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Master Thesis

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How does ESG affect the financial performance of oil and gas companies relative to traditional firm characteristics?

- An empirical examination of oil and gas companies in Europe

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Preface

This thesis is the final work of our MSc in Business - Major in Finance at Handelshøyskolen BI in Oslo. It has been exciting for us to find topics for the thesis as we have had several topics that have interested us during our two-year master's program. It was especially the course Energy in a Green Transition that inspired us to write about the topic we finally chose. While working on this thesis, we have encountered several challenges and difficulties, but we fortunately ended up with a result that we are genuinely proud of, and which has taught us a lot along the way.

We would especially like to thank the following persons for their contribution to the completion of this assignment.

Our supervisor, Professor Iván Alfaro, for good advice and inspiration in times where we have faced difficulties. We would also like to thank Professor Costas Xiouros who has always been available when we have faced various challenges.

Without their support, we would not have been able to complete this thesis. We really appreciate their time.

Abstract

This thesis investigates potential indicators of financial performance on European oil and gas companies. With the use of panel data regressions, it seeks to detect potential significant effects of traditional firm characteristics and various ESG subcategories on financial performance. The companies in our sample are observed monthly from January 2011 to March 2021. We find that previous research is conflicting and many of the studies detect low statistical significance between ESG scores and financial performance. In this thesis, financial performance is measured by three different performance indicators; monthly change in market capitalization, return on equity, and return on assets. The traditional firm characteristics we implement in our regressions are firm size, leverage, firm age, and market-to-book ratio. In addition to these characteristics, we include regressions with both overall ESG factors (Environmental, Social, Governance) and ten different subcategories of the overall ESG factors.

The result of our research suggests that commonly used firm characteristics are more significant than ESG scores in relation to financial performance. Firm size has the most substantial positive effect on financial performance, while leverage and firm age has significant negative effects on financial performance. Although we find that overall ESG scores do not have any significant effect on our performance variables, we find that some of the ESG subcategories have some significant effect. This research concludes that the overall effect of ESG scores on financial performance is negative for European oil and gas companies as the Human Rights score is the only subcategory that indicates a weak positive significant effect. It seems that demanding ESG implementations and ESG measures that cause major restructuring may appear to be a trade-off against companies' financial performance, although the trade-off could prove to be positive for future financial performance.

Table of Contents

1.0 INTRODUCTION

In the past decade, the oil and gas industry has faced great opposition and pressure from, among others, the authorities to reduce greenhouse gas (GHG) emissions to achieve the goals of the Paris Agreement (IEA, 2020). The increased focus on ESG and sustainability has led to increased competition and uncertainty for the companies within the field. In May 2021, the IEA released the report Net Zero by 2050: A Roadmap for the Global Energy Sector. The report is a strategy on how we can achieve zero emissions by 2050, and it claims that demand for oil will be reduced by approximately 75 percent. Furthermore, the report states that countries must halt their investment in fossil fuel supply projects and coal power plants that do not use carbon capture storage (CSS) technology, and that no new oil and gas fields will be started after 2021. The report is important in terms of sustainability and climate goals but may be alarming for the future of the oil and gas industry.

This augments the perspective of oil and gas companies, more specifically the increased pressure has seen companies need to shift focus from creating value for its shareholders to all stakeholders. During the chosen period of this thesis, the oil and gas industry has been through volatile times due to falling oil prices and increased focus on environmental, social and governance considerations. The proposed green shift of the industry has seen many of the companies correspond by expanding their vision and focus on their ESG score.

In recent years, it has been noticeable that companies operating in other industries such as renewable energy, tech and biotech have had increased demand and interest. On the Norwegian multilateral trading facility, Euronext Growth, almost NOK 37 billion in venture capital was raised for ESG, tech and biotech companies in 2020. Approximately NOK 5 billion were raised to companies that did not fall under this classification (KPMG, 2021).

In the view of increased ESG pressure and tougher competition, reduced demand, and lower expected oil prices, we want to investigate if there is any significant effect between the ESG performance and the financial performance for companies within the oil and gas industry in Europe. In addition, we will investigate the linkage and potential effects of traditional firm characteristics, namely firm size, leverage, firm age, and market-to-book ratio. The traditional firm characteristics

will act as control variables in our regressions but are also included as we find it interesting to see if these characteristics have less or greater significant effect on financial performance than the different ESG scores which have been a focal point in recent years.

1.1 Research Contribution

Several existing studies have focused on the combined ESG score or certain factors within ESG. This differs from our study where we choose to investigate several of the subcategories of ESG. Secondly, a large proportion of previous studies have focused exclusively on companies in specific countries and whether various firm characteristics or ESG factors have influenced the companies´ economic or financial performance. We have chosen to examine how the different ESG subcategories affect companies within a specific industry rather than focusing on the companies' geographical location or country of listing. Third, several of the ESG studies that have been conducted use panel data from Bloomberg and the KLD database. In addition to Bloomberg, our research will include data from ASSET4 Thomson Reuters which is still relatively little used in this research area. Fourth, previous research on firm characteristics has been done over relatively short periods, usually one to three years, and the observations are usually done annually. With this research, we will collect more observations as we have monthly observations. In addition, we will also be able to see if company characteristics are consistent over time and not just a short-term trend as the research extends over a ten-year period.

Due to the increased focus on environmental and social issues during the past decade, we expect to see a significant effect of ESG performance and firm characteristics on financial performance. The mentioned goals of the Paris Agreement make it crucial for the oil and gas companies to line their focus in accordance with these goals, to create value.

In recent years, investors' perceptions have changed, and more investors have converted towards sustainable responsible investing (SRI) which is getting more common and could be an immediate threat for the oil and gas companies and their traditional business model. Moreover, initiatives such as Climate Action 100+ which is an investor-led initiative that seeks to ensure that the world's largest

GHG emitters take necessary responses to the climate changes the world is undergoing. The initiative now has close to 600 investors engaged in the improvement of the companies' climate change governance, emissions cutting, and the strengthening of climate related financial disclosure. (Climate Action 100+, 2021). Admittedly, such initiatives could accelerate the development of the green energy transition within the industry.

Our research will contribute to the study on ESG and its importance for financial performance and provide a comparison with more commonly used firm characteristics. The implication of our research may be of interest to practitioners, such as investors and managers of listed companies. Our results could support investors in their investment decisions, and managers of listed companies, especially within oil and gas, can be able to form an opinion on how important ESG or factors within ESG are for their financial performance.

1.2 The Green Transition

The green transition that is upon the diverse business environment represents challenges and opportunities. The consensus within the market is that the industries need to address the environmental issues. At the core of these issues is the companies that consume natural resources to create energy. In particular, the oil and gas industry are approaching accelerated demands to address the implications of energy transition for their current business model. Moreover, define how they make contributions to reduce the GHG emissions, to carry out the goals of the Paris Agreement (IEA, 2020). Results obtained in a report conducted by the IEA suggest that the oil and gas industry is central in the transition of the energy sector. Evidence implies that without them, the transition will consume more resources and prove more costly (IEA, 2020).

The late crisis of the covid-19 pandemic has demonstrated how exposed the world economy is to systematic risk. One of which is climate change. In advance of the covid-19 crisis, the pressure was set on the market to make a transition of the energy system from high-carbon to low-carbon sources. As low-carbon sources should play a leading role in the years and decades to come. Moreover, covid-19 has redirected the perspective of the investors towards renewable and sustainable investments. This is to scale down their exposure to climate and environmental

changes. A report conducted by the International Renewable Energy Agency (IRENA), highlighted these post covid changes (IRENA, 2021).

Additionally, an analysis conducted by the Wall Street Journal found that during the first three quarters of 2020, oil and gas companies in Europe and North America devalued their assets by approximately $145 billion. Admittedly, 10 percent of the companies' market values (Eaton & McFarlane, 2020).

Furthermore, the pressure on the major oil and gas players to take actions to a greener future is increasing. The previously mentioned investor-led initiative Climate Action 100+ seeks to ensure that the world's largest emitters respond to climate changes. The investors committed to the initiative have over $54 trillion in assets under their management, which could have a sufficient impact on the companies if they were to be discriminated against by these investors. Among the investors engaged in the initiative are major asset managers like J.P. Morgan, HSBC Global, BlackRock, UBS are among the most prominent on the list. The initiative focuses on the 167 greatest emitters world-wide which are the key players in the transition.

As a result, several oil and gas companies have advanced in the renewable energy space and set net-zero-emissions targets. Regardless of the current challenges and negative economic effects of the covid-19 pandemic, several companies withstand and are making efforts to decarbonize their operations as well as their production to transit to a low-carbon future. Oil and gas companies across Europe are making changes to their business models in accordance with the increasing pressure from its stakeholders. The major players within the industry are monitored on their actions. The previously mentioned initiatives of Climate Action 100+, are categorically evaluating world's greatest emitters` publicly disclosed information against their indicators and sub-indicators. To exploit their performance as well as their alignment with the goals of the initiative (Climate Action 100+, 2021).

Moreover, the issue that has arisen is the one of greenwashing. Companies, often major ones, flag environmental, social and governance initiatives publicly to initiate a false vision of the operations of the company. Even during the last decade of the implementation of ESG, the issue of greenwashing still exists.

Together with the previously mentioned initiatives, there is a growing concern about the company's own ESG reporting and its actual ESG performance. Such a divide could present potential greenwashing as it is a deviation between what the company itself reports and what it implements. Yu et al. (2020) investigated this deviation on large cap firms across the world. Their results suggest that companies engage less in ESG greenwashing in situations where important stakeholders apply greater inquiry on the channel between ESG transparency and the corresponding performance of ESG. Further, greenwashing and the deviation between transparency and performance can be prevented by major and powerful stakeholders (Yu et al., 2020).

This thesis will first and foremost concentrate on the ESG performance of the companies, by looking at the pillar scores of the E, S, G, and their subcategories. Further, it will investigate the relationship between firm characteristics and various ESG categories in relation to financial performance of oil and gas companies in Europe to exploit potential significant effects.

2.0 LITERATURE REVIEW

2.1 Previous Research: Firm characteristics and financial performance

As we seek to explore the effects of firm characteristics on financial performance, the research of Egbunike & Okerekeoti (2018) is relevant. They investigated the relationship between macroeconomic factors, firm characteristics, and financial performance of manufacturing firms in Nigeria. Their research found that firm characteristics such as firm size, leverage and liquidity have significant impact on financial performance This is also consistent with the findings of Balatbat et al (2012). Admittedly, we implement firm size and leverage in our regressions analysis and expect to see significant effects of firm characteristics on the financial performance of the companies in our sample.

Furthermore, Akben-Selcuk (2016) investigated the potential effect of firm age on profitability for companies listed on the Turkish market. Evidently, the study suggested that there is a convex and negative relation between age and profitability of the firms listed on the Borsa Istanbul index. The financial

profitability seems to be higher in the early years of the companies' life cycle before it starts to decline as they mature. The indicators used as metrics for financial performance and profitability was ROA, ROE, and gross profit margin. On the other hand, Sharma et al. (2013) did research on the market-to-book ratio which is an indicator for efficiency and growth and a proxy for risk. Their results suggest that market-to-book ratio can to a great extent explain the success of the management of the company's effectiveness of securing operating performance and growth in the company's net assets. We find this interesting as we implement market-to-book ratio as an indicator or potential driver of financial performance for the oil and gas companies.

2.2 Previous Research: ESG factors and financial performance

Balatbat et al (2012) also found positive relation between size, leverage, and growth on financial performance for companies listed on the Australian Stock exchange. In addition, they investigated the impact of ESG practices on financial performance where they found evidence that in the period between 2008 and 2010 there is a weak positive correlation between financial performance and ESG scores. Interestingly, they found that oil and gas are among the worst performers in terms of ESG scores. This is interesting due to the latter period of 2011-2021 that we seek to provide evidence for. During this latter period, oil and gas companies have shown increased interest in improving their ESG scores. Many oil and gas majors have made a transition to broader energy corporations, and subsequently, improved their ESG scores. Pendley (2017) studied environmental performance for companies that extract oil and gas using fracking technologies. His findings were that smaller companies that specialize in exploration and production performed better than larger international oil companies in terms of environmental performance. As we have size as an independent variable in our research, it is interesting to see if these findings also apply to the companies in our sample, both in terms of financial and environmental performance.

Orazalin, Makarov & Ospanova (2015) conducted a study examining corporate governance practices in the 20 largest Russian oil and gas companies from 2009-2012. The aim of the research was to investigate whether different corporate governance practices can be associated with companies' performance in terms of capital adequacy, asset growth, sales to asset ratio, return on assets, return on

equity, current asset ratio and quick ratio. Their findings were that governance practices such as management ownership and foreign ownership have a positive impact on the companies' performance which is consistent with the results obtained from Germany (Velte, 2017). In South East Asia, the impact of ESG factors on performance is partly consistent with the results obtained in Germany and Russia. Tarmuji & Maelah (2016) investigated the impact of Environmental, Social and Governance (ESG) practices on economic performance for companies in Malaysia and Singapore in the period between 2010-2014. Their findings were that social responsibility practices are predicted to have an impact on the economic performance of companies in Singapore, and that corporate governance practices have a significant impact on the economic performance of Malaysian companies.

