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The Effect of Capital Structure and the Use of Leverage on Sustainability Performance

Nicolás Cosijn Diez

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Abstract:

In a world where there is an increasing scrutiny on companies to behave more responsibly and have a more comprehensive business model, understanding the impact of capital structure choices on sustainability performance can improve decision making on a corporate level but also from an outside perspective, as an investor. This thesis studies the effects of capital structure choices and more particularly the effects of a strong reliance on debt, a long-term maturity structure and a strong payout policy on the sustainability performance of 108 medium and large-cap European companies between 2015 and 2019. After looking at existing literature related to the area of interest, I describe the different variables used in this study as well as how they are computed and explain their relevance. Thereafter, several regressions are conducted to test the effects of the independent variables on the ESG-performance of the sample firms. Subsequently, a comparison based on the sample firms' GICS industry classification is also conducted to assess the strength of the effect based on the industry is which the firm is classified in. The findings of these different OLS and Tobit regressions prove that there is a strong interrelation between capital structure choices and ESG-performance. The conclusions drawn from this research seem to point towards and provide a strong evidence related the cash flow theory of Jensen (1987), Modiglianni and Miller's (1958) capital structure theory and for certain industries, the agency conflicts theory by Jensen and Meckling (1976).

Keywords: Sustainable finance, corporate finance, ESG-performance, capital structure, debt, leverage, cash flow theory

I- Introduction:

The recent BDM case in Australia, or the example of Exxon losing two board seats to activist shareholders are examples of a shift in society aiming for the implementation of more comprehensive and sustainable business models (Smyth, 2021; Hiller and Herbst-Bayliss, 2021). This exemplifies the role financial institutions can play in the transition towards a low carbon economy. This example puts in evidence that the choice of capital structure in place can have numerous implications and consequences on the performance of a firm and thus, also on its stakeholders. Considering that they each have different and often opposing expectations and requirements can give rise to conflicts between them. Such conflicts can culminate in predatory and selfish behavior strategies such as over or underinvestment (Leland, 1998). These internal conflicts were coined as agency conflicts by Jensen and Meckling (1976) and is in contradiction with Modigliani and Miller's capital structure irrelevance theory and highlights the importance to develop a capital structure which limits these conflicts (Leland, 1998). One can argue that with the emergence of new stakeholders, these agency conflicts have grown, especially when factoring the growing interrelation between a company and society as well as the increasing societal expectations and scrutiny imposed by numerous exogenous actors on the firm. The shareholder model presented by Milton Friedman (1970) wherein he stated that the company's sole purpose was to its shareholders is a little outdated and narrow (Ferrero et al., 2014). Instead, a more comprehensive approach is necessary, wherein companies are expected to generate value for society and the environment (Schoenmaker, 2017). The increase in assets under management (AUM) following an Environmental, Social and Governance (ESG) investment strategy has grown by 34% from 2016 to 2018. Furthermore, the disclosure of ESG-related metrics by companies in their annual reports as well as by means of additional sustainability reports has also increased (Schoenmaker, 2020). The adherence to the Global Reporting Initiatives (GRI) standards combined with the development of large ESG-centered databases further allows investment funds and managers to pressure companies and use their leverage as a mean to force a company and potentially even a whole industry into complying with these new set of rules and societal expectations. Dordi and Weber's event study (2019) looked at the effect of different divestment pledges, announcements and campaigns on the cumulative abnormal returns (CAR) of 200 fossil fuel firms. They found that such an announcement led to negative CAR on their stock price (Dordi and Weber, 2019). This decrease in returns could potentially hurt the firm if it wanted to turn towards the equity market and thus, can be used as a lever by different stakeholders to force a company into changing its

business model and align it with current societal expectations. Angel and Rivoli (1997) specify that an investor can either "exit" the company or "voice" his opinion. They further concluded that the cost of capital of a firm increases exponentially if there is an investor boycott on the company's shares (Angel and Rivoli, 1997)

Hence, seeing the growing importance for companies to focus on and incorporate sustainability performance in their corporate strategy, I decided to examine the effect of capital structure choices, and more particularly the extent to which the use of debt has an impact on a company's sustainability performance. The underlying assumption behind this research lies in the idea that leverage increases management pressure in meeting financial obligations – such as regular interest payments –which are the direct consequence of using debt-financing. Despite the well-known tax benefits of debt, it remains a contractual obligation where failure to meet interest payments can lead to bankruptcy. By looking at the overall effect of leverage by means of a company's Debt to Equity ratio (D/E) combined with the presence of mediating variables, will clarify and help to understand the effect of debt on sustainability performance measured through a company's ESG rating. The availability of cash and the ability of the firm to meet its medium and short-term financial obligations, by being able to readily convert their current assets into cash, a high interest coverage ratio and a high credit rating are expected to alleviate the burden of debt and lead to a stronger sustainability performance. It can be said that the presence of additional capital by companies who have a strong sustainability performance could better prepare the company and serve as buffer in the event of an unexpected risk. Holling (2001) refers to this added layer of protection as "resilience". DeAngelo and DeAngelo (1990) found that when confronted with financial distress, managers of NYSE companies with binding covenants cut dividend payments. Based on DeAngelo and DeAngelo's (1990) conclusion, the presence of covenants and whether the firm pays out its excess earnings under the form of dividends – which are said to be sticky– are expected to lead to a negative effect on the studied relationship and lead to a lower resilience (Holling, 2001). By amplifying the pressure on management to meet certain financial targets, the adoption and implementation of a sound ESG-strategy is marginalized and given less attention to, thus leading to a lower sustainability performance.

The literature review conducted provides insightful information regarding the different drivers of financial performance and how it is affected by choices in capital structure. There has been an extensive focus by academics on attempting to find the relation and the effect of financial performance on sustainability performance. However, there is no agreement in the literature regarding the effect of sustainability performance on financial performance. While

Khan, Serafeim and Yoon (2015) found that focusing on different material sustainability topics improved future financial performance, others, including Hassel, Nilsson and Niqvist (2005) or Landi and Sciarelli (2019) found that sustainability had a negative or no significant effect respectively on financial performance. The classical view regarding the role of a business remains of importance. This explains the numerous studies related to capital structure and financial performance. Berger and di Patti (2006) found that higher leverage led to better profit efficiency. Das and Swain (2018), studied the effect of capital structure changes on profitability. They found that albeit profitability depends on a wide variety of factors, capital structure choices played an integral part (Das and Swain, 2018). There have also been numerous studies on the relation between capital structure and ESG-performance. Namely, Ge and Liu (2015) and Henkel and Zeichner (2001). Ge and Liu (2015) found that a high ESG-performance led to lower yields on debt because of the lower risks associated to it, while Henkel and Zeichner (2001) found that firms with a low sustainability performance were subject to a higher cost of capital. However, the effect to which leverage has an impact on the ESG performance of a company has not received the same attention by academics and thus, makes for an interesting topic to research. Furthermore, following Jensen and Meckling's (1976) line of thought and the divergent opinions and expectations of different stakeholders on the importance a firm should convey to sustainability performance allows to examine whether the agency conflict theory is visible in this scenario. This paper adds to the existing sustainable finance literature by looking at the direct relation between choices in capital structure and the use of leverage and a firm's sustainability performance, which is not something that has been done yet. In addition to being of relevance for academic purposes, this study sheds light into new potential drivers of sustainability performance and how this performance is affected by choices in capital structure. This research can also be of interest for companies to understand how their choices of capital structure impact their ESG-performance as well as for institutional investors desiring to add a new metric to their decision-making process and to assess how debt and related aspects thereto impact the sustainability performance of a firm.

This study focuses on 108 medium and large-cap (MLC) European companies, all of which are comprised in the STOXX 600 index. The timeframe of this study is a four-year period, namely from 2016-2019, yielding a total of 432 observations. There are several reasons behind the choice of sample. The choice of the sample and the reason behind selecting MLC companies is motivated by the availability of data and more specifically, of ESG-related information. The second motivation behind the choice of sample has to do with the fact that Europe is more evolved in terms of ESG reporting compared to Asia and the American continent

(Schoenmaker 2020). Over a four-year period (from 2016-2019), European companies disclosed twice as many ESG metrics on average in their annual reports than their counterparties from Asia and the American continent (Schoenmaker 2020). This research, on the effect of capital structure choices and the use of leverage on sustainability performance provides insights into potential agency conflicts in a society where sustainable reporting is expected from companies as evidenced by the fact that 62% of the European companies in the sample reported ESG metrics in their annual report in 2019 (Schoenmaker 2020). The data relevant for this research was collected from a variety of sources including Refinitiv, Orbis, Compustat and companies' annual reports.

The results were obtained by running a series of OLS and Tobit regressions through STATA. These provide insights regarding the effect of the independent variable on the dependent variable and allow to reach a meaningful conclusion regarding the relation and the effect of leverage and choices in capital structure on the sustainability performance of the sample firms. The results from these tests allow us to infer that an increase in leverage has a positive effect on the ESG performance of a company which can point towards and serve as evidence for the free-cash flow theory of Jensen (1987) in that an increase in debt allows for a more efficient use of resources and decreases managerial opportunism. Furthermore, it would seem that a high payout ratio hurts ESG-rating thus allowing to infer that excess cash flows have to be reinvested in projects that generate value rather than redistributed to shareholders. Ultimately, having a long-term horizon in terms of average time to maturity, seems to have a slightly negative impact on the ESG-performance of firms although this result is not very significant. However, it is important to note that the ESG-rating serving as basis for the study has an impact on the results. Therefore, the question and relevance of the implementation of a globally accepted methodology for ESG-measurement can be raised as it would increase the usefulness and comparability of different studies.

II- Literature review

The involvement of different international organizations such as the United Nations (UN) and the commitment of countries to sign agreements aimed at reducing carbon emissions has increased awareness on the topic. This has served as a means to accelerate the transition towards a sustainable development which was defined by the United Nations in 1987 as "the ability to meet the needs of the present without compromising the ability of future generations of meeting their own needs". The underlying pillars of sustainable development are social, governance and sustainability. The increasing scrutiny and transparency to which companies

are exposed to, allows its different stakeholders to manage the company's performance and is captured in the ESG-ratings that are published on an annual basis by external organizations such as Bloomberg, Refinitiv and the MSCI amongst others. The interest by academics in understanding the effect of this change on company performance, has led to an increasing number of papers studying the effect of sustainability performance on financial performance. Similarly, capital structure choices have also been the center of numerous studies considering the important implications financial performance still has on a company (Das and Zwain, 2018). While it can be argued that the Friedman (1970) model is a little narrow and does not fit with current societal expectations, financial performance still remains at the core of any business if it wishes to survive and succeed in an ever growing international and competitive business environment (Das and Zwain, 2018; Landi and Sciarelli, 2019)

While there have been studies looking at how CSR performance affects the cost of capital (Angel and Rivoli, 1997) and the cost of debt (Magnanelli and Izzo, 2017), there seems to be a gap in the academic literature regarding the effect of capital structure choices and the effect debt financing has on a firm's sustainability performance. This topic has not yet received a comparable level of attention and recognition, despite the general interest in the topic on a larger scale. An early paper by Magnanelli and Izzo (2017) looked at the relationship between cost of debt and CSR activities for 332 firms between 2005 and 2009. They found that an increase in CSR was associated with an increase in the cost of debt, which is counterintuitive considering that firms with a high CSR engagement are expected to be better prepared for the future (Magnanelli and Izzo, 2017; Khan, Serafeim and Yoon, 2015) and that credit ratings seem to already account and incorporate ESG-performance (Ge and Liu, 2015). A potential limitation and explanation to Magnanelli and Izzo's (2017) study can be the time frame (2005-2009) on which they based their study, as CSR performance may not have been as developed and accepted by investors as it is nowadays (Magnanelli and Izzo, 2017). Alternatively, Ge and Liu (2015) found that in accordance with the stakeholder theory and the associated reduction of information asymmetry and litigation risk, companies with a high CSR orientation issued bonds with lower yield spreads. This highlights the divergence in opinions and results related to the topic for both equities– as seen in Friede et al. (2015)–, but also for fixed-income instruments.

