidence interval around that marginal effect) in order to determine whether that marginal effect is statistically and substantively significant (Esarey & Sumner, 2018). Even if the coefficient on the interaction term is insignificant, the marginal effect of x on y can be significant for substantively meaningful values of the modifying variable z. Hence, These margins have also been tested empirically, and the result mentioned in the APPENDIX C indicates a statistically significant coefficient below, at, and above the mean. Marginal effects can be a useful way to summarize how a change response is related to a covariate's change. Moreover, the interaction effects interpretations might be challenging (Jann, 2013), therefore, including a graphical test will be useful.

Figure 1: Visual inspection of the relationship ($+1\sigma$, 0, -1σ)

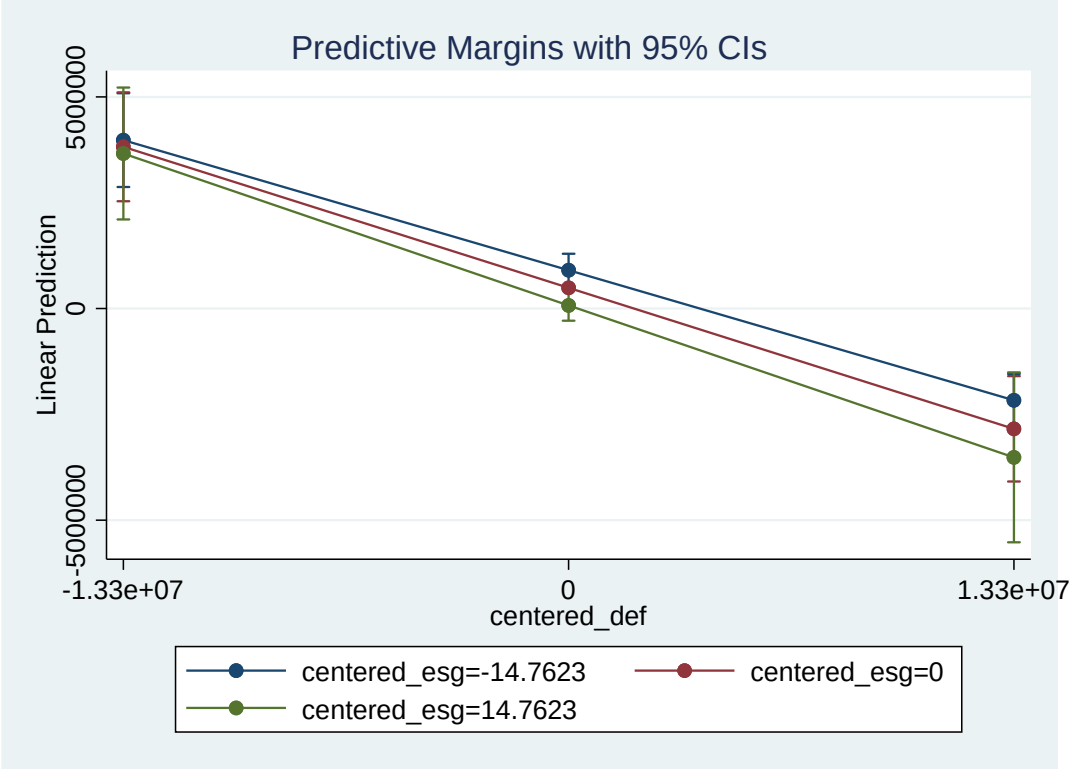


Figure 1 explains the relationship between ESG and deficit. It shows that with one standard deviation below, at, and above the mean on ESG, there is a negative relationship between deficit and change in debt level. These margins have also been tested empirically, and the result indicates a statistically significant coefficient below, at, and above the mean. The differences in significance level mean that the level of significance does not necessarily mean that the importance of the interaction effects (Esarey & Sumner, 2018). Brambor et al. (2006) elaborated how many earlier studies have neglected this notion

and removed the interaction term from their analysis based on the level of significance. As a result, they may miss significant conditional relationships between their variables.

5. Conclusion and discussion

This study investigates the moderating effect of corporate social responsibility (CSR) on the relationship between the need for debt and the change in debt level that have been identified according to the pecking order theory. This study aims to answer the following research question:

To what extent does CSR moderate the relationship between the need for debt and the actual debt level?

Using data from 117 companies representing 8 countries, retrieved from Refinitiv Eikon Datastream ASSET4 for ESG data and Refinitiv Eikon For financial data, panel data regressions are conducted to examine the relationship hypothesized in the research question.