Duque-Grisales & Aquilera-Caracuel (2019) investigated financial performance and ESG scores in emerging markets of multinationals in Latin America. The study found a negative relationship between ESG score and financial performance, both combined in an overall ESG score and when divided into the three factors, Environmental, Social and Governance. They also found that Social score was the factor that had the greatest negative effect on financial performance. This research is consistent with the findings of Makni et al (2009) who found that performance was negatively associated with employee corporate social performance (CSP) scores for Canadian companies in the period 2004 to 2005. Employee CSP score is a subcategory of the Social factor of ESG.

An interesting aspect of the ESG factor scores is to see which subcategories have the greatest effect on the various overall ESG scores. Rajesh (2020) investigated the sustainability performances of 39 Indian companies. The findings were that the Thomson Reuters ESG subcategories Resource Use, Innovation and Corporate Social Responsibility (CSR) Strategy emerged to be important indicators contributing to the sustainability performances of Indian firms. On the other hand, Shareholder score, Management score, and Human rights score were found to be less critical in determining the total ESG performance. Velte (2017) carried out a similar analysis of ESG components' effect on the financial performance but on German companies for the period between 2010 and 2014, containing 412 firm observations. Their results suggested that ESG performance has a positive effect

on Return on Assets but not on Tobin's Q. In addition, by examining the parts of ESG, they found that governance has the strongest impact on financial performance relative to environmental- and social performance. The German market offers a similar market to our sample of companies, obviously geographically but also the fact that the German economy is heavily industrialized. Furthermore, the German economy relies heavily on imported fossil fuels, specifically 63.6% net imports (Wettengel, 2020).

In terms of subcategories, Campbell & Minguez-Vera (2008) studied the effect of another subcategory of the social factor, workforce, and diversity, on companies' financial performance. Their research was conducted on Spanish companies and their findings were that companies that have a gender-diversified board and improve their general gender diversification will experience a positive effect of this financially. Fabius et al (2016) also did research where they studied listed companies' scores in corporate health and wellness and its relationship to financial performance. Their finding was that companies that invest in workforce health and employee's well-being often are associated with strong performance and effective leadership. This is consistent with Martinez-Ferrero & Frias-Aceituno (2015) who found a positive correlation between financial performance and Human Rights score. They also found that higher levels of financial performance generate higher CSR practices such as Human Rights. Lastly, Brammer, Brooks, and Pavelin (2006) examined the relationship between CSR and stock returns for the United Kingdom. They find that CSR scores, on an aggregate indicator of CSR, are negatively correlated with stock returns, and that a portfolio of the stocks with the least social scores yield significant abnormal returns.

2.3 Expected findings based on previous research

Based on previous research we expect size, leverage, and market-to-book ratio to have a positive significant effect with financial performance. We also believe that firm age will have a negative effect on the companies´ performance. In terms of ESG factor scores and their effect on financial performance, previous findings are ambiguous. We still expect to see a significant positive effect of ESG scores as the results of research done in comparable geographies and industries have found positive correlations between ESG scores and different performance metrics. We

also expect to see positive development in ESG scores in the oil and gas industry as the attention and awareness around the subject has increased significantly during the observed period. Moreover, during the period of our sample, oil and gas companies have flagged a willingness to transit from pure oil and gas companies to broader energy corporations, which we expect to have a positive effect on the ESG scores of the companies, especially the Environmental factor.

3.0 THEORY

The implementation of ESG could be connected to two of the most renowned theories on businesses and companies, and how they should operate. It is the shareholder theory and the stakeholder theory which is a response to one another. They contradict with one another conceptually. Further, we will introduce the main topic behind the theories and discuss how it relates to our research topic.

3.1 Shareholder Theory

The social economist Milton Friedman introduced the theory called Shareholder Theory which states that "The Social Responsibility of a Business is to Increase its Profits" (Friedman, 1970). Conceptually, it states that the businesses should only focus on value creation for its shareholders and should not engage in outside activities to please other stakeholders than their owners. The shareholders of the company should be rewarded by the companies through value creation and profits, next it should be up to the shareholders choice to decide what to use these profits on.

According to the theory, oil and gas companies should stick to their core business model and engage in activities that create value and increase the profitability of the company – to satisfy its shareholders. In the modern corporate landscape numerous oil and gas companies are making transitions to broader energy companies. One can argue that this strategic choice has been highly profitable for many of the shareholders of the company as green tech and energy companies have yielded great returns for their shareholders. The returns of the major oil and gas companies have been heavily disrupted by the increasing pressure of making a divestment in oil and gas exploration, as well as other GHG emitting activities. Consequently, oil and gas companies have lagged the S&P 500 during the last 15 years, and McKinsey amounts it to be seven percentage points on average (Beck

et al., 2021). An energy transition and change of business model contradicts with the shareholder theory in terms of the strategic changes, but at the same time it matches the theory in terms of the result of the transition. Admittedly, it can return a great profit for the shareholders of the company, and thus create value.

3.2 Stakeholder theory

The stakeholder theory was introduced by R. Edward Freeman in 1984 as a model to identify the stakeholders that hold an interest in the company. It came as a counter to the Shareholder theory introduced by Milton Friedman (1962), and stated that a company should be concerned about all its stakeholders and not only its shareholders. Among the stakeholders are the creditors, customers, employees, country, community, managers, and owners (Freeman, 1962). Satisfying the stakeholders is viewed as being crucial for companies to achieve financial performance. Freeman stated that companies are dependent on prioritizing many stakeholders at the same time to gain high company performance. Moreover, it is important to keep the level of satisfaction of the majority of the stakeholders stable (Freeman, 1990).

The issue of stakeholder theory can be transferred to the research question of this thesis as the ESG scores could be seen as a measure of stakeholder satisfaction. Oil and gas companies are under great pressure from many stakeholders. In particular, because of the environmental issues surrounding their operation and business model. The companies are among the greatest emitters of GHG and a critical part of climate changes. Furthermore, the covid-19 pandemic and the subsequent economic impact, and increased focus on social aspects displays the great expectations of the community towards companies. Moreover, there is an increased pressure on the management of the companies as they need to address the social and environmental issues connected with their business model, and stretch their vision beyond it (Kay, 2020).

4.0 METHODOLOGY

To find an answer to which characteristics of European oil and gas companies have influenced their performance over the last decade, we have had to find a suitable model. In this section of the thesis, we will explain our data and go

through the reason for selecting the models used. Lastly, we will discuss possible weaknesses with our model and the procedure used to obtain the results. All the regressions in this thesis are generated using the statistical software RStudio, and the regressions significant levels are interpreted as:

$$*p < 0.1 \qquad **p>0.05 \qquad ***p>0.01$$

4.1 Panel Data

Our dataset consists of 56 companies, listed in 18 different exchanges in Europe (Appendix 1). The companies have been observed monthly from 31st of January to 31st of March 2021. As we want to observe characteristics of companies over time, we have both time series and cross-sectional elements, also known as a panel of data. The reason why we prefer panel data when trying to answer our research question is that we can check for unobservable variables across companies and years, given that our model is accurate (Stock & Watson, 2015). The model is therefore beneficial for our research as our dataset is unbalanced due to lack of data for some cross-sectional elements. When we chose the companies to include in our dataset, we used the Bloomberg terminal and filtered the companies based on geography (Europe) and industry (Oil & Gas Producers, Oil & Gas Services & Equipment). After this, we had to see which companies had data from 2011 to 2021. Companies that were established/listed after 2011, went bankrupt, or for other reasons lacked data, during the period were excluded. The filtering of companies eventually made us end up with 56 companies. Although the number of companies is relatively low, with panel data we can observe the companies several times, which increases the number of degrees of freedom, and thus the power of the test (Brooks, 2014).

4.2 Panel Model

There is great variation in the methodology used in studies that assess firm characteristics and their effect on performance. The most common panel data models are Pooled OLS (POLS), Fixed Effects Model (Fe) and Random Effects Model (Re). Breuer & Nau (2014) and Velte (2017) have in their research used Fe, while Zhao et al. (2018) used Re after both Fe and Re were tested with the Hausman test. We have also chosen to use the Hausman test to determine which model we are going to use.

4.2.1 Pooled OLS

We could have chosen to do the estimation as a POLS, but by pooling the data, we would implicitly assume that the average value of the various variables and the relationship between them has been constant over the last decade (Brooks, 2014). Considering how much has changed and developed in the oil and gas industry (Williams-Derry & Smith, 2021), we find POLS as an illogical way to capture characteristics that have affected the companies' performance. Hence, we want to include Fe and Re to avoid these limitations that POLS will have on our results and their reliability. The regression equations for POLS on performance is shown below. Performance consists of the dependent variables Monthly MCAP Performance, ROE and ROA.

$$
\begin{aligned}
Performance = {} & \beta_1 + \beta_2 MBR_{it} + \beta_3 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 Resource_{it} \\
& + \beta_6 Innovation_{it} + \beta_7 Workforce_{it} + \beta_8 HumanRights_{it} + \beta_9 Community_{it} \\
& + \beta_{10} ProductRes_{it} + \beta_{11} Management_{it} + \beta_{12} Shareholders_{it} \\
& + \beta_{13} CSR.Strategy_{it} + \beta_{14} Emission_{it} + u_{it}
\end{aligned}
$$

$$
where\ i = 1, \ldots, 56\ and\ t = 01.2011, 02.2011, \ldots, 03.2021
$$

4.2.2 Fixed Effects and Random Effects

Both Fe and Re are methods that are applicable for tackling research questions with complex structures such as panel data and time-series cross-sectional data where measurement occasions are linked within entities (Beck, 2007). The Fe-estimator looks within the individual units and the effect the various independent variables have on the dependent variable. In other words, this estimation method more plausible identifies the effect different independent variables have on the dependent variables rather than confounding the effect of one independent variable with other independent variables that could be associated with it. The way Fe is estimated is with the within-group fixed effects method. This is done by demeaning the dependent and independent variables within each unit or group. The regression equation for the Fe model is as follows, where a_i used as an explanatory variable to indicate the individual effect of the model (Brooks, 2014; Collischon & Eberl, 2020; Wooldridge, 2012).

$$Performance = a_i + \beta_1 MBR_{it} + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 Resource_{it} + \beta_6 Innovation_{it} + \beta_7 Workforce_{it} + \beta_8 HumanRights_{it} + \beta_9 Community_{it} + \beta_{10} ProductRes_{it} + \beta_{11} Management_{it} + \beta_{12} Shareholders_{it} + \beta_{13} CSR.Strategy_{it} + \beta_{14} Emission_{it} + u_{it}$$

$$where\ i = 1, \ldots, 56;\ \ t = 01.2011, 02.2011, \ldots, 03.2021$$

The opposite of Fe is Re where the variables are random and unpredictable as opposed to time invariant variables as seen in the Fe. In the Fe, random variables are treated like they were non-random or fixed. For example, in regression analysis Fe regression fixes or holds constant average effects for whatever variable we might think affects the outcome of our analysis. Re takes individual effects into account and uses one intercept per entity (W_{ij}) . In contrast to Fe where a_i used as an explanatory variable to indicate individual effects, the Re divides the random error term into two parts. One part is the error term U_i that does not change over time, and the other part is the error term u_{it}which changes over time (Bell et al, 2018; Brooks, 2014; Zhao et al, 2018). The regression equation can be written as follows:

$$Performance = \beta_1 MBR_{it} + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 Age_{it} + \beta_5 Resource_{it} + \beta_6 Innovation_{it} + \beta_7 Workforce_{it} + \beta_8 HumanRights_{it} + \beta_9 Community_{it} + \beta_{10} ProductRes_{it} + \beta_{11} Management_{it} + \beta_{12} Shareholders_{it} + \beta_{13} CSR.Strategy_{it} + \beta_{14} Emission_{it} + U_i + W_{ij} + u_{it}$$

$$where\ i = 1, \ldots, 56;\ \ t = 01.2011, 02.2011, \ldots, 03.2021$$

4.2.3 Hausman Test

The model specification test proposed by Hausman (1978) is often used in testing between fixed or random individual effects in the panel data literature. By utilizing this test, we can obtain a formal statistical assessment of whether the observed individual effects correlate with the conditioning regressors in the model. If we cannot reject the exogeneity of unobserved individual effects, this provides evidence in favor of the Re model. If we can reject the assumption of exogeneity, this provides support for the Fe model (Amini et al., 2012). The model used for the different regressions is reviewed in section 6.1.

4.3. Reliability

This section will briefly summarize how we ensure validity for our regressions, what may affect our results, and how the results should be interpreted.

4.3.1 Multicollinearity and Autocorrelation

Multicollinearity is the degree of linear relationship between independent variables in a multiple regression model. Multicollinearity can be a problem as it undermines the statistical significance of an independent variable (Allen, 1997). If the independent variables have a correlation above 0.8, we have a severe multicollinearity problem in our regression (Kennedy, 1985; Kim, 2019). To detect multicollinearity, we constructed correlation matrices in which we replaced independent variables with high correlations to avoid multicollinearity problems. Our correlation matrices indicate that there is no reason to suspect multicollinearity between the variables used in this model. We will review the correlation matrices in more detail in the data description section, 5.2.4.

Autocorrelation is where the error term in a time series correlates from one period to the next. The presence of autocorrelation among the residuals can have several negative effects such as ineffective coefficients, underestimated standard error and express significance when there are none (Hintze, n.d.). In our model, we correct for autocorrelation and heteroskedasticity using the robust covariance estimator White-Arellano which is further described by Millo (2017, p. 6-8).