Considering that this is a recent topic of discussion, rather than applying past models to a contemporary setting, I reconciled the methodologies from similar papers and used it as foundation for my research. By looking at the drivers of capital structure and how choices therein are related to firm performance allows for a better understanding of the variables and

their potential effects on the dependent variable of this study, namely the sustainability performance of a firm.

a) The effect of capital structure on financial performance

Modigliani and Miller (1958) is the center stone of the corporate finance literature, as they argued in their Proposition I that the value of the firm is irrelevant to its capital structure. According to this theory, the choice in capital structure and the extent to which a firm relies on debt or equity as a source of capital and funding should not have an effect on the total value of the firm (Modigliani and Miller, 1958). However, the assumptions on which this theory is built are very restrictive. These assumptions do not hold in practice for many different reasons, amongst which is the fact that firms face corporate taxes, companies do not borrow at the risk-free rate and are exposed to bankruptcy costs. This explains why companies attempt to balance the different sources of capital financing to find an optimal capital structure leading to the lowest possible cost of capital and thus obtain a greater firm value. Maximizing firm value is not an easy task as pointed out by Wahba (2013) as it requires many different considerations. Contradicting Modigliani and Miller (1958), Myers and Maljuf (1984) found evidence supporting the pecking order theory, wherein firms preferred to fund their projects through debt rather than equity because of the lower costs it entails, after having exhausted internal sources of financing. Nonetheless, the presence of debt in the capital structure and thus of creditors, leads to conflicts among the different claimants –debt and equity holders as well as between the equity holders and management– (Jensen and Meckling, 1976) but it also leads to tradeoffs. While debt does lead to a lower cost of capital because of the tax benefits associated to it, it also leads to an increase in financial distress costs, putting pressure on management. Das and Zwain (2018) examined in their research the changes in profitability in Indian companies based on a firm's choice of capital structure. They concluded that the choice in capital structure is unique to every firm and should be considered carefully (Das and Zwain, 2018).

Rajan and Zingales (1995) in a cross-sectional study on companies in the United Kingdom and Hovakimian et. al (2001) examined the different determinants of leverage. They found that there are numerous factors influencing the extent to which a company relies on debt. Factors such as company size and asset tangibility were positively related with leverage, whereas ROA was negatively related to leverage (Rajan and Zingales,1995; Hovakimian et. al, 2001). Therefore, considering that these factors have an effect on and help explain the target leverage of a given company, they will be incorporated in this research as control variables to see if

changes in them lead to differences in ESG performance, which is the dependent variable of this study.

In her study on northern-African and Middle-Easter small and medium size enterprises (SMEs) from 2008 to 2010, Wahba (2013) concludes by saying that it is not the amount of debt which affects firm performance, but rather the structure and time to maturity of the debt. There are many reasons for which a long-term maturity structure seems to favor the financial performance of SMEs, including the decrease in rollover-risk (Cole and Kehoe, 1996). Furthermore, Wahba (2013) also states that choosing the optimal capital structure is multidimensional and dynamic, and that it differs based on the firm, as was pointed out by Das and Zwain (2018).

Financial performance is a very broad concept which can be evaluated through a variety of metrics. Since financial performance is not independent (Wahba, 2013) and is interrelated with management characteristics (Shawhan, 2014) as well as with operational decisions amongst others (De Meuse et al. 1994), the full extent to which changes in capital structure impact firm performance cannot be measured. Changes in capital structure are also accompanied with further changes in the company which are not taken into account in the above studies. A clear example thereof is the impact of changes in dividend policy on shareholder composition. Allen et al. (2000) found evidence to support the implications a change in dividend policy had on the firm's shareholder base. Firms paying dividends are found to perform better as they attract institutional investors –who benefit from tax advantages– and are able to better monitor the performance of the firm, thus leading to a "dividend clientele" (Allen et al., 2000). It would be interesting to see if this still holds in the current societal environment and if companies paying out dividends are able to achieve a better sustainability performance because of the stronger monitoring and scrutiny imposed by institutional investors, as well as by the investors' clients. Additionally, there is also evidence to support that large institutional investors may benefit more from share repurchases than individual investors (Brennan and Thakor, 1990). As there is information asymmetry between institutional investors and individual investors, the former have more knowledge about the firm. This additional knowledge and information can lead to an expropriation of wealth by the informed shareholders and lead to an increase in the value of the position held by the institutional shareholder (Brennan and Thakor, 1990).

b) The effect of sustainability performance on financial performance

The term sustainable development was first mentioned in the Bruntland report in 1987 (United Nations) and has received an ever-growing interest by society, who tries to push

companies towards change and to adopt a more sustainable and comprehensive business model. This can be achieved through an active ownership approach (Robeco, 2020) where investors "voice" their opinions (Angel and Rivoli, 1997). The strong involvement in corporate strategy by large institutional investors has made it for a very interesting and current topic. There are conflicting opinions regarding the effect of ESG performance on financial performance. While some argue that there is a positive relation between the two, such as Khan, Serafeim and Yoon (2015) as well as Dalal and Thaker (2019). Others however, either find no evidence to support this claim (Landi and Sciarelli, 2019) or find that sustainability leads to a negative effect on firm performance (Hassel, Nilsson and Nyquist, 2005).

Khan, Serafeim and Yoon (2015) developed a materiality sustainability index and incorporated it to the Carhart (1997) 4-factor model. They found that companies in the higher quintile had a better alpha (Khan, Serafeim and Yoon, 2005). This shows that according to them, material sustainability performance and financial performance go hand in hand and leads to excess returns. Dalal and Taker (2019) also came to the same conclusions, namely that ESG performance had a positive effect on the dependent variables and further lead to a decrease in risk, which attracts long-term investors. They focused their research on the effect of ESG rating and sustainability performance on the ROA and Tobin's Q of 65 Indian companies over a three-year period. The small sample size which consisted only of Indian companies may hinder the replicability of the results in other and larger geographic contexts such as the European Union or the United States.

Unlike Dalal and Taker (2019) and Landi and Sciarelli (2019) who used a single ESG rating developed, Khan, Serafeim and Yoon (2015) made their own sustainability index. By doing so, they were able to improve the accuracy of their results as they knew what information the index contained and were thus able to overcome the bias associated by relying on a single index. The approach used by Magnanelli and Izzo (2017) wherein they used the rating provided both by Robeco SAM and the Dow Jones Index is also adequate as it allows to compare the different ratings a same company was awarded by different rating agencies, thus allowing to draw a more complete and better picture of the actual sustainability performance of the firms in the sample.

Friede et al. (2015) conducted a study on the topic of ESG and corporate financial performance (CFP) by looking at and comparing the findings of vote-count and meta-analytic studies. They came to the conclusion that overall, despite differences in the research methodology, ESG investing can lead to higher excess returns as evidenced by the results of their analysis (Friede et al, 2015). In fact, 90% of studies find a non-negative effect between

the two variables (Friede et al, 2015). Their results debunked the myth and negative misconceptions associated with ESG investing. They state however, that more research is necessary to understand what the "ESG determinants" are for CFP performance (Friede et al., 2015).

Landi and Sciarelli (2019) looked at the relationship between corporate social performance and CFP on blue-chip Italian companies from 2007 to 2015. Albeit they did not find evidence to support their hypothesis –that there was a positive effect between the two variables–, they did note a change in behavior in the sustainability performance of their sample after the 2008 subprime mortgage crisis (Landi and Sciarelli, 2019). This could be in line with the "resilience" argument by Holling (2001) and suggest that the subprime mortgage crisis has made companies aware of the importance to invest in CSR and benefits associated therewith. This awareness and preparation will enable them to be better prepared in the long-term and enable them to overcome future potential risks and hence be more "resilient" (Holling, 2001). The conclusion that firms involved with a strong corporate social and responsible (CSR) performance are better prepared for the future was also shared by Brammer and Millington (2008), Jackson (2010) and Santis et al. (2016). Brammer and Millington (2008) studied the relation between corporate social performance – measured as the value of the charitable donations of the firm– and corporate financial performance in the United Kingdom from 1990 to 1999 (Brammer and Millington, 2008). However, Brammer and Millington (2008) found that companies with a very low CSR performance – firms who had little to no charitable donations – exhibited a strong-short term performance namely because of the curvilinear relationship between CSR and CFP.

Upon an analysis of the effect of accounting information disclosure and sustainability performance on the market value of Swedish companies, Hassel, Nilsson and Nyquist (2005) came to the conclusion that a strong sustainability performance hurts the market value of a firm as investors are afraid that it might increase costs. However, as they point out, this result can be explained by the early stage in which the research was conducted and the fact that companies often use CSR to window dress and is negatively perceived by investors (Hassel, Nilsson and Nyquist, 2005).

Ultimately, Kempft and Osthoff (2007) tested the effect of sustainability performance on excess returns by means of several investment strategies including a long-short investment strategy. For it, they used the Carhart (1997) 4-factor model. Their portfolio was recalibrated on a yearly basis to incorporate the top 10% and worst 10% of companies (Kempf and Osthoff, 2007). While the worst performing stocks were selected based on their ESG rating (lowest in

absolute value), the top 10% were selected following a best-in-class selection process to avoid an industry bias (Kempf and Osthoff, 2007). They found that this long-short strategy led to both statistically and economically significant excess returns over a 12-year period, namely, from 1992 to 2004. Even though the research question of this study is not directly relevant and linked to the one discussed here, it brings up an interesting aspect related to the sample selection process. Kempf and Osthoff (2017) bring up the fact that the industry of the company has a strong impact on the ESG rating, as also seen in Schoenmaker (2020). These implications are also applicable for financial indicators, as is the case with the leverage ratio of financial institutions such as banks, pensions and insurance companies.

c) Capital structure and sustainability performance

As seen previously, there are numerous factors influencing a company's capital structure and more precisely the extent to which it relies on debt to finance its operations. Hovakimian et al. (2001) looked at the different drivers of leverage and found that factors such as size, asset tangibility and ROA were all related to firm leverage. This highlights the interrelation between capital structure choices and other firm characteristics. It also adds to the importance of incorporating different control variables to isolate the effects of the variables of interest.

Heinkel and Zechner (2001) found that firms which investors considered to perform poorly from a sustainability perspective, exhibited a higher cost of capital, as investors demanded higher returns for holding their shares. This conclusion was also reached by Chava (2014). He derived the firm's cost of capital from analyst estimates and found that after adjusting for firm characteristics such as size, firms excluded by environmental screens –not having a high sustainability performance– had a higher cost of capital. The higher cost of capital to which those excluded firms are exposed to, is the consequence of a series of ripple-effects. The reporting on sustainability performance decreases information asymmetry which leads to a decrease in demand for the stocks with a poor sustainability performance (through exclusion), which in turn leads to a decrease in their liquidity and thus increases the expected returns required by shareholders (Heinkel and Zechner, 2001; Chava, 2014). This highlights the benefits and the importance for the firm to focus on the implementation of a sustainable strategy.

Furthermore, Chava (2014), also looked at the effect of those exclusionary policies on the cost of debt. He found that firms with environmental concerns are charged higher costs to account for the bigger risk they pose (Chava, 2014), which is in line with the stakeholder theory

argument presented by Ge and Liu (2015). These additional costs to which the firm is exposed to for their low sustainability performance are non-negligeable as they are of around 25bps and can have serious long-term implications for the firm (Chava, 2014).

