

1. Introduction

Socially Responsible Investment (SRI), Corporate Social Responsibility (CSR), and Impact Investing are a few names for investing more responsible and sustainable. Even if the idea is not new, it has received more attention over the past decade. Defining this area of investing has proven to be quite difficult, it seems like there is no obvious way to measure responsibility, sustainability and ethics. The individual companies can disclose information on their own, and therefore choose what information to present to the public. A measurable concept that have increased in popularity is Environmental, Social and Governance (ESG) ratings (or scores). Even if some companies have been reporting their ESG scores for years, it has recently been considered something that should be standard. The European commission have suggested guidelines for regulating the financial markets and integrating sustainability (European Commission, 2018). Due to the current uncertainty regarding the measures, having proper guidelines and benchmarks should be welcomed. ESG is part of a very current topic, climate change. Since awareness for our planet's health is increasing, it not so surprising that more and more companies and investors want to be transparent and provide and receive information about Environmental, Social and Governance scores.

The positive outcomes from responsible investments can be multiple according to researchers. It can benefit the company in different ways by offering security, increased satisfaction for employees, and enhancing production can generate more loyal business partners and higher financial performance (Auer & Schuhmacher, 2015; Schramade, 2016). The main focus of the E, S and G areas have developed and changed throughout the years. In 2008, environmental management and emissions were important. In 2018, more focus was on environmental management and water usage, along with protection of biodiversity (Escrig-Olmedo, Fernández-Izquierdo, Ferrero-Ferrero, Rivera-Lirio & Muñoz-Torres, 2019). The social aspect used to target training and rights for employees, this has now shifted to the quality of working conditions and safety, human rights still remain an important aspect (Escrig-Olmedo et al., 2019). Governance main focus seem to be situated in committees and board structures. Attention towards precautions against bribery, corruptions and money laundering have increased since 2008 (Escrig-Olmedo et al., 2019).

Thousands of papers have been written about ESG and its connection to company performance, investigating different angles, and including different variables. Depending on the data, measurements and approach, how ESG ratings affect performance, profits, and stock returns seem to differ a great deal. There are three different conclusions about ESG (or sustainable investing) and returns and valuations; there is a positive impact, a negative impact or no impact at all (Friede, Busch & Bassen, 2015). Agencies often present the research and articles that have gotten the desired results, or just mention benefits with e.g. ESG scores. Consider that there are also a lot of papers without significant results, making the information about ESG (SRI and CSR etc.) public and available is becoming important to investors. How to include ESG in investment analysis is not always clear, and there is no specific training for companies (Friede, Busch & Bassen, 2015). Disclosing this type of information is supposed to enhance performance and benefit the company (Almeyda & Darmansya, 2019). Without transparency regarding the company's sustainability, it can look like you are trying to hide something, and investor might disregard the organization completely.

The amount of responsible investments made by professional management in Europe makes it one of the leading continents, compared to e.g. North America where the market size is much smaller (Global Sustainable Investment Alliance, 2018). Since Europe is a leading force within sustainable investments, examining companies from Europe is of interest. The companies for this paper are from the STOXX Europe 600 index. The data from Sustainalytics starts in February 2014, ending in December 2019. It is rarer to see monthly updated ESG ratings compared to yearly scores, so using data on a monthly basis will enable us to follow the data and identify changes throughout the years more thoroughly, and hopefully capture something others have not. Even if the main focus is the monthly data, I have also included yearly data from Thomson Reuters and will run the same regressions on that data set, those companies are from the Nordic markets, excluding Iceland. It will be interesting to see potential similarities or differences that the results can bring. To examine this topic, panel regressions with random and fixed effects will be used on the equations.

The purpose of this particular study is to see how ESG affects the expected returns of the companies based on their price-to-earnings (PE) ratio and dividend yield. Considering the previous research and the result, finding some sort of relationship is definitely possible. Other papers have not looked at the relationship between the PE ratio and ESG, or dividend yield and ESG, it is hard to predict the outcome. Past articles have used other measures, such as realized

or abnormal returns, as a proxy for expected returns. Therefore, the main difference with this paper compared to others are that it uses the PE ratio and dividend yield as an estimation for expected return. Other performance measures have also been used to evaluate the relationship. Using these particular variables is rare and therefore, the contribution is the results from these regressions from adapting another form of dependent variable. In section 4 of this study, the PE ratio and dividend yield are presented in more detail and the link between the variables and expected return will be seen more clearly. With the close connection of stock prices, these measures could potentially shed more or new light on the relation. The main question that arises is: “Does ESG and expected returns have a relationship, and if so, what kind of relationship exists?”.

After this Introduction, the Institutional Background, presents more information about the concept of ESG and Sustainability, there is also an overview of the two agencies that provide the ESG scores for this particular paper. Moving forward, the Previous Literature is presented and then followed by the Theoretical Background that discusses the dependent variables and what they represent. This section also includes a straightforward hypothesis. The chapter about the Data is next and contains a summary over the panel data sets, and information such as number of observations, firms and means. This leads the reader to the Empirical Approach, which discusses the use of panel data, reasoning behind the control variables and the equations used for the regressions. The next section, the Results are given in both tables and shorter comments. After the results are presented, they are discussed in Discussion, where they are looked upon with greater detail. The paper ends with a Conclusion, where the study is summarized. This thesis also has appendices with additional results and tables.

2. Institutional Background

2.1 ESG

Environmental, social and governance factors are now part of the process when taking investment decisions. There are multiple components to consider that are built into these three letters (MSCI, 2020). Therefore, presenting them one by one will be helpful.

Environmental

This part refers to how resources are used, the companies carbon footprints and emissions, water usage, raw material sourcing, toxic emissions and waste, and electronic waste. It is also about opportunities to take part or invest in renewable energy, green buildings and clean tech. This is all included in the environmental aspect, and usually the first thing you think about when referring to sustainable investments.

Social

Human capital development, labor management, safety procedures for both workers and products, privacy and data security, responsible investments, and access to finance, communications and health care are usually included in this segment. The social aspect is what many think about after the environment when they think about responsible investments.

Governance

Ownership and control, board diversity, business and ethics, tax transparency, and corruption and financial systems instability is what this factor is built upon. This aspect is equally important, even if it is not thought about as much.

Studies on ESG investing have found results that point to outperformance, lower risk, over the medium, and also a positive effect on company performance and valuation. The three main contributing factors associated with high ESG ratings are higher profitability, lower tail risk, and lower systematic risk (MSCI, 2020). ESG can also be used as a sort of shield in downturns. Screening for companies with low ESG have provided good results, i.e. shown a positive improvement on companies that take more sustainable actions (Nordea, n.d).

In 2016, the US SIF foundation reported that assets based on ESG criterions was worth \$8.7 trillion. Two years later, that amount increased with over \$3.3 trillion, meaning that in 2018 the assets were worth approximately \$12 trillion. Investors are very aware of their investments and seem to put a lot of thought into where they go and that it is contributing to something good (US SIF, 2019). More than five years ago, back in 2014, the market size for CSR investments was 58.8 percent in Europe, it was only 17.9 percent in North America (Almeyda & Darmansya, 2019). 49 percent of professionally managed assets in Europe are devoted to sustainable investment strategies. In the US, it is almost half that, professional management hold 26 percent in sustainable investment strategies (Global Sustainable Investment Alliance, 2018).

Since the interest from investors is increasing, it is crucial for companies to keep up with demand and disclose these types of figures. Not only can not being up to date be looked upon negatively by investors or customers, but it might also cause legal issues that could results in fines (Nordea Equity Research, 2017). Companies with higher ESG scores usually present better stability and returns. It is clearly seen as a benefit and it is too costly not to care about it anymore. These conclusions are drawn from the positive connection between ESG and higher ROE and ROCE, and the lower net debt/EBITDA (Nordea Equity Research, 2017). The relations are getting stronger by the year and it is likely to continue. Stability in margins and returns is also something that is noticeable with improved ESG performance, which can be seen as a symbol for improvement in quality. ESG reporting can lead to an increase in demand and therefore compensate for the potential higher ESG-related costs. In the short-term in might not always look like a positive thing in regard to profit or costs, but it is very likely to pay-off in the long-run with e.g. higher returns (Nordea Equity Research, 2017).

2.2 Sustainability

The definition of sustainable in the Cambridge dictionary is being “able to continue over a period of time” or “able to be maintained or continued” (Cambridge Dictionary, 2020). So, in order for something to be sustainable it must be continued over a longer period of time. The world is facing multiple obstacles when it comes to sustainability; rising temperature, flooding’s, and distinction of different species are just a few things. People are rethinking the way they act and also how they invest, so the companies have to keep up with investors needs and wants (MSCI, 2020).