4.3.2 Omitted Variable and Selection Bias

Omitted Variable Bias is a type of bias that occurs in regression analysis when we do not include the right controls. By leaving out essential variables we are omitting variables that could bias our results and lead other variables that are included to be more impactful than they really are (Brooks, 2014; Wooldridge, 2012). In this research, we have chosen to exclude industry variables that could have been included as e.g., dummy variables. The reason industry was excluded was because we did not find sufficient data for it. Through the Bloomberg terminal, we can obtain data on which industry the companies have their revenues from, but the data only reflects the current industry they take part in. Which industry the companies have had their revenues from during the past decade may have changed significantly, and we therefore believe it is wrong to include this as

we cannot ensure that the company has operated within a specific industry throughout the period that it is being observed.

Selection Bias is when there is bias in the OLS estimator due to endogenous sample selection (Wooldridge, 2012). In other words, this error can occur when the entities in the data sample do not represent the entire population of which they are a part. If this bias is not considered, conclusions and results from the regression may be biased. Selection bias can be a problem in our research due to lack of data. Initially, we collected data from all listed oil and gas companies in Europe, but after we included our variables, we discovered missing data for several of the companies in the initial sample. For this reason, we had to exclude several companies, which may mean that our research will not be representative for all European listed oil companies, but only for the 56 companies included in the final sample.

5.0 DATA DESCRIPTION

5.1 Variable description

In this section we will go through the chosen variables of our analysis. First, we describe the dependent variables which are the financial performance indicators. Secondly, we go through the firm characteristics we seek to implement. Finally, we describe the independent variables namely ESG subcategories. The chosen variables are implemented to support the regression analysis we perform to detect potential links between ESG performance and financial performance, and other potential drivers.

5.1.1 Financial performance – Dependent variables

The objective of this thesis is to see if the green transition and increased focus on ESG score has had an impact on the oil and gas industry. We will try to detect significant effects of ESG on the financial performance of the companies in our sample. Moreover, we will compare the potential effect of ESG relative to the traditional firm characteristics of similar analysis.

To measure the financial performance of the firm to the shareholders we implement the monthly returns of the market capitalization (MCAP). MCAP

represents the most recent market value of the firm's outstanding shares. To capture the performance and development, we look at the monthly change in MCAP. Change in monthly MCAP is measured using the following formula:

$$Monthly\ MCAP\ performance = \frac{MCAP_{t+1}}{MCAP_t} - 1$$

To get a nuanced picture of the financial performance of the companies, we apply two accounting-based estimates. Accounting based methods capture a companies' internal efficiency. Moreover, accounting measures are contingent on the companies' allotment of funds to its activities. Internal decisions and accounting based measures will reflect the internal and managerial performance of the company, without being biased and influenced by the responses of the market (Orlitzky et al., 2003).

First, we implement Return on Equity (ROE) in our regression. It is perceived as one of the most important ratios, as it seeks to offer the result of structured financial ratio analysis – Du Pont (Stowe et al., 2002). The ratio is also retrieved from Thomson Reuters Eikon. The calculation of the ratio is performed in the following way:

$$ROE = \frac{Net\ Income}{Average\ Shareholders' Equity}$$

Next, we apply Return on Assets (ROA) as the ratio reflects the internal efficiency from the management's decisions and how well they allocate the company's assets. Along with ROE, it is the one of the commonly used measures of overall corporate financial performance. The ratio is retrieved from Thomson Reuters Eikon database and is estimated using the following formula:

$$ROA = \frac{Net\ income\ before\ preferred\ Dividends + ((Interest\ Expense\ on\ Debt - Interest\ Capitalized) * (1 - Tax\ Rate)))}{Average\ total\ assets\ t\ and\ t-1}$$

5.1.2 Firm characteristics

To support our regression, we implement a set of firm characteristics. We implement market-to-book ratio, firm size, leverage (debt-to-equity), and age. Indeed, these sets of variables are included to augment and boost the validity of our regression analysis (Bhandari, 2021). Moreover, we seek to uncover the effect

of these traditional firm characteristics on financial performance relative to the ones of ESG subcategories.

Market-to-book ratio is the market capitalization of the firm divided by the total asset value (CFI, 2021). The market-to-book ratio has been used as proximity for Tobin´s q. Which is a frequently applied measure for firm value during the past decades. However, the ratios have been used both as a proxy for growth and efficiency, and as a measure for risk (Sharma et al., 2013). The results of Sharma et al. (2013) suggest that the market-to-book ratio reflects the potential success of the managers of the company, in delivering operating performance and a growth in the net assets of the company.

Firm size is the logarithm of total assets which we also retrieve from Thomson Reuters Eikon database. The study conducted by Fama & French (1993), found evidence that the earnings of smaller firms tend to be greater relative to the ones of larger firms. Subsequently, indicates that there is a negative relationship between firm size and the ROA, although larger firms retain a greater market power (Fama & French, 1993). In our thesis, where we focus on oil and gas companies across Europe, because of the limitations of this thesis, we will not be able to distinguish between the major oil suppliers, the service companies and other companies connected with the industry. Admittedly, the major oil and gas companies hold a greater market power and potentially economies of scale relative to the smaller cap firms of the industry (Penrose, 1959). Furthermore, there is a tendency that larger firms disclose more information on environmental, social and governance relative to the smaller cap firms (Cho et al., 2010; Drempetic et al., 2020). Balatbat et al. (2012) anticipated a positive relationship between size and company performance which is in contrast with the one of Fama & French (1993).

To capture the amount of leverage and risk of the companies, we implemented the debt-to-equity ratio in our regression. The debt-to-equity ratio is retrieved from the Thomson Reuters Eikon database and is estimated by dividing the total liabilities of the company on the shareholders' equity. Evidence suggests that during the mid 2000s, the oil and gas companies reduced their debt-to-equity ratio in effect of rising oil prices during the period. The consequence of increasing oil

prices has seen the companies' profit margins raising (Cheung, 2019). In the subsequent period the economic downfall of the financial crisis and the later crack in the oil prices saw the margins and cash flows of the companies diminish. This caused the oil and gas companies to adapt to the new environment and change to debt financing to finance their operations. As a result, the Debt-to-Equity ratio of the companies started rising. It went from 0.2-0.6 in 2008 to 0.5-0.9 in 2018 (Cheung, 2019).

We seek to implement age as variable in our regression to see if the age of the companies within our data has a significant impact on its performance. Earlier studies have found results that suggest that as companies mature, the profitability and performance declines (Akben-Selcuk, 2016). The paper concludes that it is a convex relationship between age and profitability e.g., a young firm's financial performance may decline during the first years but might increase as it gets older (Akben-Selcuk, 2016). We believe that this might be the case of the oil and gas industry as we have seen many new listings during the later years of the decade that has had an immense growth, but slowly starts to decrease as it matures.

5.1.3 Thomson Reuters ESG Scores – Independent variable

There is a great variety of rating agencies that rate the ESG performance of companies and industries. KLD, MSCI's, EIRIS, Fitch, Moody's and S&P are examples of such agencies. Through the variety of rating firms and the fact that there is no regulated method of measuring the ESG score, it is challenging to choose the right one. Indeed, this issue is one of the main criticisms of the agencies and application of the score (David, 2019).

The Thomson Reuters rating offers the most comprehensive database of ESG ratings. As they are clear about their methodology and arguably the most transparent. Which as mentioned above, is one of the main criticisms and drawbacks of several ESG rating agencies.

In this thesis we choose to examine the subcategories of the ESG ratio separately. Admittedly, it could exploit a more distinct and precise relationship to the dependent variables.

A study carried out by MSCI found that governance steadily showed more significance in financial terms in shorter periods than in the longer run (Umpierrez, 2020). Nevertheless, the pressure surrounding climate change has shed an even greater importance on ESG. Which could result in more companies redirecting their focus to develop their environmental (E)- and social factor (S) (Umpierrez, 2020). Through running the regressions solely on E, S and G as the independent variables, we got no significant results. Therefore, we decomposed the E, S and G into the subcategories of the score. Namely,

E: Resource use, Innovation, Emission
S: Workforce, Human Rights, Community, Product Responsibility,
G: Management, Shareholders, and CSR strategy (Thomson Reuters, 2017).

The definitions of the different subcategories are listed in Appendix 2. The thesis attempts to find a significant relationship between each part of the ESG scores and the financial performance of the oil and gas companies across Europe.

5.2 Descriptive Statistics

5.2.1 Observation

Our data consists of monthly observations from 31st of January 2011 to the 31st of March 2021. The 56 companies in our dataset were initially observed a total of 6,888 times over the period. After cleaning our dataset and removing months where data was missing, we ended up with a total of 5,460 observations. The dataset has some mixed frequency variables where some change from month to month while others change quarterly or annually. The common approach to mixed frequency data in previous empirical literature has been to aggregate the data to the lowest possible frequency data. We therefore did the regressions with an annual approach without this changing any of the results we obtained by the monthly- or mixed frequency approach. Foroni & Marcellino (2014) conducted a study on mixed frequency data and found that aggregating the data to the lowest possible frequency is ineffective and may distort the identification of structured shocks and their propagation mechanism. Hence, we follow their research and use monthly observations with mixed frequency data.

As mentioned in the previous section, we did our regressions with the same dependent variables and the following independent variables (MBR, Size, Leverage, Age) in all our regressions, however, some of the independent variables were changed. The first regressions we ran had overall Environment (E), Governance (G) and Social (S) scores instead of being filtered within more specific segments of the ESG factors. In these regressions we have a total of 5,403 observations during the same period (January 2011 - March 2021). We will later in the thesis go in more detail through the results from the regressions containing the overall E, S and G scores versus the regressions containing more specific ESG segments (Table 1).

5.2.2. Variable Means

To get an overall overview of how the performance variables have behaved on average throughout the period, we have summarized them visually in graphs. This is also to ensure that the data we have is reasonable and reliable. After this, we will briefly comment on the general development European oil and gas companies have had within the ESG factors the past decade.

5.2.2.1 Monthly Performance (MCAP) Average

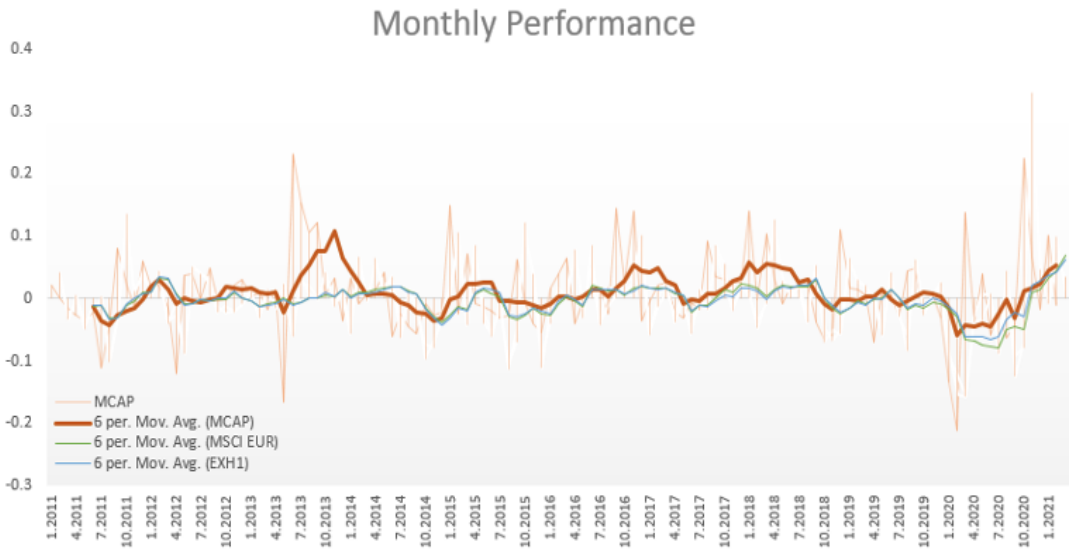

Figure 1: Average monthly performance for observed companies (MCAP) compared to oil and gas industry indices

The average monthly MCAP performance has been relatively volatile throughout the sample period and for this reason we have included a 6-month moving average (MA) to better show the trend and the direction the industry has had. The MA shows no clear trend in the performance and the industry appears to have been in a

consolidation phase for much of the period. The data we have obtained for monthly performance seems reliable when we compare it with other indices such as MSCI Europe Energy Index (MSCI EUR) and iShares STOXX Europe 600 Oil & Gas UCITS ETF (EXH1). Both indices are created to provide exposure to European oil and gas companies and have had similar returns as the averages in our sample. The average monthly return for performance in our sample was 0.05% while it was -0.15% and -0.60% for MSCI EUR and EXH1, respectively. The monthly performance in our sample is somewhat more volatile than the indices, which may be due to the indices including more companies than we do in our sample.

