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MASTER'S THESIS

THE CORRELATION BETWEEN ESG SCORES AND THE EFFECT ON THE CORPORATE FINANCIAL PERFORMANCE

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AUTHORSHIP STATEMENT

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

E – Environmental factor of ESG score
S – Social factor (i.e. employee, product, customer related)
G – Governance factor (i.e. political lobbying, anticorruption, board diversity)
ROA – Return on assets

INTRODUCTION

During the last three decades, the number of companies that are reporting Environment, Social, and Governance (ESG) data have increased rapidly. From 20 companies in the beginning of the 1990s, more than 9,000 companies were reporting data over ESG as of 2016 (Amel-Zadeh, & Serafeim, 2019), 72% of S&P500 companies in 2015 (Clark et al. (2015) and more than 11,000 companies as of 2020 (Bloomberg, 2020; Refinitiv, 2020). Investors and managers are also become more interested in ESG data. In United States, funds specializing in high ESG companies had an inflow of 28% of total asset inflow in 2019. Up to 80% of CEO's believe it is important for the company to demonstrate a commitment to society, which can be done with the help of ESG ratings. The managers can use the sustainability rating ESG rating as a benchmark (Berg, Koelbel, & Rigobon, 2019) for their commitment. Research over ESG and stock performance have also increased (Friede, Busch, & Bassen, 2015; Sahut, & Pasquini-Descomps, 2015) in the last decade. The amount of ESG providers providing ESG data is now more than 100 and includes several big names such as Refinitiv, Bloomberg and Morgan Stanley Capital International (MSCI) (Amel-Zadeh, & Serafeim, 2019).

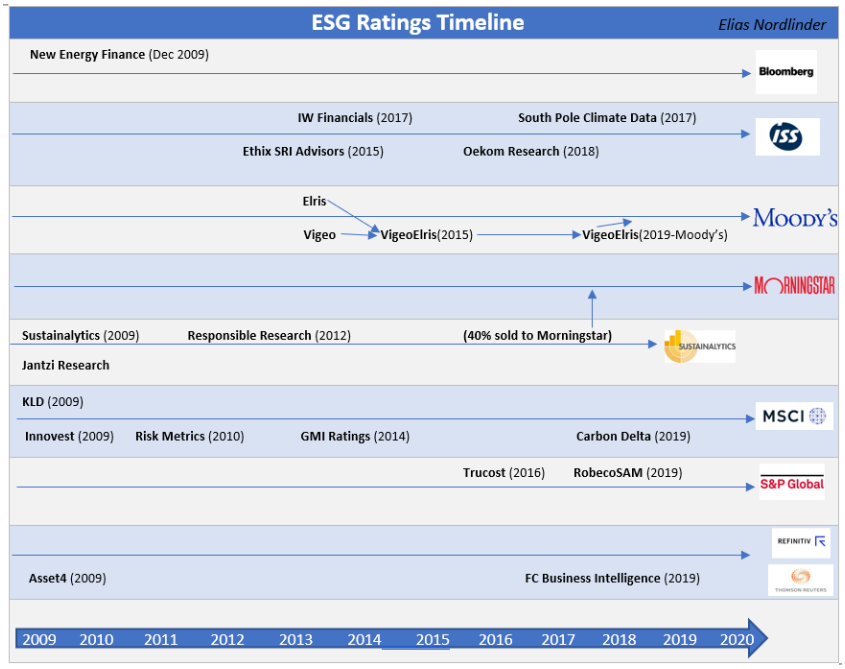
But what do people really know about the ESG measure? What do people really know about the underlying factors? One question to investigate is regarding the validity of the ESG measure. The underlying factors are measured very different between different providers and the rating for each stock can be very different depending on which providers that provides it. One of the biggest studies regarding the ESG rating done by (Chatterji, Durand, Levine, & Touboul, 2014). They found this result, that the ESG ratings from stocks from different providers usually have a big discrepancy. The overall correlation between the same stocks, but from two different ESG providers, were between 0.13 – 0.52. In the study that will be done in this paper, where the two ESG providers Bloomberg and Refinitiv will be compared, similar results were found. The correlation between the two providers was found to be on average around 60%. Compared to the biggest credit rating institutes, they have a correlation on around 99% between each other (Berg, Koelbel, & Rigobon, 2019). The basis of where managers, investors and researchers are making their decisions on are therefore quite noisy. The hypothetical benefits from sustainable firms can disappear because of this noise and inconsistency in the data (Chatterji, Durand, Levine, & Touboul, 2014) and firms does not know which ESG provider they should commit their efforts against.

According to (Berg, Koelbel, & Rigobon, 2019) there are three main negative consequences of the low correlation between ESG providers. ESG is not properly reflected in stock and performance, which means investors cannot really trust the ESG measure. Ambitious

companies receives mixed signals of which action that will bring value for the company in the market and do not know what the best way is to invest to increase their ESG ratings. Empirical research will be inconclusive when different studies might show different results. The conclusive results that would be drawn if the correlation were higher cannot be drawn, because the choice of provider matters. In this paper this deviation in ESG rating between two different providers, Bloomberg and Refinitiv, was first analysed. By finding more information about the source of divergence, more research can be attributed to this in the future. This paper also analysed how different companies' corporate financial performance, using Return on Asset (RoA) as a proxy variable, and corporate market performance, using Tobin's Q as a proxy variable, was affected by the different factors of the ESG measures. To further see the impact of divergence between the two providers, both Bloomberg and Refinitiv were used in the regression of ESG on ROA and Tobin's Q with the same stocks and control variables for the two ESG providers.

Below is a timeline over how ESG ratings have changed over time. Bloomberg acquired New Energy Finance in 2009. Institutional Shareholder Service (ISS) acquired Oekom Research and IW Financial. Moody's acquired Vigeo-Eiris in 2019. Sustainalytics is one of the other big ESG ratings that was bought by 40% of Morningstar in 2017, it is the main ESG rating that Morningstar is using. KLD was often used in previous research about ESG rating as well, but was bought later by RiskMetrics which now is a part of Morgan Stanley Capital International (MSCI). Trucost and RobecoSAM which are two other major players in the ESG provider scene have the last couple of years being bought by S&P Global. Finally, Asset4 were acquired by Thomson Reuters in 2009 and have lately been updated to the new ESG rating now in the Refinitiv Eikon terminal.

Figure 1: ESG Timeline from 2009 to 2020



Source: ESG Navigator (2020); Bendell (2011); Douglas (2017)

The first *aim* of this paper is to understand how high the correlation between different ESG providers is, while also investigating the underlying variables, E, S and G, that are the source of this correlation. The second *aim* of this paper is to see if companies that are more sustainable also have better financial and market performances.

The *purpose* of this paper is to get a better understanding of the ESG measure and how this affect corporate performance and market performance for different companies. The *goal* of this research is to get in-depth knowledge about the ESG measure, how it differs between different providers and consequences of this. It is also to give some advice for further research about the ESG measure and about the need for a common taxonomy.

This paper will focus on two aspects, the correlation between different ESG providers and how ESG rating impacts corporate financial performance and corporate market performance. The research questions will therefore be:

RQ1: How does ESG correlate between two different providers and which part correlates the most?

RQ2 a): How does the ESG score and corporate financial performance relate, and which part of E, S and G have the strongest relation?

RQ2 b): How does the ESG score and corporate market performance relate, and which part of E, S and G have the strongest relation?

It is possible to either conduct a qualitative study or a quantitative study in research. A qualitative research method is focused on finding new results by looking at research and theory. The interpretation of the result is very important, and results will be formed from a large source of different qualitative data. In these studies, interviews or surveys are popular methods of collecting the data. The ethical considerations and how the data is collected is therefore of major importance as well. A quantitative research method is more focused on deductive methods. The goal for quantitative methods is to test already existing theories. The quality and collection of data is of course still important aspects. The interpretation of the data is important in these kinds of studies as well, but is done different than for qualitative studies. The interpretation is more from an objective stance.

In this paper, the research will be based on quantitative secondary data from Refinitiv Eikon and Bloomberg. This data will be analysed objectively to test previous theories. This will therefore be a study of quantitative research. This paper could also have included a qualitative part. Both interviews and surveys could be sent out to collect more information about the current state of ESG, and about different views of how the future will be. The choice to not conduct interviews is mainly due to time and resource constraints, and to not make the paper cover too many different topics.

The two datasets that data were collected from in this paper are from the data providers Bloomberg and Refinitiv. Refinitiv have been used in a lot of previous studies regarding ESG research and is one of the primary leaders of ESG data in the world. They have data over more than 11 000 companies of ESG in the world. The company is based in Europe which could make the data skewed a bit, as previous research have proved that geographic location of the provider can impact the ratings of the companies. The second proved, Bloomberg, have not been used in the same amount of research as Refinitiv. But it is still one of the biggest data providers in the world and have a long history of providing data to companies and individuals. The company is based in the US, which make it interesting to include together with Refinitiv.

Even if these two providers are two of the leaders of providing data in the world, the ESG measure is still very new, and the methods how ESG providers collect data differs substantially. No previous study have shown "high" correlation between different ESG providers, where high in this aspect is over 0.70 and, in many cases the correlation have not even been above 0.50. In comparison, the correlation between credit rating institutes which often are close to 0.99. As seen in this study is the correlation between Bloomberg and Refinitiv around 0.65 in total, which means that the methodology between these two providers do differ quite substantially.

The issues and considerations considering ethics and society will be discussed here. The ten ethical considerations that (Bryman, & Bell, 2007) are discussing in their paper are in many cases not applicable here, as these are largely based on surveys and primary data. The representation and collection of the data, in this case secondary data, is fully transparent during the whole process, and misleading information and biases will be avoided. As no specific individuals are participating in the study, the anonymity is also ensured. Societal considerations are factors concerned with interests of individuals, groups, and the society at a whole, which could be regarding trends or conflicts in the society. The interpretations of the result of this paper could somewhat be of societal consideration. Several results of this study could, possibly, be interpreted as that the ESG factor is not important either businesses or investors. This could in that case harm the society if these factors are positive for the society. Therefore, an insignificant correlation between ESG and ROA/Tobins Q or low correlation between ESG providers, should be interpreted as follows. The financial outcome of investing in companies with more focus on these factors does not need to significantly improve your return, but from a societal or environmental stance it could still increase the well-being of the society in both the short and long run. For companies, even if the ROA would not be significant correlated with ESG, there could still be encouraged to continue to work towards these factors. If it is not significant negative related to profit, there should be no "harm" to focus on these factors, and furthermore it could show to be more important in the future than it is now.

This paper will focus on two ESG providers, Refinitiv and Bloomberg. Many previously studies have used Refinitiv of this kind and is one of the world's biggest data providers. The

ESG data is very transparent and available for over 11.000 companies all over the world. Bloomberg is one of the world's biggest data providers in the world and one of the biggest providers of the ESG measure. The sub-categories E, S and G are available for Bloomberg as well as for Refinitiv. Besides this, both of these providers have enough data possible to collect to conduct this paper. This paper will be on data for 12 years for all the common companies for Refinitiv and Bloomberg.

The region that this paper is concentrated to is Europe. If the paper would have been on a greater part of the world, it could lead to ambiguous results due to region differences and similar. The choice of Europe is because the high reporting of ESG, the geographical interest of the writer of the paper and the lack of previous papers on this region. The industries will be all but the financial institutions, as their business models is different in fundament and does not apply environmental or social policies in the same way. (Eccles, Ionnou, & Serafeim, 2014). This paper will not go into any qualitative aspects such as interviews or forms sent out to companies. If the resources and time were available this could be an option to further broaden the research.

1 PREVIOUS RESEARCH ON ESG

In this part, previous research related to the ESG rating will be presented. The first part of the chapter will be about the first research question, correlation between ESG providers. The second part of the chapter will be regarding the second research question, the relationship between ESG ratings and financial corporate, respectively market performance. The third part of the chapter will be about sustainable finance and investor sentiments.

1.1 Correlation between ESG Providers

(Berg, Koelbel, & Rigobon, 2019) writes about the divergence of the environmental, social and governance ratings in their paper from 2019. They use data over companies with ESG ratings from five different ESG providers, Sustainalytics, RobecoSAM, Vigeo-Eiris, KLD and Asset4 for the year 2014. The data for E, S and G respectively was also analysed in their paper. The data was divided into a common sample which included the 823 common firms. The paper found that the total ESG rating between the different providers were between 0.42 (KLD vs Asset4) to 0.73 (Sustainalytics vs Vigeo-Eiris) with an average of 0.61, 0.55 – 0.74 for E with an average of 0.65, 0.24 – 0.70 for S with an average of 0.49 and -0.01 – 0.81 for G with an average of 0.38. Total correlation was analysed by heterogeneity in the firm level, by looking at the distance to the median rating for each firm. They therefore used a normalized common sample. Finally, the quantiles were also analysed where the proportion in the top quantile respectively in the bottom quantile were analysed. The common firms

were checked in the top quantile and bottom quantile respectively to see if there are the same firms in these quantiles for different ESG providers.

As they found that there are very few companies in the common top quantile it points to that there is a large disagreement between different agencies. Furthermore, (Berg, Koelbel, & Rigobon, 2019) conclude that the result of that there are very few common top companies does help investors, as they at least know that they will have very few companies to choose between if they want companies with high ESG ratings. The final result from the study was still that there are a large disagreement between different ESG rating agencies and that the disagreement was found to be heterogeneous.

(Chatterji, Durand, Levine & Touboul, 2014) analysed the converging between a common universe of six leading ESG providers: KLD, Asset4, Innovest, DJSI, FTSE4Good and Calvert. The data is over the period 2002-2010 for KLD, 2004 for DJSI, 2005 for Calvert and Innovest and 2006 for FTSE4Good. Three of the ratings: KLD, Calvert and Dow Jones are based in the United States, while Innovest is based in Canada and FTSE4Good and Asset4 in Europe. The ESG providers in the analysis have similar processes to collect their data, by collecting data on small sub-categories such as CO^2 emission, and later merge this into biggest subcategories such as environmental impact. The common universe was around 500 companies per year. The researchers found that the average correlation was between 0.13 (Calvert) to 0.52 (DJSI) between the different ESG providers. For the environmental score, the correlation was between 0.05 – 0.40, for social score 0.26 – 0.34 and for governance 0.02 – 0.19. Just as for (Berg, Koelbel, & Rigobon, 2019) the governance score show much lower correlation between different providers than the environmental and social score.

(LaBella, 2019) analyses in his paper the convergence between two different ESG providers, MSCI and Refinitiv for the time period 2012 – 2018. In the paper he found that total ESG correlated with 0.40 between US companies and with 0.46 for all companies for ESG Total. Environment correlated with 0.29 on US basis and 0.31 on global basis. Social correlated with 0.19 on US basis and 0.23 on Global basis. Finally, Governance correlated with 0.16 on US basis and 0.16 on global basis. Just as for (Berg, Koelbel, & Rigobon, 2019) and (Chatterji, Durand, Levine & Touboul, 2014) the overall correlation seems to be relatively low and governance seems to be the variable that correlates the least between the different providers. (LaBella, 2019) also analysed how the risk and return relates to ESG ratings. He found that systematic risk overall decreased with higher ESG rating while return did not have any significant relationship. He also found that companies with high ESG ratings are defensively oriented companies, companies with higher ROE and higher dividend yield. He believe that ESG will be further integrated in the future alongside the traditional financial analysis. But, as the title suggests, because of the vast amount of data available and difference between providers, the devil is in the detail and it is very important for investors to educated in the data they are analysing.

(Gibson, Krueger, Riand, & Schmidt, 2020) analysed the impact of disagreeing ESG ratings on stock return with a sample of from S&P 500 between 2013 and 2017. They begin with showing very basic empirical facts such as that average correlation between six different ESG providers show an overall correlation of 0.46, where the lowest correlation is governance with 0.19 and highest environment for 0.43. Larger firms seems to disagree more and more profitable firms seems to have lower ESG rating disagreement. They furthermore look into the disagreements in detail and finds three results. First, more profitable companies are subject to lower ESG ratings disagreements. Firm without a credit rating have higher disagreement and larger firms seems to have higher disagreement. This could be because of that profitable firms are more overlooked by analysts, the lower transparency in firms without credit ratings and the complexity in large firms.