Ge and Liu (2015) also found that a high sustainability performance led to lower yields because of the lower risks associated therewith. Their study was based on the analysis of North American public non-financial firms between 1992 and 2009 (Ge and Liu, 2015). They used numerous control variables related to both the firms as well as to the debt to test their hypothesis. These control variables include the quality of the auditing firm, the extent to which the firm relies on leverage, the presence of covenants, and if the bonds issued have embedded call or put options (Ge and Liu, 2015). The inclusion of such a large number of control variables increases the validity of the results (Ge and Liu, 2015).

d) *Takeaways*

The above articles present valuable insights regarding how different studies related to the one discussed in this paper have been conducted, the different control variables they used and the conclusions they reached. It can be said that that neither financial performance nor sustainability performance can be looked at as standalone metrics, but rather as a large subset of interconnected concepts (Wahba, 2013). Hovakimian et. al (2001) highlights the large number of drivers which can have an effect on firm leverage. Hence, it is for that reason that it is important to understand the different drivers and the relation between the concepts to ensure that the results are valid and significant. For this, the methodology used in past studies will serve as a foundation for this research. In addition, for the results to be meaningful it is also important to have a large enough sample and to rely on different sources to assess the sustainability performance of a firm (ESG-rating) as done by Magnanelli and Izzo (2017) and Khan, Serafeim and Yoon (2015), rather than on a single one. Furthermore, the relevance to study the relationship between sustainability performance and financial performance is greater now than it was in the past as seen by the increasing societal awareness and changes. This could explain the divergent results seen previously. Because sustainability performance has become a general expectation and requirement by investors across the world, there is more information available and of greater quality, and potential bias with regards to greenwashing is limited.

e) Hypotheses formulation

Based on the above literature review, several hypotheses are developed to answer the research question formulated earlier, to look at the effect of capital structure and more precisely the extent to which the use of debt has an effect on the sustainability performance of a company.

Building on the agency conflict theory by Jensen and Meckling (1976), frictions can be expected to arise between the different claimants based on the degree of leverage, subsequently hurting the sustainability performance of a firm. Indeed, as the degree of leverage rises, there is an increase in monitoring to ensure that the company is able to repay its creditors. The combination of the monitoring and the risks associated with the use of leverage can force the company to focus on short-term financial performance and focus on meeting its short-term financial obligations at the expense of sustainability performance.

H1: Firms with a higher degree of leverage exhibit a lower sustainability performance.

Allen et. al (2000) highlight the beneficial effect paying out dividends has on firm performance since it attracts institutional investors, while DeAngelo and DeAngelo (1990) point out the negative effect dividends have on the flexibility of a firm. Finally, Brennan and Thakor (1990) add that institutional investors can benefit the most from share repurchases as they have more information than individual investors. Taking into consideration the above-mentioned arguments, and the increasing presence of active shareholders "voicing" their opinion (Angel and Rivoli, 1997), shows the importance such shareholders have in helping companies in the transition towards operating a more comprehensive business model. Because these institutional investors who can leverage their position as a large shareholders to achieve change within the firm are attracted by payouts:

H2: Firms with a strong payout policy have a higher sustainability performance

Ultimately, Brammer and Millington (2008) state that firms with a strong commitment regarding sustainability performance are long-term oriented. Wahba (2013), states that SMEs with a long-term maturity structure have a better performance. Therefore, it can be hypothesized that large companies exhibit a similar behavior and that a long-term maturity structure is indicative of a forward-looking company culture. As this long-term vision is a key concept for a strong ESG-performance, it can be hypothesized that:

H3: Companies with a long-term maturity structure perform better in matters related to sustainability.

III- Data and Methodology

a) Data

The data used in this research is a compilation of information retrieved from numerous different databases. The majority of information comes from Refinitiv, but Orbis, Compustat, annual reports and the MSCI ESG-index were also used to complete the data and information

retrieved from Refinitiv. The population of interest are European MLCs since they disclose more information than private and small companies. Therefore, the sample consists of companies comprised in the STOXX 600 Index. The focus on European companies comes namely from the fact that ESG reporting is more developed in Europe than in the American continent or in the Asia/Pacific region (Schoenmaker, 2020) and could therefore yield more interesting results and provide better insights regarding the effect between the variables of interest. Companies from the financial services GICS industry classification such as banks and insurance companies were excluded from the sample as was also done by Ge and Liu (2015). Seeing that their capital structure of those companies is significantly different from that of other industries as they operate with very high levels of debt, incorporating them in the sample would have altered the results and thus the subsequent interpretations regarding the effect of leverage on sustainability performance. From the 600 companies initially in the sample, the size of the sample was reduced to 529 after excluding banks and insurance companies. Finally, after accounting for missing values and excluding those firms, gives us a final sample consisting of 108 companies or equivalently 432 observations over the 4-year period. The large number of missing values is mainly due to the lack of information regarding the credit-rating of the firm and regarding the ESG-rating of the firm over the time period of interest.

This study looks at the effect of leverage on sustainability performance over a four-year period. The timeframe of this study ranges from the start of 2016 to the end of 2019. A four-year period is deemed to be sufficient to get statistically significant and meaningful results. The reason why the time frame goes up until 2019 is to remove the effect of a large crisis as was the one caused by COVID-19 which happened during 2020. The substantial implications of the pandemic and the measures that have been imposed by government agencies to limit its spread have required and forced many companies to restructure. This has been done by raising capital either by taking out large loans or issuing secondary offerings in order to survive and overcome liquidity problems (Kraus et al. 2020). Since the extent to which these changes have been successful and the impact that these restructurings are going to have on the long-term performance of the company are still unknowns and cannot be tested, I decided to focus up until the end of the year 2019. Doing so, removes the potential for any anomalies caused by the COVID-19 pandemic. Magnanelli and Izzo (2017) used a similar approach by using data up-until the subprime-mortgage crisis in 2009 and thus avoid "distorted results" as a result thereof (Magnanelli and Izzo, 2017).

b) Variables

i. Dependent variable

The dependent variable of my study is the company's sustainability performance captured through their ESG-rating. ESG-rating are computed by different rating agencies all of which have their own methodology. There is a low correlation between the ESG-ratings (Berg et al., 2020), which highlights the different factors and aspects considered by each rating agency. To avoid any bias and errors related by relying on an ESG-rating, the sustainability performance of the firm is measured as first through the Refinitiv ESG-rating and subsequently with the MSCI ESG-rating which serves as a robustness test. This allows to incorporate a second opinion regarding the sustainability performance of the firm in the analysis and ensure that the results found with the first set of ESG-ratings are consistent and not affected by the rating's methodology. The relevance of using these ESG metrics is twofold. In addition to being developed by trustworthy sources, both ratings are based on the firm's ESG performance and not on ESG disclosure like the Bloomberg ESG-rating. The ESG-rating obtained from Refinitiv consists of a value between 0-100 (where 100 is the highest possible value). Berg et al. (2020b) note that the Refinitiv ESG-rating is the most commonly used rating amongst investment professionals. The second source used to assess the sustainability performance of a firm is the MSCI-ESG rating. This rating is presented in a way similar to that of corporate bonds where a CCC rating is the lowest possible ESG rating a company can obtain, and AAA is the highest. While this variable is simply transformed into a number for the regression calculations, slight adjustments have to be made to the regression coefficients to compare the results to those of the *Refinitiv* regression. The process followed as to render the two metrics comparable on the same scale consists of dividing 100 by 7, which is the number of MSCI-ESG-rating categories and associate each of those categories with a range.

MSCI ESG-Rating	Numerical value for regressions	Approximate value on scale from 0-100
CCC	1	7.15
B	2	21.44
BB	3	35.71
BBB	4	50.02
A	5	64.32
AA	6	78.60
AAA	7	92.88

Table 1: Converting the MSCI ESG-rating into numbers

This data (*MSCI_ESG*) has some limitations since it does not differentiate between companies within a same category or range. However, it does allow to incorporate a second opinion related to the sustainability performance of a company in the study and ensure that the results obtained with the first set of ESG-ratings are replicable with another ESG-rating which is constructed following a different methodology and which takes different data points to assess the overall ESG-performance of a firm.

ii. Independent variables

There are three independent variables that are used in this study depending on the hypothesis. For *Hypothesis 1*, the independent variable is the extent to which the firm relies on debt financing relative to equity financing. This will be measured through the Debt-to-Equity ratio *D/E*. The use of a ratio allows for a comparison across companies irrelevant of the size of the company. While Hovakimian et. al. (2001) and Wahba (2013) use the Debt-to-Capital ratio, using the D/E ratio seems in this case more appropriate as it gives a direct insight regarding the use of debt relative to the use of equity. For *Hypothesis 2,* the independent variable is the dividend payout plus share repurchases relative to total operating cash flows, that is the weight of the cash payouts either in the form of dividends or share repurchases relative to the firm's operating cash flows for a given accounting period. The reason why dividends are looked at in combination with share repurchases is because dividends attract large institutional investors, as mentioned by Allen et al. (2000). These investors are interested in dividend paying firms because of the tax advantages associated therewith. Seeing that those institutional investors can exert a great amount of control on the company, the presence of dividends and thus of institutional investors can be indicative of a better sustainability performance (Allen et al., 2000). Dyck et al. (2019), also reached the conclusion that the presence of institutional investors in the shareholder base of a company leads to an increase in focus on matters related to the environment and social issues. They further note that firms with high environmental and social scores perform better in periods of crisis, which reinforces the "resilience" argument by Holling (2001) (Dyck et al., 2019). Furthermore, the possibility to expropriate wealth from individual investors by having more knowledge than them is a factor in favor of the presence of share repurchases for large institutional investors according to Brennan and Thakor (1990). Again, to allow for a comparison across companies of different size, the payout amount will be looked at based on the percentage of operating cash flows that the payout represents. By taking the percentage relative to operating cash flows allows for a comparison between firms and removes the bias associated with the size of the payout and the number of shares outstanding.

Additionally, even if the payout of the firm is generally looked at through the dividend payout ratio, as in Zhou and Ruland (2006), the ratio between payouts and cash flow from operations (CFO) is used here, as CFOs are less biased and are less affected by accounting manipulations since they do not include non-cash expenses such as depreciation and allow therefore for a better comparison between companies of different sizes and between different industries. Finally, for *Hypothesis 3,* the independent variable is the average time to maturity of the outstanding debt, excluding convertible bonds. The average time to maturity of the bonds and bank loans thus depends on the value of the fixed-income security outstanding and the time to maturity associated to it. Wahba (2013) came to the conclusion that it was not the extent of leverage but rather the maturity structure which had an impact on firm performance. Therefore, a long average maturity structure should be indicative of a long-term orientation by the firm's management and thus should suggest a better sustainability performance.

iii. Control Variables

Ge and Liu (2015) use a large number of control variables to isolate the effect of the independent variable on the dependent variable. The incorporation of related variables increases the accuracy and the explanatory power of the results. Past research serves as basis and foundation to determine which related variables to incorporate as control variables. Control variables are used if there is more than one factor that can influence or have an effect on the dependent variable (Brooks, 2019). Using relevant control variables is very important to ensure that the results are not skewed and thus incorporate the effect of other variables in understanding the effect of the independent variable on the dependent variable (Allen, 2017). The research conducted by Hovakimian et al. (2001) and Ge and Liu (2015), provide valuable insights regarding different control variables that can be of use in this study. Hovakimian et. al (2001) looked at the determinants of firm leverage. Similarly, Ge and Liu (2015) also include firm size, ROA and add credit rating as control variables in their study. Thus, seeing that these variables are directly related to the use of debt by a company they, will be included in the analysis. The concept of firm size is measured in both cases as the natural logarithm of the firm's total assets, which is the method that is also used in this study. The computation of the ROA is identical between both studies as it is a standard accounting formula. To account for credit rating, Ge and Liu (2015) assign a number to each rating category, in a process similar to the one discussed hereabove which was used to quantify the MSCI ESG-rating (Table 1). Ge and Liu (2015) assign a value of 1 for companies with an S&P AAA rating and a rating of 27 for companies that do not have a credit rating. Seeing that not all companies are awarded a

credit rating by the same agency and that credit ratings are not easily comparable (Jewell and Livingston, 1999). Because of this, the method used by Ge and Liu (2015) might not be very useful in this case. Therefore, the method used to account for credit rating is to use a dummy variable, which takes the value of 1 if the firm has an investment grade rating (above S&P BBB- or Moody's Baa3) (Altman et al., 2019) and a value of 0 is the firm is non-investment grade. A high credit rating entails a low risk, while a low credit rating is generally indicative of greater risk. One of the main limitations of Hovakimian et al. (2001) is that they do not account for financial constraint which is a relevant variable in our case (van Kampen, 2021). To account for this, a formula that represents "the difference between the change in total assets and the value of cash plus the change in debt" during a given year will be used (van Kampen, 2021)

Besides those control variables mentioned hereabove that were used by Hovakimian et al. (2001) and Ge and Liu (2015) there are also other control variables that are used in this research. A high interest coverage ratio, and current ratio should further emphasize the financial stability of the firm and be indicative of the firm being able to meet its short and medium-term financial obligations and increase sustainability performance. The two formulas used to compute these ratios are also straightforward as they are common accounting ratios used in both the academic as well as the professional environment. Furthermore, whether the firm is bound by covenants is also included through a dummy variable, taking the value of 1 if the firm is bound by covenants and 0 otherwise. Ultimately, the firm's weighted average cost of capital (WACC) is also included as a control variable. This can be explained by the fact that a high cost of capital makes it more complicated and expensive for the firm to raise capital in the near future and might therefore entice the company to place a greater focus on satisfying their investors and thus omit or place less importance on sustainability performance. The following table summarizes the different variables (dependent, independent and control) that are used in this study, what they mean, how they are calculated and briefly describes the nature of their expected effect on the dependent variable.