As a rational investor, you are looking for a positive financial return, no matter if your investment is considered sustainable or not. Sustainability, in business terms, should not compromise the future and future generations while still meeting wants and needs of the current generation (US SIF, 2019). The decision-making within a company when working towards sustainable goals should be long term and not just focused on the next quarter. Reasonable goals can include decreasing the company's emissions by five percent. Because of these new goals, modest earnings can arise in the nearer future which forces investors to adjust their expectations on returns. The change does not occur overnight, and it is not uncommon that the adjustments toward sustainability take time and can be costly.

2.3 Sustainalytics

Sustainalytics have been working with ESG over 25 years. During those years they have provided data for an endless number of companies. Sustainalytics is a leading provider of ESG data worldwide and they provide risk ratings and qualitative analysis, which makes them multi-dimensional. They are providing efficiency and deeper insight into the company for their clients (Sustainalytics, 2019). They have five risk levels and a rating scale of 0-100. The risk levels are negligible, low, medium, high and severe. Sustainalytics considers their assessment unique because they expose multiple dimensions and factors, it is comparable between industries, sectors and regions, and they inform the companies about the good and poor things they are doing (Sustainalytics, 2019).

For investors, the use of this information is multifold. They can use the data for equity and bond modulation, best-in-class comparison analysis for multiple approaches, risk ratings and scores for robust benchmarking between industries and sectors, creation input for funds and indices, and check the priorities of the company (Sustainalytics, 2019). The scores are updated frequently which means that it can be used for more frequent data sets.

2.4 Thomson Reuters

Thomson Reuters is another provider of ESG scores and associated information. What is previously known as the Thomson Reuters ASSET4 Equal Weighted Ratings (EWR) have now been improved, so ASSET4 EWR does not exist anymore (Thomson Reuters, 2017). The data,

however, is still available and goes back to 2002. The idea with this measurement was to easy convert information to units that could be compared. At the time, more than 3,000 organizations used their services and it was definitely one of the biggest agencies to provide ESG scores (Thomson Reuters, 2010). ASSET4 EWR includes more than 250 indicators. They claim to be transparent and objective with information they provide and update their information according to daily news (Thomson Reuters, 2010). Not only do clients get access to their own strengths, weaknesses and progress, they can also find information on policies and practice of improvement and competitors, industries and sectors ESG performance (Thomson Reuters, 2010). This allows them to create a benchmark to compare with. For companies and organizations, it is a useful tool that grant them tremendous access to not only improve themselves, but make sure that they are ahead of the competition (Thomson Reuters, 2017). Just as the Sustainalytics score, the scale is 0-100.

3. Previous Literature

The previous research on this subject have generated mixed results. From the results of previous articles, it is safe to say that the impact of sustainability could leave us with more questions than answers. Friede, Busch and Bassen (2015) wrote an article summarizing over 2,000 studies in this area, the research goes back to the 1970's but has increased substantially during the 2000's. They conclude that around half of the results imply a positive relationship between ESG and firm valuation (accounting or market based). Almost one fourth of the studies find a neutral relationship, while only one tenth displayed a negative one (Friede, Busch & Bassen, 2015). These studies have different hypotheses and approaches, uses different data and they examine different parts of the world. Due to the different aspects of each article, different outcomes are also likely to happen.

There are multiple agencies and sources for ESG information these days and different agencies have access to different types of information and also measure ESG differently. Therefore, it can be hard to navigate and distinguish information. There are some frameworks and rules for CSR reports, but the comparability for companies might not be optimal since there are still differences between firms and industries in regard to what is being measured and how (Almeyda and Darmansya, 2019). The overall score can also be misleading if there are areas of the company that are really good in some respects and worse in others. This can cause a misbalance and the firm's good sides might outweigh the bad and create a high score which is not actually reflective of the firm in total (Escrig-Olmedo et al., 2019). The lack of transparency and difficulties to access data are just some of the challenges. The guidelines are flexible and there is no universal way to really compare results (Escrig-Olmedo et al., 2019).

Just because Europe is a leading force in sustainable investment strategies, all research on European countries are not automatically positive. There are still differences and mixed results both within Europe and world-wide. Sahut and Pasquini-Descomps (2015) studied the ESG and monthly stock market returns in Switzerland, the US and UK. This gives a rather slim collection of firms to work with. However, the four-factor model showed that the results from Switzerland and the US were insignificant, and the results from the UK showed a slight negative impact on the returns (Sahut & Pasquini-Descomps, 2015). Good news regarding ESG should be able to lead to higher demand, growth and prices. Since it was a smaller sample, the

results are not really generalizable, and they might be depending heavily on the years and sectors more than the actual ESG scores (Sahut & Pasquini-Descomps, 2015).

Germany and Italy have also been studied individually. Velte (2017) uses firms from Germany because of the obligation to report information about CSR. Because of that, it can be easier to gain access to the necessary material. The point is to see if ESG performance can lead to better financial performance. The regressions provided significant positive results. There is a positive relationship between ESG performance and accounting based financial performance, so the hypothesis holds (Velte, 2017). However, the study concludes that there is no positive relationship between ESG, and market based financial performance. The prediction that abnormal returns and ESG have a positive relation fell short on companies in Italy (Landi & Sciarelli, 2019). The results showed that no significant relation exists between the Italian companies' abnormal returns and ESG scores. The authors draw the conclusion that you cannot rely on social responsibility in terms of financial leverage (Landi & Sciarelli, 2019).

Venturing outside of Europe, a study with over 200 Australian companies show that different industries perform differently in terms of ESG scores. Financial and banking industries showed better ESG scores than industries such as mining, electricity and utilities who had low scores. With the help of multiple profitability and equity measures, the study provided a variety of insignificant results (Balatbat, Siew & Carmichael, 2012). However, weaker correlations could be established, such as the connection between enterprise value and ESG along with some negative correlations with other financial performance measures. The result of this could have been affected by the financial crisis, since the data period is 2008 to 2010 (Balatbat, Siew & Carmichael, 2012). With data from North America, Europe, Japan, Asia-Pacific, South America and Africa, including EGS when researching different factor models showed that lower ESG score demonstrates higher expected returns (Ciciretti, Dalò & Dam, 2019). The point is to use ESG as a risk factor to see how the ESG premium evolves in the long-run. The results indicate that the cross-sectional variation of expected returns related to the ESG premium is mainly driven by investors preference for ESG-related issues rather than that systematic risk components captured by ESG scores (Ciciretti, Dalò & Dam, 2019).

4. Theoretical Background

4.1 Behavioral Finance

According to the efficient market hypothesis (EMH), available information is already reflected in the asset's price. When using the PE ratio as a proximation for stock price, evidence also showed that the information is not fully reflected in the asset's price (Basu, 1977). Outperforming the market is rather difficult and whether it is actually efficient or not have been questioned (Bodie, Kane & Marcus, 2018). One theory that could influence the market and disrupt the efficiency is behavioral finance. The EMH does not consider that people are individuals and that they take different decision under different circumstances (Bodie, Kane & Marcus, 2018). The available information is not handled 'correctly' by people and can cause them to deviate from expectations the hypothesis has. Investors are not always rational; therefore, we cannot be certain of their behavior or actions.

Behavioral finance can display itself in different ways. The behavior of investors differs from human to human, but also from situation to situation. How information or suggestions are presented can affect the way we act, we cannot be certain that we have all the details (Bodie, Kane & Marcus, 2018). Buying at the wrong time or holding stocks losing stock for too long is common behavior. Investors can also attach good or bad feelings to a financial decision that can affect the decision-making process. Rationality is not winning when feelings are present (Bodie, Kane & Marcus, 2018).

Sustainable investments and behavioral finance can lead to something called the warm-glow effect (Allison, McKenny & Short, 2013). Warm glow is a phenomenon that generates good feelings after doing good. Some studies suggest that the reason behind good actions is simply a product of egotistic behavior (Allison, McKenny & Short, 2013). The reason behind doing something good is simply to feel better about yourselves and not actually improve or better something. To get rewarded or avoid punishment can be a motivational factor. There is also a more optimistic way to look at it, and that is that people actually want to help those in need. Thus, investing in e.g. sustainable assets can generate a warm-glow effect (Allison, McKenny & Short, 2013).

4.2 A Measure for Return: PE ratio

The price-to-earnings ratio is a form of valuation method that investors can use to compare the shares of a company (Bodie, Kane & Marcus, 2018). The general formula follows:

$$\frac{\text{Market (current) value per share}}{\text{Earnings per share (EPS)}} \quad (1)$$

Both historical and future returns can be used for the calculations. The most common form is to use the trailing 12 months, which combines the ratio over the past twelve months and thereby uses the average of those values. There is also the option to combine earnings over ten and 30 years. Big fluctuations do not have the same impact on the outcome when measured over multiple years. Forward PE is also common, which forecasts the future instead of looking into the past. However, the future is uncertain and unknown so mistakes can easily be made. There is also the possibility of manipulating the numbers and underestimating them on purpose in order for the firm to exceed expectations later on. Investor should not base their decisions solely on this method because, just like any other measure, it is flawed. The main issue is that the ratio differs a lot between industries and sectors, it is also very volatile.

