



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Real Estate and ESG Rating

A cross-sectional study of ESG Risk, ESG Management and financial performance

Abstract:

Environmental destruction and social sustainability issues are more relevant than ever. The human impact causing social and environmental destruction has led to a forced market movement worldwide where sustainability awareness has grown amongst stakeholders. The use of company ESG ratings when evaluating a company and its financial performance has increased during recent years because of this. The purpose of this thesis is to define the quantitative relationship between company ESG Risk Rating measured by Sustainalytics and the financial performance of companies within the Scandinavian real estate industry. The thesis also aims to answer if strong ESG Management Score implies good financial performance within the same subindustry. Previous research shows no distinct answer regarding the topic which invites new empirical evidence to answer the question. Four hypotheses are formulated to answer the research questions. The hypotheses seek to analyse the correlation between ESG Risk Rating and two financial ratios through regression analyses and ANOVA tests. The financial ratios used in the analysis are price-to-book ratio and return on equity. The analysis including the return on equity did not show significant results. From the significant test results, the conclusion that ESG performance negatively correlate with price-to-book ratio could be made.

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Keywords: ESG Rating, Real Estate, Financial Performance, Sustainability, Sustainalytics, Inferential Statistics

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1. Introduction

1.1 Background

In recent years there has been an overall increase in company commitment to environmental and social sustainability worldwide. Researchers has shown and continuously suggest new evidence of environmental destruction from human impact, which mainly arise from CO₂ emissions. Further, there are also some extensive amounts of research on social sustainability, which however are not as stressed by companies as the findings on environmental sustainability are (Tillvaxtverket, 2018). The sequent public consciousness about the matter has also increased the awareness from consumers, particularly in well-developed regions such as Scandinavia. The Scandinavian countries are seen as some of the most sustainable countries in the world, both companies and consumers are known for being sustainably conscious (Strand, Freeman & Hockerts, 2015). This has led to a forced market movement, where suppliers and consumers must oblige in the changing market environment.

The growing importance of corporate sustainability has also been acknowledged by the European Union (EU) which requires large enterprises to disclose Environmental, social, and corporate governance (ESG) information. Directive 2014/95/EU regarding the disclosure of non-financial and diversity information by certain large undertakings and groups has been in effect since 2017 (EU, 2014). This directive applies to companies with more than 500 employees, and it implicates that the companies concerned need to disclose information regarding their environmental and social performance (EU, 2014). In 2021 the addition of regulation 2019/2088 regarding sustainability related disclosure in the financial sector came into effect (EU, 2019). This regulation is better known as the Sustainable Finance Disclosure Regulation and is intended to redirect the investors' attention towards a more sustainable way of investing through increased transparency (EU, 2019). The individual Scandinavian countries have alongside the EU directives individual laws and directives regulating company ESG disclosure. All three countries have laws either based on or similar to the EU directives regarding the matter.

Companies desire to always increase their value is constant. This in combination with the increased knowledge of sustainability and demand of company transparency has led to an expanded need of quantitative measurements containing sustainability and financial efficiency

variables. Quantitative tools to measure sustainability within corporates have also been more involved in the valuation of corporations because of this. The increasing interest in corporate social responsibility (CSR) along with the ever-expanding need for information in the company valuation process has made sustainability related factors more relevant. ESG and CSR is used as if they are interchangeable as it is used in that way in earlier papers (Gillan, Koch & Starks, 2021). Using these factors to develop investment portfolios can create superior performance compared to not including them in the company valuation. A study performed back in 2005 reveals the importance of incorporating ESG measurements during a company valuation. A portfolio comparison between two portfolios with a low respectively a high eco-efficiency score, acknowledge how carrying a portfolio with high eco-efficiency score would create significantly higher return than a portfolio with lower score (Derwall, Guenster, Bauer & Koedijk, 2005).

There are a lot of different private institutions that calculate and display companies ESG performance. Institutions such as Sustainalytics, MSCI and Bloomberg all display their slightly different version of company ESG rating. According to Sustainalytics (2022) the ESG Risk Rating shows a company's exposure to industry-specific material risk along with how they manage these risks. Their rating shows how big of an impact the ESG risks do or could have on the company where a rating of 0-10 is seen as negligible and a rating of 40 or more is seen as severe. The different institutions define ESG and calculates ESG performance very similarly, but not precisely the same. This should be remembered when researching and analysing ESG performance of companies.

Overall, there seem to be a distinct unitary result from previous papers. It has been shown that there is a positive relation between corporate financial performance and the ESG criteria (van Beurden & Goessling, 2008; Friede, Busch & Bassen, 2015). Furthermore Friede, Busch & Bassen, (2015) explain that ESG investing outperformance is more common in some industries. However, this relation is declared ambiguous in some cases (van Beurden & Goessling, 2008; Revelli & Viviani, 2013). In the business area of real estate for example, the relation between ESG management and corporate financial performance are overall uncertain (Kempeneer, Peeters & Compernelle, 2021).

Stakeholders are demanding change in the real estate industry's approach to corporate sustainability. Being one of the sectors that produces the most CO₂ emissions is not positive for either the businesses itself, the stakeholders, or the environment. Green buildings have been a

popular topic within the real estate industry for a long time, but the transition towards a more sustainable business model is challenging. Progress has been made over the years to improve upon these matters, however the problem and challenge remains. With increasing regulatory requirements from both the EU and the individual nations along with the increasing demand of transparency towards the public, the transition to a more sustainable business approach needs to happen. (PWC, 2022)

The uncertainty of effects from ESG-related implementations and activities in the real estate industry is left with no distinct answers which invites new empirical evidence to solve this conundrum.

1.2 Problem Definition

As interest in ESG investment increases, both new regulations and solutions are required to redirect focus of development for a more sustainable future. For example, EU regulations has been introduced to direct investments towards companies that has better sustainability performance. In addition, third-party rating agencies that help participants in the capital market to measure and evaluate ESG information has become more popular. One such example is Morningstar's Sustainalytics.

Participants in the capital market want a market return that corresponds with the type of individual investment and its related risk. The existing problem is that there is no unequivocal empirical material that confirms that there is a causal relationship between ESG performance in the real estate industry and financial ratios used by both companies and investors (Kempeneer, Peeters & Compennolle, 2021). This means that there is no evidence that motivates participants in the capital market to use the ESG Risk Rating as a basis for their investments in the real estate industry.

From a corporate perspective, a difficulty is being able to perform financially while also acting sustainably. Companies need to fulfill their responsibility towards their shareholders by meeting their required return. This is achieved by taking on projects that yields a positive Net Present Value (NPV). In other words, the company should take on projects that increases the present value of the firm. This difficulty is especially true for companies within the real estate industry. In 2019 the real estate industry contributed to 39% of all energy related carbon

emissions, 28% consists of operational carbon (World Green Building Council, 2019). Operational carbon is emissions from building maintenance such as heat, ventilation, and power. There is not just the construction of buildings that need to become more sustainable, the transition into more sustainable building maintenance is needed. The much-needed green buildings are not just about how they are constructed, but also the way of life within the building and the maintenance of the building.