1.2 ESG Ratings and Financial Corporate/Market Performance

(Fernandes, 2019) analysed how Corporate Social Responsibility is affecting the performance of European firms. She analysed 250 firms between 2002 and 2017. As independent variables are the firms total ESG score and individual components that makes up the ESG score, Environmental, Social and Governance. The ESG score is also divided in HighESGScore and LowESGScore to see how they affect financial performance. She used ROA and ROE as dependent variables for firm performance and Tobin's Q for a proxy for market performance. The data is winsorized at 1% tails and includes all firms with non-missing observations. The control variables used in the study for ROA and ROE are firm size, which is the log of total assets and log of total sales, risk, which is taken as the Debt/Asset ratio and country specific variables. For Tobin's Q the control variables are Book Value of Assets, Sales Growth, country variables and Return on Assets, where sales growth should be a proxy for R&D and the other two variables proxy for firm size.

The result from the study was that ESG scores seems to have significant positive relationship with ROA at 1% significance level and with Tobin's Q at 1% significance level. For the individual components Environment is not significant in any of the regressions, whereas social score is significant at 1% level and governance significant at 5% significance level. The environmental variable is negative related to both RoE and Tobin's Q, whereas Social Score has a positive relationship in all regressions. Governance score shows positive relationship with both ROA and ROE.

(Eccles, Ionnou, & Serafeim, 2014) investigated the effect of corporate sustainability on organizational performances and processes by analysing 180 US firms. They first divided the firms in the year 1993, by high or low sustainability, and then compared these firms by the performance until 2009. They use Asset4 database (Thomson Reuter) similar to many previous studies and eliminates financial institutions as their business models is different in fundament and does not apply environmental or social policies in the same way. Similar to previous studies they create an equal-weighted index of the reminding companies to see the

performance. They used Return on Assets (ROA) and Return on Equity (ROE) as proxy variables for accounting performance. The regression was controlled for firm size, growth opportunities, and performance measured as 2009. The authors found that high sustainability companies significantly outperform their counterparts over the long-term, both in terms of stock market as well as accounting performance. Abnormal performance was found to be 4.8% higher annually for high sustainability companies than low sustainability companies, significant at 5% significance level, 2.3% value weighted. Regarding ROA and ROE, the high sustainability also outperformed and was even more prone to outperform in regard to B2C companies. The author suggest that the market is undervaluing the high sustainability firms compare to the low sustainability firms.

(Zhao et al., 2018) analysed the financial performance of 20 large listed power generation companies for observations over 10 years. They measured the accounting performance with the financial indicator Return on Capital Employed (ROCE). The regression was a panel regression as the data was both cross-sectional and over time. White test was implemented to see if there were any heteroskedasticity in the data. Besides the ROCE, the control variables Debt to Equity and Size (Logarithm of Total Assets) were used. The result of the study was that ESG performance has an impact on financial performance and that the impact is positive.

(Velte, 2017) analysed the impact from ESG on financial performance in Germany. As indicator for accounting performance ROA was used, and as an indicator for financial performance Tobin's Q was used. He used the Asset4 database from Thomson Reuter to conduct his study. The independent variables were ESG total, E, S and G, and furthermore, the control variables Research and Development (R&D), Beta for systematic risk, Debt/Asset for unsystematic risk, logarithm of assets for size and dummy variables for industry specific variables. The analysis was done for over 5 years with 80-85 companies included in each yearly sample. The assumption of the regression (linearity, homoscedasticity, normal distribution of error term and multicollinearity) was also tested. The result from the regression was that ESG total, E, S and G are all positively significant related to ROA. The regression is a fixed-effect panel study. The strongest relationship between the individual categories are from the governance variable. No significant relationship between ESG or the specific categories and Tobin's Q was found in the analysis.

(Al-Tuwaijri et al., 2004) found that "good" environmental performance was associated with "good" economic performance. (Han, & Jeongmin, 2016) found that environmental performance where associated with negative economic performance on the other hand. According to (Doyle, 2018) does the individual ratings diverge vastly between different agencies simultaneously. This is due to methodology, subjective interpretation, or could also be because of the individual agency's agenda.

1.3 Sustainable Finance and Investors

(Schoenmaker, & Schramade, 2018) wrote about the change of finance from traditional finance to sustainable finance. Earlier institutions often avoided unsustainable companies as it could lead to higher risk, while they are now instead are investing in sustainable companies to create long-term value for the wider community (Sustainable finance 3.0). Companies are changing from thinking short term to mid-term in their business (Sustainable Finance 1.0/Sustainable Finance 2.0) to thinking in the very long term (Sustainable Finance 3.0). Instead of focusing on maximizing financial value, companies are moving towards to optimize social impact and Environmental impact subject to Financial value. In the sustainable finance paragraph in the theoretical framework chapter this will be described more in depth in this paper.

(Hartzmark, & Sussman, 2019) analysed if investors value sustainability by investigating the inflow to sustainability funds 9 months before and 11 months after publication of sustainability rating. They used Morningstar's sustainability ratings which were published the first time in 2016. They then divided the funds into the top 10% funds in one bin (High sustainability) and the bottom 10% funds in another bin (Low sustainability). They found that the funds with high sustainability had an inflow of 4% of the fund size for the next 11 months while the funds with low sustainability had an outflow of approximately 6% of fund size after publication. They also found that investors are significantly differentiating in their investing in high sustainability and low sustainability but are not differentiating between the sustainability in between. Investors focus more on the extreme outcomes than on small differences. The result also show both that investors value sustainability and that they value it positively.

Their hypotheses for the inflow was that institutional investors value sustainability more or that individual investors prefer sustainability because of higher perceived return. To get more specific results they also conducted a survey to MBA students and found that the reason for valuing sustainability funds where because of perceived higher return and perceived lower risk. Another reason were because of wanting to invest in regard to environmental or social factors. Higher sustainability ratings does increase the perception of future performance, lower risk, and altruistic behaviours.

(Amir, 2017) mention that the primary reason for that investor consider ESG information in investment decisions is because they consider that it is important financially for the investment performance. (Sunggon, & Park, 2014) found that investors value CSR activities and (Park, & Wier, 2012) found that companies that are social responsibility also manipulate operating activities less. Finally (Cheung, & Wilson, 2010) found that there were no definitive relationship exists between CSR disclosure and financial performance in commercial banks. (Luo et al., 2015) found that analyst can help to mediate the relationship between CSR and stock returns to investors.

1.4 Summary – Previous Research

The different studies about correlation between ESG providers seem to agree that there are disagreement between the different providers. The overall correlation is between 0.13 (Chatterji, Durand, Levine, & Touboul, 2014) to 0.73 (Berg, Koelbel, & Rigobon, 2019) with (LaBella, 2019; Gibson, Krueger, Riand, & Schmidt, 2020) having correlation in between this. There also seemed to be large divergence in the top and bottom ESG companies (Berg, Koelbel, & Rigobon, 2019). The three main reasons for disagreement is according to (Berg, Koelbel, & Rigobon, 2019): Scope divergence which is because different choice of ESG categories, measurement divergence which means that the ESG categories are assessed different and weight divergence which means that the ESG categories are weighted different. 50% of the divergence could be explained by measurement divergence. (Gibson, Krueger, Riand, & Schmidt, 2020) found that high profit companies diverges less, while large companies and companies with high credit ratings diverges more. (LaBella, 2019) found that US companies have lower correlation than global companies. Most of these papers found the Environmental rating to have the highest correlation between the underlying variables with a correlation around 0.30 – 0.65. The Social rating had a correlation around 0.20 – 0.50. The governance rating had the lowest correlation between the underlying variables for all of the papers with correlation spreading between 0.10 – 0.40.

In the previous studies regarding ESG providers and relationship with financial performance (Hartzmark, & Sussman, 2019) found that both institutional and individual investors do value sustainability, which could be because of perception of higher future performance, lower risk, or altruistic behaviour. (Fernandes, 2019) found that ESG on a total basis seems to have significant positive relationship with both financial performance (ROA) and market performance (Tobin's Q). There are mixed result for the subcategories though. (Zhao et al., 2018) found that that ESG has a positive impact on financial performance.

2 SUSTAINABLE FINANCE AND ESG

2.1 Sustainable Finance

During the industrial revolution in the 19th century, fossil fuel became a mean to economic prosperity and population growth. Besides economic and population changes, this also led to new social and environmental changes (Daly, & Farley, 2011). Henry Ford installed in 1913 the first moving assembly line for mass production and long working hours with low salaries were introduced into the world. The increased use of fossil fuels and other resources of the earth later led to climate change being an important factor to consider for today's companies. In 1970, the Club of Rome wrote a publication, *the limits to growth,* that declared that the current economic and population growth rates cannot be sustainable after the year 2100. They suggested that the humanity must impose limits on its production to achieve a state of global equilibrium if it want to live indefinitely on earth. (Meadows, Meadows,

Randers & Behrens III, 1972). In the Paris Agreement in 2015 countries decided to limit the increase in the global temperature average to 2 degrees until 2100.

Sustainable finance is a field regarding how finance in different ways interacts and considers the issues of the economy, the society, and the environment. Financial decisions can be made to which trade-offs will be taken regarding sustainability goals. This could be how investors invest their money depending on different sustainable preferences, or how managers and companies have to take in regard different sustainable goals. Sustainable finance also helps to value the risk that companies might take in regard to different environmental issues, such as climate change. (Schoenmaker, & Schramade, 2018). (Friedman, 1970), one the most prominent economist during the last century, often talked about that firms only should focus on short-term profit and maximise shareholders value, rather than surround themselves with sustainable practices. But the society and finance field have evolved quickly since then. Sustainable finance was primary focused on Shareholder value before, also called Sustainable Finance 1.0 (Schoenmaker, & Schramade, 2018). It later evolved to Sustainable Finance 2.0 which is which focuses on the medium-term horizon. Finally, today, it has evolved to focus on Common good value (Sustainable Finance 3.0) which focuses on the long-term horizon.

Figure 2: The three pillars of ESG

Environmental Pillar	Social Pillar	Governance Pillar
Categories (# Sub-categories) • Resource Use (20) • Emissions (28) • Innovation (20)	**Categories (# Sub-categories)** • Workforce (30) • Human Rights (8) • Community (14) • Product Resp. (10)	**Categories (# Sub-categories)** • Management (35) • Shareholders (12) • CSR Strategy (9)

Source: Thomson Reuters (2019)

2.2 Environmental Factor

The environmental factor is the factor that will later be mentioned as E in the ESG measure. In total Refinitiv have 98 different indicators that makes up for the E measure. The three main categories in the Environmental factor for Refinitiv is Resource Used with 20 indicators, Emissions with 28 indicators and Innovation with 20 indicators. All of these three are related to the impact on the environment that different companies have. The weighting for the environmental factor and the subcategories differs between different industries as Refinitiv is including weighting of ESG factors depending on industry. Different raters have different ways in how they measure good environmental performance. Some providers

measure environmental performance by measuring the environmental process, while other measure it by the environmental outcomes. Some gives a higher score that have good products that are beneficial for the environment, while other give more points to companies that have procedures to decrease environmental dangers. (Chatterji, Durand, Levine, & Touboul, 2014) is mentioning this divergence in which indicators that providers use as one of the reasons for divergence in ESG ratings. The E measure have in many previous studies been the measure that have had the highest correlation of the three subcategories. One reason of this could maybe be that variable scope is more similar between different providers, i.e. that the three main categories, Resource Used, Emissions and Innovation are more sim

2.3 Social Factor

The social factor is the S in the ESG measure. In total Refinitiv have 62 different indicators for the S measure. The four main categories in the Social factor is Workforce with 30 indicators, Human rights with 8 indicators, community with 14 indicators and product responsibility with 10 indicators. These are different ways to try measure companies' impact on the society. For society, the geographic location seems to matter in how different providers is measuring the social factor. (Chatterji, Durand, Levine, & Touboul, 2014) is mentioning that KLD, which is a U.S rating have as much as 71% of its subcategories about social issues while Asset4 (Thomson Reuter/Refinitiv) only have 47% of its subcategories about social issues. It seems to differ quite remarkably between how many subcategories different providers have different issues of the CSR. The Social Factor have in previous research had around 50% correlation which usually have been higher than the governance factor but lower than the environmental factor in correlation.

2.4 Governance Factor

The governance factor is the G in the ESG measure. In total Refinitiv have 56 different indicators for the G measure. The three main categories in the Governance factor is Management, Shareholders and CSR strategies. Two fundamental attributes of the corporate governance system is the responsibility of the board of directors and the incentives provided to top management. The role of the board of directors is to monitor management to make the right decisions, see principal-agent problem and similar. (Eccles, Ionnou, & Serafeim, 2014). The Governance factor have most of the times had the lowest correlation between providers.

3 DATA AND THE MODEL

3.1 Data Collection

The data for this paper has been collected from Refinitiv Eikon and Bloomberg. The database from Refinitiv Eikon have been used in many studies before (Dahlberg & Wiklund, 2018; Fernandes, 2017; Velte, 2017) even though the way the ESG is measured have changed

during the last years. It was previous called the Asset4 ESG metrics but have changed to the current when Refinitiv bought Thomson Reuter. It includes ESG data for over 11 000 companies, it is easily accessible, and the reporting is transparent. As it has been used in so many previous studies, and that this is a quantitative study, it is logical to use the database to be able to compare it to previous theories. That it has been updated recently also make it appropriate to see if the earlier results with the Asset4 database is still correct.

The Bloomberg ESG database is not as commonly used for ESG studies, which makes it interesting to study. It is an American database, but it is also one of the databases with the greatest span of companies, with over 11 000 companies. Bloomberg also have specific measures for E, S and G. For this paper, the data will be specified for European companies. The filter for headquarters in Europe was used for both Refinitiv and Bloomberg when the data is downloaded. For Refinitiv this data was downloaded over 12 years, while it was only downloaded for 1 year for Bloomberg. The reason was that the library, with the available resource, closed during the ongoing COVID-19 pandemic, which was not counted for when the proposal was made. Besides these filters, all the financial institutions are removed from the dataset in line with (Eccles, Ionnou, & Serafeim, 2014; Velte, 2017).

Table 1: Data: Downloaded data for the regression.

Refinitiv		Bloomberg
GICS Ind.Group	Year	Year
GICS Sector	Firm_ID	Firm_ID
GICS Industry	Company Name	Company Name
GICS Sub-Ind	Country_HQ	Bl Total
ESG Combined	ROA	Bl E
Ref Total	Assets	Bl S
Ref E	Debt	Bl G
Ref S	Market Value	
Ref G	Beta	

Source: Refinitiv, & Bloomberg (2020),

Data for ESG on an aggregate level is downloaded as Ref Total and Bl Total, which is a combination of the E, S and G data with specific weights for Refinitiv and Bloomberg. Data for the subcategories Environment, Societal and Governance is also downloaded. Data over the country of headquarters is downloaded to be able to do dummy variables for countries. Data over GICS Sector, GICS Industry group, GICS Industry and GICS Sub-Industry is downloaded to be able to make dummy variables for industry. Data over ROA is downloaded for 12 years to be included as the dependent variable in the regression on corporate financial performance. Data over total value of assets are downloaded to be able to use the log value as a proxy variable for size. Data over book value of debt is downloaded to be able to be

used as a proxy variable for financial leverage together with asset. Finally, Beta is downloaded to be used as a proxy variable for systematic risk and Market Cap is downloaded to be able to be used as a proxy variable for Tobins Q together with Book value of equity. Financial were also dropped as an industry from the GICS sector along with previous studies. As (Eccles, Ionnou & Serafeim, 2014) have mentioned, they have different operational processes and regulations which make them differ from other companies. Outliers for the other variables were also dropped as well as winsorized. For ROA and Tobin's Q the outliers were winsorized to the 95% and 5% quantile, respectively.