Because of the PE ratio's properties, understanding the value of a company is more tangible. It is also easy to compare to indices and benchmarks, as well as determining if a stock is over- or undervalued. Growth stocks usually have high PE ratios whilst value stocks have a low ratio (Corporate Finance Institute, 2020e). The high ratio signals potential high future returns and investors might be willing to pay more for these stocks. Besides high ratio and returns, growth stocks are also associated with higher volatility, that is high risk (Corporate Finance Institute, 2020e). The high PE ratio could alternatively indicate that the stock is overvalued. A low PE ratio can be a sign for an undervalued stock, which means it can be a really good deal for investors to make a profit (Corporate Finance Institute, 2020e).

Normally, the ratio is used as an accounting valuation measure. However, that is not the only way to use it. The PE ratio can also be used as a proxy for example, risk or growth. For the purpose of this paper, it will be used as a way of predicting expected returns. The PE ratio of the firm does not change, the change lies in the interpretation. If the PE ratio is low, the stock price is considered cheaper and the return is anticipated to be higher in the near future (Basu,

1977). There is also evidence indicating that portfolios with low ratios have a higher risk adjusted return, more so than portfolios with a high PE ratio (Tseng, 1988). Investing in portfolios with a low ratio would help investors earn a higher return than investing in high ratio portfolios.

The PE ratio is closely related to the stock price of the asset, meaning that it often changes as the price moves. Based on the dividend discount model that will be presented in more detail in the next subsection, we can further develop an equation that shows the relationship between the PE ratio and expected return:

$$P = \frac{E}{E(r)} \rightarrow \frac{P}{E} = \frac{1}{E(r)} \rightarrow P = \frac{(1-b)E_1}{E(r)-g} = \frac{D}{E(r)-g} \rightarrow E(r) = \frac{D}{P-g} \quad (2)$$

where P is the stock price, E is the earnings, $E(r)$ is the expected return of the stock, D is the dividend yield, and g is the dividend growth rate.

Several studies have shown a relationship between expected returns and PE ratio. Further, Basu (1983) found that it is true for risk adjusted returns as well. Basu (1977) used the PE ratio because of its proximity to risk, which he later found actually evidence of in 1983. Fama and French (1992) have also found a positive relationship between low PE ratios and abnormal returns. As with most research in the academic world, there are evidence that contradict these findings and have come up empty handed in regard to a significant relationship between the variables in question. A specific example of that is a study that showed that the PE ratio was not a significant parameter for predicting returns on Indonesian companies (Fun & Basana, 2012).

The Federal Reserve Bank of Kansas mentions that high PE ratios and stock with slow growth accompany each other (Shen, 2000). From history, we can see that discouraging market performance and high PE ratios follow each other as well. If the firm is riskier, it could be that the PE ratio will be lower, i.e. the required rate of return is higher. That could imply that low ratio stocks do not have to be a good deal because the reason for the low PE ratio can be influenced by the fact that the firm is riskier, which investors want to be compensated for by a higher rate of return (Fun & Basana, 2012). Compared to a normal bank account, bonds or funds, stocks are looked upon as more risk filled. If the perception is changing and investor

view it as less risky, then the demand will probably increase. If that happens, it will also raise stock prices and PE ratios (Shen, 2000).

4.3 A Measure for Return: Dividend Yield

Dividend yield is the return from dividends, and part of the return of an investment. This payout is something that companies decide for themselves, and therefore it can vary a lot (Bodie, Kane & Marcus, 2018). It is measured in percentage and is based on the current stock price, the formula follows:

$$\frac{\text{Dividend per share (DPS)}}{\text{Market (current) value per share}} \quad (3)$$

Usually, the yield rises when the stock price fall and rises when the yield falls. The yield can vary a lot if prices fluctuate heavily. Whether the yield is low or high relies mostly on the business- and industry cycle of the firm (Corporate Finance Institute, 2020a). If the firm is growing a lot, and fast, the money might be better spent on other investments that can help the company grow even more. It is likely that they do not pay out any dividend at all. More established firms have a larger payout and therefore a higher yield since they already have made the most necessary investments (Corporate Finance Institute, 2020a). However, it could also be seen as a lack of growth potential to have a high yield. One should not rely on the yield when determining whether a company is a good or bad investment (Corporate Finance Institute, 2020a).

Just as the price-to-earnings ratio, dividend yield can be used to predict expected returns (Dow, 1920). This theory goes back all the way to 1920, but many articles published since then. Fama and French (1988) did a study about this on the New York Stock Exchange (NYSE) and found that dividend yield most definitely can predict expected returns. Similar studies have been done and have reached to the same conclusion (Ball, 1978; Campbell & Shiller, 1988; Cochrane, 1997; Fama & French, 1989; Rozeff, 1984; Shiller, 1984). Many studies have been done on US data, so Monteiro, Sebastião and Silva (2018) decided to include other countries. The countries that showed a relationship between dividend yield and returns was the US, UK and France. For Germany, the test revealed that the connection only exists in the short run. As for Spain, Italy and Japan, no such link could be found (Monteiro, Sebastião & Silva, 2018).

The framework behind this is the Dividend Discount Model (DDM), which claims “that stock prices are determined ultimately by the cash flows accruing to stockholders, and those are dividends”, according to Bodie, Kane and Marcus (2018). The simplest formula (where g is constant) for the model is presented below:

$$P = \frac{D}{E(r)-g} \rightarrow (E(r) - g)P = D \rightarrow E(r) = \frac{D}{P} + g \quad (4)$$

where P is the price of the stock, D is dividend yield, g is the dividend growth rate, and $E(r)$ is the expected return of the stock.

It is rearranged for a clearer vision that the expected return is highly relevant when it comes to dividend yield. Dividend yield and dividend growth rate is therefore equal to the expected return (Bodie, Kane and Marcus, 2018). The expectation is that well-established firms have zero growth and are not reinvesting in the firms but put that money towards dividend instead. In equilibrium, the assumption is that since there are no further investments and as a result, no growth. In that case, the owners of the firms receive all earnings (Bodie, Kane and Marcus, 2018). Just as the PE ratio, dividend yield is definitely influenced by the stock prices. It follows the up and down movements of the asset's price, which can vary a lot.

Just as the PE ratio, DDM is used to value stocks. Part of the earnings per share (which is part of the PE ratio formula) usually comes from dividends, so they are associated with each other. The two measures actually have an inverse relationship, meaning that they should present an opposite relationship for the potential result with, for example, a variable like ESG.

4.4 Hypothesis

Considering the studies on return and ESG, and studies regarding PE ratio and dividend yield as a proxy for expected return, the establishment of the hypothesis is not complex. To help answer the main question of this study, if ESG is related to expected returns, the hypothesis for the regressions is the following:

H₀: ESG does not have a significant correlation with expected returns.

H_A: ESG does have a significant correlation with expected returns.

5. Data

This chapter will present further details about the data, number of observations and firms, and some summary statistics.

The monthly data set from Sustainalytics reaches from February 2014 to December 2019, a period of 71 months. Compared to e.g. Thomson Reuters ASSET4, which only was accessible in years in my case, Sustainalytics data is monthly updated and therefore all other factors can also be on a monthly basis. The data from Sustainalytics is gathered from the Bloomberg terminal. The STOXX Europe 600 Index contains 600 large, mid and small firms across 17 European countries. Due to a lack of observations for some of the firms, companies from 15 countries are included. A list of countries and firms can be found in Appendix 3. The original 600 countries originate from the STOXX Global 1800 Index and are derived from the STOXX Europe Total Market Index (STOXX Qontigo, 2020).

The monthly data set contains 314 firms, these have been selected due to the accessibility in the Sustainalytics ESG data, as well as the amount of available data for the dependent and independent variables. Apart from ESG rankings, PE ratios, dividend yield, other control variables have been selected and gathered through Bloomberg. There are some observations missing and not all companies have numbers for the entire period. The variables are considered missing at random, which means that its absence is because of unavailable information (Gelman & Hill, 2006). In this case, some of the data have simply not been able to access from Bloomberg or other sources, which is why it is not available. To exclude variables when they are missing at random is acceptable; instead of having to remove an entire firm some firms just have less observations for the different variables (Gelman & Hill, 2006). We can still capture a potential outcome with the information we do have. Despite some missing variables, the monthly data set contains over 20,000 observations. The statistical program used for this paper is Stata 16.1. The original data is set up as a panel data set in Excel and then transformed in the statistical program.