Variable name	**Definition**	**Formula**	**Expected effect**
		Dependent variable	
ESGperf	Measures the ESG performance of the company.	$RefESG$ and $MSCI\ for\ robustness$	Not applicable

Independent variables			
D/E	How much debt there is relative to equity in the company structure.	$D/E = \frac{Total\ Debt}{Total\ Equity}$	Negative
Pay	Measures how much the company has paid out to each shareholder either as a dividend based on their total operating cash flows.	$Div = \frac{dividends + share\ repurchases}{operating\ cash\ flows}$	Negative
ATM	The average time to maturity before the debt expires.	$ATM = \Sigma \frac{Value\ of\ debt}{Total\ value\ of\ debt} * time$	Positive
Control variables			
lnSize	Measures the size of the firm.	$lnSize = \ln(Total\ Assets)$	Positive
ROA	Measures the efficiency of the assets in generating income.	$ROA = \frac{Net\ income}{Total\ Assets}$	Positive
D_rating	Informs about if the firm has an investment grade credit rating or not.	$D = 0\ if\ non - investment\ grade$ $D = 1\ if\ invesment\ grade\ bond$	Positive
D_cov	Informs about if the debt has covenants attached to it or not.	$D = 0\ if\ no$ covenants $D = 1\ if\ covenants$	Negative
FC	Measures the extent to which the firm faces financial constraints (van Kampen, 2021).	$FC = \max(Change\ in\ total\ assets - Change\ in\ debt - Cash; 0)$	Positive
WACC	Calculates the cost of capital of the firm.	$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - tc)$	Negative
Curr	Measures the ratio of current assets to current liabilities. It is a measure of liquidity.	$Curr = \frac{Current\ assets}{Current\ liabilities}$	Positive

IntCov	Measures how many times the firm is able to cover its interest payments through their income.	$IntCov = \frac{EBIT}{Interest\ expense}$	Positive

Table 2: Variable description.

iv. Descriptive statistics

The first step with the data is to winsorize the variables at the 2% on both sides to exclude the effect of outliers. This was done for variables for which there was a large number of extreme values, namely, *Pay* and *IntCov*. The process of winsorizing enables to keep a larger number of observations than if the variables had been excluded. The average ESG rating of the companies (108 in total) in the sample is of 67.04 when the *RefESG* is used and approximately 71.09 when the *MSCI_ESG* approximation from Table 2 is used. Table 3 shows the differences in statistics between the two ESG ratings.

	Mean	**Median**	**Standard deviation**	**Minimum**	**Maximum**	**Observations**
Ref_ESG	67.04	69.89	17.88	13.07	94.54	432
MSCI_ESG	71.09	78.6	16.43	21.44	92.88	432

Table 3: ESG-rating statistics

Table 4, which can be found hereunder, presents a more elaborate view of the statistics of the different variables (dependent, independent and control) used in this study. From the firms in this sample, it can be said that they have a strong reliance on debt, as seen by the average D/E ratio of 0.72. In addition, it would also seem that on average, firms have no difficulties in meeting their financial obligations as evidenced by the high interest coverage ratio (30.75x on average) and an investment grade credit rating, since the median value for the *D_Rating* is 1. However, these values are just averages are do not present the full picture. The range, which is the difference between the maximum value and the minimum value for a given variable is quite significant in some instances and suggests large disparities amongst firms in the sample. This is further evidenced by the large standard deviation for certain variables. Finally, it can be inferred from the table that the companies used in this study and that comprise the sample are very varied and broad. Indeed, the large ranges regarding the *ROA*, their *D/E* ratio as well as their *WACC* highlight significant differences between the firms due in part to the different industries in which they operate as well as to their managerial practices, thus enabling us to extract meaningful information from them.

	Mean	Med	St.de	Min	P5	P95	Max	Kurt	Skew
ESG_rating	67.04	69.98	17.88	13.07	29.48	90.04	94.54	3.33	-0.89
D/E	0.72	0.51	0.77	0	0.03	1.92	10.77	72.21	6.14
ATM	4.70	4.27	2.40	0	1.53	10.13	13.7	5.49	1.40
Pay	0.43	0.34	0.41	0	0	1.18	2.27	10.93	2.48
ROA	0.06	0.05	0.06	-0.13	-0.01	0.16	0.42	9.86	1.56
Curr	1.54	1.27	1.19	0.21	0.67	3.40	14.29	40.24	4.85
IntCov	30.75	11.59	58.08	1.14	2.57	131.73	322.04	18.21	3.85
D_rating	0.75	1	0.43	0	0	1	1	2.40	-1.18
D_cov	0.60	1	0.49	0	0	1	1	1.17	-0.41
FC	1.92E+10	0.00	1.26E+10	0	0	6.31E+10	1.65E+12	129.17	10.88
WACC	0.06	0.05	0.02	0.00	0.03	0.10	0.22	7.58	1.04
lnSize	16.84	17.00	1.66	10.92	13.82	19.05	19.67	4.50	-0.98
N	432								

Table 4: Descriptive statistics

c) Methodology

i) OLS regressions on panel data

The results of this study are tested by running a series of ordinary least squares (OLS) linear regressions and a Tobit regression with the variable *MSCI_ESG* and *Ref_ESG* as robustness tests. However, prior to running the regressions, a Hausman test is conducted to see if a fixed or random effects model is going to be used. Dalal and Thaker (2019) also used a panel data for their study and conducted a Hausman Test prior to their regressions. This allows us to determine if a fixed-effects model is necessary to extract meaningful and significant results from the dataset. Testing the hypothesis by means of an OLS linear regression is the method that is used most often in similar and related papers attempting to measure the relation and effect between an independent variable and a dependent variable. The OLS linear regression model is more powerful tool than a simple correlation analysis (Brooks, 2019). A linear regression allows to get a representation and evaluate the effect of the independent variable on the dependent variable by determining the effect of a unit change in the independent variable on the dependent variable. The formula used and the variables incorporated in the model depend on the hypothesis and the independent variable that is being used. The models are defined in the following way:

For *Hypothesis 1: Firms with a higher degree of leverage exhibit a lower sustainability performance:*

$$ESGperf = \alpha + \beta \frac{D}{E} + \beta_{lnSize} + \beta_{ROA} + \beta D_{rating} + \beta D_{cov} + \beta_{FC} + \beta_{Curr} + \beta_{WACC} + \beta_{IntCov} \quad (1)$$

For *Hypothesis 2: Firms with a strong dividend policy have a higher sustainability performance:*

$$ESGperf = \alpha + \beta_{Pay} + \beta_{lnSize} + \beta_{ROA} + \beta D_{rating} + \beta D_{cov} + \beta_{FC} + \beta_{Curr} + \beta_{WACC} + \beta_{IntCov} \quad (2)$$

For *Hypothesis 3: Companies with a long-term debt maturity structure perform better in matters related to sustainability:*

$$ESGperf = \alpha + \beta_{ATM} + \beta_{lnSize} + \beta_{ROA} + \beta D_{rating} + \beta D_{cov} + \beta_{FC} + \beta_{Curr} + \beta_{WACC} + \beta_{IntCov} \quad (3)$$

Finally, a fourth regression is conducted wherein all the variables are combined to see if the explanatory power of the regression increases. This regression looks the following way:

$$ESGperf = \alpha + \beta \frac{D}{E} + \beta_{Pay+} \beta_{ATM} + \beta_{lnSize} + \beta_{ROA} + \beta D_{rating} + \beta D_{cov} \beta_{FC} + \beta_{Curr} + \beta_{WACC} + \beta_{IntCov} \quad (4)$$

ii) Regressions on clustered data for industry comparison

To analyze the effect and the nature of the relationship based on the firm's industry, firms are classified based on their GICS industry classification. Six distinct categories are made, namely transportation (maritime, airplanes, automobile), industrial (machinery, metals & mining and construction), energy (oil & gas, electric utilities), health (pharmaceuticals, healthcare providers), consumer goods (tobacco, textiles & apparel and food & staples) and other services (telecommunications and professional services). Each of these categories contains firms that operate in similar industries and should therefore have, in theory, a similar level of capital intensity. The relevance between the classification into different categories based on the firm's industry lies in that industries with a high level of capital intensity require more financing as they rely heavily on machinery for example. This high level of capital intensity necessary to run the business comes at a high cost and can push management to favor financial performance over sustainability performance to cover these costs. Furthermore, if we hold to the pecking order theory (Myers and Maljuf, 1984), then these firms should have more debt in their capital structure and the effect of the studied relationship should be stronger. Regarding how the results are obtained, the same process as the one illustrated hereabove is used, namely running three distinct OLS regressions. By separating the firms based on their industry allows for a clear comparison between industries and can bring up any specific industry-related trends or characteristics. The following table (Table 5) presents the distinct categories as well as the number of companies and subsequent observations for each industry cluster.

Name of industry cluster	Number of companies	Number of observations
Health	8	32
Energy	15	60
Industrials	22	88
Consumer goods	38	132
Transportation	7	28
Other services	18	92
Total	**108**	**432**

Table 5: Industry sub-classification and number of observations

Looking at this information, it can be seen that there is a strong overweight towards the consumer goods industry as that industry accounts for over 30% of the total sample whereas the health industry merely accounts for 7.40% of the total sample. Even if the small number of observations for certain industries such as for the health or transportation industries does not pose a direct problem for the validity of the results and allows for the inference of industry trends, it does pose a certain limitation regarding the generalizability of the results, especially if looked at it a broader context. From Figure 1 it can be seen that the companies in the other services and industrial clusters have a similar average D/E ratio of 94% and 95% respectively and that the health and consumer goods industries operate with a lower leverage ratio of close to 60%. From the sample, it would seem that the companies comprised in the energy industry have the lowest D/E ratio on average of 46%.