The social issues that all companies need to manage are just as important as the environmental. Six out of the ten UN Global Compacts principles are focused on the social aspects of sustainability. The social factors are important for all companies to handle both to keep employees motivated and to keep customers happy. Issues based on topics such as human rights, labor and anti-corruption all need to be managed proactively by all companies no matter what sector they work within. Real estate businesses must transition into a more sustainable way of maintaining their buildings and working with social issues while keeping their market shares and increasing their financial performance. (United Nations Global Compact, n.d)

As previous research concerning the real estate industry shows ambiguous results on a global level regarding the correlation between ESG and financial performance, this study is conducted in the Scandinavian market. According to Strand, Freeman, and Hockerts, (2015, 1-15) the Scandinavian countries are commonly mentioned as the global leaders of CSR. The authors also state the similarity between the countries regarding both economy and culture, which enables a fair comparison between companies within the region.

1.3 Purpose

The purpose of this project is to define the quantitative relationship between company ESG Risk Rating and the financial performance of companies within the Scandinavian real estate industry to determine if investors have something to gain when investing more sustainably responsible. More specifically, the purpose of this study is to analyse the correlation between the ESG Risk Rating measurement created by Sustainalytics and two financial ratios of companies within the Scandinavian real estate industry. Apart from that, this study also has the purpose to determine if better company ESG management leads to increased financial performance for companies within the Scandinavian real estate industry. This to determine if company managers should focus more resources on CSR activities from a financial performance stand point. This is determined with statistical methods and includes variables

such as ESG Risk Management Rating created by Sustainalytics and two financial ratios of companies within the Scandinavian real estate industry.

1.4 Research Questions

The questions this thesis answers are:

- How does ESG Risk Rating and financial performance correlate in the Scandinavian real estate industry?
- How stands financial performance in relation to ESG Risk Management Rating within the Scandinavian real estate industry?

1.5 Expected Contribution

The thesis prolongs the already existing research in the field of ESG and company valuation. Mainly the contribution to this field is new insights regarding how ESG measurements and risk management affects a company's financial performance within the Scandinavian real estate industry. The research helps investors to better understand the real estate industry and gain new knowledge about different aspects of financial performance and its correlation with ESG measurements. The thesis also gives companies an understanding of the correlation between their ESG Risk Management and the financial performance of the company.

2. Previous Research

In this section of the thesis the previous research within the area that is being examined is presented. The topics covered here is a non-exhaustive list of previous research of ESG and its connection to financial performance, and ESG within the real estate industry. The articles presented in this section are all important for this report. The articles have both guided the writing of the report and are serving as a basis for the method and analysis.

2.1 ESG and Real Estate

Using environmental, social and governance factors in the business investment process is becoming increasingly important. Kempeneer, Peeters and Compernelle (2021) discuss this issue in correlation with the real estate industry. They argue that the real estate industry is undeveloped in this regard and that the use of ESG factors within the industry can add both societal and financial value. The way to make the real estate industry more sustainable is through “smart” buildings. This includes both using sustainable materials in the building process but also constructing a building that evoke behavioral change in individuals through smart solutions. Green real estate is according to the authors the way to improve the sustainability of the real estate industry. This gives the reason to believe that investment in green real estate could be a way for companies to obtain both good financial performance and good ESG performance within the real estate industry. However, they talk about how the real estate industry is undeveloped regarding ESG awareness, which could evoke the conclusion that stakeholders within the industry care less about sustainability factors.

Aroul and Villupuram (2022) established the conclusion that ESG factors have a positive impact on the financial value when examining the ESG factors impact on US-based Real estate investment trusts (REITs). They found that REITs with better ESG performance have a higher operational performance and efficiency. Implementation of ESG initiatives in real estate companies will lead to higher operational performance and efficiency and through that increase the financial values of the organization. They further talk about how the real estate industry in specific needs to transition into a more sustainable industry. This because of the increased risks from climate change along with the growing demand from stakeholders to act sustainably. To implement new ESG initiatives effectively the company should already have developed a good operational efficiency. Conclusions drawn from this article is that ESG performance does have a positive impact on financial performance within the real estate industry. This is however based upon US-based REITs and not Scandinavian based real estate companies. The conclusion that ESG should have a positive impact on the market value and financial performance of the firms can however still be made. The authors also explain how company efficiency plays an important role in the ESG initiatives effectiveness. From this the conclusion can be drawn that operational efficiency could be an explanation to both high ESG performance and good financial performance of a company.

2.2 ESG and Financial Performance

Today it becomes increasingly important to report the company's work with ESG and CSR. Not only to create a better reputation for possible clients, but also to attract investors. Naseem, Lin, ur Rehman, Ahmad, and Ali (2015) reports how the disclosure of a company's work with ESG questions can affect the firm value in a positive manner. The study shows the relationship between corporate social responsibility disclosure for multi-stakeholders and the company's financial performance. In the study the authors are comparing a set of financial ratios of companies. The companies are grouped into two categories where one of the categories has extensive CSR disclosure to the public, whereas the other group does not deliver any CSR disclosure to the public. The study reports that the firms with CSR disclosure have better financial performance compared to the companies not reporting. In addition, the firms with CSR disclosure are outperforming the industry averages. Based upon this article it should be a negative correlation between company ESG Risk Rating and the financial performance measurements researched in our analysis.

Furthermore, Awaysheh, Heron, Perry, and Wilson (2020) continue the research concerning corporate social responsibility and its relationship towards financial performance. The conducted research compares the best-in-class and worst-in-class organizations when it comes to CSR ratings. At first, the study shows how the best-in-class group outperforms the worst-in-class corporations. However, when the authors control for endogeneity the significance of the relationship between the two groups and financial performance perishes. Which means that no conclusions whether the CSR rating and financial performance can be made. Nonetheless, the authors point out the evolving expectations around CSR and how the best-in-class companies are preferred by the investors. Their conclusion is that a company with better CSR rating will not necessarily have better financial performance. By employing this article to this research, it can be theories that the ESG Risk Rating of the companies analysed does not affect their financial performance. However, the authors do mention that the best-in-class corporations are more preferred amongst investors. From this it is expected that the Price-to-Book ratio is negatively correlated with company ESG Risk Rating.

Friede, Busch and Bassen (2015) also examine the relationship between ESG criteria and financial performance. By investigating over 2000 studies concerning this relationship they

conclude that ESG portfolios on average outperforms regular portfolios and that this is especially true in emerging markets such as green real estate. With this conclusion in mind, they encourage investors to invest more responsibly, both to fulfill their fiduciary duty but also to invest with the future of society in mind. Their conclusion is that ESG portfolios on average performs better. This does not mean that all portfolios will, and it will not necessarily mean that the result in this thesis should show a negative correlation between the financial performance and ESG Risk Rating.

However, Chen, Hung and Wang (2016) found a negative impact on company financial performance when investing in CSR activities. They examine the effect of mandatory CSR disclosure on company performance in China. What they discover is that companies' financial performance decreased when CSR activities was being disclosed. The Chinese mandate did not require firms to invest money into CSR activities. However, the study shows that the money spent on CSR activities increased when the company disclosed CSR information. The costs needed to lower CSR risk was shown to negatively affect the company profitability. Because of this they also found that when companies started disclosing CSR information, they suffered a negative effect on the stock market. The mandate initiated a behavioral change amongst the companies that implicated that they spent more money on their CSR activities. The conclusion that can be drawn from this is that companies invest more money into CSR activities when disclosing such information and that the effect of this is a decrease in profitability.