3.2 Population and Sample

There are a lot of different studies conducted right now about sustainability and ESG in particular. They are mostly concerned about regression between ESG and performance measures and most are done on market performance with the whole world as a universe. The correlation between ESG measures are not that often looked at, financial performance neither and very few are focused on Europe only. The low amount of previous studies on Europe and the high availability and transparency of the data are one of the reasons to focus this study on Europe. A second reason is that it is more relevant for me as a researcher that lives in Europe to focus on stocks in this area. Another variant could be to focus on only Nordic countries, but there have been several recent studies regarding this already in the last couple of year.

Refinitiv and Bloomberg both have an equity universe with more than 11.000 companies. The stock universe is the whole world. The sample will not include the financial sector as these firms have different operational processes and is therefore often excluded from these kind of studies (Velte, 2017). The Refinitiv database includes round 800 companies for European stocks with ESG data over 12 years, the Bloomberg database have around 2400 companies for the same period. When looking at common stocks this is further decreased to 351 stocks. Out of these 60 is financial firms and are therefore removed. There are then 291 stocks left. Out of these 291 stocks some have big outliers are removed. The final sample is therefore 253 stocks over 12 years after the removal of outliers. The time period for this paper will be from 2008-2019. 2020 cannot be included in the sample as there is not enough updated data about this period yet. To include data from 2008 is because there has not be any big crash during the last 12 years, besides now, and it is important to include all parts of the financial cycle. The dependent variables, ROA and Tobin's Q will have a time lag on t-1 as ESG result on performance often are lagged, and this will therefore lead to a better match.

Table 2: Descriptive Statistics: Summary of number of companies for each step

Bloomberg (Companies)	Refinitiv (Companies)	Common (Companies)	**Common – Financial - Outliers**
2400	691	351	**235**

Source: Refinitiv, & Bloomberg (2020)

From the beginning 2400 companies and 691 companies for Refinitiv were downloaded. From these, 351 companies were common between the two companies. After removal of outliers, 235 common companies were left to analyse.

3.3 Statistical Hypotheses

The hypothesis should be formed before the study is done. It should include a null hypothesis and an alternative hypothesis. In this section the hypotheses are presented and integrated with the research questions.

3.3.1 ESG rating and correlation between ESG providers

The first two hypothesis are related to the correlation between ESG providers and the first research question, which is: How does the ESG ratings correlate between two different providers and which part of the ESG ratings correlates the most?

The first null hypothesis for this research question is regarding how the total ESG rating correlates and therefore

- H_{01}:There is no significant correlation between ESG ratings from Bloomberg and Refinitiv
- H_{A1}: There is a significant correlation between ESG rating from Bloomberg and Refinitiv

If the null hypothesis can be rejected, it means that there is correlation between the two ESG ratings Bloomberg and Refinitiv. After the hypotheses is tested the three specific parts E, S and G will also be analysed.

The second null hypothesis for this research question is regarding how the sub-categories correlates with each other and therefore:

- H_{02}: There is no significant correlation between the E, S and G ratings between Bloomberg and Refinitiv
- H_{A2}: There is a significant correlation between E, S and G ratings from Bloomberg and Refinitiv

If the null hypothesis is rejected here, it means that there is correlation between the underlying subcategories E, S and G between Bloomberg and Refinitiv.

3.3.2 ESG ratings and impact on financial market and financial corporate performance

The other hypotheses in this thesis are related to the impact of ESG ratings on financial market and financial corporate performance and related to the second research question,

which is: How does the ESG score relate with corporate financial performance and which part of E, S and G have the strongest relation?

The first hypothesis regarding this research question is regarding the total ESG rating and ROA:

- H_{03}: There is no significant relationship between ESG and ROA
- H_{A3}: There is significant relationship between ESG and ROA

The second hypothesis regarding this research question is regarding the E,S and G ratings and ROA:

- H_{04}: There is no significant relationship between the E, S and G ratings and ROA
- H_{A4}: There is significant relationship between the E, S and G ratings and ROA

The final research questions is: How does the ESG score relate with corporate market performance and which part of E, S and G have the strongest relation?

For this research question we have the first hypothesis regarding the total ESG rating:

- H_{05}: There is no significant relationship between ESG and Tobin's Q
- H_{A5}: There is significant relationship between ESG and Tobin's Q

The second hypothesis regarding this research question is regarding the E, S and G ratings.

- - H_{06}: There is no significant relationship between the E, S and G ratings and Tobin's Q
- H_{A6}: There is significant relationship between the E, S and G ratings and Tobin's Q

3.4 Regression Models

3.4.1 ESG Total vs ROA and Tobin's Q

In this study two main regression models will be conducted. The first regression model will be regarding corporate financial performance and will have Return on assets (ROA) as the dependent variable. The second one will be regarding corporate market performance and will have Tobin's Q as the dependent variable. The regressions will be done for both Refinitiv and Bloomberg. In the first regressions, ESG total rating will be the independent variable together with some control variables mentioned below. The model will look as below:

$$ROA_{it} = \alpha + \beta_0 RefESG_{it} + y_{it}X_{it} + \epsilon_{it} \quad (1)$$

$$ROA_{it} = \alpha + \beta_0 BlESG_{it} + y_{it}X_{it} + \epsilon_{it} \quad (2)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 RefESG_{it} + y_{it}X_{it} + \epsilon_{it} \quad (3)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 BlESG_{it} + y_{it}X_{it} + \epsilon_{it} \quad (4)$$

As one can see, there will be four regression in total, with the first two regarding how the ESG measure correlates with ROA for Refinitiv and Bloomberg respectively and the last two regarding how the ESG measure correlates with Tobin's Q for Refinitiv and Bloomberg respectively.

3.4.2 E, S, G vs ROA and Tobin's Q

In the next regressions the subcategories E, S and G will be looked at specifically regarding ROA and Tobin's Q. There will be 12 different regressions in total, outlines as below:

$$ROA_{it} = \alpha + \beta_0 RefEnvironmental_{it} + X_{it} + \epsilon_{it} \quad (5)$$

$$ROA_{it} = \alpha + \beta_0 RefSocial_{it} + X_{it} + \epsilon_{it} \quad (6)$$

$$ROA_{it} = \alpha + \beta_0 RefGovernance_{it} + X_{it} + \epsilon_{it} \quad (7)$$

$$ROA_{it} = \alpha + \beta_0 BlEnvironmental_{it} + X_{it} + \epsilon_{it} \quad (8)$$

$$ROA_{it} = \alpha + \beta_0 BlSocial_{it} + X_{it} + \epsilon_{it} \quad (9)$$

$$ROA_{it} = \alpha + \beta_0 BlGovernance_{it} + X_{it} + \epsilon_{it} \quad (10)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 RefEnvironmental_{it} + y_{it}X_{it} + \epsilon_{it} \quad (11)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 RefSocial_{it} + y_{it}X_{it} + \epsilon_{it} \quad (12)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 RefGovernacne_{it} + y_{it}X_{it} + \epsilon_{it} \quad (13)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 BlEnvironmental_{it} + y_{it}X_{it} + \epsilon_{it} \quad (14)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 BlSocial_{it} + y_{it}X_{it} + \epsilon_{it} \quad (15)$$

$$Tobin's\ Q_{it} = \alpha + \beta_0 BlGovernacne_{it} + y_{it}X_{it} + \epsilon_{it} \quad (16)$$

3.4.3 Variables in the model

The variables descriptions for the regressions are outlined in the table below. There are the dependent variables, ESG and subcategories and all the control variables that are included.

Table 3. Variable Explanations: Variables included in regressions

Variables	Abbreviation	Description
Return on Assets performance	ROA	Return on Asset, Proxy for corporate financial
Tobin's Q $\frac{Market\ cap}{Total\ Assets}$	Tobins_Q	Proxy variable for market financial performance
Refinitiv ESG	Ref_Tot	Total ESG for Refinitiv
Refinitiv Env	Ref_E	Total environment score for Refinitiv
Refinitiv Social	Ref_S	Total social score for Refinitiv
Refinitiv Government	Ref_G	Total government score for Refinitiv
Bloomberg Total	Bl_Tot	Total ESG score for Bloomberg
Bloomberg Env	Bl_E	Total environment score for Bloomberg
Log of Assets	SIZE	Logarithm of Assets to be used as control variable for size
Beta	BETA	Control variable for systematic risk
Financial Leverage	FINLEV	Control variable for unsystematic risk, $\frac{Total\ Debt}{Total\ Assets}$
Industrial variables	IND	Control variable for industry
Country variables	COUNTRY	Control variable for country
Sales Growth	SGROW	Control variable for sales, current year net sales/previous
Logarithm sales	lnSales	Control variable for logarithm of sales (Similar to R&D)
Firm Age	Firm_Age	Control variable for age of firm from listed on stock exchange
X		Vector for control variables
B		Coefficient
epsilon	ϵ.	Residuals

3.4.4 Dependent variables

The two dependent variables in the regressions are Return on Assets (ROA) and Tobin's Q. ROA have previously often been chosen as a proxy variable for corporate market performance (Fernandes, 2019; Eccles, Ionnou & Serafeim, 2014, Velte, 2017 and Dahlberg & Wiklund, 2018) It is calculated by taking the net income divided by the average of the total assets. It is therefore a measure of how effective a company is in converting invested money to generate net income.

The dependent variable in the other regression is Tobin's Q. Tobin's Q is calculated by taking the market capitalization divided by the total assets. A Tobin's Q ratio below one

indicates that that the company is not using the resources optimal. This is because the stock value of the company is lower than what the assets should be worth. Meanwhile a higher ratio would mean that the stock value is higher than what the assets are worth. Because of this valuable quality it have often been chosen as a proxy variable for corporate market performance. This was chosen by (Hartzmark & Sussman, 2019; Zhao and others, 2018; Gibson, Krueger, Riand & Schmidt, 2020; Fernandes, 2019; Eccles, Ionnou & Serafeim, 2014; Velte, 2017 and Dahlberg & Wiklund, 2018) as the variable to have as their dependent variable when they were looking at market performance. One could choose to only look at (excess) stock returns instead when doing these kinds of studies, but Tobin's Q is also preferable to choose as one does not have to adjust for risk or normalisation. Market to Book Value can also be chosen as a similar proxy variable but is not chosen in this study. To conduct two regressions with both ROA and Tobin's Q is also interesting as mentioned by (Choi & Wang, 2009). If Tobin's Q would be significant but ROA not significant this means that investors prefer to invest in these firms not only because of the performance of the firm.

3.4.5 Independent variables

The goal of these regressions are to see if ESG rating has a positive or negative relationship with ROA and Tobin's Q. Therefore, the independent variable in all of these regressions is the ESG rating. In the first regressions is the ESG rating from Refinitiv, while in the last ones from Bloomberg. Both Refinitiv and Bloomberg have ESG ratings for over 11.000 companies (Refinitiv, 2020; Bloomberg, 2020). Most of the sub-categories from the Refinitiv ESG ratings are in the environmental spectrum, with 68 subcategories, followed by social with 62 subcategories and governance with 56 subcategories. Below is a table over the different indicators and weights per category.

Table 4. Descriptive Statistics: Refinitiv Indicators and weights per category.

Pillar	Category	Indicators Rating	Weights	Sum of Category Weights
Environment	Resource Use	20	15%	
Environment	Emissions	28	15%	44%
Environment	Innovation	20	13%	
Social	Workforce	30	13%	
Social	Human Rights	8	5%	
Social	Community	14	9%	31%
Social	Product Responsibility	10	4%	
Governance	Management	35	17%	26%
Governance	Shareholders	12	5%	
Governance	CSR Strategy	9	3%	
Total		186	100%	100%

Source: Data from Refinitiv (2020)

One of the important factors for this regression is that Refinitiv both have data 12 years back for many companies and that they divide their data into the subcategories E, S and G. As this study partly also want to deep further down and look into these specific variables, this was one of the conditions that had to be made on the ESG provider. Bloomberg have not been used in that many previous studies, but they have a very comprehensive amount of data about ESG rating and is one of the biggest data collection companies in the world. They also have specific data over the subcategories E, S and G, data over long time periods and as mentioned before, includes over 11.000 companies. They do conduct their ESG data a little bit different, as they do not use percentile rankings like Refinitiv. But this will be fixed later and described in next chapter.

3.4.6 Control Variables

It is important to include control variables in regression studies. If some variables are omitted, but have effect on the dependent variable, there might be omitted variable bias because of the omitting of this variable. There is however hard to know exactly which variable that should be included. Therefore, the control variable in this study are for the most part chosen after previous studies together with some kind of economical and common sense. The first variable that is often controlled for in these studies is the systematic risk. Systematic risk is the risk that are related to the whole market, sometimes called undiversified risk, volatility, or market risk. Similar as (Velte, 2017 and Dahlberg & Wiklund, 2018) the control variable used to control for systematic risk in this study is Beta. Furthermore, unsystematic, or diversified risk should also be controlled for and this is done using financial leverage. This is done in previous studies done by (Dahlberg & Wiklund, 2018; Fernandes, 2019 and Velte, 2017). As a third control variable, R&D can be used as a proxy for technological knowledge, but this variable was not available in Refinitiv Eikons database. This is why the natural logarithm of sales and sales growth is used instead, similar to what was used by (Fernandes, 2019).

Country variables were chosen as the study is spread out over a lot of countries, similar to (Dahlberg & Wiklund, 2018 and Fernandes, 2019) and because of the descriptive statistics. The Nordic and Latin countries had high ESG rating, while countries as the UK had low ESG rating. It is therefore common sense to include a control variable for country. Industry variables were chosen in line with (Garcia, Mendes-Da-Silva & Orsato, 2017) and what was found in the descriptive statistics in this study. Utilities and Materials industries had a very high ESG rating, while other industries, such as Energy and Real Estate, had a very low ESG rating. Therefore, industry variable will be included to control for this. Firm Age is used as a control variable similar to some previous study as it seems like firms that have been listed longer is in another phase in their cycle which according to these previous studies then lead to higher ESG ratings. ROA is also used as a control variable for Tobin's Q as firm performance is a quite big explanation factor of Tobin's Q in many cases. The model does not include time-effect as a control variable as the model already control for entity effects

which is similar to include a time dummy in the model. One can see significant difference when entity effects (fixed effects) are included or not which leads us to believe that the year do matter for the significance of the variables.

3.4.7 Choice of regression model

For Refinitiv we have data over 12 years, both cross-sectional and over time. Therefore, a panel regression is best suited for the data. Both fixed effect and random effect panel regressions can be conducted. Fixed effect regressions should be used if the effects are constant across individuals, while random effects should be used when effects vary across individuals. In this study a Hausman test was performed to decide if fixed effects or random effect should be used with the result as below.

Table 5. Wu-Hausman test for choice of panel data model.

Wu-Hausman test of exogeneity	
H0	All endogenous variables are exogenous
t-statistic	19.9511
P-value	0.0000

Source: Data from Refinitiv (2020)

A t-statistic above 2 or a p-value below 0.05 means that the null-hypothesis can be rejected. A rejection of the null hypothesis means that we can reject the use of random effect panel regressions. Therefore, fixed effect panel regressions will be used in this study.

For Bloomberg, the data is only available for one year, because of the closure of library during COVID-19. Therefore, panel regressions cannot be conducted as the data is only cross-sectional. Instead wls-regression will be conducted instead, which is preferred when there are signs of heteroskedasticity in the data.

4 EMPIRICAL RESULTS

4.1 Descriptive Statistics

4.1.1 Overall dataset Refinitiv and Bloomberg

The dataset is divided in 10 different GICS sectors, over 12 years and 19 different countries. The data for Refinitiv is on percentile basis. This means that all the original observations are divided by the maximum observation to get a percentile number. To be able to compare the two datasets, the data for Bloomberg is therefore also transformed to be on percentile basis. This is done by taking the current ESG value divided by the maximum ESG value, as well for the three subcategories. The table below describes the descriptive statistics for Refinitiv and Bloomberg, including the number of observations, mean, standard deviation, min, max and different quantiles.

Table 6. Descriptive statistics: ESG ratings for Refinitiv and Bloomberg.