5.2.2.2 Return on Equity Average

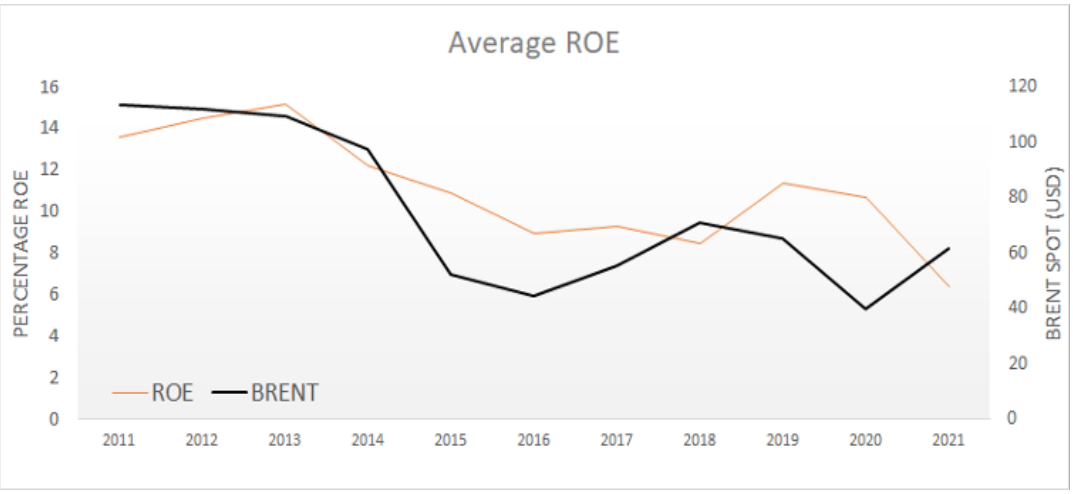

Figure 2: Average return on equity for observed companies compared to BRENT spot price

As can be seen from the graph, the average ROE in our sample has fallen by approximately 50% from 2011 to March 2021. In 2011, the average ROE was approximately 13.6% while in 2021 it was approximately 6.4%. The significant decrease in ROE may be affected by several factors, but we can see that the movement in ROE has been relatively similar to the price change in the Brent crude oil over the same period. We find this reasonable as several of the companies in our sample are exposed to this commodity. Previous research has also found that ROE for oil and gas companies, especially in Europe, is positively significantly affected by crude oil prices (Dayanandan & Donker, 2011; Bagirov & Mateus, 2019; Hussain Shah & Siddiqui, 2020; Whattanatorn & Kanchanapoom, 2012).

5.2.2.3 Return on Assets Average

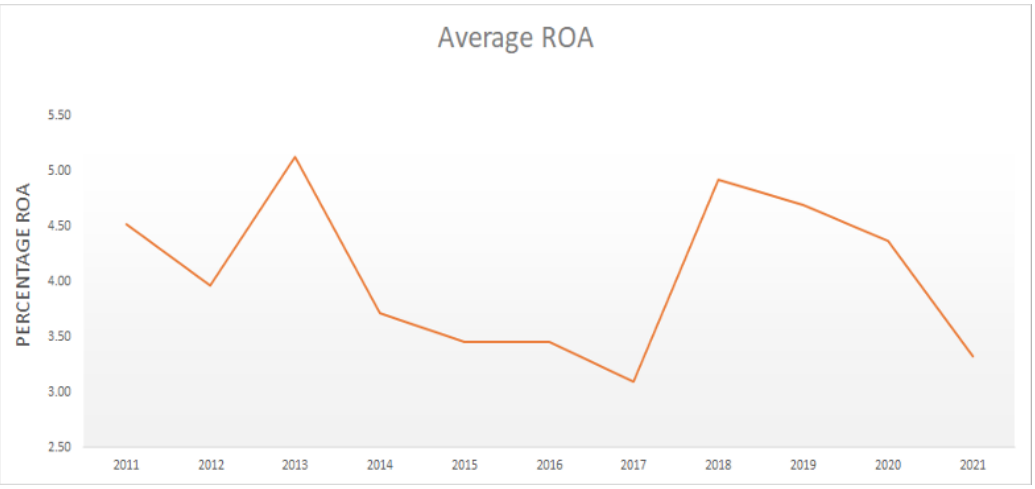

Figure 3: Average return on assets for observed companies

Average ROA has followed a similar pattern as ROE. ROA for oil and gas companies has in previous research been found to be positively significantly affected by oil prices which may be a part of the reason for the similar pattern (Shah & Siddiqui, 2020; Wattanatorn & Kanachanapoom, 2012). Our correlation matrix showed that ROE and ROA have correlation of 0.78, hence the similar movements are as expected. What is unexpected is the significant increase in average ROA from 2017 to 2018 of almost 60%. The reason for the increase is uncertain, but it could be due to low production costs per barrel and increased production levels. EIA states that, despite lower oil prices, 2018 was likely the most profitable year for US oil producers since 2013. Due to lower costs and increased production this contributed to higher returns in the fourth quarter of 2018 than in any other quarters from 2013 to 2018 (Barron, 2019).

5.2.2.4 Developments within ESG

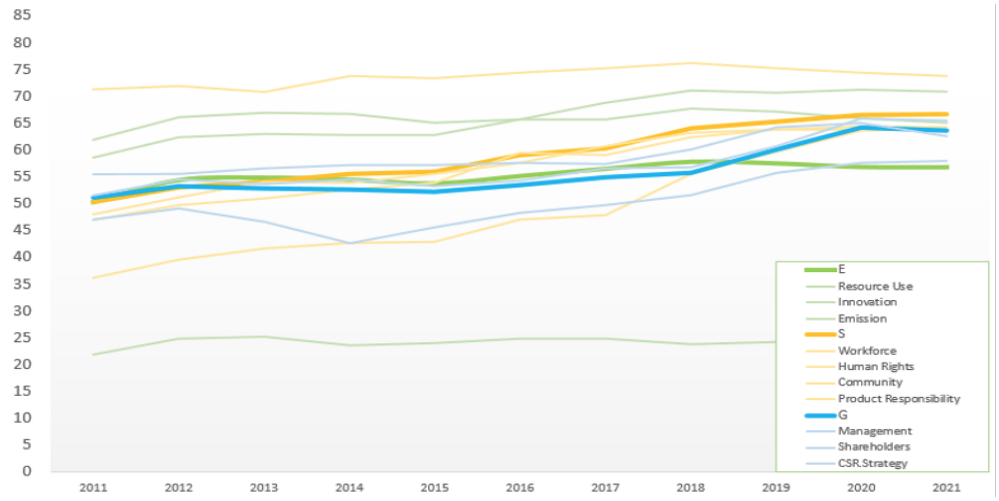

Figure 4: Average scores for main ESG factors and factor subcategories for observed companies

The oil companies in our sample have on average had a steady increase in all the three ESG factors. Social has had the largest increase of 32.63% closely followed by Governance with 24.60% increase. The Environmental score has improved by 14.53% since 2011 and lags the two other factors. It may seem that this is due to the lower scores achieved in the Innovation subcategory as the two other Environment subcategories have relatively high scores. The fact that European oil companies scored worst in the Environmental factor is not surprising, but that they did not have any improvement within Innovation was unexpected considering how much attention that has been directed towards innovation in recent years (EY, 2020; Ibrahimov, 2018; Perssons, 2014). In a survey conducted by IBM they find that only four out of ten oil and gas executives are executing an innovation strategy. Only 39% say that innovation is important for their organization's success today, however, 82% of the respondents believed that innovation will be essential in the next coming three years (Evensen et al, 2020). In other words, the innovation focus is evident, but the execution lacks which is also reflected in the Innovation score in our sample.

5.2.3 Descriptive Statistics

Statistic	N	Mean	St.Dev.	Min	Max
PRF %	5,460	0.005	0.178	-0.770	9.010
ROE %	5,460	12.878	15.063	-85.700	86.330
ROA %	5,460	5.058	6.178	-43.820	30.670
MBR	5,460	1.794	2.079	-4.130	37.490
Size*	5,460	24.064	2.485	18.000	31.000
Leverage %	5,460	76.924	78.038	0.000	569.890
Age	5,460	55.052	38.504	7.000	199.000
Resource	5,460	67.974	24.216	0.000	99.769
Innovation	5,460	27.740	31.066	0.000	89.847
Workforce	5,460	76.234	20.970	2.895	99.814
Human.Rights	5,460	53.982	34.918	0.000	98.980
Community	5,460	60.709	27.963	1.031	99.742
Product.Res	5,460	58.654	31.917	0.000	99.776
Management	5,460	57.806	30.926	1.471	99.515
Shareholders	5,460	50.558	27.855	0.319	99.515
CSR.Strategy	5,460	61.539	28.339	0.000	98.781
Emission	5,460	70.453	24.533	0.000	99.763

*The logarithm of total assets

Statistic	N	Mean	St.Dev	Min	Max
PRF %	5,304	0.006	0.179	-0.770	9.010
ROE %	5,304	13.355	14.841	-85.700	86.330
ROA %	5,304	5.309	5.842	-43.820	30.670
MBR	5,304	1.819	2.102	-4.130	37.490
Size*	5,304	24.147	2.465	18.000	31.000
Leverage %	5,304	79.181	78.043	0.200	569.890
Age	5,304	55.944	38.675	7.000	199.000
E	5,304	59.677	20.188	3.630	94.060
S	5,304	62.806	22.427	5.200	96.050
G	5,304	56.635	23.663	5.050	97.910

Table 1: Descriptive statistics for data with subcategories (left) and for main ESG factors (right)

The tables above show the descriptive statistics for all the variables included in our regressions. The left table shows the statistics for the regressions where ESG were divided into specific ESG subcategories, and the right table shows the statistics for the variables that were included in the regressions where ESG were divided into the overall three factors, E, S and G. Although several of the same variables are used in both samples, there are some variations between them which

can be explained by differences in the number of observations. The reason for the difference in observations is the lack of data for the overall ESG factors. Further in the thesis, we will focus mostly on the regressions that include specific ESG categories, but we choose to include both statistics as it has given us some interesting findings that we will go into more detail on in the discussion section.

5.2.4 Correlation Matrix

	PRF	ROE	ROA	MBR	Size	Leverage	Age	Resource	Innovation	Workforce	Human.Rights	Community	Product.Res	Management	Shareholders	CSR.Strategy	Emission
PRF	1.00	-0.05	-0.04	0.02	-0.01	0.07	0.01	0.01	0.00	0.01	0.02	-0.01	0.00	0.00	0.01	-0.01	0.01
ROE	-0.05	1.00	0.78	0.32	0.08	-0.09	0.02	0.03	0.10	0.01	0.03	0.03	0.12	-0.04	0.01	0.00	0.06
ROA	-0.04	0.78	1.00	0.22	0.24	-0.27	0.01	-0.01	-0.01	-0.05	-0.10	-0.02	0.03	-0.04	-0.03	-0.10	-0.03
MBR	0.02	0.32	0.22	1.00	-0.21	0.19	0.14	-0.08	0.08	0.02	0.02	0.11	0.05	0.11	0.14	0.00	-0.02
Size	-0.01	0.08	0.24	-0.21	1.00	-0.19	0.02	0.43	0.18	0.18	0.07	0.17	0.20	0.08	-0.26	0.34	0.33
Leverage	0.07	-0.09	-0.27	0.19	-0.19	1.00	-0.04	0.06	0.05	0.13	0.24	0.14	0.13	0.00	0.09	0.12	0.22
Age	0.01	0.02	0.01	0.14	0.02	-0.04	1.00	0.18	0.35	0.21	0.34	0.12	0.20	0.18	-0.04	0.20	0.19
Resource	0.01	0.03	-0.01	-0.08	0.43	0.06	0.18	1.00	0.32	0.62	0.50	0.35	0.46	0.13	-0.12	0.45	0.66
Innovation	0.00	0.10	-0.01	0.08	0.18	0.05	0.35	0.32	1.00	0.35	0.40	0.34	0.30	0.25	-0.01	0.36	0.41
Workforce	0.01	0.01	-0.05	0.02	0.18	0.13	0.21	0.62	0.35	1.00	0.58	0.42	0.45	0.27	-0.09	0.56	0.60
Human.Rights	0.02	0.03	-0.10	0.02	0.07	0.24	0.34	0.50	0.40	0.58	1.00	0.39	0.38	0.16	-0.14	0.36	0.49
Community	-0.01	0.03	-0.02	0.11	0.17	0.14	0.12	0.35	0.34	0.42	0.39	1.00	0.28	0.29	-0.02	0.35	0.32
Product.Res	0.00	0.12	0.03	0.05	0.20	0.13	0.20	0.46	0.30	0.45	0.38	0.28	1.00	0.00	0.04	0.23	0.53
Management	0.00	-0.04	-0.04	0.11	0.08	0.00	0.18	0.13	0.25	0.27	0.16	0.29	0.00	1.00	0.10	0.40	0.11
Shareholders	0.01	0.01	-0.03	0.14	-0.26	0.09	-0.04	-0.12	-0.01	-0.09	-0.14	-0.02	0.04	0.10	1.00	-0.15	-0.08
CSR.Strategy	-0.01	0.00	-0.10	0.00	0.34	0.12	0.20	0.45	0.36	0.56	0.36	0.35	0.23	0.40	-0.15	1.00	0.59
Emission	0.01	0.06	-0.03	-0.02	0.33	0.22	0.19	0.66	0.41	0.60	0.49	0.32	0.53	0.11	-0.08	0.59	1.00

Table 2: Pearson correlation matrix for sample with ESG subcategories

The Pearson correlation matrix shows the correlation between our dependent variables, independent variables, and firm characteristics. We observe a high positive correlation between two of our dependent variables ROE and ROA – this indicates that they measure much of the same variation. Furthermore, we can see a positive linear correlation between our independent variables. They vary between below 0.15 and up to above 0.60, which is natural due to them being parts of the ESG factors scores. The strongest correlation is between Emission and Resource Use, which implies a moderate to strong uphill positive linear relationship. It indicates that there is a strong relation between the companies use of resources and its corresponding emissions, which can be seen as reasonable since the more resource efficient the company becomes, the less GHG it emits (Thomson Reuters, 2017).