2.3 ESG Investing

Cornell (2021) analyses the relationship between risk, return and ESG. By investigating the investor preferences, ESG-expected return and whether ESG is a risk factor he comes to a conclusion. The conclusion drawn by Cornell is that investing in companies with a high ESG rating will likely result in lower returns. He further explains that this is mainly because of the rewards for bearing risk. Companies with a higher ESG rating are less affected by climate shocks and changes in environmental regulations. Investing in companies with higher ESG rating will imply lower risk but also lower expected returns. However, some investors are shown to prefer investing in highly rated ESG companies because of social reasons. Investing in these types of companies will benefit society through the opportunity of more green projects

with the increased investments. From this article the conclusion can be drawn that the correlation between the ESG Risk Rating and the financial ratios is positive. A higher risk implies higher expected return according to Cornell (2021).

3. Theoretical Framework

Relevant theoretical framework is presented in this section of the thesis. The theoretical framework presented serves as background to the thesis. This provides useful information to gain a deeper understanding of the subject analysed and discussed in the thesis.

3.1 Financial Ratios

Profitability Measures

There is an excess of possible financial ratios to use in order to evaluate a company's performance (Laurent, 1979). The author expresses the difficulties of using too many ratios to interpret the financial status in a firm. The main reason is that the underlying data, which is measured with those ratios are being obscure when decomposed because of overlapping. Laurent (1979) states that 10 different ratios are enough to measure the financial position of a firm. Since the purpose of this paper partly is to investigate whether ESG Risk Management Rating yields differently, the selection of ratios for this paper is of importance. The aim should be to capture as much financial information as possible from any investigated company with an as small set of ratios as possible.

Return on Equity (ROE)

ROE measures the Return on Equity with respect to a large compound of underlying data (Laurent, 1979), and can be broken down into the DuPont model (Flesher & Previts, 2013). The DuPont model consists of figures from the balance- and the income sheet. It shows how different components of a firm's performance are affecting the one single figure which is the ROE. The model itself is mainly used to find out the specific component to be improved or that are performing well related to its strategy or market position. The ROE can be used both by corporate management or equity holders to calculate how successful the firm are, have been, or will be. The formula which calculates ROE is made with the following equation. This equation can further be broken down into both operational performance and balance sheet ratios, which is why it is so useful, and a good ratio to use in this study.

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

(1)

Price-to-Book Ratio

The market-to-book ratio, also known as Price-to-Book ratio (P/B-ratio) is a common measurement as it measures the market value of equity in the nominator, relative to its balance sheet value, which is also referred as Tobin's Q (El Khoury, Nasrallah & Alareeni, 2021). The interpretation of P/B-ratio as henceforth is used to notion the ratio, is the ratio between the current market value and a company's assets. Companies within the industry uses the properties to make profit from operations and from speculating in increases of value. Hence, the ratio is used to estimate whether the outstanding shares can be traded to a premium or a discount related to the assets current value.

$$\text{Price-to-Book Ratio} = \frac{\text{Market Value of Equity}}{\text{Balance Sheet Total}} \quad (2)$$

3.2 The Efficient Market Hypothesis

The efficient market hypothesis is a well-known theory developed by Eugene Fama in 1970. The theory states that the stock prices always trade at a fair price and that the price reflects all available information (Fama, 1970). When new information is disclosed, the market will take this into account when evaluating the company and this will later be reflected in an accurate stock price. Since the price of the stock always is based upon all information available the price is always fair and it is impossible for investors to outperform the market. There simply are no undervalued or overvalued stocks.

Based on the assumption above, it is possible to argue that new information, available from new ESG disclosures, will affect the stock price. This study compares companies ESG Risk Rating score from Sustainalytics, which involve the ESG risk and how well the company manage that risk, with financial performance. Hence, a logical assumption would be that a lower risk would imply higher stock price compared with a company with a higher ESG Risk Rating. One way to measure this is by comparing ESG Risk Rating with the P/B-ratio, which is a common financial measure for real estate companies. The hypothesis is that the lower the risk the higher is the P/B-ratio.

3.3 Information Asymmetry

Asymmetry of information will always be part of the economic sector. Different actors will always have different insight and knowledge (Stiglitz, 2002). All decisions made are based on the information available. Stiglitz states that information asymmetry is created when a market actor is withholding information that would benefit a second party in their decision-making process (2002). Later he explains how behavior both on the market in general and by individual actors communicate information (Stiglitz, 2002). Information disclosed through actions leads to change in the behavior of the market and Connelly, Certo, Ireland and Reutzel (2011) describes this as being the reason for information asymmetries significant impact on the market. Only actors that have superior performance will disclose information about their activities. By disclosing information such as this the company will gain a competitive advantage. This type of behavior on the market creates information asymmetries.

The information asymmetry that exists on the market is a risk for investors and other stakeholders. When a company with inferior performance does not disclose the information, it creates a gap of information between the investor and reality. However, Yuan, Li, Xu and Shang (2022) suggest that ESG disclosure reduces the risk of corporate financial irregularities. A corporate financial irregularity is when the company intentionally change a financial statement to the incorrect information or leave important information out. A common example of corporate financial irregularity is fraud. With other words, Yuan et al. (2022) suggests that ESG disclosing companies are less likely to commit fraud.

Moreover, there are not only information asymmetries between companies and investors, but also between companies and the institutions performing an ESG evaluation. As stated above, only actors that have superior performance will disclose information. The inflicted issue by this is that all companies desire a good score and hence will not disclose non-beneficial information. This is an important statement for the study because outliers can be presented in the data because of the derivation from information asymmetry.

3.4 Third Party ESG Rating Agencies

The growing use of sustainability factors used when evaluating a company and its performance has created the need for sustainability rating agencies (SRAs). Third party ESG rating agencies

make it easier for stakeholders to get fast information regarding company ESG commitment. They are independent third-party institutions that provide ESG scores based on company ESG performance. The private institutions perform the time-consuming task of gathering the ESG information disclosed by companies so that investors and stakeholders will have easy access to it. ESG scores are based upon a lot of different information from a lot of different actors. Gathering and processing all the information needed takes time that not every stakeholder has. ESG rating agencies are also significant in the strive to reduce information asymmetry by disclosing the information in this accessible way. By providing the public with simple ESG scores the customers get information otherwise vary hard to get hold of and through this decreasing the informational gap between the companies and the stakeholders (Abay, 2022).

Additionally, third party rating agencies also provides external assurance for both companies and stakeholders. By having a third party investigate the information disclosed by the companies and other sources, the credibility of the information increases (Abay, 2022). What should be remembered is that a third party will never have a complete insight into the companies' activities which means that the information displayed cannot be completely accurate with reality. Companies do not display all information regarding the subject and because of this information asymmetry occur between the rating agencies and the companies. The companies will always have better insight and more information regarding their business activities than the stakeholders.

In addition to the informational role, the agencies also have the role to influence businesses positively. Firms tend to change their behavior because of the rating given by the rating institutions (Sharkley & Bromley, 2015). A good rating becomes a competitive advantage, and a bad rating can make the firm less attractive to stakeholders. Firms will change their way of working to receive a better rating from the rating agencies. The SRAs play an important role in making both companies and stakeholders more aware of ESG performance.

3.5 Hypotheses

The expected result of this thesis is to be able to answer the research questions. From previous research it can be interpreted as the current situation of the ESG and financial performance relationship in the real estate sector is uncertain. Hence, the expected result is uncertain, which makes this study relevant to perform. Previous studies regarding the subject show mixed results regarding the correlation between ESG performance and financial performance. This is

especially true in the long run. With this in mind, the hypotheses still remain the same. You could argue that the result of the analysis may show an indecisive correlation between ESG performance and financial performance because of the mixed results from previous research. However, the fact that previous research on the subject on average show a positive correlation between ESG performance and financial performance gives the incentive to predict that the thesis presents the same positive results.