	Ref ESG	Ref E	Ref S	Ref G	Bl ESG	Bl E	Bl S	Bl G
count	235.00	235.00	235.00	235.00	235.00	235.00	235.00	235.00
mean	62.97	59.34	67.11	60.17	62.54	50.45	59.72	79.32
std	16.79	24.33	18.81	19.88	15.65	20.72	16.36	10.04
min	2.38	0.00	0.57	3.59	23.13	3.66	20.25	43.90
25%	52.61	42.56	55.98	46.56	51.62	34.05	50.01	73.17
50%	64.58	61.98	71.44	64.54	61.45	49.99	56.82	80.49
75%	76.64	80.94	81.40	75.38	74.54	66.06	70.46	85.37
max	92.33	97.93	96.45	94.10	99.32	97.24	100.00	100.00

Note: Ref ESG, E, S and G represents the ratings for companies according to Refinitiv for ESG total, Environment, Social and Governance. Bl ESG, E, S and G the same for Bloomberg. Source: Data from Refinitiv and Bloomberg

Refinitiv total ESG ratings have a mean of 62.97, which higher than for Bloomberg which is 62.54. The companies can have an ESG rating between 0-100 for each provider. The value 62.97 means that for the 235 companies in this study, they have on average a rating of 62.97 rated for Refinitiv. For the same 235 companies is the average 62.54 for Bloomberg. Both the min and max values, which are the highest and lowest rated companies for each provider, are lower Refinitiv, but Refinitiv have higher ratings for the 25, 50 and 75 percentiles. This indicates that Refinitiv's ESG ratings have a larger group between 50 – 92, even if though Bloomberg have smaller outliers. It seems like Bloomberg are valuing their best companies higher, but the providers otherwise are rating the companies quite consistent.

The highest mean for Ref is for the Social variable with 67.11, which is 59.72 for Bloomberg, respectively. It seems to be a quite large discrepancy with more than 15% difference. Refinitiv is giving companies higher ratings for their social contributions, such as human rights, community etc. The lowest ESG rating for Refinitiv is for the environmental variable at 59.34, but it is still around 20% higher than for Bloomberg. Refinitiv are also giving companies higher ratings for variables such as Resource use and emissions. The greatest discrepancy between the two is however for the governance variable. Bloomberg have a very high mean for this variable of almost 80, with the 25th quantile being at 73. This means that 75% of all stocks have a governance rating of 73 or above. The similar for Refinitiv is only 60, and a 25th quantile of 47. Bloomberg seem to have easier to give high ratings for aspects such as CSR Strategy and Management. The two providers seem to differ quite a lot even if they include exactly the same stocks. For all the three sub-categories, Environment, Social and Governance, the discrepancy seems very large. This can potentially lead to different results in the regressions later, when analysing how ESG ratings correlates with firm performance and market performance, and have economic impact.

4.1.2 Correlation heatmap Refinitiv and Bloomberg

The Pearson correlation matrix is analysed in figure 2 below. In a correlation matrix all the interesting variables correlations with each other respectively are analysed. In this case the interesting variables are the total ESG ratings for Refinitiv and Bloomberg, as well as for the subcategories.

Figure 3. Descriptive Statistics: Pearson correlation between Refinitiv and Bloomberg.

Note: The darker red colour means a higher correlation while a brighter red colour means a lower correlation. Ref stands for Refinitiv and Bl stands for Bloomberg.
Source: Data from Refinitiv and Bloomberg

The total correlation between Refinitiv and Bloomberg is 0.64. A correlation of 1.00 would mean that the companies were total correlated, a number of 0 that they are completely uncorrelated and a number of 0.5 that they are somehow correlated, but not very strongly. This also must be taken in context. In this case, this could be compared to the correlation between credit ratings which is found to be around 0.99. A value of 0.64 therefore means that they are correlated, but the correlation is not very strong, and the result from regressions can vary quite a lot because of this low correlation.

For the environmental variable, the in-between correlation is 0.66 which is the highest correlation for the subcategories. It seems that the environment have somewhat similar methodology at least. For the social variable, the correlation is 0.54, which is higher than the "Threshold" of 0.5, but in this context still low. Finally, the governance correlation is only 0.25, which is consistent with the descriptive statistics which seems to be very different for Refinitiv and Bloomberg. This could very well have implications for when doing regressions

using different providers, as the methodology seem to differ quite substantially for all sub-categories, but specifically for the governance variable.

4.1.3 Top 20 companies/Bottom 20 companies

One way to dig deeper into the descriptive statistics is to do as (Berg, Koelbel, & Rigobon, 2019). They divided the companies in high and low ESG ratings for each provider and see if there are any similarities. In Table 5 is list over top 20 companies with highest/lowest ESG score for Refinitiv and Bloomberg. This is done after the companies is made into the final samples with 235 companies and only for 2019 as this is the year data is available for both data providers.

Table 7. Descriptive Statistics: Top 20 and Bottom 20 companies based on ESG total rating for Refinitiv and Bloomberg.

Ref_Top	**Bl_Top**	**Common**	**Ref_Bot**	**Bl_Bot**	**Common**
Adidas	Billerud	**Billerud**	Atrium	Aryzta AG	**Aveva**
Arkema SA	CRH PLC	**CRH PLC**	Aveva	Aveva	**Daejan**
BillerudKorsnas AB	Diageo PLC	**Diageo PLC**	Daejan	CEZ	**Keller Group**
Carrefour SA	EDP Energias	**Iberdrola SA**	DNO	Daejan	**Pendragon**
Casino Guichard	Geberit AG	**L'Oreal SA**	Euromoney	D'leteren SA	**Ryanair**
Continental AG	Iberdrola SA	**Mondi PLC**	Ferguson	DNO ASA	**Zardoya**
CRH PLC	Imerys SA	**Saipem SA**	Frasers	HedelbergCement	
Diageo PLC	Infineon	**Snam SpA**	HomeServe	HomeServe PLC	
Iberdrola SA	Leonardo		Keller Group	Immfinanz AG	
L'Oreal SA	L'Oreal SA		Paypoint	Keller Group	
Marks and Spencer	Mondi PLC		Pendragon	Kloeckner & Co	
Mondi PLC	Pernod Ricard		Qietiq Group	Melrose Industries	
Nexans SA	Sacyr SA		Reach PLC	Orange Belgium	
Pearson PLC	Saipem SA		Rheinmetall AG	Pagegroup	
Publicis Groupe SA	Snam SpA		Ryanair Holdings	Pendragon PLC	
Reckitt Benckiser	Solvay SA		Savills PLC	Ryanair Holdings	
Saipem SpA	Sonae		Signature Aviation	Sanoma	
Snam SpA	Terna		Ultra-Electric	SThree PLC	
Tui AG	Verbund		United Internet	Tenaris	
UPM-Kymmene O	Wacker		Zardoya	Zardoya	

Note: Ref_Top stands for the 20 companies with the highest ESG rating for Refinitiv, Bl_Top for Bloomberg, respectively. Ref_Bot for the 20 companies with the lowest ESG rating, Bl_Bot for Bloomberg. The first common column is for common stocks in the top 20 and the second common column is for common stocks in bottom 20.
Source: Bloomberg, & Refinitiv (2020).

For the top companies, 8 out of 20 companies are the top 20 companies for both companies, this means an overlap of 40%. For the bottom companies there are even less overlap, with only 6 out of 20, which means an overlap of 30%.

Once again, this also tells a story that the two dataset seems to quite substantial difference, which the correlation heatmap and previous descriptive statistics also led us to believe. Furthermore, there are many funds that only includes that top ESG rated companies, or exclude the bottom ESG rated companies. That the top 20 and bottom 20 companies differs this much means that these funds would include very different stocks depending on which provider they collect the stocks after.

4.1.4 Descriptive statistics by country

To further analyse the descriptive statistics, in Table 8 and Table 9, the total data is divided by country. There seems to be a divergence both in ESG ratings between countries and divergence between the ESG ratings for the same country. Portugal, Italy, and France have higher ESG rating than the average ESG rating for Refinitiv, while the same countries including Spain have the same for Bloomberg. For both providers does UK have very low ESG rating compared to other countries.

Table 8. Descriptive Statistics:
Bloomberg and Refinitiv per country

Country_x	Ref_Mean	Ref_Max	Ref_Min	Bl_Mean	Bl_Max	Bl_Min
Austria	61.228	72.349	47.438	60.556	82.363	33.768
Belgium	66.600	80.204	50.351	57.463	82.363	22.426
Czech Republic	71.574	71.574	71.574	40.880	40.880	40.880
Denmark	58.958	58.958	58.958	67.551	67.551	67.551
Finland	64.362	84.995	51.088	60.941	79.997	34.958
France	70.313	87.735	48.006	66.650	87.697	43.261
Germany	65.931	88.114	27.148	60.691	85.919	29.624
Greece	54.269	63.530	47.704	57.279	73.473	42.071
Ireland	53.068	86.556	30.132	55.343	91.253	26.670
Italy	72.135	92.327	50.905	74.612	90.651	58.661
Jersey	46.097	63.477	28.718	52.739	56.295	49.183
Luxembourg	60.382	60.382	60.382	40.880	40.880	40.880
Netherlands	63.875	70.790	56.381	64.733	71.695	53.327
Norway	53.098	70.698	14.130	51.873	63.722	26.183
Portugal	78.906	79.839	76.932	81.582	93.031	66.949
Spain	62.686	85.650	29.538	76.587	96.315	36.149
Sweden	64.500	83.980	50.358	70.107	83.539	53.327
Switzerland	65.123	80.948	47.215	59.452	94.809	28.434
United Kingdom	58.495	92.177	2.379	55.541	89.475	25.480

Source: Bloomberg and Refinitiv (2020)

In the specification in Table 9, Refinitiv Spain have 196% more companies in top 20 then they "should have", France have 136% more and Italy 136% more. For both Refinitiv and Bloomberg UK have much lower proportion of companies in top 20 then they should have. Because of these large differences, a country is suitable to have as a dummy variable to control for this later.

Table 9: Descriptive Statistics: Bloomberg and Refinitiv per country vs the average amount

	Total(#)	Ref_Top/Tot	Ref_Bot/Tot	Bl_Top/Tot	Bl_Bot/Tot
Austria	5	0.000	0.000	2.350	2.350
Belgium	8	0.000	0.000	1.469	2.938
Czech Republic	1	0.000	0.000	0.000	11.750
Denmark	1	0.000	0.000	0.000	0.000
Finland	3	3.917	0.000	0.000	3.917
France	33	2.136	0.000	1.068	0.000
Germany	25	1.410	0.940	0.940	0.940
Greece	3	0.000	0.000	0.000	0.000
Ireland	5	2.350	2.350	2.350	2.350
Italy	11	2.136	0.000	4.273	0.000
Jersey	2	0.000	5.875	0.000	0.000
Luxembourg	1	0.000	0.000	0.000	11.750
Netherlands	4	0.000	0.000	0.000	0.000
Norway	5	0.000	2.350	0.000	2.350
Portugal	4	0.000	0.000	5.875	0.000
Spain	6	1.958	1.958	3.917	1.958
Sweden	11	1.068	0.000	1.068	0.000
Switzerland	6	0.000	0.000	1.958	1.958
United Kingdom	101	0.582	1.629	0.233	0.931

Note: Total(#) means total amount of stocks per country.
Ref_Top/Tot: Number of stocks vs number of stocks it should have in top 20. France score of 3.917 means that they have 3.9 times more stock in top 20 than they should have.
Source: Bloomberg and Refinitiv (2020)

4.1.5 Descriptive statistics per sector

In Table 10 and Table 11 the data is divided by GICS sector. There seems to be large differences in the data here as well. Utilities, Materials, Consumer staples and health care have high ESG ratings and many companies in the top 20 ESG ratings. On the other hand, sectors such as Energy and Real Estate have low ESG ratings and fewer companies in the top 20 ESG ratings.

Table 10: Descriptive Statistics: Bloomberg and Refinitiv per sector

GICS_Sector_x	Ref_Mean	Ref_Max	Ref_Min	Bl_Mean	Bl_Max	Bl_Min
Communication Services	60.260	84.275	2.379	57.184	78.219	22.426
Consumer Discretionary	65.559	88.114	24.935	57.200	79.395	36.364
Consumer Staples	70.818	89.734	41.164	64.328	87.697	28.434
Energy	56.830	92.327	14.130	54.758	90.651	26.183
Health Care	70.203	78.923	58.958	64.289	81.173	49.771
Industrials	57.511	83.731	3.573	56.927	94.809	26.670
Information Technology	60.987	79.213	25.035	56.972	84.141	30.814
Materials	70.272	92.177	39.469	72.501	91.253	35.546
Real Estate	56.307	80.707	16.660	57.178	79.395	25.480
Utilities	72.333	90.616	51.574	73.708	96.315	40.880

Source: Bloomberg and Refinitiv (2020)

In Table 11 it can be seen that for industry level the divergence between the ESG providers seems to be lower than at country level. But because of the large differences between different industries, it is suitable to have a dummy variable for industry later in the regression as well.

Table 11: Descriptive Statistics: Refinitiv and Bloomberg per Sector vs the average amount

	Total_c	Total	Ref_Top_Tot	Ref_Bot_Tot	Bl_Top_Tot	Bl_Bot_Tot
Communication Services	23	0.098	1.022	1.533	0.000	1.022
Consumer Discretionary	29	0.123	1.621	0.810	0.000	0.810
Consumer Staples	19	0.081	3.092	0.000	2.474	0.618
Energy	11	0.047	1.068	1.068	1.068	2.136
Health Care	6	0.026	0.000	0.000	0.000	0.000
Industrials	78	0.332	0.151	1.506	0.452	1.205
Information Technology	13	0.055	0.000	0.904	0.904	0.904
Materials	28	0.119	2.098	0.000	2.518	0.420
Real Estate	14	0.060	0.000	2.518	0.000	1.679
Utilities	14	0.060	1.679	0.000	4.196	0.839

Note: Total(#) means total amount of stocks per country.
Ref_Top/Tot: Number of stocks vs number of stocks it should have in top 20. Consumer Staples score of 3.092 means that they have 3.1 times more stock in top 20 than they should have.
Source: Bloomberg and Refinitiv (2020)

4.1.6 Descriptive Statistics other variables

Finally, it is time to go through the descriptive statistics for the reminding variables. This will be done for the variables ROA, Tobin's Q, Size, Beta, Firm Age, ESG rating from Refinitiv and ESG rating from Bloomberg. In table 9 below is a summary of these variables. All the variables that are collected from measurement in currencies are downloaded as Euros from both Refinitiv and Bloomberg. They are already transformed to Euro before they were collected. The size variable is the logarithm of assets as mentioned before, therefore it these will be transformed below to be able to interpret the descriptive statistics. To make the understanding clearer, the asset size is also included in the table below, in terms of billion. The Beta is a measure of volatility, or systematic risk. A Beta value of 1 means that the security move similar to the market, while a Beta value below 1 means that the security is less volatile/risky than the market. The firm age is in year basis, where a firm age of 27 means that the company was first listed on the stock exchange 27 years ago, in 1993. The Tobin's Q is not logged in this comparison and the ROA is on percentage basis, 0.04 therefore means 4%.

Table 12. Descriptive Statistics: Mean score for Size, Beta, Firm Age, ROA, Tobin's Q, Ref ESG and Bl ESG

	All Comp (Mean)	**Ref Top 20 (Mean)**	**Ref Bot 20 (Mean)**	**Bl Top 20 (Mean)**	**Bl Bot 20 (Mean)**
Size	22.58	23.78	21.74	23.52	22.12
Assets €	6.40	21.26	2.76	16.39	4.04
Beta	0.91	0.97	0.88	0.99	0.98
Firm Age	27.48	30.85	25.80	27. 14	20.55
ROA	0.04	0.03	0.07	0.04	0.04
Tobin's Q	1.24	0.78	1.40	1.03	1.14
Ref Tot	53.44	86.20	27.49	80.67	43.32
Bl Tot	60.54	77.07	41.93	86.84	33.96

Note: This is done for the top 20 and bottom 20 companies for Refinitiv and Bloomberg, with the same terminology as previous table.