This paper will also include regressions on yearly data from Thomson Reuters ASSET4 EWR. The firms included are from Danish, Finnish, Norwegian and Swedish markets. It consists of 84 firms and reaches from 2002 to 2018. Since it is yearly, it is a total of 17 periods and over

1,000 observations. This data set is a lot smaller since it only contains firms from northern Europe, and due to more missing observations, many firms had to be removed. This means that more firms had to be removed from the panel data set. Thus, this panel is unbalanced as well.

Tables 1 and 2 show summarizing statistics over the data. The mean, minimum and maximum is presented for the variables. The minimum and maximum represents the lowest and highest values for the variables. Simply explained, the ‘between’ refers to the difference between the firms (n), whilst ‘within’ is the variation that exists between the different observations (N) (Stata, n.d). The ‘within’ for the minimum and maximum values for e.g. the ESG scores indicate the deviation from each score’s average. The standard deviations in these tables refers to the difference between two randomly drawn observations or firms (Stata, n.d).

Table 1. Summary statistics of the monthly data set

Variable	Mean	Standard Deviation	Minimum	Maximum	Observations
ESG	77.7226	21.3074	0	100	N = 22,256
Between		19.5856	3.1692	99.9425	n = 314
Within		8.4706	27.3675	123.3027	
PE ratio	25.3606	28.7181	1.6203	448.6715	N = 21,997
Between		14.4279	6.6391	122.0462	n = 314
Within		24.9478	-92.1881	418.6693	
Dividend Yield	3.3374	1.7299	0.1175	14.2037	N = 22,033
Between		1.4390	0.3629	7.3568	n = 314
Within		0.9643	-1.3688	12.9595	
Market Capital	44.2197	79.7742	1.6422	1039.7400	N = 22,283
Between		78.2324	3.2053	788.1789	n = 314
Within		16.1329	-155.2829	295.7808	
Beta	0.9500	0.2994	-0.2486	4.2566	N = 22,281
Between		0.2102	0.4537	1.5559	n = 314
Within		0.2137	-0.0421	3.6508	
Leverage	7.3142	60.5530	1.0076	5,001.846	N = 21,558
Between		18.6113	1.0076	224.4975	n = 314
Within		57.7403	-213.2441	4,784.663	

Note: N = number of observations, n = number of firms. Between = difference between n, within = difference between N.

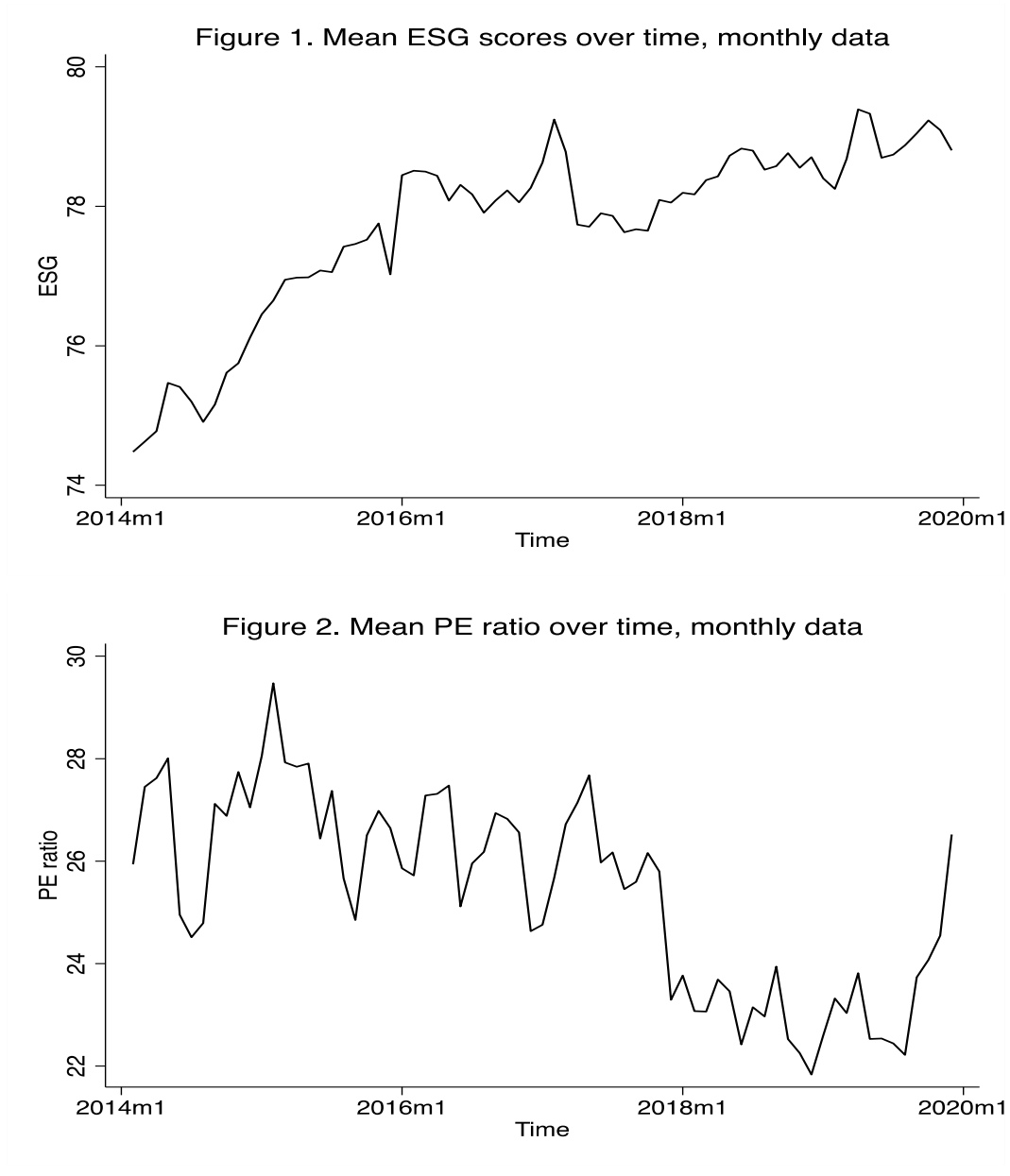
Table 2. Summary statistics of the yearly data set

Variable	Mean	Standard Deviation	Minimum	Maximum	Observations
ESG	65.5517	30.6136	1.46	98.6	N = 1,377
Between		17.5086	12.7007	95.1094	n = 84
Within		25.2712	-15.7612	118.003	
PE ratio	19.1962	27.2642	0.1095	412.3169	N = 1,411
Between		10.4349	3.8753	67.8653	n = 84
Within		25.2075	-40.7902	363.6478	
Dividend Yield	4.8752	6.4467	0.1837	61.5385	N = 1,382
Between		4.7706	0.51	40.1264	n = 84
Within		4.3227	-33.9785	26.2873	
Market Capital	56.0176	82.2424	0.7258	613.479	N = 1,435
Between		73.9275	1.0121	407.4213	n = 84
Within		35.8496	-223.313	297.5661	
Beta	1.6966	1.9629	-0.4931	14.733	N = 1,063
Between		0.8098	0.3581	4.3087	n = 84
Within		1.7973	-2.2600	12.7771	
Leverage	4.7194	8.0152	1.0834	94.9047	N = 1,444
Between		6.5951	1.2742	35.9408	n = 84
Within		4.6984	-27.9391	84.0348	

Note: N = number of observations, n = number of firms. Between = difference between n, within = difference between N.

To get an additional overview of the variables of interest, the figures below represent the mean of the ESG scores, PE ratio and dividend yield over the course of the period for the monthly data. From figure 1, the average ESG seem to have increased over the time period. Figure 2 shows that the PE ratio varies a lot more over the months. It has larger swings, which might not be surprising considering that it is dependent on stock prices. Dividend yield show some movements as well in figure 3, but not to the same extent as the PE ratio. Thus, dividend yield is also related to stock prices so that behaviour is not unexpected.

Financial data in general is considered to be somewhat noisy (Brooks, 2014). With noisy meaning that it is harder to separate trends or pattern in the actual data from random or irrelevant characteristics. When dealing with higher frequencies, the data may contain more information that is not really relevant for the specific research. This can cause bigger standard errors. Daily returns for example, are considered extremely noisy because of the volatility and can affect the outcomes of the regressions (Brooks, 2014).



6. Empirical Approach

Time series data with cross-sectional features are called panel data and are common in the world of finance. A panel measures some quantity over time while maintaining objects, individuals or firms (Brooks, 2014). Pooled regression is one way to address this, that means that all data (time series and cross-sectional) is within a single equation. Besides pooled regression, panel data can be executed with either fixed or random effects. When you use fixed effects, each firm is estimated by a parameter, the intercept does not vary over time despite the fact that the intercept changes across firms. The fixed effects model refers to the perception of the intercept and slope parameters (Javed, 2019). The random effects model can also be called the error components model (ECM). One of the assumptions of the models are that the error terms are not correlated with each other. There is no autocorrelation across either the time series or cross-section components (Javed, 2019). The intercepts are mean of the cross-sectional intercepts. The random variance from the mean for the specific intercept is represented by the error component. Heterogeneity is taken into account automatically and the aggregation decreases bias (Javed, 2019).