The research questions of this study are answered with the help of inferential statistics. Based on previous research, there are four null hypotheses which is evaluated to answer the research questions. The first and second null hypotheses tries to answer the first research question, while the third and fourth null hypothesis handle the second research question.

The first null hypothesis is:

$$H_0: \rho_{ROE/ESG \text{ Risk Rating}} \geq 0$$

$$H_A: \rho_{ROE/ESG \text{ Risk Rating}} < 0$$

This null hypothesis tests whether ESG Risk Rating and ROE is correlating with each other or not. Based on previous research the assumption is there is a negative correlation between them. Which corresponds to the lower ESG Risk Rating a company has a higher ROE can be expected compared with a company with higher ESG Risk Rating.

The second null hypothesis is:

$$H_0: \rho_{Price-to-Book/ESG \text{ Risk Rating}} \geq 0$$

$$H_A: \rho_{Price-to-Book/ESG \text{ Risk Rating}} < 0$$

This null hypothesis tests whether ESG Risk Rating and Price-to-Book is correlating with each other or not. Based on previous research the assumption, as for ROE, is that there is a negative correlation between them. Which corresponds to the lower ESG Risk Rating a company has a higher P/B-ratio can be expected compared with a company with higher ESG Risk Rating. An important note for both the first and second null hypothesis is that correlation does not mean causality. This means that it is not possible to conclude if one of the variables is a driver for the other one. However, it is possible to make other conclusions from correlation, such as if the assets of the company are valued higher with lower risk.

The third null hypothesis is:

$$H_0: \mu_{P/B \text{ weak}} = \mu_{P/B \text{ average}} = \mu_{P/B \text{ strong}}$$

H_A: The mean values are not all equal

The third null hypothesis determines whether there is a difference between the risk management categories regarding P/B-ratio. The hypothesis is that there is a difference between the categories. Since the companies in this study is in the same industry, they are facing very similar risk. Hence, it is interesting to explore the difference between companies depending on how well they are managing the risk.

The fourth null hypothesis is:

$$H_0: \mu_{ROE\ weak} = \mu_{ROE\ average} = \mu_{ROE\ strong}$$

H_A: The mean values are not all equal

The fourth and last null hypothesis determines whether there is a difference between the risk management categories regarding ROE. The hypothesis is that there is a difference between the categories. This hypothesis has the same reasoning as the third null hypothesis.

The four hypotheses are evaluating difference in P/B-ratio and ROE depending on ESG Risk Rating and ESG Risk Management Rating. The reason of the choice of financial ratios is to include both how much the market values companies' assets, but also how well the company is performing financially.

4. Method

This part of the report explains the methods used to answer the two research questions. The data collection is presented. It is important to understand the data collection process and the data used in the analysis to better grasp how the result is calculated and what it measures. The analytical models used in the thesis is also presented and explained to properly understand the analysis used to test the hypotheses. At last, the hypotheses constructed to answer the research questions is presented.

4.1 Validity and Reliability

Validity refers to gathering and using information that is both relevant and correct (Bryman & Bell, 2011). A part of this is achieved by using data from well-known and respected institutions such as Sustainalytics and Bloomberg. Gathering data from these type of sources increases the validity of the thesis, this because the data used can be trusted. It is also presumed that the data used in the report is relevant since the data needed is quite uncomplicated.

What could be said about the relevancy of the data used is that each institution evaluates company ESG performance a bit different from one another. By only looking at the ratings calculated by Sustainalytics the validity of the thesis unfortunately suffers. However, the ratings displayed by each institution is similar and the data used is both correct and relevant. The report is also based upon relevant previous research. The articles being used are carefully chosen to make sure that they are both correct and relevant. All articles used are for example peer reviewed to make sure that they are of a high standard.

The reliability of the thesis is based on its trustworthiness, but also how likely it is that research executed the same way will display the same results (Bryman & Bell, 2011). The thesis is based on numbers and because of this it is easy to recreate it with the same result. The main data consist of numbers and since there are few interpretations needed in the handling of numbers, the recreation of this research will be consistent with our results.

What should be mentioned concerning validity and reliability is that our tests include quite a small sample size. When the sample size is small, the validity of the test diminishes due to randomness in the sample. As the sample size grows, the more representative the data is to make inferential conclusions. However, it is further assumed that the sample data is normally distributed. The first gathering of data resulted in only 21 out of 61 with complete accessible data. Because of this more data points are gathered by hand to create a total sample of 30. That is because if the sample size is greater or equal to 30, the central limit theorem (CLT) can be assumed to hold which implies the sample means approximates a normal distribution (Kwak & Kim, 2017). Though with a final sample of 30 accessible data points from Sustainalytics database, it is not possible to collect a random sample because of this. This creates less reliability in the tests.

4.2 Data Collection

To be able to perform a high-quality research project with a high validity and reliability level the data sources is chosen with utmost precision. To collect the data for this project three data sources with high reputational value is chosen to assure high quality data. The three data sources are Sustainalytics, Bloomberg and Avanza.

4.2.1 Sustainalytics

An important decision in this research project is which data source to obtain the ESG-data from. As mentioned before there are several different options when it comes to gathering ESG-data. Though, all data sources are not available to the authors of this thesis which limits them to Bloomberg, MSCI and Sustainalytics. There are differences between these sources and the quality of the ESG evaluation. Sustainability (2019; 2020) has performed extensive research on this matter. 2019 they performed a survey with 319 sustainability professionals to rate the different companies providing ESG-ratings. In this survey they ask about the most important factors determining the rating quality. The two most important factors are credibility of data sources and quality of methodology. In this survey the highest scoring data source of those available is Sustainalytics. Furthermore, in the 2020 review 17 in-depth interviews with investors were performed and additional 25 surveys were conducted. Also, in this study Sustainalytics ended up with the highest perceived quality by the investors. The investors emphasise Sustainalytics broad coverage and expressed its higher grade of transparency than MSCI.

Based on these studies with sustainability professionals and investors the choice of the source for this thesis is Sustainalytics. However, there were two data sources in the reports with higher score than Sustainalytics but due to no availability these sources can not be accessed and evaluated as a choice.

Sustainalytics ESG Risk Rating measurement is based upon three building blocks. Block one consists of corporate governance which is the foundation to the rating. This because corporate governance issues lead to material risks for companies. The second block consists of material ESG issues. The material ESG issues are the main building block of the measurement and consist of the ESG issues relevant for the company at hand. These are the issues directly relevant for the subindustry and the business model of the company being analysed. The material ESG

issues are later derived into two categories, manageable risks, and unmanageable risks. The third and last building block of the measurement framework is the idiosyncratic issues. The idiosyncratic risks are risks than can be described as unpredictable. These are issues that companies cannot predict since they are unrelated to the specific industry or company business model. (Sustainalytics, 2021)

What determines a company's ESG Risk Rating is the unmanaged risk. The unmanaged risk consists of the unmanageable risks and the manageable risks that are not managed. The ESG Risk Ratings are divided into five categories. A rating of 0-10 is negligible, 10-20 is low, 20-30 is medium, 30-40 is high and 40+ is Severe. A lower rating signifies less unmanaged risk. Apart from the main ESG Risk Rating, companies are also given Exposure and Management classification ratings. These are the two categories that the ESG Risk Rating consists of. The exposure classification considers a company's total exposure to material ESG issues, and it varies from a rating of low, medium, and high. The ESG Risk Management Rating describes how well a company manage the ESG issues that are manageable, and it varies from a rating of weak, average, and strong. (Sustainalytics, 2021)

4.2.2 Bloomberg

Bloomberg Terminal (2022) is a market leading service offering financial data from companies all around the world. It is a source of financial data used by industry professionals and offers a convenient function to import the data into Microsoft Excel. The thesis uses Bloomberg Terminal to gather the necessary financial data required to perform the study. More specifically, the data is firsthand information based on companies reports e.g., return on equity. It is also secondary data such as data from the market e.g., P/B-ratio.