Source: Refinitiv, & Bloomberg (2020)

The mean value of asset for these companies is 6.4 billion Euro. There are a quite substantial difference in the size of companies with high ESG ratings for both Refinitiv and Bloomberg compared to the mean asset value of companies. The 20 companies with the highest ESG rating for Refinitiv have an asset value of approximately 3.5 times the average company, while the 20 companies with the highest ESG rating for Bloomberg have an asset value of approximately 2.5 times the average company. Companies with low ESG rating for both Refinitiv and Bloomberg have on the other hand substantially lower size and amount of assets. The average asset size for the companies with the lowest ESG rating for Refinitiv have an asset size of 2.76 billion, which is almost 20 billion Euro lower than the average asset size for the companies with highest ESG ratings, and less than half of the mean company. For Bloomberg, the companies with lower ESG ratings also have a lower asset

size than the mean company. From these descriptive statistics it looks like the size could have an influence on the ESG ratings.

Both Refinitiv and Bloomberg have substantially higher Betas than the average company, for companies in the top 20 highest ESG ratings. This seems to indicate that stock with high ESG ratings also are riskier. For Refinitiv the reverse can also be seen, where the stock in the bottom 20 ESG ratings have a lower volatility than the average company and seems to be less risky. For Bloomberg do the companies with the lowest 20 ESG ratings though also have high betas. It is therefore not very clear from these about the relationship between Beta/Risk and ESG rating. The highest ESG rated companies for Refinitiv have been on the stock market for on average 31 years and the lowest ESG rated companies for 26 years. For Bloomberg, the highest rated ESG rated companies have been on the stock market for 27 years and the lowest for 21 years. For both providers, the low ESG rated companies have been on the stock market shorter than the average company.

For ESG and ROA, there seem not to be any real relationship besides that lower ESG rated seems to have higher ROA. For Tobin's Q it looks like the 20 lowest rated companies have a higher Tobin's Q than the 20 highest rated companies. This could be because of the size, beta, or firm age of these companies. Therefore, it will be important to do the regression with these control variables included, to see the relationships much clearer, if there are any.

4.2 Multivariate Analysis

4.2.1 Data Transformation

It is important that the data is transformed appropriately so that it fulfils the linear assumptions of linear regression. Data can be detrended if it is not stationary, the natural logarithm or square/cube the data if it is skewed and winsorizing of the data can be done to fix outliers. By winsorizing, the outliers are limited to a specific percentile such as the 95% or 99% percentile. In these regressions there are two dependent variables that have to be analysed if they have to be transformed, the ROA and the Tobin's Q. To look at homoskedasticity three other tests were conducted, the Goldfeld-Quandt test, Breusch Pagan-test, and White test. To look at autocorrelation the Durbin-Watson and Breusch-Godfrey tests are used.

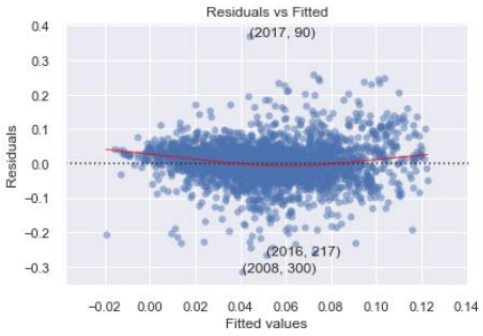
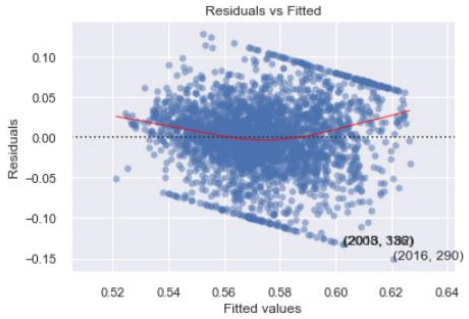
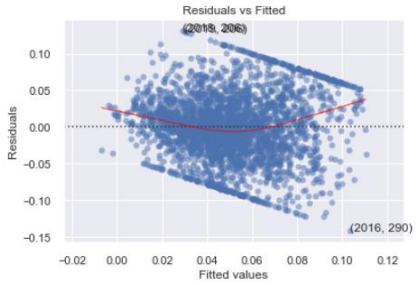
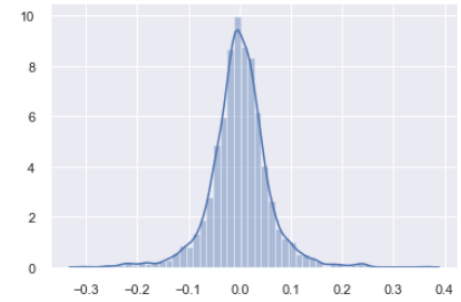
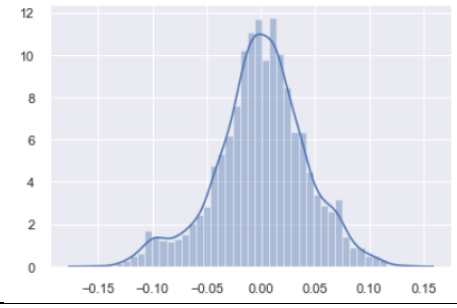
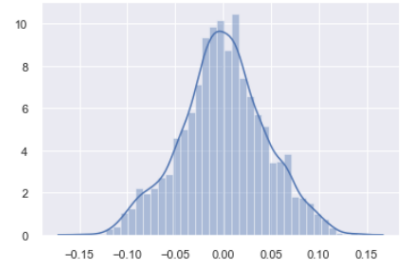
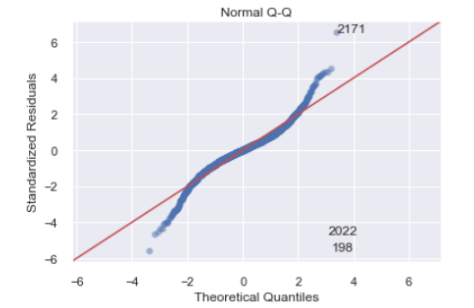
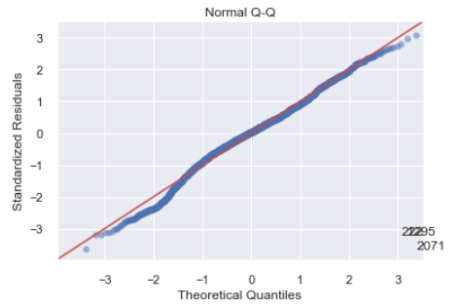
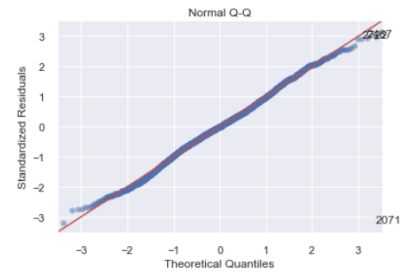
4.2.2 Transformation of ROA

See Table 13 for graphical information. The fitted values are regressed against the residuals to get a first overview of the data. If the data is appropriate there should be no trend of the residuals that depends on the fitted values. It looks quite well but there to be a small trend in the data, see the red line. Afterwards the distribution of the residuals were analysed by two diagrams, one histogram and one QQ-plot. In both the histogram and the QQ-plot the

residuals does not look normal distributed with high outliers seen on the big tails and that the QQ-plot is not similar to the 45-degree line. To further analyse if the residuals follows a normal distribution a Jarque-Bera test is implemented. The p-value of the Jarque-Bera test is 0.0 which means that we cannot reject the null hypotheses that the sample is not from the normal distribution, which is consistent with the histogram and QQ-plot. To give more weight in the normality analysis a Shapiro-Wilk and D'Agostino test were also conducted. Both of these tests also show that the residuals are not normal distributed.

To fix this for the data two transformations were tried out. In the first alternative ROA were squared and then winsorized at 95% respectively 5%. In the second alternative the ROA was only winsorized at 95% respectively 5%. At the three plots the residuals look quite similar, with the QQ plot showing the most difference where the only winsorized data looks more normal. In the three tests the squared and winsorized ROA does not look normal with any of the three tests while the winsorized ROA look normal with the Jarque-Bera and D'Agostino test but not with the Shapiro-Wilk test. In this paper the winsorized ROA is decided to continue with. For the Homoskedasticity tests only the Goldfeld-Quandt test can reject that the data is still homoscedastic. Therefore, this will instead be controlled for when the regression is done later than in the transformation. The Durbin-Watson and Breusch-tests both conclude that the data is stationary, value close to 2 for Durbin-Watsons and p-value above 0.05 for Breusch-Godfrey. Finally, there are some negative kurtosis and skewness in the data, but this is valid when doing the regression later.

Figure 4: Transformation of ROA

ROA		ROA squared+Winsorized	ROA Winsorized
			
			
			
Jarque-Bera p-value	0.0	6.16e-14	0.6234
Shapiro-Wilk p-value	2.82e-30	5.21e-14	0.0000136
D'Agostino p-value	0.0	0.0	0.641
Result	Non-normal	Non-normal	Normal, Non-Normal, Normal

Note: The transformation is done in two steps where the first column is the original step, the second column the first transformation and the third column the last transformation. Below the graphs are the statistics for each step.

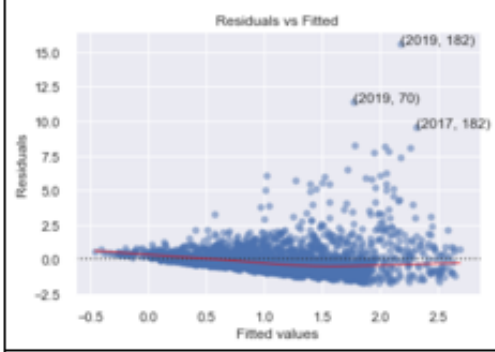
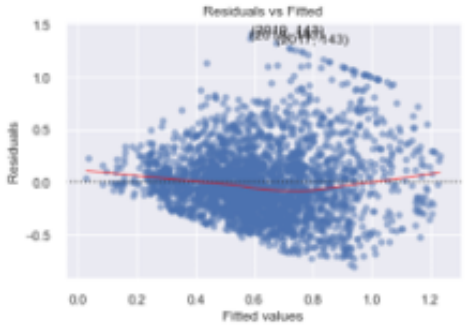
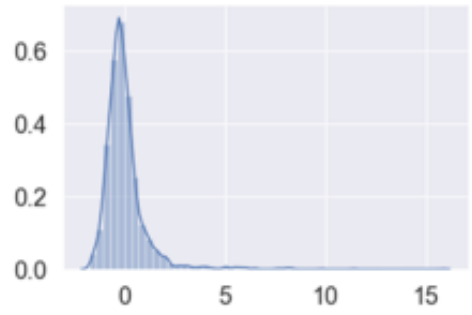
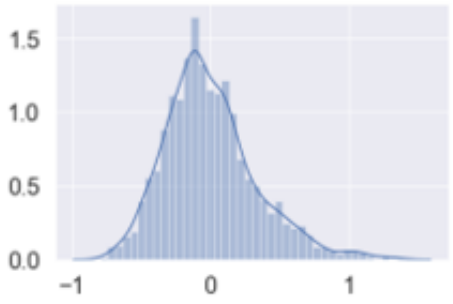
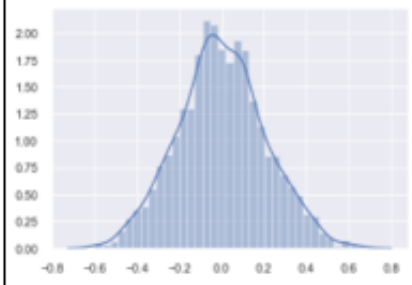
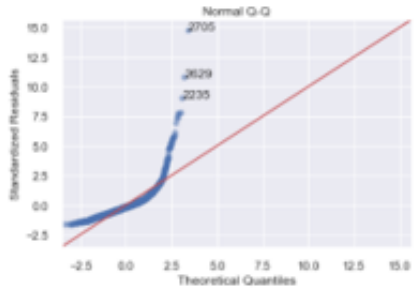
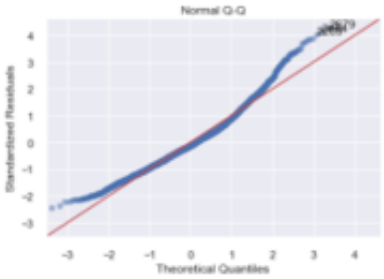
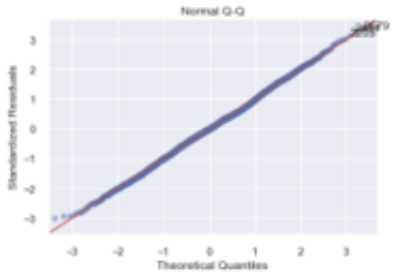
Source: Bloomberg and Refinitiv (2020)

4.2.3 Transformation Tobins Q

See Appendix 8 for graphical information. The first graph for Tobins Q looks much worse than the one for ROA. There is an exponential increase in the Residuals for higher values of Tobins Q which means that the value of residuals depends on the value of the dependent variable which is bad. The histogram and one QQ-plot both further emphasise on this. The histogram is very right skewed and fat tails to the right, the QQ-plot is very much off from the 45-degree line. It is probably not necessary in this case but the Jarque-Bera, Shapiro-Wilk and D'Agostino tests were also conducted which all have p-values of 0.0 which means that they could not reject the null-hypothesis and the data is not normal distributed.

The natural logarithm of the data is taken. The logarithm can only be done on positive numbers and therefore a constant was also added to make the negative values positive. There seem to still be some tail to the right and the QQ-plot still looks a little bit off. Finally, the data is therefore squared as well, which can also fix right tail, non-normal data. In the final plot, log squared Tobins Q, the red trend line now look flat, the histogram looks normal distributed and the QQ-plot is mostly around the 45-degree. Furthermore, all the three tests show that the data is normal-distributed. The homoskedasticity, stationarity and kurtosis and skew is now analysed for the log squared Tobin's Q. For the Homoskedasticity tests all three tests show that the data is still homoscedastic. Therefore, this will instead be controlled for when the regression is done later than in the transformation. The Durbin-Watson and Breusch-tests both conclude for Tobin's Q as well that the data is stationary with a Durbin-Watson value of 1.94 and Breusch-Godfrey value of 0.10. Finally, the kurtosis and skew is similar to ROA with kurtosis of -0.05 and skew of 0.34. This will still be viable for the regression.

Figure 5: Transformation of Tobin's Q

Tobins Q	Log Tobins Q	Log Squared Tobins Q
		
		
		

Jarque-Bera p-value	0.0	0.0	0.769
Shapiro-Wilk p-value	0.0	2.70e-24	0.09
D'Agostino p-value	0.0	0.0	0.785
Result	Non-normal	Non-normal	Normal

Note: The transformation is done in two steps where the first column is the original step, the second column the first transformation and the third column the last transformation. Below the graphs are the statistics for each step.
Source: Bloomberg and Refinitiv (2020)

Table 13: Homoskedasticity, stationarity and Kurtosis and Skew, Summary

Tests	ROA	Log-Squared-Tobins'Q
Homoskedasticity		
Goldfeld-Quandt	0.749	8e-3
Breusch-Pagan	5.39e-42	7.21e-26
White test	2.60e-55	1.75e-31
Stationarity		
Durbin-Watson	2.04	1.94
Breusch-Godfrey	0.25	0.10
Kurtosis and Skew		
Kurtosis	-0.13	-0.05
Skew	0.42	0.34

Source: Bloomberg and Refinitiv (2020)

4.2.4 Autocorrelation and Multicollinearity, all variables

To see if there is autocorrelation in the whole dataset Durbin-Watson were analysed. All variables are reasonably close to 2 and it does not seem to be autocorrelation. This can be seen in table 14 below.