The reasons for using panel regressions and the main advantage are that we can go much deeper with our analysis (Brooks, 2014). Combining them gives us the ability to focus on complicated problems and questions; it is often used to analyze the way two (or more) variables move over time. If you are going to do the same thing with time series or cross-sectional data separately, it would require a much larger dataset in order to get the same level of accuracy (Brooks, 2014). When no observations are missing in the panel data, it is called a balanced panel, otherwise we have an unbalanced panel (Stock & Watson, 2015). Omitted variables can be constant over time while they still differ across entities. Numerous measurements on the same object over time can help control the unobservable omitted variables. If the dependent variable changes while the unobservable variable does not, the change is due to something other than fixed aspects (Stock & Watson, 2015).

In this paper, the data consist of multiple observations of multiple variables over a specified time period for many different firms. Therefore, it has both cross-sectional and time series features that will be suitable as panel data. There are missing variables in the data, which makes

it an unbalanced panel data. Considering the amount of observations for the monthly data, this should not have a huge impact on the result.

The data are collected from Bloomberg, then organized by e.g. removing companies due to the lack of observations or unreasonable values. The data was constructed to be recognized as panel data in the statistical program. The equations presented below are first executed as pooled regressions, then with random effects, and lastly with fixed effects. Conventional standard errors are used. Tests are performed to see which approach is the best fit for the data. A Breusch and Pagan Lagrangian multiplier test for random effects determine whether to use pooled regressions or random effects. The Hausman test is to decide between the fixed and random effects. The null hypothesis of the test tells us that the difference in coefficients are not systematic. If we can reject the null hypothesis on a 5 percent level, fixed effects are more appropriate. These tests are done after each regression. The measure of fit, the R^2 , will be presented as well, which represents the fit between the regression and the data. If there are other important factors that can benefit the model or influence the outcome of the regression, the value of the R^2 will indicate that (Stock & Watson, 2015).

In order to explore the hypothesis and the main purpose, four equations are created. First up is the bivariate cases where ESG is the only independent variable:

$$PE\ ratio_{it} = c + \beta ESG_{it} + u_{it} \quad (5a)$$

$$Dividend\ Yield_{it} = c + \beta ESG_{it} + u_{it} \quad (5b)$$

where ESG is the Environmental, Social and Governance score, i is the i -th cross-sectional unit, t is t -th period of time.

The control variables are then added to the previous regressions. From the following equations the relationship will be explored further:

$$PE\ ratio_{it} = c + \beta_1 ESG_{it} + \beta_2 MARKCAP_{it} + \beta_3 BETA_{it} + \beta_4 LEV_{it} + u_{it} \quad (6a)$$

$$Dividend\ Yield_{it} = c + \beta_1 ESG_{it} + \beta_2 MARKCAP_{it} + \beta_3 BETA_{it} + \beta_4 LEV_{it} + u_{it} \quad (6b)$$

where ESG is the Environmental, Social and Governance score, MKCAP is the market capitalization, BETA is the company's beta, and LEV is the financial leverage, i is the i -th cross-sectional unit, t is t -th period of time.

It is because of previous research by Fama and French (1992, 1993) and their significant results that market capitalization, beta and financial leverage are included. They show that adding additional variables can help beta explain the relationship with stock market returns. According to Fama and French (1993), explaining the changes in market returns is not something beta can do on its own. They added additional factors to the equation that represented size and book-to-market value, which measure liquidity and debt in a sense (Corporate Finance Institute, 2020d). Thus, market capitalization and financial leverage are similar risk measures to the factors of Fama and French (1993). It is possible that ESG have an effect on expected return on its own, controlling for risk can help the fit of the model (Fama & French, 1993).

The way market capitalization is calculated is by multiplying shares outstanding with the last closing price (Bloomberg, 2020a). It is measured in billions of euros. The market capital represents the value of the company's shares outstanding, excluding treasury shares. If the company happens to have multiple shares, all common stocks at the end of the period is representative as the market capitalization. Therefore, it becomes a sort of risk measure because it shows the firm's financial ability (Corporate Finance Institute, 2020c).

The overridable adjustable beta is derived from multiple beta measures in Bloomberg (Bloomberg, 2020c). Calculating the beta is calculating the risk of the asset, that is the volatility of the asset. In general, a beta below one does not have lower expected return since the risk is less than the market portfolio. If it happens to be above one, the investor takes a higher risk and therefore expect a higher excess return (Stock & Watson, 2015).

Meeting obligations and the ability to secure finances is the measure of the leverage ratio (financial leverage) which is based on total equity. Bloomberg uses the numbers the company publish themselves, if that information is not available it is calculated by dividing the total adjusted assets with the total adjusted equity (Bloomberg, 2020b). The financial leverage shows the division of asset and equity in the firm, namely the portion of debt in the company (Corporate Finance Institute, 2020b). Having a high leverage signals a higher risk to investors since the firm is relying more on debt. A company have to meet obligations and pay back its

investors and still have enough funds to run their business as normal. In a way, this can also be used as a form of risk measure for the individual organization (Corporate Finance Institute, 2020b).

7. Results

The results of the regressions will be presented in two different tables, one for each dependent variable. Results from both random and fixed effects will be presented. Before going any further, the results from the yearly data can be found in Appendix 1, this because of the lack of significant results. Potential causes for this outcome will be briefly discussed in the next chapter.

To see whether a pooled regression or if a regression with random effects should be used, a Breusch and Pagan Lagrangian multiplier test for random effects is conducted. The probability is 0.000 and therefore, random effects fits better moving forward than a pooled regression. This result is continual for all regressions in this paper and therefore, this is only mentioned once. Thus, the results from the pooled regressions can be found in Appendix 1.

The Hausman test is conducted to see which effects model is appropriate for the regression. With the PE ratio as the dependent variable and ESG as the independent, the null hypothesis is rejected, and fixed effects are used for further analysis. For the case where the other control variables have been added, the null hypothesis cannot be rejected, and the random effects is more appropriate. To see more clearly which model is the most suitable, the suitable effects are written in bold in the respective tables. The results of all the Hausman tests can be found in Appendix 2.

The results of the regressions with the PE ratio as the dependent variable shows a significant negative relationship between ESG and the PE ratio. The other independent variables are also statistically significant. The low R^2 indicates that a better model might exist. However, due to the significant results, we should not dismiss them based on the R^2 alone.

Table 3. Regression with PE ratio as dependent variable, monthly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	-0.0452** (0.0181)	-0.0669*** (0.0200)	-0.0346* (0.0185)	-0.0556*** (0.0206)
Market Capital			-0.0145* (0.0075)	-0.0263** (0.0105)
Beta			1.5850** (0.7913)	1.6805** (0.8084)
Leverage			0.0076*** (0.0029)	0.0075** (0.0030)
R ²	0.0005	0.0005	0.0000	0.0000

Note: Standard Error in parentheses. *, **, *** notable level of significance of 1%, 5% and 10%, respectively.

The Hausman test for table 4 provides the information that random effects should be used for the bivariate case and fixed effects for when the additional control variables are added. When dividend yield act as the dependent variable, a significant positive relationship has been found. The significance of the additional control variables is at the 1 percent level. The R² is slightly better in table 4, but still very low.

Table 4. Regression with dividend yield as dependent variable, monthly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	0.0035*** (0.0008)	0.0035*** (0.0008)	0.0051*** (0.0008)	0.0048*** (0.0008)
Market Capital			-0.0116*** (0.0004)	-0.0135*** (0.0004)
Beta			0.1623*** (0.0316)	0.1578*** (0.0315)
Leverage			-0.0004*** (0.0001)	-0.0004*** (0.0001)
R ²	0.0140	0.0140	0.0013	0.0015

Note: Standard Error in parentheses. *, **, *** notable level of significance of 1%, 5% and 10%, respectively.

8. Discussion

From previous research, saying that ESG have an impact on expected return is not uncalled for. It has been shown that ESG have a positive significant impact on different valuation measures and the stock market returns. There are also articles that show a neutral relationship between ESG and expected returns, so finding something in those lines would not be surprising. Looking at the results for the monthly data from Sustainalytics, the outcome is mixed. In theory, the effect on the dependent variable should differ between the PE ratio and dividend yield based on the inverse relationship mentioned earlier.