4.2.3 Avanza

Avanza (2022) is a Swedish bank that is niche towards investments. It is one of Sweden's biggest platforms for retail investors and covers a wide range of markets. Avanza is used in this study to select companies in the real estate industry, that is not part of the selected list from Bloomberg Terminal.

4.3 Data Selection

Data for real estate companies is acquired from three different data sources. The selection of enterprises is made in Bloomberg Terminal based on four filtering criteria:

1. Trading status: Active
2. Security Attributes: Show primary security of company only
3. Sectors (Bloomberg Industry Classification Standards): Real Estate Owners & Developers
4. Country/Territory of Domicile: Denmark; Norway; Sweden

From these four criteria, 61 companies are filtered out in Bloomberg Terminal. To acquire enough data points Denmark, Norway and Sweden is chosen as the countries to be included in the study. From these companies two financial ratios are obtained from Bloomberg Terminal, based on applications option called “Cyclic Year’s Value”. These ratios are:

- Price-to-Book
- Return on Equity

The ESG Risk Rating, ESG Risk Category, ESG Risk Exposure and ESG Risk Management Rating for these companies are collected from Sustainalytics. Unfortunately, only 21 of the 61 companies selected in the Bloomberg Terminal have available ESG Risk Ratings in Sustainalytics database. However, there are companies in the real estate industry that are not included in the list of companies after the four filtering criteria but have an available ESG Risk Rating. By using Avanza’s (Avanza, 2022) list of real estate companies, nine more companies with available ESG Risk Rating are identified. These nine companies are handpicked and not randomised, which might cause a selection bias in the study. The financial data for these companies are fetched from Nasdaq (2022). By adding these nine new companies a total of 30 companies with ESG Risk Rating is included in the research. These 30 companies can be found in appendix A. Ideally, there would exist available time series data of the ESG Risk Rating values. Unfortunately, due to lack of access of Sustainability’s full dataset it is not possible at the time this research is performed.

4.3.1 Pearson's Correlation Coefficient

Pearson’s correlation coefficient is a method to measure the relationship between two variables. This relationship is of linear nature and the correlation coefficient is calculated through (Weisstein, 2022):

$$cor(X, Y) = \frac{cov(X, Y)}{\sigma_X \sigma_Y} \tag{3}$$

Where $cov(X, Y)$ is the covariance between X and Y and σ is the standard deviation. The correlation coefficient has a range between -1 and 1 , where a negative value means two variables have negative correlation. In other words, when one variable goes up the other variable goes down. When the correlation coefficient is bigger than 0 then the correlation is positive and if one of the variables increases the other increases as well. The closer the correlation coefficient is to either side of the spectrum, the stronger is the relationship between the variables.

By only measuring the correlation between two variables there is not possible to decide if there is any causality between them. This study is testing hypotheses concerning Price-to-Book and Return on Equity and they are both depending on countless of factors. Hence, this study does not identify whether ESG Risk Rating is a driving factor of any of the financial performance because of lack of data.

4.4 Data Analysis

The analysis of the study is based on both inferential statistical analysis and descriptive analysis. For the statistical analysis a correlation analysis of the ESG Risk Rating paired with all the financial ratios is performed. With the help of the calculated correlation, it is possible to decide which financial ratios that have in theory the highest effect by ESG Risk Management Rating in a company. To provide descriptive analysis, a scatter plot of the ESG value and each financial ratio will be made to visualise the data. Based on these graphs it is possible to interpret the spread of the different distributions and find potential outliers which affect the correlation.

Further, a bivariate regression analysis is performed to answer the research questions. The analysis contains of a X & Y graph where datapoints are plotted for values from each of the sampled companies and display how one explanatory variable change another. Y -variables are put on the vertical axis and are the values which are meant to be measured. These values are dependent variables for that reason. In these tests, the Y -variables are each company's ROE

and P/B-ratio respectively. On the horizontal axis, the independent X-variables are input and are in these tests each company's ESG Risk Rating. It is possible to include one or more control variables when doing a regression analysis to evaluate if the independent variable and dependent variable has any causality. Due to lack of resources this study is not including any control variable.

Another method used to answer the second research question is an Analysis of Variance (ANOVA). The reason ANOVA is used to distinguish the means is because that the test can compare more than two different categories, which is not possible in bivariate regression. The implication of the test is to measure change in the dependent variable which are ROE and P/B-ratio from each sampled company. The independent variable however is nominal or ordinal, which means they cannot be measured, but rather distinguished by categories with a special trait for each category. In our test, the three independent variables for the ANOVA-test are 'weak', 'average' and 'strong' in regard of the ranking of ESG Risk Management Rating from Sustainalytics. The analysis measures each mean value between every category and returns an F-value for each dependent test to determine if there are differences in mean values for the dependent variable when categorized.

4.4.1 Bivariate regression analysis

To make an adequate bivariate regression analysis, four assumptions need to hold for the variables (Cortinhas & Black, 2012):

- The model is linear
- Homoscedasticity
- The error terms are independent
- The error terms are normally distributed

To test these assumptions, residual analyses for each regression are made. The first assumption is about the model being linear. To confirm this from a residual plot, the points are expected to fit on a straight line. If most of the points are on or very close to this hypothetical line the model can be assumed to be linear (Cortinhas & Black, 2012).

The second assumption is homoscedasticity, which means the variance in the residual plot should be constant (Cortinhas & Black, 2012). In other words, the spread of the points is equal across the X-axis. Breusch and Pagan (1979) created a test called Breusch-Pagan test to evaluate

heteroscedasticity of the data. If the p-value of the test is above the significance level, homoscedasticity cannot be rejected, and the assumption holds.

The third assumption is that error terms are independent. An independent error term is not dependent on its neighbors. Which could be explained as the residuals have a spread and the neighbors of each point are not always having a similar value (Cortinhas & Black, 2012). This assumption can be controlled by using Durbin-Watson test (Durbin & Watson, 1950) which calculates a measurement of autocorrelation. The fourth assumption is checking whether the error terms are normally distributed. This assumption can be checked with the Shapiro-Wilk test, which returns a p-value. If the p-value is below the significance level, normality can be rejected (Shapiro & Wilk, 1965).

Furthermore, Cortinhas and Black (2012) continues by explaining how analysis of residual plots with small sample size can be problematic and subject to over-interpretation. Since this study is performed with a small sample size the analysis of the residual plots is interpreted with regards to this.

4.5 Variables

This study includes four different variables and this section gives a brief explanation of them. These variables are used to evaluate the hypotheses and ultimately the research questions.

- *ESG Risk Rating* – A score from Sustainalytics that measure the unmanaged ESG issues of a company, where a low rating is desirable.
- *ESG Risk Management Rating* – An ordinal variable with the categories Weak, Average and Strong. It displays how well a company manage the manageable ESG issues.
- *Return on Equity* – A financial ratio measuring the ratio between net income and equity.
- *Price-to-Book* – A financial ratio measuring the ratio between market value and balance sheet total.