According to the literature discussed in this thesis, it is argued that performing socially responsible and informing stakeholders about this social responsibility performance reduces information asymmetry (Dhaliwal et al., 2011). Adverse selection problems, according to the pecking order theory, are the most important element in the capital structure (Myers and Majluf 1984). Disclosing ESG information improves the transparency concerning CSR performance, hence, mitigating information asymmetry between companies and debt providers. Furthermore, companies that publish substantial CSR information display lower risks and better performance (Hamrouni et al., 2019). Hamrouni et al. (2019) suggests that the economic and financial benefits of CSR are likely to motivate credit providers to pay attention to ESG problems. In this sense, the amount of ESG data that companies publish might be important and relevant to credit providers, allowing companies with good CSR practices to borrow more easily. Therefore, this thesis hypothesized that CSR positively moderates the relationship between the need for debt and the change in debt level.

The hypothesis has been tested through three models. The first model tests the main effect of both the independent and the moderator on the change in debt level. The second model included the interaction term besides the main effect of these variables. The third one is a robust standard error test and has been conducted after detecting heteroscedasticity in the data used. The result does not support the hypothesis that there is a positive moderating effect of CSR on the relationship between the need for debt and the change in debt level. The result in the second model indicates a negatively significant moderating effect in addition to a negatively significant main effect of these variables on the dependent. However, after conducting the robust standard error test, the interaction effect became insignificant. Meanwhile, after testing the marginal effect of the interaction term, the result indicated a negative and significant relationship. In the light of the previous result, there is an indication of a moderating effect that negatively strengthens the relationship between the need for debt and the change in debt level. To

put it another way, the main effect of deficit refers to that increasing deficit leads to decrease the debt level, and when CSR intervene, it will lead to an even lower debt level.

The interpretation of such a result might be that increasing the need for debt finance leads debt providers to be skeptical over the firm's capability to pay off. Additionally, the negative sign associated with the ESG score might be a consequence of the expensive implications of CSR activities which might weaken the ability of the corporation to meet its financial obligations. For instance, CSR activities are considered by banks as an expensive diversion of the company's resources (Magnanelli & Izzo, 2017). Goss and Roberts (2011) provide evidence that lenders demand greater debt costs for low-quality borrowers who engage in discretionary CSR expenditure. However, those lenders are unconcerned about CSR activities for high-quality borrowers.

This thesis aims to help business managers satisfy credit providers' expectations and attract debt funding sources by providing a deeper understanding of the implications of CSR information. However, this study does not provide a robust result due to an insignificant result regarding the moderating effect of CSR on the relationship between the need for debt and the change in debt level. Therefore, caution is needed in interpreting this result, given that there are some limitations. Firstly, this result should not be generalized since the sample was based on 8 European countries for 2010-2019. The generalizability is violated due to differences among the EU and other regions. These differences include significant variations in law, policy, and enforcement (Fox, 1997). Secondly, This thesis focuses solely on the quantity of ESG data disclosed, rather than the quality of the CSR activities. Thirdly, some other studies utilized different empirical models in order to examine similar subjects, which might provide different results. Finally, many pieces of research on the subject of sustainability performance have found that sustainability information is disclosed voluntarily. As a result, firms' CSR performance depends on the information supplied by the companies themselves. Hence, this information may not reflect actual CSR performance for some organizations.

Consequently, further research is needed that might investigate the same relationship by testing different regions or even larger samples. Moreover, a longer duration could be employed in order to differentiate between short and long-term impact, given that the implementations of ESG activities need a long time to yield results.

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APPENDIX A

Testing for heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of Debt change
chi2(1) = 3039.65
Prob > chi2 = 0.0000

APPENDIX B

Testing serial correlation

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 116) = 1.977
Prob > F = 0.1624

APPENDIX C

The empirical test of marginal effect

Average marginal effects **Number of observations = 1,170**

Model VCE : Robust

Expression : Linear prediction, predict()

dy/dx w.r.t. : DEF_C

1._at : ESG_C = -14.7623

2._at : ESG_C = 0

3._at : ESG_C = 14.7623

		Delta-method				
	dy/dx	Std.Err.	z	P>z	[95%Conf.	Interval]
DEF_C						
_at						
1 ESG_C	-0.231	0.031	-7.430	0.000	-0.292	-0.170
2 ESG_C	-0.250	0.049	-5.160	0.000	-0.346	-0.155
3 ESG_C	-0.270	0.068	-4.000	0.000	-0.402	-0.138