Table 3 show the results of the regressions where the PE ratio is the dependent variable. For the bivariate cases, ESG is statistically significant on a 5 percent level. The coefficients in these cases are negative, meaning that ESG has a negative impact on the PE ratio. Adding the additional variables, the coefficients are all significant on a 10 percent level. With the information above, the conclusion is that the ESG have a significant negative impact on expected returns when estimated on its own. When the control variables are added, the significance decrease slightly but is still within reasonable range. The market capitalization and the relationship with the PE ratio is slightly negative. The beta and leverage seem to have a positive significant impact on the dependent variable. The R^2 for the models are extremely low, so even if ESG does have an impact we cannot say that it is crucial for the expected returns. There are probably many other factors that can affect the dependent variable.

When dividend yield is used the dependent variable, the results show that the ESG is significant on a 1 percent level, this is true for all of the regressions. The outcomes show that there are positive impacts on the dividend yield from the ESG scores. This is in line with expectations and the previous research. The market capitalization seems to have a negative relationship with the dependent variable, while the beta has a positive one and pretty similar coefficients as in the previous regression. The financial leverage is now negative.

Some studies have shown that a negative relationship between ESG and expected returns exist. Despite this, the expectations of the ESG score on the monthly data is positive. The number of articles displaying negative connections is less compared to positive and neutrals relationships. The PE ratio and dividend yield as dependent variables gave different reactions to the ESG,

even if they are both an assessment for expected returns. However, that was expected and demonstrates that there is actually something of interest here. The outcome is thus that the PE ratio gets impacted negatively, the dividend yield is positive. The low R^2 suggests that ESG does not really explain the PE ratio or dividend yield that well and that there are other factors missing from the regressions. This does not specifically mean that ESG does not have any impact on expected returns, only that explanation of the movements in the dependent variable is low. Thus, the dependent variables reflect expected returns. With the null hypothesis established in section 4, “ESG does not have a significant correlation with expected returns” and the result in hand, the null hypothesis can be rejected for both measures.

Behavioral finance tells us that investors are not always rational, so even if sustainable companies would not offer the highest return, it is possible that investors would still invest in those companies. The timing of buying and selling could also cause affect the return, in a positive or negative way. It could be because they actually care about the environment and the globe, or because they feel like the need to compensate for something else. The demand for these assets might be affected due to behavior and individual feelings. Increasing the demand for the stocks will also drive up the price, since the dependent variables are heavily correlated with stock prices. The warm-glow effect can have something to do with the increased interest overall. The lack of common regulations and standards hinder us from making straight comparisons with other studies. To get that aspect, one would have to use data from the same sources, but hopefully that is not so far away,

The same process is repeated with the yearly data from Thomson Reuters ASSET 4. The results are still mixed and the expectations from the regressions were that there were going to be similarities with the monthly data. For the regressions with one independent variable (i.e. ESG), the coefficients are negative when the PE ratio act as the dependent variable. The processes are repeated and the results from using the dividend yield shows a negative coefficient in the bivariate case but adding the other control variables reveals a positive coefficient instead. However, ESG is insignificant in all these cases.

Having a much smaller data set for the yearly data is definitely a limitation if comparability would have been a main priority. The yearly data set contains a fraction of the observations in the monthly data set, which can decrease the ability to pick up any changes. The variety in the yearly data is much higher and the mean e.g. for the beta is higher, meaning that the overall

risk of those stocks is greater. With this in mind, it should not be surprising that the results do not really align. It can also be that these Nordic companies ESG simply does not have a relationship with the dependent variables. A larger sample is probably required to be certain.

9. Conclusion

ESG scores are here to stay, and it will probably continue to be a well-researched topic for the next coming years. What the results of that are going to show is for the future to decide. Right now, all we know is that the varied results of the subject can be confusing. Most previous studies show that ESG have a positive effect on expected returns and firm performance, and therefore the expectations were just that, positive.

This study uses up-to-date monthly data for all variables, the data set is relatively large and includes many observations. With the variety of firms and countries included, the representation of firms in Europe overall is rather extensive. The yearly data set contains less observations but also includes fewer firms and countries. The conclusions we draw from those results applies to the specific companies and due to the lack of data, the results should not be generalized. Repeating the process with more firms is preferable.

The dependent variables of this study portray the expected stock returns, and the control variables serve as measure of risk. The PE ratio and ESG scores signify a negative significant relationship from the monthly data. The null hypothesis can therefore be rejected. The evidence from the yearly data is not significant. A positive connection between dividend yield and ESG can be find. Once again, the null hypothesis is rejected and concludes that ESG have an impact on expected returns using the monthly data. The product of the yearly data show insignificant results, we cannot confirm that ESG impact the dependent variable.

Maybe the reason for sustainable investing does not come from the right place, maybe they just want good karma or get rewarded somehow. But as long as individuals let feelings affect their financial decisions, the socially responsible investments can do good, no matter the intentions. The information available on ESG is somewhat accessible, but some of the material could be more transparent and easier to get a hold of. As an individual it can be harder to access the right information but if the European Commission and other similar organizations continue to work towards common guidelines, it will be more convenient for everyone. It can improve the research and studies; it will be more comparable and hopefully more transparent. For the monthly data, it is easier to generalize the results, but one should be careful with comparing

studies that use different data sources. Due to the irregularities in measurements, it might affect the results.

Despite some insignificant reactions, the monthly data shows that there is something of value there. The ESG scores show sign of being able to influence expected returns in both a positive and negative way. If ESG scores have a negative impact on stock returns, investors can probably be discouraged, and in turn the companies will not think it is worth to invest in sustainable actions. A positive connection between the two encourages investors to look for firms that are including ESG in their business plan, and the organizations will be more inclined to continue in that direction. Nonetheless, the relationship between PE ratio and dividend yield is oppose to each other, which falls in line with theory and expectations. The purpose of this thesis is to investigate the effect ESG can have on expected returns, and to answer whether there is a significant relationship there, and also in what direction this relation goes. With that said, it has been achieved to a certain extent.

For the benefit of this study, comparing portfolios with different ESG rankings could potentially show the effect of the level of ESG scores that perform better in terms of expected returns. One could also have compared individual countries or added data from North America to see if there are any differences. Europe is one of the leading continents when it comes to sustainable investments, assuming that ESG would impact expected returns seems reasonable. If the European Commission and other similar organization can create reasonable guidelines that unites the firms, maybe the results of future research will be different and more comparable. New ways, new ideas and new data will continue to develop and contribute to more interesting results in this area of research for years to come.

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Appendices

Appendix 1

Table 5. Pooled regression results, monthly data

Variable	One Independent Variable		Multiple Independent Variables	
	PE ratio	Dividend Yield	PE ratio	Dividend Yield
ESG	-0.0444** (0.0181)	0.0037*** (0.0008)	-0.0340* (0.0185)	0.0050*** (0.0008)
Market Capital			-0.0070* (0.0132)	-0.0000*** (3.74e-07)
Beta			1.1805** (0.7930)	0.1607*** (0.0310)
Leverage			0.0076*** (0.0030)	-0.0004*** (0.0001)

Note: Standard Error in parentheses. *, **, *** notable level of significance of 1%, 5% and 10%, respectively.

Table 6. Pooled regression results, yearly data

Variable	One Independent Variable		Multiple Independent Variables	
	PE ratio	Dividend Yield	PE ratio	Dividend Yield
ESG	-0.0076 (0.0263)	0.0028 (0.0049)	-0.0139 (0.0311)	0.0027 (0.0061)
Market Capital			-0.0070 (0.0132)	-0.0127*** (0.0036)
Beta			0.3885 (0.4356)	-0.1625** (0.0827)
Leverage			-0.2833** (0.1277)	0.0366 (0.0398)

Note: Standard Error in parentheses. *, **, *** notable level of significance of 1%, 5% and 10%, respectively.

Table 7. Regression with PE ratio as dependent variable, yearly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	-0.0076 (0.0264)	-0.0071 (0.0287)	-0.0150 (0.0314)	-0.0245 (0.0348)
Market Capital			-0.0068 (0.0138)	-0.0074 (0.0254)
Beta			0.3766 (0.4359)	0.2838 (0.4575)
Leverage			-0.2912** (0.1304)	-0.3949** (0.1674)
R ₂	0.0001	0.0001	0.0078	0.0073

Note: Standard Error in parentheses. *, **, *** notable level of significance of 1%, 5% and 10%, respectively.

Table 8. Regression with dividend yield as dependent variable, yearly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	-0.0028 (0.0049)	-0.0032 (0.0050)	-0.0027 (0.0061)	0.0029 (0.0063)
Market Capital			-0.0127*** (0.0036)	-0.0169*** (0.0045)
Beta			-0.1624** (0.0827)	0.1700** (0.0837)
Leverage			0.0367 (0.0397)	0.0237 (0.0459)
R ₂	0.0000	0.0000	0.0098	0.0092

Note: Standard Error in parentheses. *, **, *** notable level of significance of 1%, 5% and 10%, respectively.