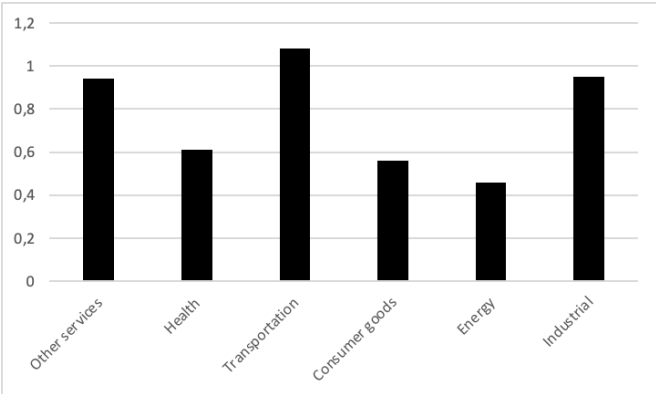

Figure 1: Comparison of average D/E ratio between industries

When comparing the average ESG-rating per industry (Figure 2), it can be seen that the firms in the sample have on average a similar ESG performance. Four industries have an average ESG-score which is close to 70, except for the transportation and energy industries, which is not surprising. The lowest average ESG-rating is 57.55 and can be explained by the fact that the transportation industry (airplanes, boats and automobiles) is an industry with a strong reliance on fossil fuels and accounts for a large share of total greenhouse gas emissions, hence the low average rating.

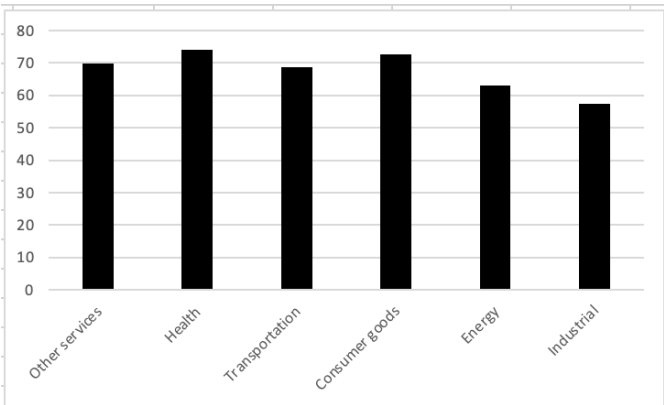

Figure 2: Average ESG-rating per industry

IV- Results

a) OLS regression results

As mentioned previously, the first step is to determine if the use of fixed effects is necessary. As a result of this Hausman test, both the industry fixed effects and time fixed effects lead to a significant improvement in the R-square of the OLS regression as evidenced by the F-probability close to 0. Therefore, all the regressions conducted include these effects. In

addition, based on the White test, it was not necessary to correct the regression outputs for heteroskedasticity. The results for hypotheses 1 to 3 can be found in Table 6. Additionally, I conducted a fourth regression combining the three independent variables to see if combining them leads to an increase in explanatory power of the OLS coefficients (equation 4).

It can be seen from the results that the model has a strong explanatory power as captured by the high adjusted R-squared. This means that changes in both the independent and control variables help explain variations in the dependent variable which in first instance, is the *RefESG rating*. However, because the coefficients of the independent variables are not statistically significant at the desired 10% level of confidence, the fourth regression is conducted, to see if by adding the three independent variables in the same equation leads to an overall improvement of the statistical significance of the coefficients.

Overall, it can be seen that a higher D/E ratio leads to an increase in *ESGPerf* as seen by the positive coefficient. However, this coefficient is not statistically significant as seen by the p-value that is larger than 0.1 and the t-stat of 0.86. It would seem from the results of the second regression, that changes in payout policy (either by means of share repurchases or through dividends) has a negative effect on the *ESGPerf* of a firm as the coefficient is negative and close to -2. This means that an increase in the payout ratio by 1x decreases the *ESGPerf* of the firm by 2. Nonetheless, because these coefficients are not statistically significant at the 10% level, inferences regarding the effect of the firm payout on its ESG performance have to be made with caution. Furthermore, it would seem that a high interest coverage ratio has no effect on the ESG performance of a company at a 10% significance level, and that *ROA* has an inverse relation with leverage which is in line with Rajan and Zingales (1995) and Hovakimian et al. (2001). Regarding the third independent variable, it would seem that an increase in time to maturity has practically no effect on the ESG performance of a firm as evidenced by the coefficient that is close to zero (-0.01), and not statistically significant. The fourth regression grouping the three independent variables does not lead to a higher explanatory power as seen by the similar adjusted R-square it has compared the other regressions as well as the similar t-statistics of the independent variables.

While the nature of a given control variable is identical across the different regressions, the differences however lie in the size of the effect and the statistical-significant of the computed effect. Overall, it would seem that *ROA* has a negative effect on the ESG performance of a firm. Indeed, an increase in *ROA* by 1% leads to a decrease in ESG performance of 0.4201 when looking at the statistically significant regression coefficient of the first regression, while the effect is -0.4375 when the independent variable is the *ATM*.

	ESGperf	*ESGperf*	*ESGperf*	*ESGperf*
α	48.37*** (3.80)	51.29*** (4.04)	51.76*** (4.07)	49.02*** (3.76)
$\beta_{D/E}$	**0.96** ***(0.86)***			**0.91** ***(0.81)***
β_{Pay}		**-1.98** ***(-1.06)***		**-1.92** **(-1.02)**
β_{ATM}			**-0.01** ***(-0.03)***	**-0.02** ***(-0.06)***
β_{lnSize}	1.59*** (2.34)	1.63*** (2.39)	1.56*** (2.28)	1.66*** (2.42)
β_{Curr}	0.54 (0.82)	0.48 (0.73)	0.50 (0.75)	0.52 (0.77)
β_{D_rating}	-0.77 (-0.43)	-0.69 (-0.39)	-0.69 (-0.39)	-0.75 (-0.42)
β_{D_cov}	-1.02 (-0.54)	-1.25 (-0.67)	-1.11 (-0.59)	-1.16 (-0.61)
β_{FC}	-2.15E-12 (-0.37)	-2.65E-12 (-0.46)	-2.52E-12 (-0.44)	-2.31E-12 (-0.40)
β_{IntCov}	-0.02 (-1.19)	-0.02 (-1.31)	-0.02 (-1.28)	-0.02 (-1.21)
β_{ROA}	-42.91*** (-2.59)	-40.91*** (-2.45)	-43.75*** (-2.64)	-40.26*** (-2.40)
β_{WACC}	2.27 (0.06)	0.12 (0.00)	2.26 (0.06)	0.63 (0.02)
Adj. R-squared	40.85%	40.91%	40.73%	40.70%
N	432			
Fixed effects	Yes			

*Table 6: OLS regression outputs for hypotheses 1 to 3 plus an additional fourth regression combining all the different variables. The dependent variable is the RefESG rating. *, **, *** means that the coefficient is statistically significant at the p-value of 10%, 5% and 2.5% respectively. The value in brackets corresponds to the t-statistics*

b) OLS regression results for clustered data

The objective of this test it to provide us with insights regarding the effect and strength of the independent variable based on the firm's industry and allow for comparisons across industries. While industry fixed effects are not considered for this step, time fixed effects are. The results of these regressions testing the aforementioned hypotheses, can be found from Appendix 2 to 5, where Appendix 5 combines the three independent variables in one regression.

The results obtained from these regressions provide interesting insights as to the differences in ESG performance based on the industry of the company. The outcomes shed insights into these drivers and impacts of the different variables based on the industry. Overall, these regressions also have a high explanatory power, captured by their high adjusted R-squared. The differences in R-squared and statistical significance of certain coefficients

between different industries is mostly due and amplified by the differences in the number of the observations in the different industry clusters.

As was expected, the effect of the independent variable and the control variables on the dependent variable are highly dependent on the industry of the company. When looking at the coefficients for the Payout variable in Appendix 5, it can be seen that in the health industry, an increase in payout ratio by 1% increases the ESG rating by 0.25 while that same increase in payout decreases the ESG rating of companies in the transport industry by 0.38. Similarly, from Appendix 4, it can be concluded that an increase by one year in the average time to maturity of debt has a negative impact of 1.70 and 1.26 on the ESG rating of companies in the industrials and consumer goods industries respectively. Additionally, the nature of the effect of the control variables also differs between industries. While it would seem that the presence of covenants leads to a decrease in the value of the firm's ESG rating by 10.37 (t-stat of -2.43) for firms in the health industry, it leads to an increase in 10.64 (t-stat of 1.88) for firms which belong to the other services industry.

c) Robustness test for the OLS regression

Two types of Robustness tests are conducted. The first one simply consists in changing the dependent variable (*MSCI_ESG* instead of *RefESG*) and running the same equations using a Tobit regression. Industry fixed effects and time fixed effects are again used and correcting for heteroskedasticity is not necessary. The outcome of these regressions is summarized in the table hereunder (Table 7). Under this model, the results regarding the effect of the independent variable on the dependent variable seem to hold and are consistent for both the *D/E* and *ATM* variables in that an increase in the debt/equity ratio leads to an increase in ESG rating while an increase in time to maturity has the opposite effect. Furthermore, the coefficients are significant at the 10% level which further confirms the validity of the previously computed results. Nonetheless, the effect of the payout on ESG performance is this time positive and statistically significant at a confidence level of 2.5%. By transforming the 0.42 coefficient to a value on a scale from 0-100 allows to infer that an increase in payout ratio by 1% leads to an increase in ESG rating by 0.06. Furthermore, the 0.13 coefficient for the *D/E* corresponds to an increase in 1.86 – on a scale from 0-100– which is significantly higher than the result found in Table 6. While the sign of the *lnAssets* variable has remained constant the sign of others has changed, and the statistical significance for most variables has increased. Under this regression model, having covenants increases the ESG rating by 7.86 if we take an ESG rating going from 0-100. These differences related to the coefficients of the *Pay* and control variables can be explained by the fact that the *MSCI_ESG* variable contains fewer values –as there are only 7 scores–, and

the low correlation between both ESG-ratings, as mentioned by Berg et al. (2020). In fact, when computing the correlation between the Refinitiv ESG score and the MSCI rating of the firms in the sample, we observe that the correlation is of -0.01. The fact that the coefficient from two out of the three independent variables is similar to the one computed originally can be used to reinforce the validity of the obtained results and explain that the difference is due to the low correlation between coefficients and the differences in methodologies between ratings.

	ESGperf	*ESGperf*	*ESGperf*	*ESGperf*
α	2.81*** *(3.62)*	3.22*** *(4.30)*	3.09*** *(4.08)*	2.86*** *(3.76)*
$\beta_{D/E}$	**0.13*** ***(1.87)***			**0.13**** ***(2.07)***
β_{Pay}		**0.42***** ***(3.82)***		**0.42***** ***(3.86)***
β_{ATM}			**-0.05*** ***(-1.94)***	**-0.04*** ***(-1.80)***
β_{lnSize}	0.05 *(1.17)*	0.03 *(0.71)*	0.05 *(1.23)*	0.04 *(0.98)*
β_{Curr}	-0.07* *(-1.89)*	-0.08* *(-1.93)*	-0.09** *(-2.21)*	-0.08* *(-1.98)*
β_{D_rating}	-0.01 *(-0.07)*	-0.00 *(0.01)*	0.01 *(0.16)*	0.01 *(0.05)*
β_{D_cov}	0.51*** *(4.55)*	0.53*** *(4.77)*	0.50*** *(4.49)*	0.54*** *(4.95)*
β_{FC}	2.38-13 *(0.69)*	2.16-13 *(0.63)*	1.89E-13 *(0.55)*	2.68E-13 *(0.79)*
β_{IntCov}	-0.00 *(-0.35)*	-0.00 *(-0.47)*	-0.00 *(-0.62)*	-0.00 *(-0.32)*
β_{ROA}	3.17*** *(3.21)*	2.47*** *(2.50)*	3.00*** *(3.05)*	2.52*** *(2.58)*
β_{WACC}	-3.14 *(-1.47)*	-2.73 *(-1.29)*	-2.59 *(-1.20)*	-2.20 *(-1.04)*
Pseudo. R-squared	21.62%	22.42%	21.64%	22.98%
N	432			
Fixed effects	Yes			

*Table 7: Tobit regression outputs for hypotheses 1 to 3 plus an additional fourth regression combining all the different variables. The dependent variable is the MSCI ESG rating. *, **, *** means that the coefficient is statistically significant at the p-value of 10%, 5% and 2.5% respectively. The value in brackets corresponds to the t-statistics*

Having seen that the results hold with another independent variable, the second robustness test consists of doing a Tobit regression while keeping the same variables as in the first regression, and thus verify that the model used namely the OLS regression, is an adequate method. The output of this regression can be found in Table 8.