Table 14: Durbin-Watson statistics all variables

```
('Country', ':', 2.02)
('GICS_Sector', ':', 1.99)
('GICS_Industry_Group', ':', 1.98)
('Ref_Tot', ':', 2.05)
('Ref_C', ':', 2.02)
('Ref_E', ':', 2.08)
('Ref_S', ':', 2.02)
('Ref_G', ':', 1.96)
('ROA', ':', 2.02)
('Beta', ':', 1.99)
('Firm_Age', ':', 1.92)
('Total_Sales', ':', 2.07)
('Sales_Growth', ':', 2.09)
('log_sales', ':', 2.08)
('Size', ':', 2.08)
('FinLev', ':', 2.01)
('Tobins_Q', ':', 2.05)
('Log_Tobins_Q', ':', 2.06)
('log_squared_Tobins_Q', ':', 2.06)
```

Source: Bloomberg and Refinitiv (2020)

Multicollinearity were also analysed for all variables with a VIF-test, where the highest variable, Size, has a VIF-value of 3.1 All VIF-values are below 5 and therefore the dataset seems to not have multicollinearity. This can be seen in table 15 below.

Table 15: VIF-Factors all variables

	VIF Factor	features
0	1071.2	Intercept
1	1.9	ROA
2	2.1	log_squared_Tobins_Q
3	1.6	Ref_Tot
4	3.1	Size
5	1.1	Beta
6	1.3	FinLev
7	1.3	Country
8	1.1	Firm_Age
9	2.1	Total_Sales
10	1.0	Sales_Growth
11	1.1	GICS_Sector
12	1.2	GICS_Industry_Group

Source: Refinitiv and Bloomberg (2020)

4.2.5 Correlation between ESG providers and in-depth data

From the regression results the correlation between ESG total Refinitiv and ESG total Bloomberg was 0.64. For the top 20 highest ESG companies for Refinitiv, there were only 40% common sample with Bloomberg. For the bottom 20 companies, there were even lower with only 30% common sample. For the individual ratings, the correlation were highest for the environment variable at 0.66, while the social and governance variables had even lower correlation with 0.54 and 0.25, respectively. The hypothesis that there are no significant correlation between these two providers cannot be rejected from this correlation analysis. There seems to be quite a lot of divergence, especially in the governance ratio and in the top respectively bottom 20 companies of the ratings. These results are all similar to the previous research conducted by (Berg, Koelbel, & Rigobon, 2019; (Chatterji, Durand, Levine, & Touboul, 2014, 2015; LaBella, 2019; Gibson, Krueger, Riand & Schmidt, 2020).

4.3 Regression Models

4.3.1 ESG and financial corporate performance

In the following section the ESG variables are regressed on the financial corporate performance, which means that the independent variable is ROA. In the first columns of the table the ESG total is regressed ROA, followed by the Environmental, Social and Governance variable specifically. For Refinitiv 235 firm specific variables are regressed in a panel study of 12 years with a total of 2585 observations. As data availability is only one year for Bloomberg this is a cross-section WLS regression with 235 firms regressed over 1 year. The control variables are Size, Beta, Finlev, Country, GICS Industry, Firm Age and Log Sales.

4.3.2 Refinitiv and financial corporate performance

In table 16 below is a summary of four fixed effect panel studies with the independent variables ESG, Environment, Social and Governance, respectively.

Table 16: Panel Regression Result: ESG, E, S and G vs ROA for Refinitiv

Variables	ESG	Environment	Social	Governance
Constant	0.2661***	0.2566***	0.2703***	0.2418***
ESG Score	0.0002***	8.923-05***	0.0002***	**2.36e-05**
Size	-0.0142***	-0.0140***	-0.0144***	-0.0131***
BETA	-0.0225***	-0.0222***	-0.0225***	-0.0222***
FINLEV	-0.0752***	-0.0749***	-0.0760***	0.0749***
COUNTRY	0.0009***	0.0010***	0.0009***	0.0010***
GICS Industry	0.0009***	0.0009***	0.0009***	0.0009***
Firm Age	0.0002***	0.0002***	0.0002***	0.0002***
Log Sales	0.0044***	0.0048***	0.0043***	0.0047***
Observations	2585	2585	2585	2585
Firms	235	235	235	235
F-test	84.91	84.29	86.52	83.60
R-square	0.21	0.21	0.21	0.2

*Note: *, ** and *** respectively means*
significant on 90%, 95% and 99% significance level.
Source: Refinitiv (2020)

The total ESG variable has a significant relationship with ROA. Statistically the result says that the ESG score is correlation with ROA with a coefficient of 0.0002 with 99% significance. If the ESG score increases with 1, then the return on asset will increase with 0.02%. The R-square value is 0.21. Economically this means that firms that are more sustainable will also have better firm performance, or more specifically that firms can increase their financial performance by focusing more on sustainability. The regressions for Environment, Social and Governance can tell a more nuanced story about why this is the case. Both the Environmental and Social variable have positive significant relationships with ROA, while the Governance variable does not have this relationship. A focus on variables

specifically that are good for environment and the society increases the performance of the firms, where the focus on society have the highest relationship. On the other hand, it does need to matter for firms to focus on governance, such as shareholder value or CSR strategy to increase the firm performance.

All the control variables are significant on 99% significance level. Size, Beta and Financial leverage all have negative correlation with ROA. Larger companies have worse performance, companies that takes higher both systematic and unsystematic risk do also have worse performance. On the other hand, does Country, Industry, Firm Age, and the logarithm of sales all have positive relationship with firm performance. The country and industry variables are hard to discuss as these are proxies for a lot of different countries and industry. The firm age variable means that the older the company is the better it performs. For every year since the firm were listed on the stock exchange, the company performs 0.02% higher. The Log Sales variable, which is a proxy for capital expenditure, says that every 1% higher sales are the ROA increasing with 0.44%.

4.3.3 Bloomberg and financial corporate performance

In table 16 below is a summary of the ESG and the three categories E, S and G regressed against the independent variable ROA for Bloomberg.

Table 16. WLS Regression Result: ESG, E, S and G vs ROA for Bloomberg

Variables	ESG	Environment	Social	Governance
Constant	2.4067***	2.4216***	2.3578***	2.2031***
ESG Score	0.0019	0.0012	0.0004	**0.0056****
Size	-0.0893***	-0.0890***	-0.0850***	-0.0865***
BETA	-0.1004**	-0.1010**	-0.0992**	-0.0993**
FINLEV	-0.3042***	-0.3012**	-0.03049**	-0.3176***
COUNTRY	0.0056*	0.0056**	0.0055*	0.0052*
GICS Industry	-0.0003	0.0004	0.0005	-0.0001
Firm Age	-0.0005	-0.0005	-0.0005	-0.0008
Log Sales	0.1870	0.0192	0.0190	0.0147
Observations	235	235	235	235
Firms	235	235	235	235
F-test	7.14	7.09	6.95	7.86
R-square	0.20	0.20	0.20	0.22

*Note: *, ** and *** respectively means*
significant on 90%, 95% and 99% significance level.
Source: Bloomberg (2020)

All the ESG scores do have positive relationship with ROA. But the only significant relationship for Bloomberg is for the Governance variable, with 95% significance. Firm performance, ROA, will not increase if a firm increases its sustainability measures. Firms should not focus on sustainability, if they want to do it to have higher profits, or more specific, if they want to have higher return for their assets. As the ESG measure does not tell the whole picture, the sub-categories were looked at specifically as well. That the Governance does have a positive significant coefficient means that an increase in the

governance ratio can increase the ESG rating. A coefficient of 0.0056 means that an increase of the governance ratio with 1 will increase ROA with 0.56%. Economically this means that a company can increase its performance by putting more money/reallocate its resources to increase its governance ratio, but not by increasing its environmental or social variables.

4.3.4 ESG and financial market performance

To further analyze the effect of increased ESG ratings the financial market performance is also analyzed as the second research question. This is done by having the log of Tobin's Q as the independent variable with ESG as dependent variable. Tobin's Q is, as mentioned before, a proxy variable for market performance, calculated as the market cap divided by total assets. That it is transformed, by logging it, means that the results are interpreted as below. If the coefficient for the dependent variable, say ESG, is 0.01, then Tobin's Q increase with 1% in the ESG measure will mean an increase with 0.01% in log Tobin's Q and approximately 1% in Tobin's Q. Just as for financial corporate performance four regressions are run for Refinitiv and four for Bloomberg.

4.3.5 Refinitiv and financial market performance

Table 17. Panel Regression Result: ESG, E, S and G vs Log Tobin's Q for Refinitiv

Variables	ESG	Environment	Social	Governance
Constant	1.7281***	1.6006***	1.7794***	1.5923***
ESG Score	0.0007***	-0.0001	0.0011***	**0.0001**
Size	-0.0474***	-0.0398***	-0.0508***	-0.0422***
BETA	-0.0365***	-0.0346**	-0.0374**	-0.0352**
FINLEV	-0.1635***	-0.1641***	-0.1688***	-0.1634***
COUNTRY	0.0011**	0.0014***	0.0010**	0.0013**
GICS Industry	-0.0008**	-0.0008**	-0.0008	-0.0008**
Firm Age	-0.0010***	-0.0009***	-0.0011***	-0.0009***
ROA	2.8561***	2.8754***	2.8294***	2.8705***
Sales Growth	0.1017***	0.0978***	0.1016**	0.0994***
Observations	2585	2585	2585	2585
Firms	235	235	235	235
F-test	351.45	349.16	358.63	349.14
R-square	0.55	0.55	0.56	0.55

*Note: As Tobin's Q is logged, the result will be interpreted different both statistically and economically. *, ** and *** means significant on 90%, 95% and 99% significance level.*
Source: Refinitiv (2020)

The ESG score and the social score does have positive significant relationship, just as ROA. The Governance variable is once again not significant, as for ROA. Interesting enough does the environmental variable does not have any significant relationship for Tobin's Q, while it did have significant relationship for ROA. Statistically this mean that an increase in ESG score with 1 will lead to an increase in Tobin's Q with 0.07%. An increase in the social variable with 1 will lead to an increase in Tobin's Q with 0.11%.

From an economic point of view a firm can increase its stock value by increasing its ESG rating, and then specifically increase its the social variable of the ESG rating. It both boost the firms' profit, ROA, and the firms stock value, by increasing the social value and then its ESG rating and sustainability. As the Environmental variable is not significant it does not look like the stock market is valuing a higher focus on environmental variables, even if firm performance is increasing with it.

4.3.6 Bloomberg and financial market performance

Table 18. WLS Regression Result: ESG, E, S and G vs Log Tobin's Q for Bloomberg

Variables	ESG	Environment	Social	Governance
Constant	1.7281***	1.6006***	1.7794***	1.5923***
ESG Score	0.0007***	-0.0001	0.0011***	**0.0001**
Size	-0.0474***	-0.0398***	-0.0508***	-0.0422***
BETA	-0.0365***	-0.0346**	-0.0374**	-0.0352**
FINLEV	-0.1635***	-0.1641***	-0.1688***	-0.1634***
COUNTRY	0.0011**	0.0014***	0.0010**	0.0013**
GICS Industry	-0.0008**	-0.0008**	-0.0008	-0.0008**
Firm Age	-0.0010***	-0.0009***	-0.0011***	-0.0009***
ROA	2.8561***	2.8754***	2.8294***	2.8705***
Sales Growth	0.1017***	0.0978***	0.1016**	0.0994***
Observations	2585	2585	2585	2585
Firms	235	235	235	235
F-test	351.45	349.16	358.63	349.14
R-square	0.55	0.55	0.56	0.55

*Note: As Tobin's Q is logged, the result will be interpreted different both statistically and economically. *, ** and *** means significant on 90%, 95% and 99% significance level.*
Source: Bloomberg (2020)

The same results as for ROA can be found in terms of significance. ESG, Environment and Social is not significant, while the governance ratio once again is significant. It seems like neither the market or the firm performs better in regards to most of the ESG ratings. The increase in governance does not "Even out" the non-significance in the Environmental and Social variable. Statistically, the coefficient of the governance variable can be interpreted as that an increase with 1 in the governance variable will lead to an increase of 0.42% in Tobin's Q. Economically, a firm can increase both its stock performance and firm performance by aiming at increasing its sustainability in the governance variable.

5 DISCUSSION

In this study, the first goal was to find out if two different ESG providers, Bloomberg and Refinitiv, diverges in their ESG ratings and specifically in their subcategories, Environment, Societal and Governance. A low correlation would imply that the choice of ESG provider will impact both the result of ESG researches and have implication for managers and investors that are guided by ESG ratings. In many of the previous studies done at this matter, one have yet to find strong correlation (~70%) between different ESG providers and many

studies have not even proven a correlation to be over 50%. This is why it is important to conduct this study. The second goal of this study was to analyse these things that divergence could lead to. More specifically, to find out if a higher ESG rating leads to higher corporate and market performance. Then analyse this with these two different providers but with the same stock universe. The result could then be discussed in many different parts. If the regression between ESG and Tobin's Q would be significant for one provider, but not ROA, this would tell us that investors prefers to invest in companies, but not based on the profit of the firm. If one provider would have significant result, but not the other provider, this will tell us that the result are inconclusive and depends on which provider you are using when you are conducting the study. If all regressions are significant and there are high correlation between providers, it validates previous studies that only uses Tobin's Q and one provider to conduct their studies. Let us discuss and analyse all of these scenarios with the result we now have got from the section above.

5.1 ESG Providers and Correlation

The first research question in this paper was regarding the correlation between the two different ESG providers, Refinitiv and Bloomberg. The hypotheses to test were that there is no significant correlation between the total ESG rating, Environmental rating, Social Rating, and governance rating between Refinitiv and Bloomberg.

In table 14 the results from the correlation analysis of the ESG ratings can be found. The total ESG rating had a correlation of 0.64 between the two different providers. The correlation is a bit higher than (Chatterji, Durand, Levine, & Touboul, 2014) whom found the correlation to be between 0.13 to 0.52, (LaBella, 2019) which found the correlation to be between 0.40 and 0.46 and (Gibson, Krueger, Riand & Schmidt, 2020) who found the correlation to be 0.43. This result is similar to what (Berg, Koelbel, & Rigobon, 2019) found in their study, where the correlation was 0.42 between KLD and Asset4 and 0.73 between Sustainalytics and Vigeo-Eiris This paper therefore further emphasises that there is still not a very high correlation between different ESG providers in 2020. The correlation is not even close to the correlation of 0.99 that are between credit rating providers (Berg, Koelbel, & Rigobon, 2019) and is further proof on that the choice of provider is important when analysing sustainable finance. The hypothesis after is this is logically that the regression results later will not show very similar results because of the great difference between the two providers. The top and bottom 20 companies had high discrepancy between the two providers as well. As Bloomberg has not been used that much in the past, this paper also contributes by showing that Bloomberg also seem to have quite different methodology in their ESG ratings than Refinitiv. It seems like no matter which provider you compare it is very difficult to find a correlation above 0.70. That the ESG correlation is higher than that of most previous studies does give one room to think that the ESG ratings might becoming a little bit more similar than in the past at least. In this study, the two reasons to why ratings diverges is not looked at specific, but (Berg, Koelbel, & Rigobon, 2019) stated that the reason

for divergence is either scope divergence or weight divergence. Scope divergence means that different attributes are used inside the ESG ratings. Weight divergence on the other hand means that the attributes are weighted differently even if the same attributes are used.

As the variable scope is an important part when looking at the correlation for each category. The correlation between the Environmental rating between the two different providers was 0.66, which is the highest correlation in this study. That the environmental variable has the highest correlation is consistent with all the previous studies linked in this paper. (Berg, Koelbel, & Rigobon, 2019) found the correlation to be between 0.55 – 0.74, (Chatterji, Durand, Levine, & Touboul, 2014).) found it to be between 0.05 – 0.40, (LaBella, 2019) found it to be 0.29 in US and 0.31 on global, and finally (Gibson, Krueger, Riand, & Schmidt, 2020) found it to be 0.46. In this paper, it is not analysed why the environmental variable is the one with the highest correlation. But it could be that there is not as much room to change the measurement of the environment variable and that the subcategories from the environmental variable, the variable scope, it relative similar. Looking at table 5 above: Resource use, emission and innovation that were the three main categories for Refinitiv seems not too hard to measure, probably remotely similar between different providers and does not have too much subjectivity. The result from the correlation of the Social rating had a correlation of 0.54. This is similar to (Berg, Koelbel, & Rigobon, 2019) at 0.49, but quite a lot higher than (Chatterji, Durand, Levine & Touboul, 2014) 0.30, (LaBella, 2019) 0.19 and (Gibson, Krueger, Riand, & Schmidt, 2020) 0.39. Looking at table 5: The four categories in the social category was workforce, human rights, community, and product responsibility. It is quite clear that these subcategories are more abstract than the subcategories for the environmental variable. How do one measure Human rights and Community on a completely objective basis. Besides this, both this study and (Berg, Koelbel, & Rigobon, 2019) still had a lot higher correlation than many previous studies. Either it could mean that Bloomberg and Refinitiv after all have some similarities in their ESG methodology for the social category, or/and that the category is converging a bit during the last couple of years.