Appendix 2

Table 9. Hausman test (PE ratio), monthly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	-0.0452 (0.0087)	-0.0669 (0.0087)	-0.0346 (0.0099)	-0.0556 (0.0099)
Market Capital			-0.0000 (7.42e-06)	-0.0000 (7.42e-06)
Beta			1.5850 (0.1651)	1.6805 (0.1651)
Leverage			0.0076 (0.0002)	0.0075 (0.0002)
Prob > chi2 = 0.0126			Prob > chi2 = 0.0695	

Note: Standard Error in parentheses. Prob > chi2 determines the decision between random and fixed effects.

Table 10. Hausman test (dividend yield), monthly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	0.0037 (0.0001)	0.0035 (0.0001)	0.0051 (0.0001)	0.0048 (0.0001)
Market Capital			-0.0000 (1.37e-07)	-0.0000 (1.37e-07)
Beta			0.1623 (0.0000)	0.1578 (0.0000)
Leverage			-0.0004 (0.0000)	-0.0004 (0.0000)
Prob > chi2 = 0.0987			Prob > chi2 = 0.0000	

Note: Standard Error in parentheses. Prob > chi2 determines the decision between random and fixed effects.

Table 11. Hausman test (PE ratio), yearly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	-0.0076 (0.0111)	-0.0076 (0.0111)	-0.0150 (0.0152)	-0.0245 (0.0152)
Market Capital			-6.84e-06 (-0.0000)	-7.40e-06 (-0.0000)
Beta			0.3766 (0.1387)	0.2838 (0.1387)
Leverage			-0.2912 (0.1049)	-0.3949 (0.1049)
Prob > chi2 = 0.9614			Prob > chi2 = 0.8009	

Note: Standard Error in parentheses. Prob > chi2 determines the decision between random and fixed effects.

Table 12. Hausman test (dividend yield), yearly data

Variable	One Independent Variable		Multiple Independent Variables	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
ESG	-0.0028 (0.0008)	-0.0032 (0.0008)	0.0027 (0.0014)	0.029 (0.0014)
Market Capital			-0.0000 (2.72e-06)	-0.0000 (2.72e-06)
Beta			-0.1624 (0.0126)	-0.1670 (0.0126)
Leverage			0.0367 (0.0230)	0.0237 (0.0230)
Prob > chi2 = 0.6557			Prob > chi2 = 0.3593	

Note: Standard Error in parentheses. Prob > chi2 determines the decision between random and fixed effects.

Appendix 3

List of countries and companies for the data. The country represents where they are listed, on which financial market.

Table 13. List of companies and markets, monthly data

Company	Country
3i Group PLC	United Kingdom
ABB Ltd	Switzerland
Accor SA	France
ACS Actividades de Construcción y Servicios SA	Spain
Adecco Group AG	Switzerland
adidas AG	Germany
Admiral Group PLC	United Kingdom
Aegon NV	Netherlands
Aéroports de Paris	France
Ageas	Belgium
Air Liquide SA	France
Airbus SE	France
Akzo Nobel NV	Netherlands
Alfa Laval AB	Sweden
Allianz SE	Germany
Alstom SA	France
Amadeus IT Group SA	Spain
ANDRITZ AG	Austria
Anglo American PLC	United Kingdom
Antofagasta PLC	United Kingdom
AP Moller - Maersk A/S	Denmark
Arkema SA	France
ASML Holding NV	Netherlands
Assa Abloy AB	Sweden
Assicurazioni Generali SpA	Italy
Associated British Foods PLC	United Kingdom
AstraZeneca PLC	United Kingdom
Atlantia SpA	Italy
Atlas Copco AB	Sweden
Atos SE	France
Aviva PLC	United Kingdom
AXA SA	France
BAE Systems PLC	United Kingdom
Baloise Holding AG	Switzerland
Banco Bilbao Vizcaya Argentaria SA	Spain
Banco de Sabadell SA	Spain
Banco Santander SA	Spain
Bankia SA	Spain
Barclays PLC	United Kingdom
Barry Callebaut AG	Switzerland
BASF SE	Germany
Bayer AG	Germany

Bayerische Motoren Werke AG	Germany
Beiersdorf AG	Germany
BNP Paribas SA	France
Bollore SA	France
Bouygues SA	France
BP PLC	United Kingdom
Brenntag AG	Germany
British American Tobacco PLC	United Kingdom
British Land Co PLC/The	United Kingdom
BT Group PLC	United Kingdom
Bunzl PLC	United Kingdom
Burberry Group PLC	United Kingdom
Bureau Veritas SA	France
CaixaBank SA	Spain
Capgemini SE	France
Carlsberg A/S	Denmark
Carrefour SA	France
Casino Guichard Perrachon SA	France
Centrica PLC	United Kingdom
Chocoladefabriken Lindt & Spruengli AG	Switzerland
Cie de Saint-Gobain	France
Cie Financiere Richemont SA	Switzerland
Cie Generale des Etablissements Michelin SCA	France
CNP Assurances	France
Coca-Cola HBC AG	United Kingdom
Coloplast A/S	Denmark
Colruyt SA	Belgium
Commerzbank AG	Germany
Compass Group PLC	United Kingdom
Continental AG	Germany
Covivio	France
Credit Agricole SA	France
Credit Suisse Group AG	Switzerland
CRH PLC	Ireland
Croda International PLC	United Kingdom
Daimler AG	Germany
Danone SA	France
Danske Bank A/S	Denmark
Dassault Systemes SE	France
Deutsche Bank AG	Germany
Deutsche Boerse AG	Germany
Deutsche Lufthansa AG	Germany
Deutsche Post AG	Germany
Deutsche Telekom AG	Germany
Deutsche Wohnen SE	Germany
Diageo PLC	United Kingdom
Direct Line Insurance Group PLC	United Kingdom
DNB ASA	Norway
DSV PANALPINA A/S	Denmark
E.ON SE	Germany
easyJet PLC	United Kingdom
EDP - Energias de Portugal SA	Germany

Electricite de France SA	France
Electrolux AB	Sweden
Elisa Oyj	Finland
EMS-Chemie Holding AG	Switzerland
Enagas SA	Spain
Enel SpA	Italy
Engie SA	France
Eni SpA	Italy
Equinor ASA	Norway
Erste Group Bank AG	Austria
EssilorLuxottica SA	France
Eurazeo SE	France
Eutelsat Communications SA	France
Experian PLC	United Kingdom
Ferrovial SA	Spain
Fiat Chrysler Automobiles NV	Italy
Fortum Oyj	Finland
Fraport AG Frankfurt Airport Services Worldwide	Germany
Fresenius Medical Care AG & Co KGaA	Germany
Fresenius SE & Co KGaA	Germany
FUCHS PETROLUB SE	Germany
G4S PLC	United Kingdom
Galp Energia SGPS SA	Germany
GEA Group AG	Germany
Geberit AG	Switzerland
Gecina SA	France
Getinge AB	Sweden
Getlink SE	France
Givaudan SA	Switzerland
Gjensidige Forsikring ASA	Norway
GlaxoSmithKline PLC	United Kingdom
Glencore PLC	United Kingdom
Grifols SA	Spain
Groupe Bruxelles Lambert SA	Belgium
Hammerson PLC	United Kingdom
Hannover Rueck SE	Germany
Hargreaves Lansdown PLC	United Kingdom
HeidelbergCement AG	Germany
Heineken NV	Netherlands
Henkel AG & Co KGaA	Germany
Hennes & Mauritz AB	Sweden
Hexagon AB	Sweden
HSBC Holdings PLC	United Kingdom
HUGO BOSS AG	Germany
Husqvarna AB	Sweden
Iberdrola SA	Spain
ICADE	France
Iliad SA	France
Imperial Brands PLC	United Kingdom
Industria de Diseno Textil SA	Spain
Industrivarden AB	Sweden
Infineon Technologies AG	Germany