The matrix indicates a negative correlation between two of our independent variables of financial performance, and leverage ratio (debt-to-equity ratio). This is not in line with the theory of the Capital Asset Pricing Model (CAPM), that implies a positive relationship between leverage ratio and financial performance i.e., increased risk leads to an increased return (Markowitz, 1952, Sharpe, 1964; Lintner, 1965; Sharpe, 1964; Mossin, 1966). Balatbat et al. found similar evidence

as in our sample as their results anticipated a negative correlation between financial performance and leverage of companies listed on the Australian Stock Exchange (Balatbat et al., 2012).

The observed negative correlation between ROE and the leverage ratio is more surprising, as one would expect, at least mathematically, that an increase in the level of debt would imply an increase in the ROE. Equity is the denominator in the formula and an increase in debt would imply a decrease in equity, thus a potential increase in ROE (McClure, 2021). Moreover, as Modigliani & Miller stated in their second proposition of their theorem, expected return of a firm increases with the leverage ratio (debt-to-equity), as owners and equity holders would demand a higher return for the increased risk of adding further leverage (Modigliani & Miller, 1963). Conversely, the sample indicates a low positive correlation between monthly MCAP performance and leverage which matches the CAPM theory of Markowitz (1952), Sharpe (1964), Lintner (1965), Sharpe (1964), and Mossin (1966).

Furthermore, observations from the correlation matrix suggests low correlations between the three financial performance indicators and the independent variables. Monthly performance and ROE have a positive correlation with most of the independent variables, while ROA is negatively correlated with most of them. Overall, it indicates that there is little to no correlation between the dependent variables and the independent variables of the oil and gas companies in our sample. Admittedly, this is not in accordance with our initial hypothesis and expectations.

The two firm characteristics, size, and age, indicates a positive relationship with all our independent variables except for shareholders. This suggests that firm size and age affect the company's effectiveness of equal treatment of shareholders negatively (Thomson Reuters, 2017). Implicitly, it indicates that the larger and the more mature a company is, the less effective it is to treat its shareholders equally. Size and age have only low correlations with the financial performance indicators in our sample. The only correlation coefficient being of interest is the one between ROA and size, where it indicates a positive relation between the size of the company and its financial performance measured in the ROA. Interestingly, an

increase in size means greater total assets, thus the denominator of ROA is bound to appreciate. Intuitively, this should result in a lower ROA. Vinasithamby (2015) and Orazalin et al. (2015) found evidence that firm size measured in total assets has a negative correlation with the ROA, which is contradictory with our results.

Admittedly, the use of Pearson correlation matrix should be limited to examining the linear relationship between variables and should not be used to draw any conclusion (Schober et al., 2018).

Nevertheless, multicollinearity could be detected in a correlation matrix. As previously mentioned in section 4.3.1, a correlation coefficient above 0.8 in one of the independent variables indicates a severe multicollinearity problem in our regression (Kennedy, 1985; Kim, 2019). The correlation matrix of our regression does not show any signs of multicollinearity, as the coefficients are well below the 0.8 level.

6.0 Results

6.1 Choice of Model

As described in section 4.2.3, to decide between Fe or Re we ran a Hausman test where the null hypothesis is that the preferred model is Re, and the alternative model is Fe (Greene, 2008). Thus, if the p-value from the Hausman test were above 0.05, we used the Re model, if not we used the Fe model. The model chosen for the different regressions is shown in the table below. PRF, ROE and ROA are the regressions where we used ESG subcategories. PRF_ESG, ROE_ESG and ROA_ESG are the regressions where we only used the three main ESG factors.

Regression	P-Value	Hausmann Test	Model Choice
PRF	0.079	Do not reject H0	Random-Effect Model
ROE	0.000	Rejct H0	Fixed-Effect Model
ROA	0.000	Rejct H0	Fixed-Effect Model
PRF_ESG	0.049	Rejct H0	Fixed-Effect Model
ROE_ESG	0.000	Rejct H0	Fixed-Effect Model
ROA_ESG	0.000	Rejct H0	Fixed-Effect Model

Table 3: Hausman Test with relevant p-values for the different regression

6.2 Regression results

In this section we will present the results of our regressions. We performed six regressions on the chosen dependent variables, monthly MCAP performance, ROE and ROA. Three of the regression uses the three main ESG factors as independent variables, while the other three regressions use ESG subcategories instead of the main factors. All six regressions used the same control variables (market-to-book ratio, size, leverage, age) for firm characteristics. We will present the results connected with each of the independent variables and the firm characteristics, and its effect on each of the financial performance indicators. See Appendix 4 - 9 for a complete results overview.

6.2.1 Market-to-Book ratio

The results of the regression models suggest that the market-to-book ratio only has a significant effect on the financial performance when testing for ROA as the dependent variable. The Fe model finds that the market-to-book ratio has a significant positive effect on the ROA at a 10% confidence level. While the Fe model on the ROE and the Re model on Monthly MCAP Performance show no significant effect of market-to-book ratio at any confidence level. Admittedly, a one-unit change in the market-to-book ratio should result in a 0.494% change in the return on assets.

Our observations indicate a positive change in the market-to-book ratio which according to Sharma et al. (2013) reflects the success of the company's management in delivering operating performance and growth in net assets. Implies greater financial performance in the name of return on assets.

6.2.2 Size

Interestingly, the regression results display an opposite effect of size relative to the one of market-to-book ratio. As it exploits that there is a significant positive effect of size on both Monthly MCAP Performance and ROE at 10% confidence level. Although, we find the effect on ROE to be implausible as it states that a one-unit change in size results in a 4.781% change in the return on equity on the companies within our sample. The effect seems high compared to the effect of the other variables in the regression. Comparing it with the effect on Monthly MCAP

Performance, which indicates that a one-unit change will result in a 0.001% change in the Monthly MCAP Performance.

Admittedly, the evidence of Balatbat et al. (2012) is consistent with our results, but it is inconsistent with the theory of Fama & French (1993) which anticipated a negative relationship between size and financial performance. Orazalin et al. (2015) found evidence that is consistent with the theory of Fama & French (1993), thus found that there is a negative linkage between firm size and financial performance. Supporting that smaller cap firms on average outperform large cap firms (Orazalin et al., 2015). The paper of Egbunike & Okerekeoti (2018) found the effect to be significantly positive which is consistent with our results.

6.2.3 Leverage

Leverage shows a significantly negative effect on both ROE and ROA, but not on the Monthly Performance. The leverage ratio which is calculated by the Debt-to-Equity ratio is negatively significant at a 1% confidence level at both ROE and ROA. Thus, the effect of incurring more debt will result in a decrease in both the ROE and the ROA of the companies in our sample. Specifically, a one-unit increase in debt-to-equity will effectively see a 0.083% decrease in ROE and a 0.031% decrease in ROA. This is consistent with the result we obtained in our correlation matrix in section 5.2.4. Although, it is inconsistent with the CAPM theory and previous studies such as the one of Balatbat et al. (2012) which anticipated a positive relationship. Similarly, Egbunike & Okerekeoti (2018) found the effect of leverage to be significantly positive on ROA.

As stated by Cheung (2019), in times of increasing oil prices the debt-to-equity ratio tends to decrease as the profit margins rise, and opposite in periods with falling prices. Intuitively, this should imply a negative relationship between the financial performance of the company and its debt-to-equity ratio, which is consistent with the results obtained in our regressions analysis.

6.2.4 Age

Age shows statistical significance on a 5% significance level on ROE and 1% level on ROA and suggests that there is a negative effect of age on the financial performance indicators. Implicitly, this implies that younger companies within the

oil and gas industry yield a greater return on both assets and equity relative to mature companies. Specifically, it indicates that a one-unit increase in change in age should result in a 0.595% decrease in ROE and a 0.32% decrease in ROA. Furthermore, the results are consistent with the evidence of Fama & French (1993).

The negative significant effect of age in our sample is further documented and supported by Akben-Selcuk (2016), which concluded that there is a convex relation between age and profitability. These results are consistent with the results of our regression. Moreover, evidence from last year, during the pandemic, saw many new listings of green tech and renewable energy companies on the stock exchanges across Europe perform incredibly well and experienced immense growth relative to the more mature companies within the energy sector.

6.2.5 Environmental Scores

The correlation matrix (Appendix 3) indicates an ambiguous relationship between performance and Environmental score. The matrix shows a weak but positive correlation between Environmental score and both MCAP (0.01) and ROE (0.03). For ROA, the correlation is negatively correlated with -0.12. Our results, on the other hand, do not show any significant effect of the overall Environmental score on any of the performance variables. However, the subcategory Resource Use has a negative significant effect at a 1% significance level on ROA. The result indicates that if the Resource Use score is increased by one unit, then it will have a negative impact on ROA by -0.071. Companies that achieve good scores in this subcategory are those that manage to reduce their usage of things such as materials, energy, and water, and those who find more eco-efficient solutions to improve supply chain management. Our results indicate that this will have a negative effect on ROA, which is an interesting finding we will discuss further in the following section 6.2.8. Apart from Resource Use, there are no other subcategories of the Environmental factor that are significant at 10%, 5% or 1% significance level.

6.2.6 Social Scores

Overall Social score has no significant effect on any of the performance variables despite weak positive correlation with both MCAP Performance (0.01) and ROE

(0.03). The correlation with ROA is negative -0.11 and appears to be relatively similar to the Environmental score. Two of the subcategories of the Social factor appear to have a significant effect on ROE at a 10% significance level. The first subcategory that turns out to have a negative significant effect on ROE is Workforce score. Companies that score high on workforce are companies that effectively work towards a good working environment, a healthy and safe workplace, maintain diversity and equal opportunities, and develop opportunities for their employees. If the Workforce score increases by one unit, the ROE will decrease by -0.111. The other social subcategory that is significant is the Human Rights score. The score measures companies' effectiveness towards respecting the fundamental human rights conventions. In contrast to Workforce, Human Rights have a positively significant effect on ROE with a coefficient of 0.057.

6.2.7. Governance Scores

The correlation matrix shows that Governance has a negative correlation with ROE (-0.02) and ROA (-0.04) and is close to uncorrelated with monthly MCAP performance (0.002). Despite this, our results show no significant correlation between the performance variables and overall Governance score. The subcategory of Governance, CSR Strategy is negatively significant with monthly MCAP performance at a 5% significance level. CSR Strategy score reflects a company's practices to communicate that it integrates the economic, social, and environmental factors into its decision-making processes. The coefficient of -0.0002 indicates that the effect of CSR Strategy is marginal on monthly MCAP performance.

6.2.8. ESG Results - Discussion

Our results implies that the effect different ESG scores have on performance is ambiguous. Like Balatbat et al. (2012), we found no significant correlation between overall ESG scores and companies' financial performance. This is in line with Friedman's (1978) Shareholder Theory which states that businesses should only focus on value creation and not participate in activities to please other than their owners. What is not in line with this theory is that one of the ESG subcategories, Human Rights score, was shown to have a positive significant effect on financial performance. This is supported by the second theory, Stakeholder Theory (Freeman, 1984). The reason the subcategories may have an

effect, and not the overall factors, is because in the overall ESG factors, multiple ESG practices are merged. Hence, an overall ESG measurement will not be entirely accurate which was a part of the reason we chose to divide ESG into more specific subcategories. We have found one of the subcategories to have a positive effect on performance (Human Rights), and three subcategories that have a negative effect (Resource Use, Workforce, CSR Strategy).

We found that Resource Use had a negative significant effect on ROA which was unexpected, but when we link this to previous reach, the result may be reasonable. Firstly, Rajesh (2020) found that Resource Use played an important role in determining the overall Environmental score for companies when using the same Thomson Reuters ESG subcategories as in this research. Secondly, Pendley (2017) found that smaller companies specializing in exploration and production have on average a higher Environmental score than larger international oil companies. If we combine these findings, it implies that the Resource Use score is closely related to the overall Environmental score, and that the Environmental score is on average better for small companies than for large companies. In our research the size of the companies has been found to have a significant positive effect on companies´ financial performance. Resource Use may therefore have been interpreted as having a negative impact on performance as smaller companies have higher Resource Use scores than larger companies, but also performed worse financially than larger companies.

Our results showed no significant effect of overall Social score on financial performance. The insignificant finding is partly in line with Velte's (2017) ESG research on German companies. He found no significant effect between overall ESG factors on Tobin's Q, but he found that the ESG factors had a positive effect on ROA. On the other hand, Duque-Grisales & Aquilera-Caracuel (2019) found that ESG scores are negatively associated with financial performance and that the Social score has a greater negative effect on performance than Environmental and Governance scores. Our results are divided as we found a significant negative relation between Workforce and ROE, and a positive significant relation between Human Rights and ROE.