The coefficients obtained from this regression are identical to those obtained from the first set of OLS regressions, and the statistical significance of the coefficients is slightly higher. This shows that the OLS regression is in this case an adequate model to gain insights regarding

the impact of the independent variables on the dependent variable. The results from the robustness tests confirm that the findings in the original regression model are robust and allow to draw meaningful conclusions.

	ESGperf	*ESGperf*	*ESGperf*	*ESGperf*
α	49.37*** *(4.07)*	51.30*** *(4.33)*	51.76*** *(4.37)*	48.10*** *(3.93)*
$\beta_{D/E}$	**0.96** ***(0.92)***			**0.91** ***(0.87)***
β_{Pay}		**-1.98** ***(-1.14)***		**-1.91** ***(-1.10)***
β_{ATM}			**-0.01** ***(-0.03)***	**-0.02** ***(-0.07)***
β_{lnSize}	1.59*** *(2.51)*	1.63*** *(2.56)*	1.56*** *(2.45)*	1.66*** *(2.60)*
β_{Curr}	0.54 *(0.88)*	0.48 *(0.78)*	0.50 *(0.81)*	0.52 *(0.83)*
β_{D_rating}	-0.77 *(-0.46)*	-0.69 *(-0.42)*	-0.69 *(-0.41)*	-0.75 *(-0.45)*
β_{D_cov}	-1.02 *(-0.58)*	-1.25 *(-0.72)*	-1.11 *(-0.64)*	-1.16 *(-0.66)*
β_{FC}	-2.15E-12 *(-0.40)*	-2.65E-12 *(-0.49)*	-2.52E-12 *(-0.47)*	-2.29E-12 *(-0.42)*
β_{IntCov}	-0.02 *(-1.27)*	-0.02 *(-1.40)*	-0.02 *(-1.38)*	-0.02 *(-1.31)*
β_{ROA}	-42.91*** *(-2.78)*	-41.91*** *(-2.63)*	-43.74*** *(-2.84)*	-40.26*** *(-2.58)*
β_{WACC}	2.28 *(0.07)*	0.12 *(0.00)*	2.26 *(0.07)*	0.63 *(0.02)*
Pseudo R-squared	7.72%	7.73%	7.70%	7.75%
N	432			
Fixed effects	Yes			

*Table 8: Tobit regression outputs for hypotheses 1 to 3 plus an additional fourth regression combining all the different variables. The dependent variable is the Refinitiv ESG rating. *, **, *** means that the coefficient is statistically significant at the p-value of 10%, 5% and 2.5% respectively. The value in brackets corresponds to the t-statistics*

V- Discussion

Contrary to what was hypothesized at the beginning of this paper, the effect of leverage on the sustainability performance of a firm is positive. Based on these findings, the premise that: a higher degree of leverage increases pressure on management to perform financially and as a result forces a firm to disregard their ESG performance does not hold. While these results might seem surprising at first, the cash flow theory by Jensen (1987) offers a logical explanation and reasoning to these results. According to Jensen (1987), an increase in debt goes hand in hand

with an increase in efficiency and a decrease in discretionary spending by management. Efficiently allocating the cash proceeds of debt; in value-enhancing projects can replace dividend payments by effectively promising future cash flows to shareholders in a way that neither dividend payments nor share repurchases do (Jensen, 1987). When a firm issues debt, it enters a legal contract wherein it promises to make timely repayments of the interest and principal amount, indirectly forcing the firm to generate positive returns from their investments and thus also grow. This firm commitment by the company to generate growth through investment projects as a result of leverage allows for shareholders to have their investment appreciate in value through an increase in share price rather than through more traditional methods such as cash payments. Furthermore, Rajan (1992) also notes that lenders generally have more controlling power over the firm and thus can ensure that the proceeds are used more efficiently.

The alternative to a more traditional shareholder value creation model can be an explanation to the fact that a strong payout has a negative effect on the sustainability performance of a firm, which was the interest of our second hypothesis. The increase in payouts could create a negative impression that the firm is not committed nor focused to create value for society. This focus of creating long-term future value and taking other stakeholders into account is the premise on which sustainable finance is built and should be the goal of a company (Schoenmaker and Schramade, 2019). Now more than ever, corporate image is very important and has to be monitored carefully. It is for that reason that there is a possible association between strong payouts and a shareholder-centric management approach which is detrimental to sustainability performance. These results contradict the finding of Allen et al. (2000) as they show evidence of new investor preferences.

Modigliani and Miller (1958) stated that in a world with corporate taxes an increase in debt was positive as it led to an increase in firm value. The results obtained can be used to back their claim if we look at it in a sequential perspective, namely that an increase in debt leads to an increase in firm value through the higher tax shield, which in turn allows the company to spend more in R&D and better working conditions (amongst others), ultimately increasing its ESG-performance. This theory and rationale can also help explain the negative coefficient for the payout ratio. When looking at it from the same sequential perspective, it can be said that the increase in payouts decreases firm value, maybe even to the point of cancelling the benefits obtained through the tax shield, thus leaving the firm value unchanged. This decrease in cash available, would thus not be invested in ESG projects which consequently hurts the ESG-performance of the company.

Another and more contemporary explanation to the obtained result related to the first hypothesis regarding the use of leverage has to do with risk mitigation. The recent case of BDM failing to secure insurance for a project amidst the firm's lack of ESG implementation and the risks associated therewith (Smyth, 2021) shows a certain evolution in shareholder preferences. This exemplifies one of the roles financial institutions can play towards an improvement of society in matters related to ESG, namely the efficient allocation of resources to where they are most needed (Schoenmaker and Schramade, 2019). This motivation by lenders to decrease ESG-related risks as a result of societal pressures can help explain why an increase in leverage has a positive association with ESG performance. Following this recent and contemporary explanations is also the possibility that the increase in debt was used to directly finance green projects either through green bonds or through project financing, which would also explain the positive relation between an increase in leverage and ESG-performance.

The OLS result from the third hypothesis, which looked at the effect of the average time to maturity on ESG-performance, would seem to be negative albeit not being significant in neither economic nor statistical terms. Nonetheless, the coefficients of three of the industry regressions further seem to support this claim and indicate the existence of a negative relationship at a statistically significant level of confidence. This is also contrary to the assumption that was initially made, for which the rationale was that a long-term average maturity was indicative of the adoption of a long-term perspective, resulting in a higher sustainability rating. However, Jensen (1987) notes that because long-term debt does not have to be refinanced on a regular basis, it increases the possibility of wasteful spending by management. This argument comes back to and points towards the initial argument of the cash flow theory (Jensen, 1987).

Another explanation to the negative effect of a long-time to maturity is the value of flexibility which is also seen by the negative coefficient in Table 6 of covenants. Flexibility is especially important during periods of crisis (DeAngelo and DeAngelo, 1990; Bancel and Mittoo, 2011). In an ever-growing competitive environment firms have to be able to quickly respond to changes and to the potential threat of new entrants and potential substitutes (Porter, 1979). By committing large amounts of capital to the future decreases the firm's flexibility and ability to respond to changes in the industry quickly. Firms prefer having a strong cash balance, liquidity and rely on short-term maturities to use as buffer in the event of a potential crisis (Bancel and Mittoo, 2011). Following this reasoning, a long-time to maturity could lead to an underinvestment in matters related to ESG-performance as the firms want to use their excess cash as buffer to protect themselves.

Furthermore, this study focused on European listed MLCs which have to disclose their performance on a regular basis, thus exacerbating and amplifying short-termism. Laverty (2004), states that there are other factors that are inherent to the firm's culture and corporate governance that can push the firm to focus at the short-term rather than on long-term performance to achieve its goals. Such factors include temporal traps, organizational trust and memory, and density (Laverty, 2004). While these factors are not directly observable, it can be hypothesized that the reason why a long-term perspective has a negative impact on ESG-performance is a combination of external market pressure and inadequate managerial systems, that are associated with publicly listed companies (Laverty, 2004). Thomsen et al. (2018) also point that this short-termism is inherent to the prevailing ownership structure, and if the firm wishes to have a long-term vision, a whole different ownership structure would be needed.

As expected, there are considerable differences in the effects of the variables on the ESG-performance between industries. From the obtained results, it would seem that the industries that are most affected by the independent variables are the health and transportation industries, so not necessarily companies with the highest capital intensity, nor largest in size (see Appendix 1). While the cash flow theory (Jensen, 1987) seems to hold for the transportation and consumer goods industries, as the effects of the independent variables are in line with those of the original regressions, the opposite applies for the health and other services industries regarding the effect of debt and payout. A plausible explanation as to the differences in results can be that these industries are not affected by the same performance metrics. Taking the example of the health industry, it could be that considering that this industry already generates a positive value to society by selling products and services which aim to improve the lives and health of people, already contributes towards an increase in ESG-performance. It is possible that an increase in payout would merely confirm that the company has grown and been able to generate more value to society, implicitly meaning that their ESG-performance has also increased. This implicit association between increases in payouts resulting from an increase in revenue and subsequent increase in societal value does not hold for all industries especially those known for being more carbon intensive, such as the transportation or consumer goods industries.

A similar reasoning and theory can be used to explain the differences in impact an increase in leverage has across industries. Industries wherein there is a history and strong opportunities of managerial opportunism and cash expropriation will exhibit a positive effect between leverage and ESG in line with the cash flow theory (Jensen, 1987). The opposite would then apply to industries where management has a strong reputation and where and increase in

leverage would potentially lead to agency conflicts (Jensen and Meckling, 1976) between the different claimants thus hurting the ESG-performance of the firm.

Finally, irrespective of the managerial track record and reputation, all industries coincide that a long-term maturity structure hurts sustainability performance, thus reiterating the value of flexibility. This can be seen as an argument to further support the previous claim. Industries for which the cash flow theory (Jensen, 1987) applies would want to have short-term debt as it requires a regular refinancing and thus decreases the probability of wasteful spending by management. For those industries where the cash-flow theory (Jensen, 1987) does not seem to hold another theory can be used to explain the results. To circumvent the costs related with agency conflicts (Jensen and Meckling, 1976), companies would want to issue short-term notes and rely on lines of credit which are short-term fixed income instruments, which would also explain the negative effect of a long-term maturity structure on ESG-performance. This further shows that the rollover risk which was one of the reasons why SMEs preferred longer-maturities (Wahba, 2013) does not seem to be an issue for these European MLCs.

VI- Conclusion, Limitations and Future Research

By looking at the effects of leverage, the amount of cash distributed to shareholders and the maturity structure of a company's financial obligations has allowed to gain a deeper insight regarding the relation between capital structure choices and ESG performance. The choices in capital structure cannot be looked at in isolation and have to be considered in a broader context. The sustainability performance of a company is seen to be affected by more factors than just their GHG emissions, or how well they treat their employees (Refinitiv, 2021). Hovakimian et al. (2001) state that the majority of capital structure models always look at the tradeoffs between cost and benefit from a static perspective. It is for this reasons that potential new and more dynamic models that take into account the interrelation between capital structure choices and ESG performance have to be developed. The conclusions reached here should serve and be used by companies to consider a wide array of aspects and metrics, including capital structure choices as a way to maximize their ESG-performance. Seeing the impact leverage and payouts have on ESG-performance and if we hold to the validity of the free cash flow theory, then these conclusions could also be used by investors in their equity selection process as complements to their existing methodology. Nonetheless, the low correlation between ESG-ratings as pointed out by Berg et al. (2020) and as seen again here can be an issue especially if firms rely on third party ratings to assess their ESG-performance. The need for a universal methodology or at least the call for a greater similarity between the different ratings would

allow for an easier comparison in performance between companies and for the results obtained from different studies to be assessed together, without having to account or adjust for differences in methodology related to ESG-performance.