5. Results

In this chapter the results from the bivariate regression analysis and ANOVA are presented. Firstly, the f-values is displayed together with statistical inference and with significance values. Secondly, an explanatory part for the analyses is presented to give a deeper understanding of the results.

5.1 Results and hypotheses

From the companies collected from Bloomberg Terminal, only 21 out of 61 has available data from Sustainalytics database. Hence, another nine companies based on Avanza's list of real estate companies are added to the dataset to increase the set to 30 companies. From the 30 companies there can be concluded all of them have a score between 7.9 and 29.0 from the possible range of 0 – 40+ which is shown in Figure 1. In the range between 7.9 and 29.0 are companies which are in the categories of negligible, low and medium. In the negligible category is all the companies between 0 and up to 10, in the low category are all the companies between 10 and up to 20 and in the medium category are all the companies with a score between 20 and up to 30. No company is in any of the other two categories, which are high and severe. The sample mean is 17.78, and the median value is 17.83. In other words, the average company in this selection is classified as having a low ESG risk. Figure 1 also shows that the distribution of the ESG Risk Ratings is not normally distributed, however there is a resemblance to a normal distribution which perhaps can be explained by the small sample size.

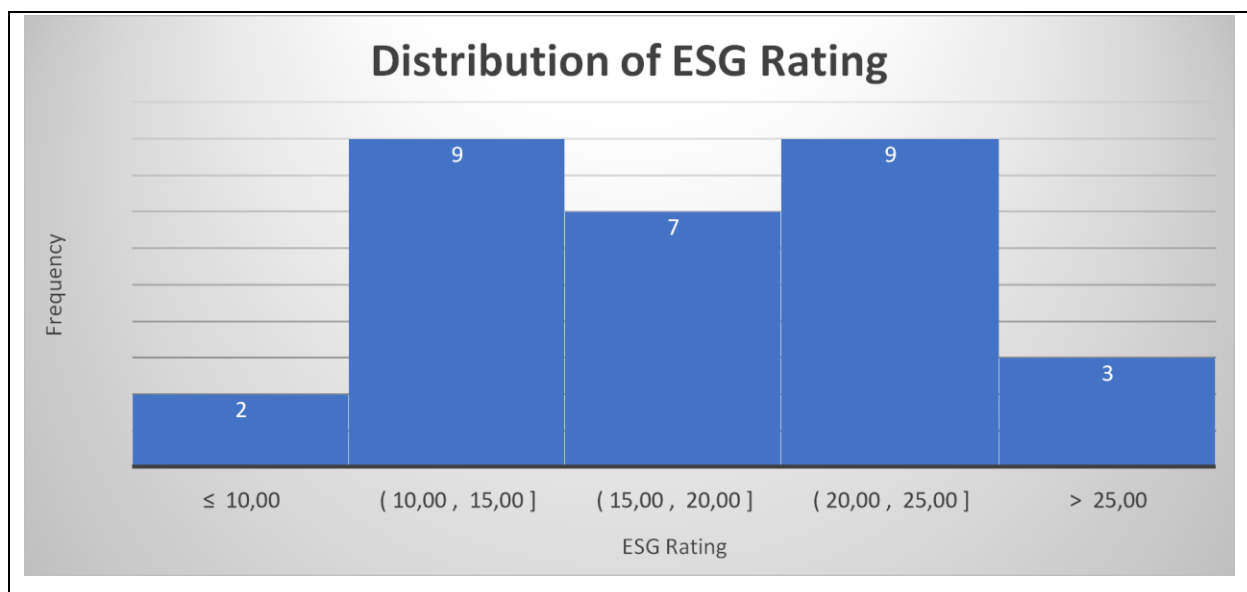


Figure 1: Distribution of the ESG Risk Rating amongst the companies

5.1.1 Hypotheses Testing

The bivariate regression analysis for the first two hypotheses resulted in correlation coefficients, p-values, coefficient of determination, beta-coefficient, residuals and graphs. The results can be found in Table B.2 and B.3 in the appendix section. In this section the results from the analyses which answers the research questions is presented and explained.

Hypothesis 1 – ESG Risk Rating and Return of Equity

From the regression it is found that the correlation coefficient between ESG Risk Rating and ROE is -0.01. This means if the risk is higher the ROE is lower. Though, -0.01 is considered to be no relationship between the variables. This statement can also be interpreted in the graph (Figure 2) as there is no distinct visual pattern. The p-value for this regression is 0.95 which confirms there is no relationship between ESG Risk Rating and ROE. However, a p-value of 0.95 indicates that there is almost only randomness in the population. A p-value in this magnitude indicates either that there is close to no relationship at all or the sample size is too small to conclude any statistics. Furthermore, the determination coefficient for the regression is 0.0001 which means there is nearly no explanation in the test given by ESG Risk Rating. From the result of the regression analysis, it is possible to conclude that the null hypothesis cannot be rejected. Thus, it is not possible to state whether the variables have a positive or negative correlation.

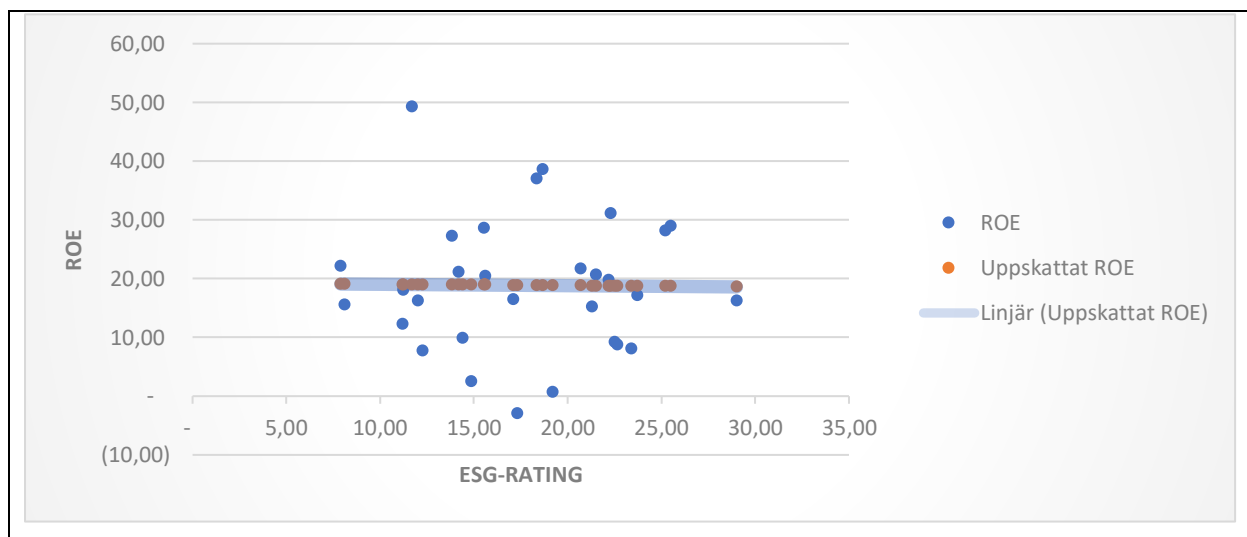


Figure 2: Regression plot for the variables ROE and ESG Risk Rating

By studying the residual plot in Figure 3 it is possible to interpret that the first assumption about linearity does not hold. The determination coefficient with a value of 0.0001 also confirm that the first assumption does not hold. Furthermore, the second assumption about homoscedasticity

also does not hold as it is possible to interpret the plot as the variance decreases as the ESG Risk Rating increases. Looking at Table 1 the Breusch-Pagan outcome confirms the interpretation of the graph is correct. However, the table shows an opposite result for assumption three. From the Durbin-Watson test it can be read that it is not possible to reject homoscedasticity, hence the assumption holds. Though, the test of assumption four resulted in rejection of normality.