Previous research that has used the Workforce category of Thomson Reuters is limited, but the category should reflect factors like e.g., workforce diversity, health, and safety. Regarding workforce diversification, Campbell & Minguwz-Vera (2008) found that gender diversification has a positive effect on companies' economic gains. Health and safety, which is also included in the Workforce category, has also been found to have a positive correlation with the companies' performance (Fabius et al, 2016). The findings of Makni et al (2009) are more consistent with our results where they found a statistically significant negative association between the employee corporate social performance score and stock returns in the Canadian stock market in the period 2004 to 2005. The negative correlation between social performance and financial performance is consistent with the findings of Poelloe (2010) which is that there is a trade-off between social responsibility and corporate financial performance. Other possible reasons why we find a negative correlation between Workforce score and ROA could be that there are several fundamental flaws with affirmative action's such as reverse discrimination, which may create an adverse effect for both the company and the individual (Kennedy, 2015).

Although the Human Rights subcategory is included in the overall Social score, our results indicated that the Human Rights score has a positive effect on companies´ ROE. Limited research has been conducted regarding companies´ human rights focus and how this affects the companies' financial performance. We believe this an important issue as many oil and gas companies operate in difficult areas where human rights and ethical issues can arise. Growing concerns about corruption, human rights and labor issues can affect international corporate relations, which in turn could affect the oil and gas industry. Our finding is consistent with Martinez-Ferrero & Frias-Aceituno (2015) who found a positive correlation between financial performance and Human Rights score.

Although we did not exploit much significance in subcategories of governance in our results, we found evidence that suggested a significant negative effect of the CSR Strategy score. Admittedly, the results are not aligned with the expectations as we expected to see a positive effect of the Governance score on the financial performance of the oil and gas companies. As mentioned in the section 6.2.7,

there is a marginal negative effect at -0.0002 and the R-squared is very low for this regression.

Furthermore, a negative effect of CSR strategy on financial performance implies that companies that communicate their actions of socially responsible decision making on a corporate level, have a negative effect on its financial performance. The governance score and its subcategories should capture the companies' ability to implement and make commitments to effective corporate decisions. Earlier studies are conflicting on the matter, Kiel & Nicholson (2003) and Jackling & Johl (2009) found that competent corporate governance positively affects the financial performance of companies. While studies by Yermak (1996) and Mashayekhi & Bazaz (2008) anticipated a negative relation between the two variables (Orazalin, 2015). Brammer et al., (2006) investigated the relationship between CSR scores and stock returns. Their results suggested a negative correlation, thus negative effect of CSR on the stock returns, and the portfolio of stocks with least social scores yields significant abnormal returns (Brammer et al., 2006).

7.0 Conclusion and Future Research

7.1 Conclusion

This thesis has been based on the much-discussed controversy surrounding oil and gas companies and the uncertain future of the industry. While we observe an ever-increasing ESG-conscious world, the aim of the thesis is to see if there are certain firm characteristics that have been significantly beneficial for the companies´ financial performance the past decade, 2011 to March 2021. Our sample consists of 56, partly randomly selected, European companies that were extracted from the Bloomberg terminal when filtered by geography and industry. Together with commonly used firm characteristics (size, age, debt ratio, market-to-book ratio), we also included ESG factors as part of the companies' characteristics with the basic idea that this has become increasingly important for the companies' financial performance. As dependent variables for financial performance, we have used monthly returns in the form of changes in market capitalization, Return on Equity, and Return on Assets.

Our findings suggest that it is traditional firm characteristics that have the greatest impact on the financial performance of oil and gas companies, although we also find some subcategories of ESG to have an effect. The size of the companies had the largest positive influence on companies' financial performance and is positively significant for both monthly returns and ROE. The results also indicate that a high leverage has had a negative impact on the companies´ ROE and ROA. The age of the companies turns out to have a significant negative effect on ROA and ROE, while the market-to-book ratio has had a positive effect on ROA.

We find that none of the overall ESG scores have a significant effect on any of the performance variables, but we find that some subcategories have a significant impact. The impact of the subcategories is ambiguous. Our findings indicate that Resource Use score, Workforce score and CSR Strategy score have a negative impact on companies´ performance. Human Rights is the only subcategory of ESG that has had a positive effect on companies' financial performance.

Although our results are not consistent with our initial thoughts regarding the importance of ESG and its impact on financial performance, we have found that it has some effect. It may seem that it is the most basic ESG investments and the ones that are easiest to implement that have a positive impact on financial performance. Demanding ESG implementations and ESG measures that cause major restructuring may appear to be a trade-off against companies' financial performance. The trade-off may still prove to be profitable in the long run.

7.2 Limitations

Omitted variable bias may have been a problem for our research. In all our regressions we have had a relatively low coefficient of determination (R^2) which means that our independent variables only explain a small portion of the variance in the financial performance. An independent variable that we believe would have been essential to include is a variable that could separate companies based on industry. Although all the companies we have included in our data sample operate within the oil and gas industry, there is a significant difference in how much impact their operation within the industry has on their performance. The reasons for this could be, e.g., that the companies operate in multiple industries at the same time, or that the companies have changed industry during the observation

period as we only based our sample on companies who had oil and gas activities in 2021. The lack of data availability of the ESG scores of European oil and gas companies can also be an issue as it narrows down our dataset and puts a constraint on which companies to be included. It could possibly result in a dataset where e.g., there are mostly larger cap firms and majors of the industry, as they tend to report more extensive information relative to smaller cap firms.

7.3 Future Research

Future research could seek to augment our analysis and implement how oil and gas companies' financial performance correlates with the oil price. To be able to exploit if the companies with high ESG performance scores have a lower correlation with the oil price, and thus be less sensitive to sudden movements caused by it. Further, we encourage future research to separate between industries and sub-industries of the oil and gas industry to detect if there is any significant divergence.

Furthermore, the implementation of the EU Taxonomy could prove to be a game changer, as it will increase the pressure on companies across the markets. The classification system will further enable investors and stakeholders to distinguish between companies based on their environmental and sustainable initiatives (EU, 2021). In the future it will be interesting to detect potential significant effects of the Taxonomy on the financial performance of the companies. Furthermore, if it were to prove more significant than ESG has proved in both this thesis and previous papers.

References

Akben-Selcuk, E. (2016). Does Firm Age Affect Profitability? Evidence from Turkey. *International Journal of Economic Sciences.* 10.20472/ES.2016.5.3.001

Allen, M. P. (1997) The problem of multicollinearity. In: Understanding Regression Analysis. Springer, Boston, MA. https://doi.org/10.1007/978-0-585-25657-3_37

Amini, S., Delgado, M. S., Henderson, D. J., & Parmeter, C. F. (2012). Fixed vs Random: The Hausman Test Four Decades Later. *Emerald Publishing Limited.* https://doi.org/10.1108/S0731-9053(2012)0000029021

Balatbat, M., Siew, R. Y. J. & Carmichael, D. G. (2012). ESG scores and its influence on firm performance: Australian evidence. *Australian School of Business School of Accounting.* https://www.researchgate.net/publication/260907931_ESG_Scores_and_its_Influence_on_firm_performance_Australian_Evidence

Bagirov, M., & Mateus, C. (2019). Oil prices, stock markets and firm performance: Evidence from Europe. *International Review of Economics & Finance*, 61, 270-288. https://doi.org/10.1016/j.iref.2019.02.007

Barron, J. (2019). *2018 was likely the most profitable year for U.S. oil producers since 2013.* This Week in Petroleum. Energy Information Administration. https://www.eia.gov/todayinenergy/detail.php?id=39413

Beck, C., Bellone, D., Hall, S., Kar, J., & Olufon, D. (2021). *The big choices for oil and gas in navigating the energy transition.* McKinsey & Company. https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-big-choices-for-oil-and-gas-in-navigating-the-energy-transition

Bell, E., Bryman, A., & Harley, B. (2018). *Business Research Methods*. 5th edition, Oxford University Press.

Brammer, S. Brooks, C. & Pavelin, S. (2006). Corporate Social Performance and Stock Returns: UK Evidence from Disaggregate Measures. *Financial Management,* 35(3). 10.2139/ssrn.739587

Breuer, N. & Nau, C. *ESG performance and corporate financial performance: An empirical study of the US technology sector.* Master's thesis, Department of Business Administrasjon, Lund University School of Economics and Management. .

https://lup.lub.lu.se/luur/download?fileOId=4580100&func=downloadFile&recordOId=4580097

Brooks, C. (2014). *Introductory Econometrics for Finance*. 3rd Edition, Cambridge University Press, Cambridge.

Campbell, K., Mínguez-Vera, A, (2008). Gender Diversity in the Boardroom and Firm Financial Performance. *Journal of Business Ethics* 83, 435–451. https://doi.org/10.1007/s10551-007-9630-y

Cheung, Billy. (2019). Common Debt-to-Equity Ratios for Oil and Gas Companies. *Investopedia.* https://www.investopedia.com/ask/answers/060315/what-debt-equity-ratio-common-oil-and-gas.asp

Cho, C. H., Roberts, R. W., & Patten, D. M. (2010). The language of US corporate environmental disclosure. Accounting, Organizations and Society, 35(4). https://doi.org/10.1016/j.aos.2009.10.002

Climate Action 100+. (2021). *About Climate Action 100+*. Climate Action 100+. *https://www.climateaction100.org/*

Collischon, M. & Eberl, A. (2020). Let's Talk About Fixed Effects: Let's Talk About All the Good Things and the Bad Things Die Vor- und Nachteile von Fixed-effects-Regressionen in der empirischen Anwendung. *KZfSS Kölner Zeitschrift für Soziologje und Sozialpsychologie, 72(2).* 10.1007/s11577-020-00699-8

Corporate Finance Institute. (2021). Market to Book Ratio. https://corporatefinanceinstitute.com/resources/knowledge/valuation/market-to-book-ratio-price-book/

David, T. (2019). Rebuttal of Prevailing Criticisms. *Sustainalytics.* https://www.sustainalytics.com/esg-research/resource/investors-esg-blog/esg-ratings-a-rebuttal-of-prevailing-criticisms

Dayanandan, A. & Donker, H. (2011). Oil prices and accounting profits of oil and gas companies. *International Review of Financial Analysis.* 20(5), 252-257. https://doi.org/10.1016/j.irfa.2011.05.004

Drempetic, S., Klein, C., & Zwergel, B. (2020). The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *Journal of Business Ethics,* 167(2). 10.1007/s10551-019-04164-1

Duque-Grisales, E. & Aguilera-Caracuel, J., (2019). Environmental, Social and Governance (ESG) Scores and Financial Performance of Multilatinas: Moderating Effects of Geographic International Diversification and Financial Slack. *Journal of Business Ethics* 168, 315–334. https://doi.org/10.1007/s10551-019-04177-w

Eaton, C. & McFarlane, S. (2020). 2020 was one of the worst-ever years for oil write- downs. *Wall Street Journal*, December 27, 2020, wsj.com. https://www.wsj.com/articles/2020-was-one-of-the-worst-ever-years-for-oil-write-downs-11609077600

Egbunike, C.F. & Okerekeoti, C.U. (2018). Macroeconomic factors, firm characteristics and financial performance: A study of selected quoted manufacturing firms in Nigeria. *Asian Journal of Accounting Research*, 3(2), 142-168. https://doi.org/10.1108/AJAR-09-2018-0029

EU. (2021). *EU taxonomy for sustainable activities.* https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en

EY. (2020). How COVID-19 could accelerate digital in oil and gas. EY Global. https://go.ey.com/35UYC9N

Evensen, O., Lin, S. & Womack, D., (2020) *Essential tactics to foster innovation in oil and gas*. IBM Institute for Business Value. https://www.ibm.com/downloads/cas/VOJ540GZ

Fabius, R., Grossmeier, J., Flynn, J. P., Noeldner, S., Fabius, D. Goetzel, R. Z. & Anderson, D., (2016). Linking Workplace Health Promotion Best Practices and Organizational Financial Performance. Journal of Occupational and Environmental Medicine, 58(1), 16-23. https://doi.org/10.1097/JOM.0000000000000631

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3–56. https://doi.org/10.1016/0304-405X(93)90023-5

Foroni, C. & Marcellino, M., G. (2013). A Survey of Econometric Methods for Mixed-Frequency Data. *SSRN Electronic Journal.* 10.2139/ssrn.2268912

Freeman RE & Evan WM (1990), Corporate Governance: A Stakeholder Interpretation, *Journal of Behavioural Economics*, 19(4), 337-359.

Friedman, M. (1970). The Social Responsibility of a Business is to Increase its Profits. *The New York Times Magazine.* http://umich.edu/~thecore/doc/Friedman.pdf

Greene, W.H. (2008) Econometric Analysis. 6th Edition, *Pearson Prentice Hall*, Upper Saddle River.

Hausman, J. (1978). Specification in Econometrics. *Econometrica,* 46, 1251-1271. https://doi.org/10.2307/1913827

Hintze, J. L. (n.d.). *User's Guide III - Regression and Curve Fitting*. NCSS.com. http://ncss.wpengine.netdna-cdn.com/wp-content/uploads/2012/09/NCSSUG3.pdf.