Similarly, the low sample size for certain industries could pose an issue regarding the generalizability of the obtained results. While this paper does point towards the existence of large differences in effects between industries, the aim of this paper was not to dig into the determinants nor specific drivers of sustainability performance for each industry. The management reputation explanation does offer a nice and logical reasoning regarding the differences in observed effects, further research is necessary to confirm this. The major bias this research would have to overcome is to ensure that there is a large enough sample size for each industry. Furthermore, the consideration of specific industry-related control variables would also have to be taken into account.

This study used the average time to maturity (ATM) of the firm's financial obligations as proxy for long-term orientation the results were not very indicative. While they point towards a negative effect, the low statistical significance poses a limit to the conclusions reached. It could be that the ATM is not a good proxy for long-term focus, explaining the low coefficients obtained. For this reason, an alternative variable can be used to compare the results, such as the long-termism index by Kappes and Schmid (2013).

This study focused exclusively on MLC European companies. By extending this research to other continents or to smaller companies could allow to assess whether ESG-performance is affected to the same extent by these three capital structure choices in different parts of the world. Even though the availability of ESG-data does pose an issue, it could be interesting to see if companies in the S&P or Nasdaq index share similarities with European companies when it comes to the effect of capital structure choices with sustainability performance. Furthermore, seeing that an increase in debt seems to lead to an increase in sustainability performance it would also be interesting to see if these results are also applicable for private companies, in particular those backed by a private equity (PE). PE firms are known to have a long-term investment perspective and for using leverage to help grow the companies in which they have invested. Therefore, it would be interesting to see if the explanation of the free cash flow theory by Jensen (1987) used in this paper to explain why an increase in leverage was associated with a better ESG-performance is also applicable in the context of PE firms. The opposite could maybe also be observable, that is, that the overleverage often associated with PE firms leads to a decrease in ESG performance especially considering that these firms are smaller and have less capital available.

This study was based on the premise that a high D/E ratio would constraint managers and lead to a worse ESG-performance. The evidence has shown that this is not the case and that a higher D/E leads to an increase in ESG-performance. However, a clear distinction has to be made between highly leveraged firms and financially distressed firms. Seeing that the proxy for financial constraint (*FC)* was not statistically significant, future research could focus on the impact of financial distress – captured through an Altman Z-Score– on ESG-performance and see if the constraint hypothesis holds as well as see what effect this higher leverage has on other performance indicators such as long-term capital investment (Singh and Faircloth, 2006).

Finally, only the effect of three variables was looked at in this study. In order to get a more comprehensive view of the interrelation between capital structure choices and ESG-performance, a future research could be to examine the effects of other capital structure decisions such as the participation in mergers, the composition of the shareholder base –with the presence of activist shareholders– or even study and compare the effect of this relation between firms in young industries or that have recently had their IPO with firms that operate in more mature and less dynamic industries.

That being said, there is still a long way to go before carbon neutral and comprehensive business models and capital structures that consider the impact of the firm's operations on all stakeholders are adopted and implemented by all firms around the world. The consideration of the interrelated nature of ESG-performance with capital structure decisions as seen in this paper can help companies establish a capital structure that allows for the company to optimize its resources and generate value for society as a whole all, and that it is possible for a company to respect its fiduciary duty towards its shareholders all while meeting its strategic objectives.

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VIII- Appendix

a) *Appendix I- Descriptive statistics per industry cluster*

Other services									
	Mean	**Med**	**St.de**	**Min**	**P5**	**P95**	**Max**	**Kurt**	**Skew**
ESG_rating	69.79	71.07	17.16	17.96	33.12	91.55	94.53	-0.97	3.90
D/E	0.94	0.84	0.59	0.05	0.22	2.04	2.58	2.84	0.73
ATM	5.29	4.78	2.20	1.1	2.36	9.85	11.94	1.05	3.92
Pay	0.37	0.29	0.59	0.00	0.00	0.93	2.27	2.84	12.65
ROA	0.05	0.05	0.05	-0.12	-0.02	0.12	0.183	-0.37	4.35
Curr	1.63	1.26	1.26	0.34	0.42	3.73	8.62	2.60	13.13
IntCov	16.10	10.52	15.92	1.14	1.61	52.72	63.44	1.55	-4.47
D_rating	0.67	1.00	0.47	0.00	0.00	1.00	1.00	-0.76	-1.58
D_cov	0.85	1.00	0.40	0.00	0.00	1.00	1.00	-1.48	3.19
FC	5.85E+09	0.00	1.68E+10	0.00	0.00	3.69E+10	9.29E+10	3.75	16.80
WACC	0.06	0.06	0.02	0.01	0.03	0.09	0.11	0.40	3.28
lnSize	16.84	16.83	1.50	12.46	13.46	18.94	19.11	-1.08	4.63
N	92								

Health									
	Mean	**Med**	**St.de**	**Min**	**P5**	**P95**	**Max**	**Kurt**	**Skew**
ESG_rating	74.13	84.01	16.07	46.47	46.47	89.80	89.90	-0.58	1.60
D/E	0.61	0.37	0.68	0.00	0.03	2	2.95	1.95	6.33
ATM	3.66	3.66	1.33	1	1.01	5.74	5.8	-0.11	2.29
Pay	0.46	0.35	0.29	0.13	0.25	0.93	1.41	1.30	4.53
ROA	0.10	0.10	0.06	0.01	0.02	0.20	0.22	0.31	1.90
Curr	1.59	1.35	0.73	0.74	0.82	3.40	3.63	1.62	4.76
IntCov	52.23	22.19	85.47	3.27	3.18	317.76	322.04	2.50	7.92
D_rating	0.78	1.00	0.42	0.00	0.00	1.00	1.00	-1.36	2.85
D_cov	0.38	0.00	0.49	0.00	0.00	1.00	1.00	0.52	1.27
FC	5.20E+10	0.00	2.91E+11	0.00	0.00	4.84E+09	1.65E+12	5.39	30.03
WACC	0.06	0.05	0.02	0.02	0.02	0.11	0.11	0.53	2.36
lnSize	16.53	16.94	1.90	13.67	13.72	18.71	18.80	-0.25	1.41
N	32								

Energy									
	Mean	**Med**	**St.de**	**Min**	**P5**	**P95**	**Max**	**Kurt**	**Skew**
ESG_rating	68.60	72.82	16.47	28.98	37.98	90.49	91.66	-0.65	2.46
D/E	1.08	0.78	1.39	0.17	0.22	2.09	10.77	5.91	42.03
ATM	5.92	5	2.76	2.72	3.01	13.32	13.7	1.61	4.80
Pay	0.29	0.28	0.17	0.00	0.03	0.63	0.69	0.43	2.80
ROA	0.03	0.03	0.03	-0.04	-0.04	0.08	0.12	0.39	4.38
Curr	1.76	1.16	2.10	0.36	0.78	5.24	14.29	4.42	24.35
IntCov	8.06	5.52	6.96	1.14	1.93	23.78	37.91	2.28	8.69
D_rating	0.77	1.00	0.43	0.00	0.00	1.00	1.00	-1.26	2.56
D_cov	0.53	1.00	0.50	0.00	0.00	1.00	1.00	-0.13	1.02
FC	8.33E+09	0.00	4.41E+10	0.00	0.00	2.86E+10	3.37E+11	7.10	53.23
WACC	0.05	0.05	0.02	0.01	0.03	0.08	0.09	0.12	2.40
lnSize	18.11	18.03	1.00	16.55	16.62	19.58	19.67	-0.04	1.68
N	60								

Industrial									
	Mean	**Med**	**St.de**	**Min**	**P5**	**P95**	**Max**	**Kurt**	**Skew**
ESG_rating	72.54	71.93	10.73	33.65	59.22	88.02	91.00	-0.79	4.70
D/E	0.56	0.48	0.36	0.07	0.12	1.34	1.90	1.54	5.83
ATM	4.70	4.29	2.16	1	2.17	9.7	11.08	1.06	4.26
Pay	0.50	0.34	0.50	0.0	0.00	1.97	2.27	2.25	7.91
ROA	0.07	0.06	0.05	-0.13	-0.00	0.14	0.18	-0.45	4.67
Curr	1.55	1.39	1.03	0.21	0.45	2.67	7.02	2.77	14.64
IntCov	18.62	13.29	16.22	1.14	4.47	55.24	77.20	1.88	6.52
D_rating	0.73	1.00	0.45	0.00	0.00	1.00	1.00	-1.01	2.03
D_cov	0.57	1.00	0.50	0.00	0.00	1.00	1.00	-0.29	1.08
FC	2.96E+10	0.00	1.70E+11	0.00	0.00	9.01E+10	1.54E+12	8.55	76.49
WACC	0.06	0.06	0.03	0.00	0.02	0.09	0.15	0.25	3.76
lnSize	16.39	16.41	1.59	12.34	13.99	18.71	18.83	-0.49	2.94
N	88								

Consumer goods									
	Mean	**Med**	**St.de**	**Min**	**P5**	**P95**	**Max**	**Kurt**	**Skew**
ESG_rating	62.93	67.73	18.59	13.07	25.04	85.66	94.05	-0.86	3.15
D/E	0.51	0.33	0.53	0.00	0.00	1.70	2.38	4.43	1.40
ATM	3.91	3.57	2.19	0.00	1.25	8	13.6	1.68	7.55
Pay	0.51	0.40	0.45	0.00	0.00	1.49	2.27	2.06	8.25
ROA	0.08	0.69	0.07	-0.32	0.02	0.22	0.42	2.18	10.18
Curr	1.33	1.23	0.72	0.48	0.65	2.65	7.02	4.09	31.28
IntCov	58.18	17.66	86.90	2.28	4.11	322.04	322.04	2.10	6.38
D_rating	0.79	1.00	0.41	0.00	0.00	1.00	1.00	-1.41	2.98
D_cov	0.55	1.00	0.50	0.00	0.00	1.00	1.00	-0.18	1.03
FC	1.97E+10	0.00	1.07E+11	0.00	0.00	9.23E+11	1.15E+12	9.38	98.13
WACC	0.07	0.06	0.02	0.01	0.03	0.11	0.13	0.45	3.11
lnSize	16.55	16.58	1.84	10.92	11.47	18.93	19.33	-1.21	4.97
N	132								

Transportation									
	Mean	**Med**	**St.de**	**Min**	**P5**	**P95**	**Max**	**Kurt**	**Skew**
ESG_rating	57.55	60.59	25.00	16.90	21.61	94.47	94.50	-0.11	1.70
D/E	0.95	0.58	1.04	0.24	0.27	2.01	5.73	3.61	16.93
ATM	4.16	3.84	2.18	1.51	1.98	9.95	10.13	1.52	4.83
Pay	0.32	0.24	0.27	0.01	0.01	0.84	0.97	16.93	2.70
ROA	0.04	0.05	0.03	-0.01	-0.01	0.10	0.12	0.27	2.79
Curr	1.20	1.02	0.38	0.63	0.86	1.84	1.85	0.63	1.87
IntCov	16.37	15.29	12.12	1.14	1.14	43.92	44.72	0.67	2.93
D_rating	0.86	1.00	0.36	0.00	0.00	1.00	1.00	-2.04	5.17
D_cov	0.86	1.00	0.36	0.00	0.00	1.00	1.00	-2.04	6.17
FC	2.29E+10	0.00	7.14E+10	0.00	0.00	1.64E+11	3.48E+11	3.82	17.00
WACC	0.07	0.06	0.04	0.03	0.03	0.10	0.22	2.76	12.81
lnSize	17.12	17.23	1.09	15.45	15.46	19.16	19.24	0.33	2.68
N	28								

b) Appendix II: Regression output for Hypothesis 1 (the effect of D/E) for the industries