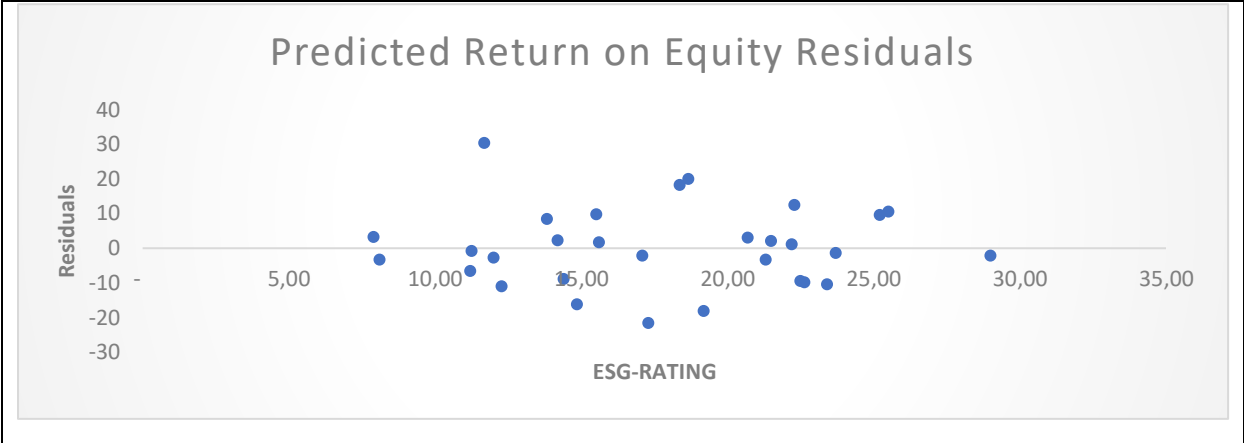


Figure 3: Residual plot for the variables ROE and ESG Risk Rating

Table 1: A summary of results from ROE residual testing for bivariate regression.

Test	Value	Critical value/interval	significance	p-value	Outcome
Shapiro–Wilk	0.867	0.927–0.985	.05	<0.01	Reject normality
Breusch–Pagan	0.512	0.05	-	0.512	Cannot reject homoscedasticity
Durbin–Watson	1.528	1.13–1.26	.05	<0.05	Cannot reject no correlation in residuals

Hypothesis 2 – ESG Risk Rating and Price-to-Book

A regression analysis of the dependent variable Price-to-Book ratio with the independent variable ESG Risk (Figure 4) yields a correlation coefficient of 0.54. This means a higher risk indicates a higher P/B-ratio. A score between 0.5-0.7 indicates a moderate strength of the relationship between the variables. This can be seen in Figure 4, where a visible pattern of increased ESG Risk Rating translates into a higher P/B-ratio. The coefficient of determination of the regression is 0.29. The p-value is 0.002, which means the result is significant. However,

the null hypothesis cannot be rejected because the result is significant in the null hypothesis favor. A p-value in this range indicates a very low probability that the results are from randomness. From the result of the regression analysis, it is possible to conclude that the null hypothesis cannot be rejected. Though, it is possible to conclude that there is a significant positive correlation between ESG Risk Rating and P/B-ratio.

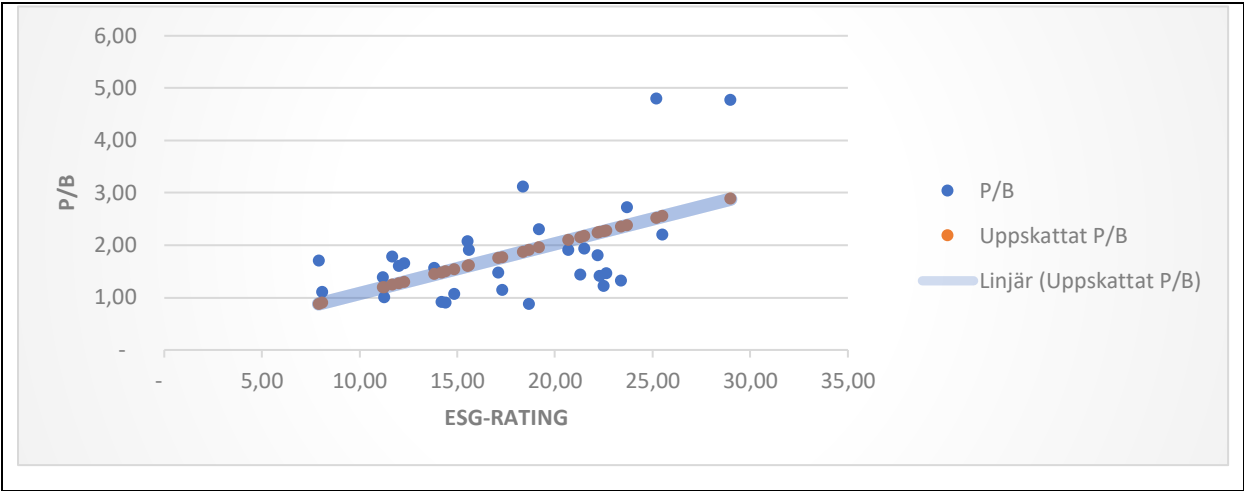


Figure 4: Regression plot for the variables P/B-ratio and ESG Risk Rating

By studying the residual plot in Figure 5 it is possible to interpret that the first assumption about linearity holds to some degree with relaxation of the two points at the end of the x-axis which could be seen as outliers. The determination coefficient with a value of 0.29 explains that the first assumption does not hold completely. Furthermore, both assumption two and three do not hold based on how the variance increases as the ESG Risk Rating increases and how the error terms are clustered together with their neighbors. This interpretation can also be confirmed statistically in Table 2. The table also shows how assumption four does not hold, since normality can be rejected by the Shapiro-Wilk test.

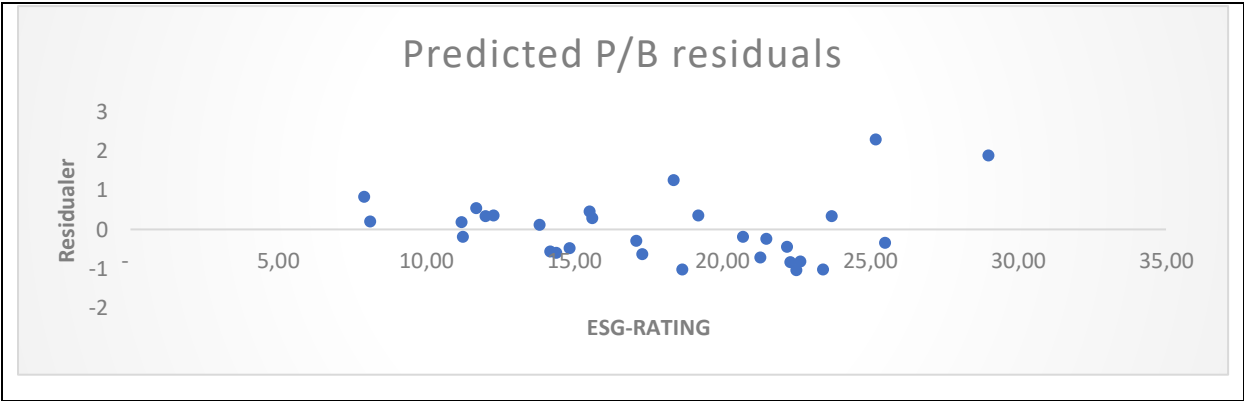


Figure 5: Residual plot for the variables P/B-ratio and ESG Risk Rating

Table 2: A summary of results from P/B-ratio residual testing for bivariate regression.