Finally, the result from the correlation of the Government rating was only 0.25. This correlation is lower than for (Berg, Koelbel, & Rigobon, 2019) (0.38), which is not too surprising. But, what is more surprising is that, even if this is a very low correlation is it even higher than both (Chatterji, Durand, Levine, & Touboul, 2014), (0.02-0.19), (LaBella, 2019) (0.16) and (Gibson, Krueger, Riand, & Schmidt, 2020) (0.19). The main categories that Refinitiv includes For all of these studies there seem to very low correlation between the governance variables. Looking at table 5 the main categories for the governance variable are management, CSR strategy and shareholders. Once again, the abstraction level seem to increase at the same time we are moving between these variables. That the correlation decreases with increased abstraction level is logical. It is possibly much harder to objectively measure CSR strategy, management and shareholders compared to resource use and emission. But this is also why it is so difficult to form ESG strategies or conducting research about ESG ratings when there are these very low correlation, in many studies between 0.20 for one of three important variables that forms ESG. In the future it would probably be

needed to make some comprehensive guidelines how all of these, and specifically the governance information should be handled.

Table 19. Hypotheses and results: Research question 1.

RQ1: How does ESG correlate between two different providers and which part correlates the most?	
Hypothesis based on research question	Bloomberg and Refinitiv correlation coefficient
H_{01}***: No significant correlation between ESG total ratings***	*ESG: 0.64*
H_{02}***: No Significant relationship between E, S and G ratings***	*E: 0.66, S: 0.54, G: 0.25*

Notes: In the second column is the Pearson correlation coefficients between Bloomberg and Refinitiv, where 1 is perfect correlation and 0 is no correlation.
Source: Refinitiv, & Bloomberg (2020)

The correlation of the total ESG rating was found to be similar to previous studies, around 0.64. The correlation between E, S and G were found to be 0.66, 0.54 and 0.25, respectively. The reason for that Environment have so much higher correlation than Governance could party be because the less abstraction of the ratios. The main categories for the environmental variable are Resource use, Emissions, and Innovation. On the other hand, are the main categories for the governance ratio Management, Shareholders and CSR strategy. Management have 35 different categories for Refinitiv, and resource use have 20 different categories. It is not that high stake to suppose that there is bigger discrepancy in comparing 35 categories of management between two providers than 20 categories of resource use. It is also a greater chance that the sub-subcategories are different in the governance sub-category than in the environment sub-category.

5.2 ESG and Corporate Financial Performance

In the first regression of ESG total on ROA, Refinitiv had a positive significant relationship, while Bloomberg had a positive, but not significant relationship. Previous studies, such as (Fernandes, 2019), (Eccles, Ionnou, & Serafeim, 2014), (Zhao et al., 2018) found all that total ESG had positive relationship with ROA. The case that this study did not find any conclusive evidence of this being the case means that the choice of ESG provider seems to matter to the result that you get. As Bloomberg have not been picked in these studies before it is interesting to see that it did not have any significant relationship between ESG and ROA. Because of this inconclusiveness, we cannot draw any significant conclusion about if higher ESG rating will lead to higher ROA. But it does not look like there are any negative relationship as both coefficients were positive.

Table 20: Hypotheses and result: Research question 2a.

RQ2 a) How does the ESG score relate with corporate financial performance and which part of E, S and G have the strongest relation?		
ESG Providers	Refinitiv coefficients	Bloomberg coefficients
H_{03}***: No significant relationship between ESG and ROA***	*0.00002***	*0.0019*
H_{04}***: No significant relationship between E, S and G and ROA***		
• ***Environment and ROA***	*8.92e-05****	*0.0012*
• ***Social and ROA***	*0.0002 ****	*0.0004*
• ***Governance and ROA***	*2.36e-05*	*0.0056 **

Notes: In the second column are the coefficients from the regression of ESG, E, S and G respectively from Refinitiv on ROA. In the third column are the coefficients from the regression from the data taken from Bloomberg.
Source: Refinitiv, & Bloomberg (2020).

5.3 ESG and Corporate Market Performance

For the environmental variable Refinitiv did have positive relationship with ROA, but not with Tobin's Q, while Bloomberg did not have any significant relationship with neither ROA nor Tobin's Q. Because of the insignificant result from Bloomberg, no conclusions can be drawn about the environmental variable either. The low correlation once again back up the underlying hypothesis that the ESG providers have different results. For the social variable Refinitiv had positive significant relationship for both ROA and Tobin's just as for the total ESG rating. Bloomberg had positive, but not significant relationship. There is not possible to draw any conclusions and the low correlation once again backs this up. Finally, for the governance variables, both the Bloomberg variables are positive and significant. Refinitiv does not show any positive relationship for the governance variable.

Table 21: Hypotheses and results: Research question 2b.

RQ2 b) How does the ESG score relate with corporate market performance and which part of E, S and G have the strongest relation?		
ESG providers	Refinitiv coefficients	Bloomberg coefficients
H_{05}***: No significant relationship between ESG and Tobin's Q***	*0.0007**	*0.0012*
H_{06}***: No significant relationship between E, S and G and ROA***		
• ***Environment and Tobin's Q***	*-0.0001*	*0.007*
• ***Social and Tobin's Q***	*0.0011 ****	*0.0005*

Notes: In the second column are the coefficients from the regression of ESG, E, S and G respectively from Refinitiv on Tobin's Q. In the third column are the coefficients from the regression from the data taken from Bloomberg.
Source: Refinitiv, & Bloomberg (2020)

5.4 Final Thoughts

From the first part it was found that there are low correlation between both the ESG rating at a whole. Refinitiv had positive significant relationship for every regression besides social rating vs Tobin's Q and Governance rating vs ROA and Tobin's Q. Bloomberg had only positive significant relationship between Governance rating vs ROA and Tobin's Q. A combined study of these two ratings therefore did not find any significant relationship between either ESG and its subcategories and ROA or ESG and its subcategories and Tobin's Q. To include all of these three parts of the paper was very important as the conclusion from including two parts would be different no matter which of the other parts that was excluded. It is important to highlight that even though there were no significant result it does not mean that ESG measure is not important. While it is difficult to follow the ESG measure, right now, to get indication on if this will lead to higher profitability for a firm or for higher stock performances, it is many other factors that could be positive about high ESG measures.

Once again, high ESG measure will be subjective depending on which ESG provider one is looking at. ESG measure is hopefully not created in the beginning to just give high profit, but to indicate that the firms are doing something that is good for the climate, the society, and the shareholders of the company. Even if this does not generate any profit or increased stock price it can still give a high, non-measurable value to the society in a whole. There is also a very short time-period of 12 years that is measured in this study, compared to how "long" these measures can affect things. Company that invest climate smart and, in the society, now, might rake in profits in 20,30 or 50 years, but not just in the first 12 years of their journey. It is important to stress the importance of converging ESG ratings from providers in the future. If this does not happen it will make it difficult for investors, managers, and companies, to know which goals their companies or investments should have.

5.5 Different Results Based on Studies

My analysis is summarised in the table below. In the first columns is hypothetical studies that could have been done. In the second column is conclusions that would have been drawn if these studies were done in a vacuum. The last of the studies is the study that is conducted in this study. The table highlight how important it is to look at correlations and what discrepancy leads to in terms of results drawn from different researches.

Table 22: Conclusions drawn based on hypothetical studies

Hypothetical study	Conclusions that would be drawn
i) Ref: Tobin's Q	ESG and S seems to have significant relationship with Tobin's Q
ii) Ref: ROA	ESG, E and S seems to have significant relationship with ROA
iii) Ref: Tobin's Q + ROA	ESG and S seems to have significant relationship with Tobin's Q, this is also backed up by the significant relationship with ROA
iv) Bl: Tobin's Q	G seems to have significant relationship with Tobin's Q
v) Bl: ROA	G seems to have significant relationship with ROA
vi) Bl: Tobin's Q + ROA	G seems to have significant relationship with Tobin's Q, and this is backed up by the significant relationship with ROA
vii) Ref + Bl: Tobin's Q + ROA + Correlation study	There are no significant relationship for both Refinitiv and Bloomberg for neither Tobin's Q or ROA, this is backed up by the low correlation shown in the correlation study

i) Ref – Tobin's Q

A study that only would be done on the relationship between ESG, the subcategories and Tobin's Q would find the following conclusion. ESG and the Social ratio seems to have positive significant relationship with Tobin's Q. There looks like stocks with high ESG ratio perform better.

ii) Refinitiv – ROA

ESG, Environmental ratio and social ratio seems to have significant positive relationship with ROA. There looks like companies with high ESG ratio perform better.

iii) Refinitiv – Tobin's Q and ROA

ESG and social ratio seems to have significant positive relationship with both ROA and Tobin's Q. There looks like stocks with high ESG ratio perform ratio and this is backed up by that the firms also perform better with the same stocks.

iv) Bloomberg – Tobin's Q

Governance ratio seems to have significant positive relationship with Tobin's Q. Stocks with high ESG ratio perform better.

v) Bloomberg – Tobin's Q and ROA

Governance ratio seems to have significant positive relationship with ROA. Companies with high ESG ratio perform better.

vi) Bloomberg – Tobin's Q and ROA

Governance ratio seems to have significant positive relationship with ROA and Tobin's Q. It looks like stocks with high Governance ratio performs better and this is backed up with higher ROA.

vii) This study: Bloomberg and Refinitiv – Tobin's Q and ROA

Neither ESG total or any of the subcategories seems to have significant relationship with ROA nor Tobin's Q for both providers of ESG. For every variable that have significant positive relationship between Refinitiv and ROA or Tobin's Q there are no significance for Bloomberg and vice versa.

The correlation in the first part of the paper underpins the importance of not looking at one single ESG provider if one want to analyse the relationship between ESG and firm performance. Because that there are so low correlation this highlights that the result with exactly the same stocks could lead to very different results, which was also the case which we saw later.

Even if one do all the transformations as done in this study to follow the linear assumptions, involves control variables that are relevant and decides to both look at ROA and Tobin's Q this could still lead to misleading results.

It is important to highlight that even though no significant results were find in this study, it could still be other reasons to invest in high ESG rated companies. Even though there were no positive significant result today, it could still lead to these firms to have higher profitability in the future. Besides this, investors that do not look for high profit, but for altruistic behaviour could find other factors to why they are positive about high ESG measures. Finally, it could be that the timeline for this paper is too short to really find the relationship between ESG ratios and performance. Companies that invest climate smart and, in the society, now, might rake in profits in 20,30 or 50 years, but not just in the first 12 years of their journey.

The discrepancy in the ratings between the two providers will still be a problem. As even if the investor or company is investing or changing their behaviour because of altruistic behaviour, there would be good if the ESG providers are not giving their scores very different. An investor might think he is investing altruistic according to one ESG provider while this is not altruistic according to another provider. A company might think that it is doing things that is sustainable, but another ESG provider might not see this as sustainable. A researcher might find result that ESG ratings leads to higher performance, but another researcher do not find these results with another provider. All of these things leads to my recommendations and further research in the conclusion chapter.

CONCLUSION

The purpose of this paper have been to first to find if there are correlation between two different ESG providers, Refinitiv and Bloomberg, while also looking at the subcategories E, S and G. The second part of the paper was to see if ESG ratings affect corporate financial and market performance. More specific, if higher ESG ratings lead to better performance of firms and better market performance. It is important to analyse both firm performance and market performance as increased market performance in isolation could be because of other

factors than increased performance based on ESG ratings. Both of these regressions were also done for the E, S and G variables specific to see if some part of the ESG rating better contributed to higher market and corporate performance.

The methodology of the study was to first do a correlation heatmap of ESG and all the underlying ESG categories between the two ESG providers. After this, the descriptive statistics were looked up with different angels, such as high/low ESG ratings, country specific ESG, industry specific ESG and difference in control variables. The methodology of the second part of the study was to do different regressions for the two ESG providers Refinitiv and Bloomberg, where ROA and Tobin's Q were the dependent variable and ESG together with control variables were the independent variables. The correlation between the two providers were quite low overall, similar to previous studies around 0.2-0.6 for the subcategories and ESG total. The low correlation were also present in the comparison between the top and bottom 20 companies for each provider. There seem to be evidence already here that the two providers are measuring the companies different.

From the regressions, several of the variables were positive and significant for Refinitiv regarding financial performance, ROA, such as ESG total, Environmental and Social variable, while ESG and the Social variable also were positive and significant for market performance, Tobin's Q. But for Bloomberg only the Governance variable were significant. The only conclusive result between the two providers were that the environmental variable were not significantly related to the market performance. It seems to be important to conduct the regressions for two different providers though as the result differ so much between the two providers. It could give an hint for future research about the importance when choosing the provider, and maybe suggest the use of several providers.

Since this study does not show any conclusive result on higher ESG rating and corporate/market performance, there need to be a more robust framework for ESG providers collecting data for the ESG measure in the future. With a more robust framework for ESG providers they have more thing to base their methodology on and the variable scope and measurement scope will no differ as much between different providers. Especially for the governance ratio it looks like it needs a more robust framework. In all previous studies that this paper is based on, including this, governance ratio had a maximum correlation of 0.35 between different providers. At the moment no recommendations can be given to investors or companies about if it is good or bad with a higher ESG score relative to corporate or market performance as no conclusive significant results were found in this paper.

This study have contributed to further research by further analysing how different ESG providers correlates and also linking this regression on financial and market performance. By including the same stock universe for both the correlation analysis and for the regressions it makes it easy to see the result of low correlation between different providers. Previous research have mostly focused on either correlation or the regression analysis but not combined. Hopefully, this gives insight in how important to really investigate the ESG

providers before doing research on financial and market performance that is derived from this.

For further research it would be interesting to include more than two ESG providers if data would be available. For example, do a similar study, but include Refinitiv, Bloomberg, Sustainalytics, RobecoSAM, and see how the regression result differ. Additionally, it would be interesting to see why the governance measure always is the one that correlates the least between different providers, both seen in this study and in previous studies. If it would be possible to go into the sub-sub-categories for different providers, it can give more information about this low correlation than only looking at the sub-categories. It would of course be interesting to see how this looks for other continents or stock universes as well. This study is only done on European stocks, but there would be possible to do similar studies for Asia, North America, South America, Nordic countries, or other geographical regions.

Besides this, I do recommend that further research would be done in giving tips in how to make a common framework for ESG ratings.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

V zadnjih tridesetih letih se je število podjetij, ki se ukvarja s trajnostnim investiranjem hitro povečalo. V tem času se je tudi veliko raziskovalcev in vlagateljev začelo bolj zanimati za to temo. V tej magistrski nalogi je bil analiziran trajnostni finančni ukrep ESG kot celota, ter njegove podkategorije okolje (E), socialna ozaveščenost (S), upravljanje (G).

Ta ukrep je bil najprej analiziran s primerjavo razlik in razhajanj v ocenah ESG za dva velika ponudnika ESG, Bloomberg in Refinitiv, s pomočjo opisne statistike in korelacijske analize.

Poleg tega je bil raziskan tudi odnos med splošno uspešnostjo in uspešnostjo na trgu med obema ponudnikoma. Specifično je bila narejena regresijska analiza z E, S in G kot odvisnimi spremenljivkami v povezavi z ROA in Tobinovim Q.