Hussain Shah, T., & Siddiqui, D. A. (2020). Impact of International Oil Price, and Its Volatility on Profitability of Top Oil and Gas Companies: The Role of Exchange Rate, Governance Institutions, and Human Development of Their Origin Country. *SSRN*. https://dx.doi.org/10.2139/ssrn.3755239

Ibrahimov, B. (2018). Open Innovation and application to Petroleum Industry. *IFAC-PapersOnLine.* 51(30), 697-702. https://doi.org/10.1016/j.ifacol.2018.11.212

IEA. (2020). *The Oil and Gas Industry in Energy Transitions.* https://www.iea.org/reports/the-oil-and-gas-industry-in-energy-transitions

IEA. (2020). *Oil 2020,* IEA, Paris. https://www.iea.org/reports/oil-2020

IEA. (2021). *Oil 2021,* IEA, Paris. https://www.iea.org/reports/oil-2021

IRENA. (2020). *Post-COVID recovery: An agenda for resilience, development and equality.*IRENA. https://www.irena.org/publications/2020/Jun/Post-COVID-Recovery

Jackling, B. & Johl, S. (2009) Board Structure and Firm Performance: Evidence from India's Top Companies. *Corporate Governance: An International Review,* 17(4), 492-509.10.1111/j.1467-8683.2009.00760.x

Kay, I., Brindisi, M., Martin, B. (2020). The Stakeholder Model and ESG. *Harvard Law School Forum*. https://corpgov.law.harvard.edu/2020/09/14/the-stakeholder-model-and-esg/

Kennedy, J. A., (2015). An Assessment of Affirmative Action in Business. Honors Scholar Theses. 432. https://opencommons.uconn.edu/srhonors_theses/432

Kennedy, P. (1985). A Guide to Econometrics. 2nd edition. *MIT*

Kiel, G.C. & Nicholson, G.J. (2003) Board Composition and Corporate Performance: how the Australian Experience Informs Contrasting Theories of Corporate Governance. *Blackwell Publishing,* 11(3), 189-205. 10.1111/1467-8683.00318

Kim, J., H. (2019). Multicollinearity and misleading statistical results. *Korean Journal of Anesthesiology,* 72(6), 558-569. 10.4097/kja.19087

KPMG. (2021). *Børspuls - Det sterkeste året noen gang i norske børs- og kapitalmarkeder.* https://assets.kpmg/content/dam/kpmg/no/pdf/2021/01/KPMG_Borspuls_2020_WEB.pdf

Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. *The Review of Economics and Statistics*, *47*(1), 13-37. https://doi.org/10.2307/1924119

Makni, R., Francoeur, C. & Bellavance, F., (2009). Causality Between Corporate Social Performance and Financial Performance: Evidence from Canadian Firms. *Journal of Business Ethics* 89(409). https://doi.org/10.1007/s10551-008-0007-7

Markowitz, H. (1952). *Portfolio Selection*. *The Journal of Finance,* 7(1). https://www.math.ust.hk/~maykwok/courses/ma362/07F/markowitz_JF.pdf

Martínez-Ferrero, J., & Frías-Aceituno, J. V. (2015). Relationship between sustainable development and financial performance: international empirical research. Business Strategy and the Environment, 24(1), 20-39. https://doi.org/10.1002/bse.1803

Mashayekhi, B. & Bazaz, M.S. (2008). Corporate Governance and Firm Performance in Iran. *Journal of Contemporary Accounting and Economies,* 4(2), 156-172. https://doi.org/10.1016/S1815-5669(10)70033-3

McClure, B. (2021) How ROA and ROE Give a Clear Picture of Corporate Health. *Investopedia.* https://www.investopedia.com/investing/roa-and-roe-give-clear-picture-corporate-health/

Millo, G. (2017) Robust Standard Error Estimators for Panel Models: A Unifying Approach. *Journal of Statistical Software.* 82(3). 10.18637/jss.v082.i03

Modigliani, F. & Miller, M., H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *The American Economic Review.* 3(53). 433-443. https://epge.fgv.br/we/MFEE/FinancasCorporativas/2012?action=AttachFile&do=get&target=Paper8.pdf

Mossin, J. (1966). Equilibrium in a Capital Asset Market. *Econometrica: Journal of The Econometric Society.* 4(34), 768-783. http://efinance.org.cn/cn/fm/Equilibrium%20in%20a%20Capital%20Asset%20Market.pdf

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate Social and Financial Performance: A Meta-Analysis. Organization Studies, 24(3), 403-441. 10.1177/0170840603024003910

Pendley, J. A. (2017). Measuring Environmental Performance for Oil and Gas Development. *Accounting Faculty Publications.* 4. https://scholarlycommons.susqu.edu/acct_fac_pubs/4

Perrons, R. (2014) How innovation and R&D happen in the upstream oil and gas industry: Insights from a global survey. *Journal of Petroleum Science and Engineering*, 124, pp. 301-312. 10.1016/j.petrol.2014.09.027

Penrose, E. T. (1959). The Theory of The Growth of The Firm. Oxford University.

Poelloe, A. (2010). I*s there a trade-off between social responsibility and financial performance?* Master's thesis, Department of Economics and Business, Erasmus University Rotterdam, Erasmus School of Economics. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.866.197&rep=rep1&type=pdf

Rajesh, R. (2020). Exploring the sustainability performances of firms using environmental, social, and governance scores. *Journal of Cle*aner *Production*, Volume 247. https://doi.org/10.1016/j.jclepro.2019.119600

Schober, P., Boer, C., & Schwarte, L. (2018). Correlation Coefficients: Appropriate Use and Interpretation. *Anesthesia & Analgesia.* 5(126), 1763-1768. 10.1213/ANE.0000000000002864

Sharma, A., Branch, B., Chgawla, C. & Qiu, L. (2013). Explaining Market-to-Book: The relative impact of firm performance, growth, and risk. *Business Quest.* https://www.westga.edu/~bquest/2013/MarketToBook2013.pdf

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance*, *19*(3), 425–442.

Stock, J. H., & Watson, M. W. (2015). *Introduction to Econometrics, Global edition* (Third Edit). Harlow, United Kingdom: Pearson Education Limited.

Stowe, J.D., Robinson, T.R., Pinto, J.E. & McLeavy, D.W. (2002). Analysis of equity investments: Valuation. *Baltimore: AIMR*. https://www.startfs.com.br/wp-content/uploads/2019/08/Analysis-of-Equity-Investments-Valuation-CFA.pdf

Umpierrez, Amanda. (2020). *Understanding How 'E,' 'S' and 'G' Contribute to ESG Performance.* Plansponsor. https://www.plansponsor.com/in-depth/understanding-e-s-g-contribute-esg-performance/

Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility*, *8*(2), 169–178. 10.1108/JGR-11-2016-0029

Vinasithamby, S. (2015). Does firm size influence on firm's Profitability? Evidence from listed firms of Sri Lankan Hotels and Travel sector. *Research Journal of Finance and Accounting,* 6(6), 201-207. https://www.researchgate.net/publication/311408600_Does_firm_size_influence_on_firm%27s_Profitability_Evidence_from_listed_firms_of_Sri_Lankan_Hotels_and_Travels_sector

Wattanatorn, W., & Kanchanapoom, T. (2012). Oil Prices and Profitability Performance: Sector Analysis. *Procedia - Social and Behavioral Sciences*, 40, 763-767. https://doi.org/10.1016/j.sbspro.2012.03.263

Wettengel, J. (2020). Germany's dependence on imported fossil fuels. *Clean Energy Wire.* https://www.cleanenergywire.org/factsheets/germanys-dependence-imported-fossil-fuels

Williams-Derry, C. & Smith, G. (2021). Oil and gas: An industry in decline. *ewg.* https://www.ewg.org/news-insights/news/oil-and-gas-industry-decline

Wooldridge, J., M., (2012). *Introductory Econometrics: A Modern Approach,* 5th edition. South -Western CENGAGE Learning. https://economics.ut.ac.ir/documents/3030266/14100645/Jeffrey_M._Wooldridge_Introductory_Econometrics_A_Modern_Approach__2012.pdf

Yermack, D. (1996). Higher Market Valuation of Companies with Small Board of Directors. *Journal of Financial Economics,* 40(2), 185-211. https://doi.org/10.1016/0304-405X(95)00844-5

Yu, E., Luu, B. & Chen, C. (2020). Greenwashing in environmental, social and governance disclosure. *Research in International Business and Finance,* volume 52. https://doi.org/10.1016/j.ribaf.2020.101192

Zhao, C., Guo, Y., Kang, J., Li, D., Yuan, J., Wu, M. & Zhou, Y. (2018). ESG and Corporate Financial Performance: Empirical Evidence from China's Listed Power Generation Companies. *MDPI Sustainability 2018, 10(8), 2607.* https://doi.org/10.3390/su10082607

Appendix

Appendix 1: List of companies

Country of listing	Eikon Identifier	Company Name	Main Sector Name	Main Industry Name
Austria	OMVV.VI	OMV AG	Energy	Oil, Gas & Consumable Fuels
Belgium	EUAV.BR	Euronav NV	Energy	Oil, Gas & Consumable Fuels
Denmark	MAERSKb.CO	AP Moeller - Maersk A/S	Industrials	Marine
Finland	NESTE.HE	Neste Oyj	Energy	Oil, Gas & Consumable Fuels
France	BOLL.PA	Bollore SE	Communication Services	Entertainment
France	GEPH.PA	CGG SA	Energy	Energy Equipment & Services
France	MAUP.PA	Etablissements Maurel et Prom SA	Energy	Oil, Gas & Consumable Fuels
France	TOTF.PA	TotalEnergies SE	Energy	Oil, Gas & Consumable Fuels
Greece	HEPr.AT	Hellenic Petroleum SA	Energy	Oil, Gas & Consumable Fuels
Greece	MORr.AT	Motor Oil Hellas Corinth Refineries SA	Energy	Oil, Gas & Consumable Fuels
Hungary	MOLB.BU	MOL Magyar Olajes Gazipari Nyrt	Energy	Oil, Gas & Consumable Fuels
Italy	ENI.MI	Eni SpA	Energy	Oil, Gas & Consumable Fuels
Italy	SRG.MI	Snam SpA	Utilities	Gas Utilities
Italy	SRS.MI	Saras SpA	Energy	Oil, Gas & Consumable Fuels
Netherlands	RDSa.L	Royal Dutch Shell PLC	Energy	Oil, Gas & Consumable Fuels
Netherlands	FUGR.AS	Fugro NV	Energy	Energy Equipment & Services
Netherlands	SBMO.AS	SBM Offshore NV	Energy	Energy Equipment & Services
Netherlands	VOPA.AS	Koninklijke Vopak NV	Energy	Oil, Gas & Consumable Fuels
Norway	QEC.OL	Questerre Energy Corp	Energy	Oil, Gas & Consumable Fuels
Norway	EQNR.OL	Equinor ASA	Energy	Oil, Gas & Consumable Fuels
Norway	AKAS.OL	Akastor ASA	Energy	Energy Equipment & Services
Norway	DNO.OL	Dno ASA	Energy	Oil, Gas & Consumable Fuels
Norway	PGS.OL	PGS ASA	Energy	Energy Equipment & Services
Norway	POSF.OL	Prosafe SE	Energy	Energy Equipment & Services
Norway	TGS.OL	TGS ASA	Energy	Energy Equipment & Services
Norway	SUBC.OL	Subsea 7 SA	Energy	Energy Equipment & Services
Poland	PGN.WA	Polskie Gornictwo Naftowe i Gazownictwo SA	Energy	Oil, Gas & Consumable Fuels
Portugal	GALP.LS	Galp Energia SGPS SA	Energy	Oil, Gas & Consumable Fuels
Russia	GAZP.MM	Gazprom PAO	Energy	Oil, Gas & Consumable Fuels
Russia	GMKN.MM	GMK Noril'skiy Nikel' PAO	Materials	Metals & Mining
Russia	LKOH.MM	NK Lukoil PAO	Energy	Oil, Gas & Consumable Fuels
Russia	NVTK.MM	Novatek PAO	Energy	Oil, Gas & Consumable Fuels
Russia	ROSN.MM	NK Rosneft' PAO	Energy	Oil, Gas & Consumable Fuels
Russia	SIBN.MM	Gazprom Neft' PAO	Energy	Oil, Gas & Consumable Fuels
Russia	SNGS.MM	Surgutneftegaz PAO	Energy	Oil, Gas & Consumable Fuels
Russia	TATN.MM	Tatneft' PAO	Energy	Oil, Gas & Consumable Fuels
Spain	REP.MC	Repsol SA	Energy	Oil, Gas & Consumable Fuels
Sweden	ALFA.ST	Alfa Laval AB	Industrials	Machinery
Sweden	LUNE.ST	Lundin Energy AB	Energy	Oil, Gas & Consumable Fuels
Switzerland	SGSN.S	SGS SA	Industrials	Professional Services
Turkey	KCHOL.IS	Koc Holding AS	Industrials	Industrial Conglomerates
Turkey	TUPRS.IS	Turkiye Petrol Rafinerileri AS	Energy	Oil, Gas & Consumable Fuels
United Kingdom	DCC.L	DCC PLC	Industrials	Industrial Conglomerates
United Kingdom	PFC.L	Petrofac Ltd	Energy	Energy Equipment & Services
United Kingdom	BP.L	BP PLC	Energy	Oil, Gas & Consumable Fuels
United Kingdom	CNA.L	Centrica PLC	Utilities	Multi-Utilities
United Kingdom	CNE.L	Cairn Energy PLC	Energy	Oil, Gas & Consumable Fuels
United Kingdom	HBR.L	Harbour Energy PLC	Energy	Oil, Gas & Consumable Fuels
United Kingdom	HTG.L	Hunting PLC	Energy	Energy Equipment & Services
United Kingdom	JKX.L	JKX Oil and Gas PLC	Energy	Oil, Gas & Consumable Fuels
United Kingdom	MRW.L	WM Morrison Supermarkets PLC	Consumer Staples	Food & Staples Retailing
United Kingdom	PHARP.L	Pharos Energy PLC	Energy	Oil, Gas & Consumable Fuels
United Kingdom	SQZ.L	Serica Energy PLC	Energy	Oil, Gas & Consumable Fuels
United Kingdom	TLW.L	Tullow Oil PLC	Energy	Oil, Gas & Consumable Fuels
United Kingdom	TSCO.L	Tesco PLC	Consumer Staples	Food & Staples Retailing
United Kingdom	WG.L	John Wood Group PLC	Energy	Energy Equipment & Services

Appendix 2: Definition of ESG subcategory scores

ESG Factors	ESG Subcategory	Definition
Environmental	Resource Use Score	The Resource Use Score reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
	Emissions Score	The Emission Reduction Score measures a company's commitment and effectiveness towards reducing environmental emission in the production and operational processes.
	Innovation Score	The Innovation Score reflects a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products.
Social	Workforce Score	The Workforce Score measures a company's effectiveness towards job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce.
	Human Rights Score	The Human rights category score measures a company's effectiveness towards respecting the fundamental human rights conventions
	Community Score	The Community Score measures the company's commitment towards being a good citizen, protecting public health and respecting business ethics.
	Product Responsibility Score	The Product Responsibility Score reflects a company's capacity to produce quality goods and services integrating the customer's health and safety, integrity and data privacy
Governance	Management Score	The Management Score measures a company's commitment and effectiveness towards following best practice corporate governance principles.
	Shareholders Score	The Shareholders Score measures a company's effectiveness towards equal treatment of shareholders and the use of anti-takeover devices
	CSR Strategy Score	The CSR Strategy Score reflects a company's practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision-making processes.