	Health	*Energy*	*Industrials*	*Consumer goods*	*Transport*	*Other services*
α	-32.47 *(0.69)*	70.52* *(1.76)*	16.76 *(1.09)*	25.04 *(1.35)*	-31.05 *(-0.17)*	68.68*** *(2.61)*
$\beta_{D/E}$	**-11.56** ***(-1.47)***	**1.11** ***(0.76)***	**0.46** ***(0.15)***	**-0.82** ***(-0.26)***	**9.99***** ***(2.49)***	**-3.86** ***(-1.05)***
β_{Pay}						
β_{ATM}						
β_{lnSize}	7.23*** *(2.90)*	-0.04 *(-0.02)*	3.11*** *(3.48)*	2.81*** *(3.00)*	5.18 *(0.54)*	-0.44 *(-0.33)*
β_{Curr}	10.89*** *(2.76)*	0.26 *(0.25)*	-0.88 *(-1.06)*	0.35 *(0.16)*	-9.26 *(-0.54)*	0.39 *(0.38)*
β_{D_rating}	3.69 *(0.60)*	6.45 *(1.18)*	0.94 *(0.33)*	0.76 *(0.20)*	1.78 *(0.14)*	-1.48 *(-0.29)*
β_{D_cov}	-5.22 *(-0.70)*	-10.28*** *(-2.26)*	-1.59 *(-0.63)*	-0.88 *(-0.25)*	-0.22 *(0.01)*	9.71* *(1.89)*
β_{FC}	6.97E-12 *(0.75)*	-7.26E-11 *(1.43)*	5.38E-12 *(1.51)*	-3.81E-11*** *(-2.67)*	-3.33E-11 *(-0.55)*	*-1.83E-10** *(1.81)*
β_{IntCov}	0.00 *(0.01)*	-0.98*** *(-2.56)*	0.14* *(1.95)*	-0.01 *(-0.37)*	0.41 *(0.87)*	0.07 *(0.52)*
β_{ROA}	-39.21 *(-0.60)*	-56.27 *(-0.66)*	44.55 *(1.67)*	-77.54*** *(-2.77)*	-434.89*** *(-2.99)*	-20.43 *(-0.50)*
β_{WACC}	-213.45 *(-1.12)*	31.16 *(0.23)*	10.03 *(0.22)*	15.28 *(0.22)*	37.58 *(0.30)*	97.21 *(0.88)*
Adj. R-squared	47.81%	15.98%	22.44%	16.93%	50.33%	15.48%
N	32	60	88	132	28	92
Time fixed effects	Yes					

*Regression outputs for hypotheses 1 to 3 plus an additional fourth regression combining all the different variables. The dependent variable is the MSCI ESG rating. *, **, *** means that the coefficient is statistically significant at the p-value of 10%, 5% and 2.5% respectively. The value in brackets corresponds to the t-statistics*

c) *Appendix III: Regression output for Hypothesis 2 (the effect of Pay) for the industries*

	Health	*Energy*	*Industrials*	*Consumer goods*	*Transport*	*Other services*
α	-32.47 *(-0.63)*	83.08** *(2.04)*	17.64 *(1.07)*	19.65 *(1.12)*	65.13 *(0.28)*	66.95*** *(3.10)*
$\beta_{D/E}$						
β_{Pay}	**25.71***** ***(3.56)***	**-7.01** ***(-0.54)***	**-0.39** ***(-0.29)***	**-6.37** ***(-1.62)***	**-32.13** ***(-1.15)***	**5.39** ***(1.24)***
β_{ATM}						
β_{lnSize}	8.28*** *(4.19)*	-0.48 *(-0.22)*	3.09*** *(3.41)*	3.28*** *(3.99)*	2.12 *(0.18)*	-0.71 *(-0.53)*
β_{Curr}	15.02*** *(4.85)*	0.24 *(0.23)*	-0.88 *(-1.05)*	0.52 *(0.28)*	-13.21 *(-0.68)*	0.54 *(0.53)*
β_{D_rating}	-2.55 *(-0.53)*	6.07 *(1.08)*	0.96 *(0.35)*	0.57 *(0.17)*	4.63 *(0.21)*	-1.84 *(-0.37)*
β_{D_cov}	-10.37*** *(-2.43)*	-11.89*** *(-2.47)*	-1.49 *(-0.56)*	-1.15 *(-0.36)*	-22.01 *(-0.76)*	10.64* *(1.88)*
β_{FC}	6.15E-12 *(0.81)*	-7.03E-11 *(1.38)*	5.39E-12 *(1.46)*	-3.58E-11*** *(-3.27)*	-1.06E-11 *(-0.12)*	2.05E-10** *(2.05)*
β_{IntCov}	0.02 *(0.76)*	-1.01*** *(-2.68)*	0.13** *(2.21)*	-0.01 *(-0.38)*	0.30 *(0.57)*	0.17 *(1.31)*
β_{ROA}	1.55 *(0.04)*	-72.92 *(-0.85)*	44.55* *(1.80)*	-66.51*** *(-2.45)*	-377.08*** *(-1.93)*	-59.99* *(-1.33)*
β_{WACC}	-211.02 *(-1.78)*	37.31 *(0.27)*	10.27 *(0.22)*	4.23 *(0.06)*	53.96 *(0.38)*	89.24 *(0.86)*
Adj. R-squared	65.13%	15.64%	22.45%	26.52%	35.53%	15.37%
N	32	60	88	132	28	92
Time fixed effects	Yes					

*Regression outputs for hypotheses 1 to 3 plus an additional fourth regression combining all the different variables. The dependent variable is the MSCI ESG rating. *, **, *** means that the coefficient is statistically significant at the p-value of 10%, 5% and 2.5% respectively. The value in brackets corresponds to the t-statistics*

d) *Appendix IV: Regression output for Hypothesis 3 (the effect of ATM) for the industries*

	Health	*Energy*	*Industrials*	*Consumer goods*	*Transport*	*Other services*
α	-46.80 *(-0.98)*	81.29** *(1.95)*	21.07 *(1.71)*	28.16 *(1.65)*	-200.42 *(-0.95)*	71.18*** *(3.48)*
$\beta_{D/E}$						
β_{Pay}						
β_{ATM}	**2.13** ***(0.87)***	**0.27** ***(0.3)***	**-1.70***** ***(3.64)***	**-1.26** ***(-1.79)***	**-4.50**** ***(-2.09)***	**-0.06** ***(-0.07)***
β_{lnSize}	6.64** *(2.18)*	-0.57 *(-0.24)*	3.11*** *(4.45)*	2.99*** *(3.93)*	16.76 *(1.53)*	-0.73 *(-0.56)*
β_{Curr}	12.7*** *(3.07)*	0.32 *(0.3)*	-0.50 *(-0.61)*	0.22 *(0.12)*	-7.83 *(-0.43)*	0.16 *(0.17)*
β_{D_rating}	0.06 *(0.01)*	6.74 *(1.23)*	0.45 *(0.17)*	-0.78 *(-0.21)*	8.30 *(0.61)*	-1.49 *(-0.29)*
β_{D_cov}	-14.78*** *(-2.62)*	-10.90*** *(2.44)*	-1.03 *(-0.37)*	0.40 *(0.12)*	20.55 *(0.83)*	9.94* *(1.72)*
β_{FC}	6.25E-12 *(0.65)*	-7.46E-11 *(1.46)*	4.46E-12 *(1.34)*	-3.66E-11*** *(-3.27)*	-7.06E-11 *(-1.16)*	-1.87E-10* *(1.93)*
β_{IntCov}	0.01 *(0.22)*	-1.03*** *(-2.73)*	0.11* *(1.99)*	-0.02 *(-0.77)*	-0.31 *(-0.60)*	0.15 *(1.13)*
β_{ROA}	1.82 *(0.03)*	-58.22 *(-0.67)*	60.51*** *(2.96)*	-73.75*** *(-2.65)*	-436.60*** *(-2.86)*	-38.50 *(-0.89)*
β_{WACC}	-33.15 *(-0.23)*	12.86 *(0.09)*	59.11 *(1.27)*	0.53 *(0.01)*	-63.81 *(-0.46)*	79.48 *(0.73)*
Adj. R-squared	44.06%	15.29%	32.03%	26.19%	45.60%	14.27%
N	32	60	88	132	28	92
Time fixed effects	Yes					

*Regression outputs for hypotheses 1 to 3 plus an additional fourth regression combining all the different variables. The dependent variable is the MSCI ESG rating. *, **, *** means that the coefficient is statistically significant at the p-value of 10%, 5% and 2.5% respectively. The value in brackets corresponds to the t-statistics*

e) *Appendix V: Regression output grouping the four IVs for all industries*

	Health	*Energy*	*Industrials*	*Consumer goods*	*Transport*	*Other services*
α	-68.71 *(-1.48)*	78.26 *(1.75)*	23.62 *(1.71)*	24.12 *(1.31)*	-52.70 *(-0.28)*	64.58*** *(3.06)*
$\beta_{D/E}$	**-4.98** ***(-0.71)***	**1.02** ***(0.62)***	**-2.91** ***(-0.84)***	**-0.64** ***(-0.20)***	**7.85***** ***(2.54)***	**-3.64** ***(-0.99)***
β_{Pay}	**25.43***** ***(2.96)***	**-5.77** ***(-0.42)***	**-0.46** ***(-0.38)***	**-6.55*** ***(-1.87)***	**-38.17** ***(-1.74)***	**5.07** ***(1.15)***
β_{ATM}	**-0.92** ***(-0.42)***	**0.14** ***(0.15)***	**-1.86***** ***(-3.44)***	**-1.28*** ***(-1.69)***	**-3.83*** ***(-2.00)***	**-0.09** ***(-0.09)***
β_{lnSize}	8.54*** *(3.22)*	-0.39 *(-0.16)*	3.09*** *(4.11)*	3.48*** *(3.62)*	7.74 *(0.79)*	-0.38 *(-0.19)*
β_{Curr}	14.48*** *(3.96)*	0.23 *(0.22)*	-0.55 *(-0.66)*	0.21 *(0.10)*	-3.40 *(-0.22)*	0.76 *(0.71)*
β_{D_rating}	-0.96 *(-0.18)*	5.91 *(1.03)*	0.21 *(0.07)*	-0.79 *(-0.21)*	0.94 *(0.08)*	-1.72 *(-0.33)*
β_{D_cov}	-6.28 *(-0.95)*	-9.99*** *(-2.12)*	-0.62 *(-0.24)*	0.08 *(0.02)*	-2.86 *(-0.12)*	10.50* *(1.90)*
β_{FC}	6.46E-12 *(0.82)*	-7.09E-11 *(1.36)*	4.63E-12 *(1.34)*	-3.48E-11*** *(-2.47)*	-3.67E-11 *(0.54)*	-2.02E-10* *(1.97)*
β_{IntCov}	0.02 *(0.60)*	-0.97*** *(-2.48)*	0.09 *(1.31)*	-0.02 *(-0.63)*	0.14 *(0.30)*	0.09 *(0.64)*
β_{ROA}	-15.78 *(-0.26)*	-60.49 *(-0.66)*	66.78*** *(2.64)*	61.74*** *(-2.28)*	-243.86 *(-1.55)*	-42.57 *(-0.96)*
β_{WACC}	-296.88* *(-1.88)*	32.91 *(0.22)*	62.68 *(1.31)*	-18.10 *(0.25)*	-13.27 *(-0.11)*	106.08 *(0.97)*
Adj. R-squared	65.54%	12.71%	12.86%	19.76%	61.02%	16.46%
N	32	60	88	132	28	92
Time fixed effects	Yes					

*Regression outputs for hypotheses 1 to 3 plus an additional fourth regression combining all the different variables. The dependent variable is the MSCI ESG rating. *, **, *** means that the coefficient is statistically significant at the p-value of 10%, 5% and 2.5% respectively. The value in brackets corresponds to the t-statistics*