ING Groep NV	Netherlands
International Consolidated Airlines Group SA	United Kingdom
Intertek Group PLC	United Kingdom
Intesa Sanpaolo SpA	Italy
Investec PLC	United Kingdom
Investor AB	Sweden
ITV PLC	United Kingdom
J Sainsbury PLC	United Kingdom
JCDecaux SA	France
Jeronimo Martins SGPS SA	Portugal
Johnson Matthey PLC	United Kingdom
Julius Baer Group Ltd	Switzerland
K+S AG	Germany
KBC Group NV	Belgium
Kering SA	France
Kerry Group PLC	Ireland
Kingfisher PLC	United Kingdom
Kinnevik AB	Sweden
Klepierre SA	France
Kone Oyj	Finland
Koninklijke Ahold Delhaize NV	Netherlands
Koninklijke DSM NV	Netherlands
Koninklijke KPN NV	Netherlands
Koninklijke Philips NV	Netherlands
Koninklijke Vopak NV	Netherlands
Kuehne + Nagel International AG	Switzerland
L'Oreal SA	France
LafargeHolcim Ltd	Switzerland
Lagardere SCA	France
LANXESS AG	Germany
Legal & General Group PLC	United Kingdom
Legrand SA	France
Lloyds Banking Group PLC	United Kingdom
London Stock Exchange Group PLC	United Kingdom
Lonza Group AG	Switzerland
LVMH Moet Hennessey Louis Vuitton SE	France
Mapfre SA	Spain
Marks & Spencer Group PLC	United Kingdom
Mediobanca Banca di Credito Finanziario SpA	Italy
Meggitt PLC	United Kingdom
Merck KGaA	Germany
Metso Oyj	Finland
Muenchener Rueckversicherungs-Gesellschaft AG in	Germany
Muenchen	
National Grid PLC	United Kingdom
Natixis SA	France
Naturgy Energy Group SA	Spain
Neste Oyj	Finland
Nestle SA	Switzerland
Next PLC	United Kingdom
Nokia Oyj	Finland
Nokian Renkaat Oyj	Finland

Nordea Bank Abp	Sweden
Norsk Hydro ASA	Norway
Novartis AG	Switzerland
Novo Nordisk A/S	Denmark
Novozymes A/S	Denmark
OMV AG	Austria
Orange SA	France
Orion Oyj	Finland
Orkla ASA	Norway
OSRAM Licht AG	Germany
Pandora A/S	Denmark
Pargesa Holding SA	Switzerland
Partners Group Holding AG	Switzerland
Pearson PLC	United Kingdom
Pernod Ricard SA	France
Persimmon PLC	United Kingdom
Peugeot SA	France
Porsche Automobil Holding SE	Germany
ProSiebenSat.1 Media SE	Germany
Proximus SADP	Belgium
Prudential PLC	United Kingdom
Prysmian SpA	Italy
Publicis Groupe SA	France
Raiffeisen Bank International AG	Austria
Randstad NV	Netherlands
Reckitt Benckiser Group PLC	United Kingdom
Red Electrica Corp SA	Spain
RELX PLC	United Kingdom
Remy Cointreau SA	France
Renault SA	France
Repsol SA	Spain
Rexel SA	France
Roche Holding AG	Switzerland
Rolls-Royce Holdings PLC	United Kingdom
Royal Bank of Scotland Group PLC	United Kingdom
Royal Dutch Shell PLC	Netherlands
Royal Mail PLC	United Kingdom
RSA Insurance Group PLC	United Kingdom
RWE AG	Germany
Safran SA	France
Sage Group PLC/The	United Kingdom
Saipem SpA	Italy
Sampo Oyj	Finland
Sandvik AB	Sweden
Sanofi	France
SAP SE	Germany
Schindler Holding AG	Switzerland
Schneider Electric SE	France
Schroders PLC	United Kingdom
SCOR SE	France
Securitas AB	Sweden
Segro PLC	United Kingdom

SES SA	France
Severn Trent PLC	United Kingdom
SGS SA	Switzerland
Siemens AG	Germany
Sika AG	Switzerland
Skandinaviska Enskilda Banken AB	Sweden
Skanska AB	Sweden
SKF AB	Sweden
Smith & Nephew PLC	United Kingdom
Smiths Group PLC	United Kingdom
Snam SpA	Italy
Societe Generale SA	France
Sodexo SA	France
Solvay SA	Belgium
Sonova Holding AG	Switzerland
SSE PLC	United Kingdom
Standard Chartered PLC	United Kingdom
STMicroelectronics NV	Italy
Stora Enso Oyj	Finland
Suez	France
Svenska Handelsbanken AB	Sweden
Swatch Group AG/The	Switzerland
Swedbank AB	Sweden
Swedish Match AB	Sweden
Swiss Life Holding AG	Switzerland
Swiss Prime Site AG	Switzerland
Swiss Re AG	Switzerland
Swisscom AG	Switzerland
Tele2 AB	Sweden
Telecom Italia SpA/Milano	Italy
Telefonaktiebolaget LM Ericsson	Sweden
Telefonica Deutschland Holding AG	Germany
Telefonica SA	Spain
Telenor ASA	Norway
Telia Co AB	Sweden
Tenaris SA	Italy
Terna Rete Elettrica Nazionale SpA	Italy
Tesco PLC	United Kingdom
Thales SA	France
thyssenkrupp AG	Germany
TOTAL SA	France
Tryg A/S	Denmark
UCB SA	Belgium
Umicore SA	Belgium
UniCredit SpA	Italy
Unilever PLC	United Kingdom
United Internet AG	Germany
UPM-Kymmene Oyj	Finland
Valeo SA	France
Veolia Environnement SA	France
Vestas Wind Systems A/S	Denmark
Vinci SA	France

Vivendi SA	France
Vodafone Group PLC	United Kingdom
voestalpine AG	Austria
Volkswagen AG	Germany
Volvo AB	Sweden
Wartsila OYJ Abp	Finland
Weir Group PLC/The	United Kingdom
Wendel SA	France
Whitbread PLC	United Kingdom
Wm Morrison Supermarkets PLC	United Kingdom
Wolters Kluwer NV	Netherlands
WPP PLC	United Kingdom
Yara International ASA	Norway
Zurich Insurance Group AG	Switzerland

Table 14. List of countries, monthly data

Country	Number
Austria	5
Belgium	8
Denmark	10
Finland	12
France	61
Germany	43
Ireland	2
Italy	15
Netherlands	13
Norway	7
Portugal	1
Spain	17
Sweden	24
Switzerland	28
United Kingdom	68
	314

Table 15. List of companies and markets, yearly data

Company	Country
Akastor ASA	Norway
Alfa Laval AB	Sweden
Assa Abloy AB	Sweden
Atlas Copco AB	Sweden
Axfood AB	Sweden
BillerudKorsnas AB	Sweden
Carlsberg A/S	Denmark
Castellum AB	Sweden
Danske Bank A/S	Denmark
DNB ASA	Norway
DNO ASA	Norway
DSV PANALPINA A/S	Denmark

Elekta AB	Sweden
Elisa Oyj	Finland
Eniro AB	Sweden
Equinor ASA	Norway
Fabege AB	Sweden
FLSmidth & Co A/S	Denmark
Fortum Oyj	Finland
Getinge AB	Sweden
GN Store Nord A/S	Denmark
H Lundbeck A/S	Denmark
Hennes & Mauritz	Sweden
Hexagon AB	Sweden
Holmen AB	Sweden
Husqvarna AB	Sweden
Industrivarden AB	Sweden
Investor AB	Sweden
JM AB	Sweden
Konecranes Oyj	Finland
Kesko Oyj	Finland
Kone Oyj	Finland
Kungsleden AB	Sweden
L E Lundbergforetagen AB	Sweden
Metso Oyj	Finland
Modern Times Group MTG AB	Sweden
Mowi ASA	Norway
Neste Oyj	Finland
NKT A/S	Denmark
Nobia AB	Sweden
Nokia Oyj	Finland
Nokian Renkaat Oyj	Finland
Nordea Bank Abp	Sweden
Norsk Hydro ASA	Norway
Novozymes A/S	Denmark
Orion Oyj	Finland
OrklaASA	Norway
Outokumpu Oyj	Finland
Prosafe SE	Norway
Ratos AB	Sweden
Sampo Oyj	Finland
Sandvik AB	Sweden
Sanoma Oyj	Finland
Scania AB	Sweden
Securitas AB	Sweden
Skandinaviska Enskilda Banken AB	Sweden
Skanska AB	Sweden
SKF AB	Sweden
SSAB AB	Sweden
Stolt-Nielsen Ltd	Norway
Stora Enzo Oyj	Finland
Storebrand ASA	Norway
Subsea 7 SA	Norway
Svenska Cellulosa AB SCA	Sweden

Svenska Handelsbanken AB	Sweden
Swedbank AB	Sweden
Swedish Match AB	Sweden
Tele2 AB	Sweden
Telefonaktiebolaget LM Ericsson	Sweden
Telenor ASA	Norway
Telia Co AB	Sweden
TGS NOPEC Geophysical Co ASA	Norway
TietoEvry Oyj	Finland
TOMRA Systems ASA	Norway
Trelleborg AB	Sweden
Tryg A/S	Denmark
UPM-Kymmene Oyj	Finland
Uponor Oyj	Finland
Vestas Wind Systems A/S	Denmark
Volvo AB	Sweden
Wartsila Oyj Abp	Finland
Wihlborgs Fastigheter AB	Sweden
Yara International ASA	Norway
YIT Oyj	Finland

Table 16. List of countries, yearly data

Country	Number
Denmark	10
Finland	19
Norway	15
Sweden	40
	84