Appendix 3: Correlation matrix for sample with main ESG factors

	PRF	ROE	ROA	E	S	G	MBR	Size	Leverage	Age
PRF	1	-0.05	-0.04	0.01	0.01	0.00	0.01	-0.01	0.07	0.01
ROE	-0.05	1	0.76	0.01	0.03	-0.02	0.32	0.05	-0.13	0.00
ROA	-0.04	0.76	1	-0.12	-0.11	-0.04	0.21	0.21	-0.33	-0.02
E	0.01	0.01	-0.12	1	0.72	0.27	-0.04	0.30	0.13	0.26
S	0.01	0.03	-0.11	0.72	1	0.27	0.04	0.13	0.21	0.30
G	0.00	-0.02	-0.04	0.27	0.27	1	0.13	0.07	0.05	0.19
MBR	0.01	0.32	0.21	-0.04	0.04	0.13	1	-0.23	0.18	0.13
Size	-0.01	0.05	0.21	0.30	0.13	0.07	-0.30	1	-0.23	-0.01
Leverage	0.07	-0.13	-0.33	0.13	0.21	0.05	0.18	-0.23	1	-0.07
Age	0.01	0.00	-0.02	0.26	0.30	0.19	0.13	-0.01	-0.07	1

Appendix 4: Regression Results - Main ESG Factors and MCAP Monthly Performance (Fixed Effects)

	Monthly Mcap Performance panel linear OLS	Coefficient test OLS robust	Monthly Mcap Performance Linear Fixed	Coefficient test Fixed robust error
E	-0.0001 (0.0002)	-0.0001 (0.0002	0.001 (0.0004)	0.001 (0.0005)
S	-0.0001 (0.0002)	-0.0001 (0.0001)	0.0002 (0.0003)	0.0002 (0.0002)
G	-0.00002 (0.0001)	-0.00002 (0.0001)	0.0001 (0.0002)	0.0001 (0.002)
MBR	0.0001 (0.001)	0.0001 (0.001)	0.003 (0.002)	0.003 (0.003)
Size	0.001 (0.001)	0.001 (0.001)	-0.018* (0.010)	-0.018 (0.015)
Leverage	0.0002*** (0.00003)	0.0002 (0.0001)	0.0003*** (0.00005)	0.0003 (0.0002)
Age	0.0001 (0.0001)	0.0001 (0.0001)	-0.0005 (0.001)	-0.0005 (0.001)
Constant	-0.020 (0.027)	-0.020 (0.019)		
Observations	5,304		5,304	
R2	0.005		0.008	
Adjusted R2	0.004		-0.003	
F Statistic	3.796*** (df = 7; 5296)		6.257*** (df = 7; 5242)	
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix 5: Regression Results - Main ESG Factors and ROE (Fixed Effects)

	ROE panel linear OLS	Coefficient test OLS robust error	ROE panel Linear Fixed	Coefficient test Fixed robust error
E	0.012 (0.014)	0.012 (0.072)	-0.080*** (0.023)	-0.080 (0.082)
S	-0.048*** (0.012)	0.048 (0.062)	0.043** (0.020)	0.043 (0.066)
G	-0.048*** (0.008)	-0.048 (0.042)	0.006 (0.014)	0.006 (0.064)
MBR	2.751*** (0.094)	2.751*** (0.881)	1.290*** (0.125)	1.290 (1.390)
Size	0.507*** (0.085)	0.507 (0.412)	4.181*** (0.653)	4.181 (2.606)
Leverage	-0.037*** (0.003)	-0.037 (0.025)	-0.078*** (0.003)	-0.078*** (0.027)
Age	-0.030*** (0.0001)	-0.030 (0.023)	-0.501*** (0.065)	-0.501** (0.252)
Constant	-0.322 (2.069)	-0.322 (10.687)		
Observations	5,304		5,304	
R2	0.156		0.164	
Adjusted R2	0.155		0.154	
F Statistic	140.021*** (df = 7; 5296)		146.673*** (df = 7; 5242)	
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix 6: Regression Results - Main ESG Factors and ROA (Fixed Effects)

	ROA panel linear OLS	Coefficient test OLS robust	ROA panel Linear Fixed	Coefficient test Fixed robust error
E	-0.035***	-0.035	-0.042***	-0.042
	(0.005)	(0.025)	(0.009)	(0.033)
S	0.006	0.006	0.009	0.009
	(0.005)	(0.022)	(0.008)	(0.024)
G	-0.013***	-0.013	0.010*	0.010
	(0.003)	(0.016)	(0.006)	(0.022)
MBR	0.923***	0.923***	0.422***	0.422
	(0.035)	(0.227)	(0.050)	(0.269)
Size	0.583***	0.583***	2.236***	2.239
	(0.032)	(0.168)	(0.001)	(1.463)
Leverage	-0.024***	-0.024	-0.029***	-0.029***
	(0.001)	(0.005)	(0.001)	(0.006)
Age	-0.007***	-0.007	-0.309***	-0.309***
	(0.002)	(0.008)	(0.026)	(0.094)
Constant	-5.669	-5.669		
	(0.771)	(3.903)		
Observations	5,304		5,304	
R2	0.244		0.174	
Adjusted R2	0.243		0.165	
F Statistic	244.189*** (df = 7; 5296)		157.993*** (df = 7; 5242)	
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix 7: Regression Results - ESG Subcategories and MCAP Monthly Performance (Random Effects)

	Monthly Mcap Performance panel linear OLS	Coefficient test OLS robust	Monthly Mcap Performance Linear Random	Coefficient test Random robust error
MBR	0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)	0.001 (0.0005)
Size	0.001 (0.001)	0.001* (0.001)	0.001 (0.001)	0.0002 (0.0002)
Leverage	0.0002 (0.00003)	0.0002 (0.0001)	0.0002*** (0.00003)	0.0001 (0.002)
Age	0.0001 (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)	0.003 (0.003)
Resource	0.001 (0.0002)	0.0001 (0.0001)	-0.0001 (0.0002)	-0.018 (0.015)
Emission	-0.0001 (0.0002)	-0.0001 (0.0001)	-0.0001 (0.0002)	
Innovation	-0.00000 (0.0001)	-0.00000 (0.0001)	-0.00000 (0.0001)	0.0003 (0.0002)
Workforce	0.0002 (0.0002)	0.0002 (0.0001)	0.0002 (0.0002)	-0.0005 (0.001)
Human Rights	-0.00000 (0.0001)	-0.00000 (0.0001)	-0.00000 (0.0001)	-0.00000 (0.0001)
Community	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)
Product Responsibility	-0.00005 (0.0001)	-0.00005 (0.0001)	-0.00005 (0.0001)	-0.00005 (0.0001)
Management	0.0001 (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)
Shareholders	0.00004 (0.0001)	0.00004 (0.0001)	0.00004 (0.0001)	0.00004 (0.0001)
CSR-Strategy	-0.0002 (0.0001)	-0.0002** (0.0001)	-0.0002 (0.0001)	-0.0002** (0.0001)
Constant	-0.037 (0.030)	-0.037 (0.020)	-0.037 (0.030)	-0.037 (0.020)
Observations	5,460		5,460	
R2	0.006		0.006	
Adjusted R2	0.004		0.004	
F Statistic	2.411*** (df = 14; 5445)		33.750***	
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix 8: Regression Results - ESG Subcategories and ROE (Fixed Effects)

	ROE panel linear OLS	Coefficient test OLS robust error	ROE panel Linear Fixed	Coefficient test Fixed robust error
MBR	2.848***	2.848***	1.398***	1.398
	(0.095)	(0.880)	(0.126)	(1.038)
Size	0.796***	0.796***	4.781***	4.781*
	(0.094)	(0.482)	(0.637)	(2.657)
Leverage	-0.034***	-0.034	-0.083***	-0.083***
	(0.003)	(0.025)	(0.003)	(0.026)
Age	-0.033***	-0.033	-0.595***	-0.595***
	(0.005)	(0.025)	(0.067)	(0.248)
Resource	-0.033***	-0.033	-0.082***	-0.082
	(0.012)	(0.057)	(0.016)	(0.056)
Emission	0.043***	0.043	0.079***	0.079
	(0.013)	(0.052)	(0.017)	(0.061)
Innovation	-0.030***	-0.030	-0.501***	-0.501**
	(0.0001)	(0.023)	(0.065)	(0.252)
Workforce	-0.041***	-0.041	-0.111***	-0.111***
	(0.014)	(0.073)	(0.019)	(0.062)
Human Rights	0.039***	0.039	0.057***	0.057*
	(0.008)	(0.036)	(0.010)	(0.034)
Community	-0.016**	-0.016	0.032***	0.032
	(0.008)	(0.045)	(0.011)	(0.027)
Product Responsibility	0.040***	0.040	0.001	0.001
	(0.007)	(0.029)	(0.011)	(0.027)
Management	-0.035***	-0.035	0.033***	0.033
	(0.007)	(0.029)	(0.009)	(0.040)
Shareholders	0.006	0.006	0.033***	0.033
	(0.007)	(0.031)	(0.009)	(0.040)
CSR-Strategy	-0.015	-0.015	-0.041***	-0.041
	(0.010)	(0.041)	(0.012)	(0.039)
Constant	-6.297***	-6.297***		
	(2.336)	(12.403)		
Observations	5,460		5,460	
R2	0.176		0.179	
Adjusted R2	0.174		0.169	
F Statistic	83.075*** (df = 14; 5445)		84.093*** (df = 14; 5390)	
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix 9: Regression Results - ESG Subcategories and ROA (Fixed Effects)

	ROA panel linear OLS	Coefficient test OLS robust	ROA panel Linear Fixed	Coefficient test Fixed robust error
MBR	1.004*** (0.038)	1.004*** (0.258)	0.494*** (0.052)	0.494* (0.269)
Size	0.851*** (0.037)	0.851*** (0.201)	2.243*** (0.263)	2.243*** (1.452)
Leverage	-0.021*** (0.001)	-0.021*** (0.006)	-0.031*** (0.001)	-0.031*** (0.006)
Age	-0.002 (0.002)	-0.002 (0.008)	0.320*** (0.028)	0.320*** (0.085)
Resource	-0.029*** (0.005)	-0.029 (0.021)	-0.071*** (0.007)	-0.071*** (0.027)
Emission	0.025*** (0.005)	0.025 (0.026)	0.041*** (0.007)	0.041 (0.036)
Innovation	-0.005* (0.003)	-0.005* (0.010)	-0.0004 (0.004)	-0.0004 (0.012)
Workforce	0.019*** (0.005)	0.019 (0.030)	-0.013 (0.008)	-0.013 (0.023)
Human Rights	0.001 (0.003)	0.001 (0.013)	0.015*** (0.004)	0.015 (0.014)
Community	-0.005 (0.003)	-0.005 (0.012)	0.018*** (0.005)	0.018 (0.015)
Product Responsibility	0.001 (0.003)	0.001 (0.013)	-0.010** (0.005)	-0.010 (0.016)
Management	-0.003 (0.003)	-0.003 (0.011)	0.004 (0.004)	0.004 (0.014)
Shareholders	0.002 (0.003)	0.002 (0.011)	0.008* (0.004)	0.008 (0.014)
CSR-Strategy	-0.045*** (0.004)	-0.045** (0.018)	-0.015*** (0.005)	-0.015 (0.016)
Constant	-13.570*** (0.920)	-13.570*** (4.865)		
Observations	5,460		5,460	
R2	0.241		0.182	
Adjusted R2	0.239		0.171	
F Statistic	123.330*** (df = 14; 5445)		85.540*** (df = 14; 5390)	
Note:				*p<0.1; **p<0.05; ***p<0.01