Rezultati so pokazali, da je povezava med Bloombergom in Refinitivom za skupno vrednost ESG 0,67, za posamezne kategorije E, S in G pa med 0,40 in 0,68. Skladno z literaturo je prišlo do precejšnih razhajanj. Rezultati pri ponudniku Refinitiv so pokazali statistično pomembno pozitivno korelacijo za vse kategorije razen G, tako v primeru ROA, kot tudi v primeru Tobin Q.

Ponudnik Bloomberg pa ima le eno statistično pomembno korelacijo v podkategoriji G, tako za ROA kot tudi za Tobin Q. Iz tega lahko sklepamo, da ni konsistentnega pomembnega odnosa med obema ponudnikoma. Zanimivo bi bilo proučiti korelacijske povezave z uporabo večjega števila bolj raznolikih ponudnikov ESG. Smiselna bi bila tudi natančnejša poglobitev v kategorijo G.

Prav tako bi bilo priporočljivo v prihodnosti analizirati, kako bi se dalo ESG model boljše posplošiti, kar bi pomenilo manjša odstopanja med ponudnikoma, s tem pa bi bili tudi kazalci doslednejši in zanesljivejši.

Appendix 2: Sustainable Accounting Standards Board (SASB) Framework

Sustainable Accounting Standards Board (SASB)

Environment
- GHG Emission
- Air Quality
- Energy Management
- Water & Wastewater Management
- Waste & Hazardous Materials Management
- Ecological Impacts

Social Capital
- Human Rights & Community Relations
- Customer Privacy
- Data Security
- Access & Affordability
- Product Quality & Safety
- Customer Welfare
- Selling Practices & Product Labeling

Leadership & Governance
- Business Ethics
- Competitive Behaviour
- Management of the Legal and Regulatory Environment
- Critical Incident Risk Management
- Systematic Risk Management

Business Model & Innovation
- Product Design & Lifecycle Management
- Business Model Resilience
- Supply Chain Management
- Materials Sourcing & Efficiency
- Physical Impacts of Climate Change

Human Capital
- Labor Practices
- Employee Health & Safety
- Employee Engagement, Diversty & Inclusion

Appendix 3: Refinitiv and Bloomberg, ESG rating per country

Appendix 4: Refinitiv and Bloomberg, Top/Bottom ESG rating per country

	Total(#)	Ref_Top/Tot	Ref_Bot/Tot	Bl_Top/Tot	Bl_Bot/Tot
Austria	5	0.000	0.000	2.350	2.350
Belgium	8	0.000	0.000	1.469	2.938
Czech Republic	1	0.000	0.000	0.000	11.750
Denmark	1	0.000	0.000	0.000	0.000
Finland	3	3.917	0.000	0.000	3.917
France	33	2.136	0.000	1.068	0.000
Germany	25	1.410	0.940	0.940	0.940
Greece	3	0.000	0.000	0.000	0.000
Ireland	5	2.350	2.350	2.350	2.350
Italy	11	2.136	0.000	4.273	0.000
Jersey	2	0.000	5.875	0.000	0.000
Luxembourg	1	0.000	0.000	0.000	11.750
Netherlands	4	0.000	0.000	0.000	0.000
Norway	5	0.000	2.350	0.000	2.350
Portugal	4	0.000	0.000	5.875	0.000
Spain	6	1.958	1.958	3.917	1.958
Sweden	11	1.068	0.000	1.068	0.000
Switzerland	6	0.000	0.000	1.958	1.958
United Kingdom	101	0.582	1.629	0.233	0.931

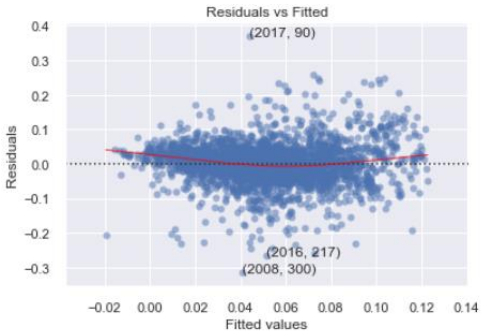
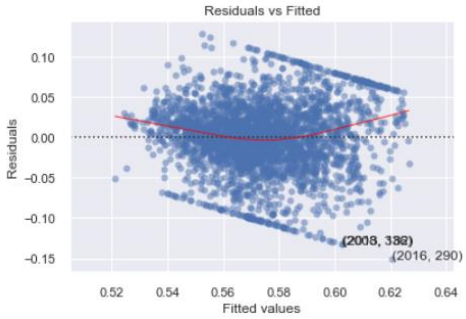
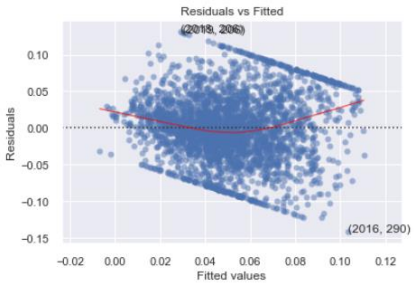
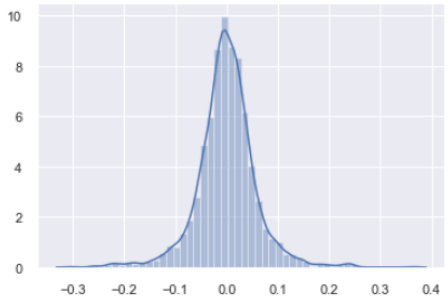
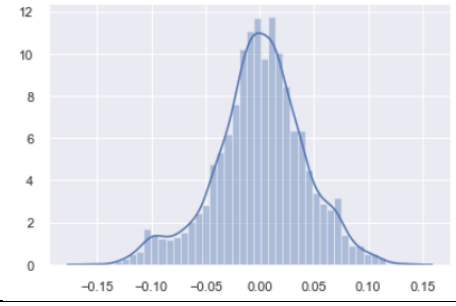
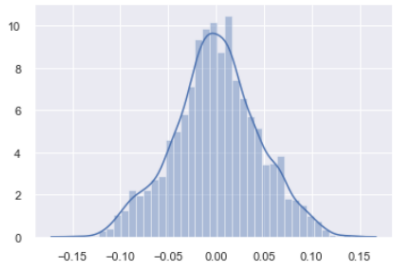
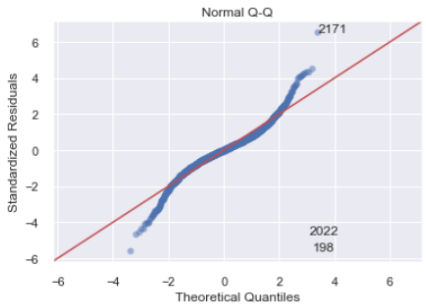
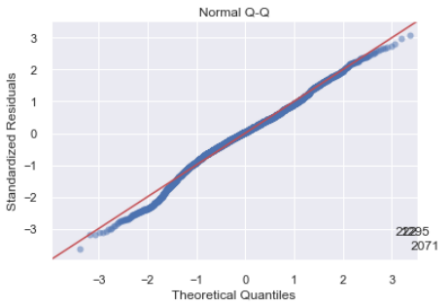
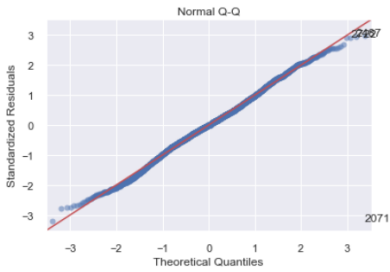
Appendix 5: Refinitiv and Blomberg, ESG rating per industry

GICS_Sector_x	Ref_Mean	Ref_Max	Ref_Min	Bl_Mean	Bl_Max	Bl_Min
Communication Services	60.260	84.275	2.379	57.184	78.219	22.426
Consumer Discretionary	65.559	88.114	24.935	57.200	79.395	36.364
Consumer Staples	70.818	89.734	41.164	64.328	87.697	28.434
Energy	56.830	92.327	14.130	54.758	90.651	26.183
Health Care	70.203	78.923	58.958	64.289	81.173	49.771
Industrials	57.511	83.731	3.573	56.927	94.809	26.670
Information Technology	60.987	79.213	25.035	56.972	84.141	30.814
Materials	70.272	92.177	39.469	72.501	91.253	35.546
Real Estate	56.307	80.707	16.660	57.178	79.395	25.480
Utilities	72.333	90.616	51.574	73.708	96.315	40.880

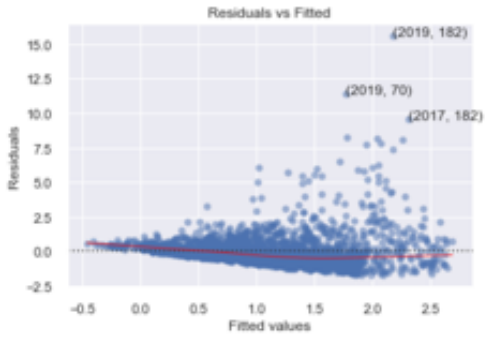
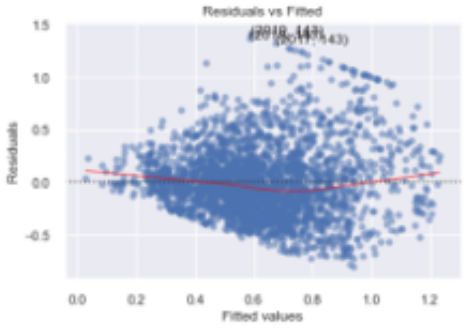
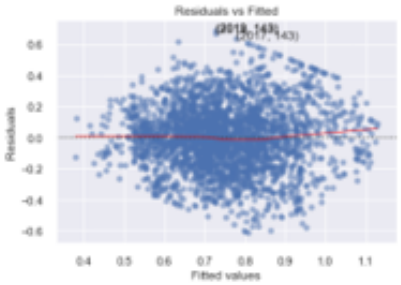
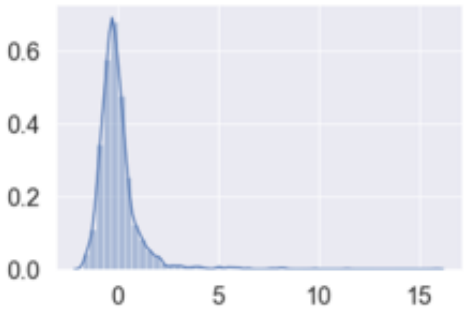
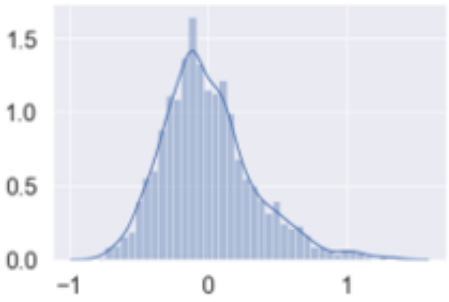
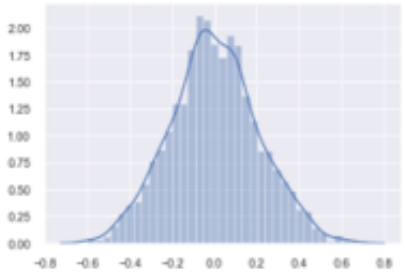
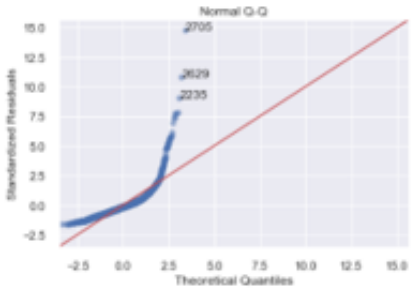
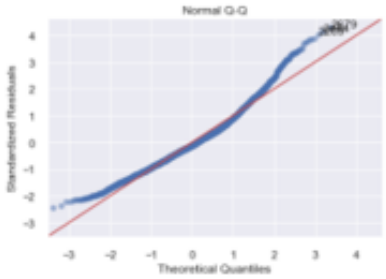
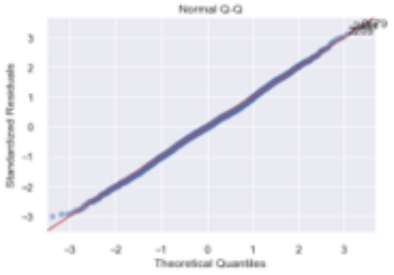
Appendix 6: Refinitiv and Bloomberg, Top/Bottom ESG rating per industry

	Total_c	Total	Ref_Top_Tot	Ref_Bot_Tot	Bl_Top_Tot	Bl_Bot_Tot
Communication Services	23	0.098	1.022	1.533	0.000	1.022
Consumer Discretionary	29	0.123	1.621	0.810	0.000	0.810
Consumer Staples	19	0.081	3.092	0.000	2.474	0.618
Energy	11	0.047	1.068	1.068	1.068	2.136
Health Care	6	0.026	0.000	0.000	0.000	0.000
Industrials	78	0.332	0.151	1.506	0.452	1.205
Information Technology	13	0.055	0.000	0.904	0.904	0.904
Materials	28	0.119	2.098	0.000	2.518	0.420
Real Estate	14	0.060	0.000	2.518	0.000	1.679
Utilities	14	0.060	1.679	0.000	4.196	0.839

Appendix 7: ROA, transformation of variable

ROA		ROA squared+Winsorized	ROA Winsorized
			
			
			
Jarque-Bera p-value	0.0	6.16e-14	0.6234
Shapiro-Wilk p-value	2.82e-30	5.21e-14	0.0000136
D'Agostino p-value	0.0	0.0	0.641
Result	Non-normal	Non-normal	Normal, Non-Normal, Normal

Appendix 8: Tobin's Q, transformation of variable

Tobins Q	Log Tobins Q	Log Squared Tobins Q
		
		
		

Jarque-Bera p-value	0.0	0.0	0.769
Shapiro-Wilk p-value	0.0	2.70e-24	0.09
D'Agostino p-value	0.0	0.0	0.785
Result	Non-normal	Non-normal	Normal

Appendix 9: Tests for homoskedasticity, stationarity and kurtosis and skew

Tests	ROA	Log-Squared-Tobins'Q
Homoskedasticity		
Goldfeld-Quandt	0.749	8e-3
Breusch-Pagan	5.39e-42	7.21e-26
White test	2.60e-55	1.75e-31
Stationarity		
Durbin-Watson	2.04	1.94
Breusch-Godfrey	0.25	0.10
Kurtosis and Skew		
Kurtosis	-0.13	-0.05
Skew	0.42	0.34

Appendix 10: Durbin Watson test, all variables

```
('Country', ':', 2.02)
('GICS_Sector', ':', 1.99)
('GICS_Industry_Group', ':', 1.98)
('Ref_Tot', ':', 2.05)
('Ref_C', ':', 2.02)
('Ref_E', ':', 2.08)
('Ref_S', ':', 2.02)
('Ref_G', ':', 1.96)
('ROA', ':', 2.02)
('Beta', ':', 1.99)
('Firm_Age', ':', 1.92)
('Total_Sales', ':', 2.07)
('Sales_Growth', ':', 2.09)
('log_sales', ':', 2.08)
('Size', ':', 2.08)
('FinLev', ':', 2.01)
('Tobins_Q', ':', 2.05)
('Log_Tobins_Q', ':', 2.06)
('log_squared_Tobins_Q', ':', 2.06)
```

Appendix 11. VIF Factors

	VIF Factor	features
0	1071.2	Intercept
1	1.9	ROA
2	2.1	log_squared_Tobins_Q
3	1.6	Ref_Tot
4	3.1	Size
5	1.1	Beta
6	1.3	FinLev
7	1.3	Country
8	1.1	Firm_Age
9	2.1	Total_Sales
10	1.0	Sales_Growth
11	1.1	GICS_Sector
12	1.2	GICS_Industry_Group

Appendix 12. List of Definitions

Bloomberg – Bloomberg Terminal, provider of ESG ratio

Carhart's four factors – Market Excess return (RM-RF), Small firm excess return (SMB), Growth firm excess return (HML), Momentum factor (WML)

ESG Score – Environmental, Social and Governance factor

Sustainable Finance – Area of finance concerning sustainable processes

Panel Regression – Regression over time and between variables

Refinitiv – Provider of ESG ratio