<i>Test</i>	<i>Value</i>	<i>Critical value/interval</i>	<i>significance</i>	<i>p-value</i>	<i>Outcome</i>
Shapiro–Wilk	0.802	0.927–0.985	.05	<0.01	Reject normality
Breusch–Pagan	0.006	0.05	-	0.006	Reject homoscedasticity
Durbin–Watson	2.036	1.13–1.26	.05	<0.05	Cannot reject no correlation in residuals

Hypothesis 3 – ESG Risk Management Rating and Price-to-Book

To evaluate the third hypothesis an analysis of variance is performed. The examination is about whether the ranking on how well a company manage the identified ESG risk has any effect on the P/B-ratio. In table 3 it can be read that the category including companies with weak management only contains five different companies and the Strong category consists of only seven companies, while the Average category accommodate for the majority of all companies in this study. The null hypothesis states that there is no difference in the mean value between the different categories. By inspecting table 3 it can be identified that the means between the categories in fact are different. Table 3 shows that companies with stronger ESG Risk Management Rating have a lower P/B-ratio. From the result it is also evident that there is lower variance amongst the companies with better ESG Risk Management Rating. By looking at the p-value which is 0.01 the result can be confirmed to be significant. Since the different means are not equal with a significance lower than 0.05, the null hypothesis can be rejected. At least one of the category means are different from another on population level, with a 1 percent risk of making a type I error.

Table 3: Summary of ANOVA-test input for P/B-ratio

<i>Classes</i>	<i>n</i>	<i>Mean</i>	<i>Variance</i>
Weak	5	2.9091	3.0410
Average	18	1.6515	0.3975
Strong	7	1.4574	0.0932

Hypothesis 4 – ESG Risk Management Rating and Return on Equity

Like the third hypothesis, the fourth hypothesis is evaluated by examining it through analysis of variance. The examination is about whether the ranking on how well a company manage the identified ESG risk has any effect on the return on equity. This exploration is using the same distribution as the third hypothesis, which results in a quite skewed distribution between the categories. The null hypothesis states that there is no difference in the mean value between the different categories. By inspecting Table 4 it can be identified that the means between the categories are different. However, by looking at the p-value which is 0.94 the result cannot be interpreted as significant. Even if the different means are not equal, the p-value is too high to reject the null hypothesis.

Table 4: Summary of ANOVA-test input for ROE

<i>Classes</i>	<i>n</i>	<i>Mean</i>	<i>Variance</i>
Weak	5	18.0363	102.4249
Average	18	18.5798	136.5601
Strong	7	20.1606	184.4830

5.2 Conclusion of Hypotheses Testing

This section gives a brief summarisation of the result. The first null hypothesis examines if ESG Risk Rating and ROE have a positive correlation or not. The conclusion is that there is essentially zero correlation between the ESG Risk Rating and ROE, hence the null hypothesis cannot be rejected. The second null hypothesis evaluates the correlation between ESG Risk Rating and P/B-ratio. This hypothesis shows support for a positive correlation with significance, which is on the contrary to the initial hypothesis based on previous research. Thus, the null hypothesis cannot be rejected.

The third hypothesis shows a significant result for the alternative hypothesis. This imply that it does matter how a company is managing their ESG risk. However, the significant result demonstrates that companies in the weak category have a higher P/B-ratio. The fourth hypothesis does not have a significant result. Even though the means are not the same between the groups, the p-value is high and hence, it is not possible to confirm if the means are different based on randomness or not.

To conclude the results, both the hypotheses regarding P/B-ratio show a significant p-value, but only one null hypothesis can be rejected. Both the hypotheses handling ROE show a high p-

value which indicates a high amount of randomness. The results are not significant, and the null hypotheses cannot be rejected.

Table 5: Output from Bivariate Regression Tests

	<i>Result</i>	<i>f-value</i>	<i>Significance</i>
$H_0: \rho_{ROE/ESG \text{ Risk Rating}} \geq 0$	Cannot reject		
$H_A: \rho_{ROE/ESG \text{ Risk Rating}} < 0$	null hypothesis	-0.0581	.9541
$H_0: \rho_{Price-to-Book/ESG \text{ Risk Rating}} \geq 0$	Cannot reject		
$H_A: \rho_{Price-to-Book/ESG \text{ Risk Rating}} < 0$	null hypothesis	3.3890	.0021

In Table 5 and 6 are the hypotheses results presented.

Table 6: Output from ANOVA-Tests

	<i>f-crit</i>	<i>f-value</i>	<i>Significance</i>
$H_0: \mu_{P/B \text{ weak}} = \mu_{P/B \text{ average}} = \mu_{P/B \text{ strong}}$			
$H_A: \text{The mean values are not all equal}$	3.3541	5.1021	.0132
$H_0: \mu_{ROE \text{ weak}} = \mu_{ROE \text{ average}} = \mu_{ROE \text{ strong}}$			
$H_A: \text{The mean values are not all equal}$	3.3541	0.0585	.9431

6. Analysis and Discussion

6.1 Analysis

To start off with, only 21 out of the 61 companies from Bloomberg Terminal have an available ESG Risk Rating on Sustainalytics which creates a need to assemble more companies. Because of this, nine more companies from Avanza's list of real estate companies are incorporated in the research to create a total of 30 companies. This creates a rather small sample set which is not ideal to perform statistical analysis on. These companies are divided into three different categories out of five possible, which created a non-homogeneous dataset.

From the result it is possible to interpret how return on equity has no linear correlation with ESG Risk Rating. This result is no surprise since previous research shows how there is no final conclusions on how ESG performance correlate with financial performance. This is aligned with Awaysheh, Heron, Perry, and Wilson (2020) previous research where no evidence of how good ESG Rating would imply better financial performance. In figure 2 the data points have no distinct pattern, and it looks like it is randomised. However, it could be that there is a non-linear relationship between ESG Risk Rating and ROE that is not captured by the linear regression model. Though, it does not look like any relationship at all between these variables. Analysing how the points in the residual plot looks like do not give much new information either since the regression line is almost a parallel line with the x-axis, which would create the same visual distribution as the scatter plot. There is not much to analyse from the statistical values since the evidence show almost zero correlation. However, in financial theory there could be factors that matters into this non-existing correlation.

As the ROE related hypotheses shows no evident correlation with ESG factors, there seem to be no real effect from these factors on the ROE. There can be costs involved in decreasing ESG risk exposure causing the operational element of ROE to decrease (Chen, Hung & Wang, 2016). Chen et al. (2016) draws the conclusion that increasing the CSR performance of a company will result in a decrease in profitability because of the increase in costs related to CSR activity. This conclusion can be an explanation for the results shown from the analysis since CSR and ESG activities are seen as synonyms. There are two principal ways to avoid ESG to affect the ROE from this point of view, which both add back symmetry into the equation. Either an increase of revenue relative to the increased costs are used to rebalance the operational part, or

a redistribution of capital structure is made to counterbalance changes from increased costs. Both approaches can be implemented with the same outcome, as operational performance is positioned in the numerator of the equation, and the capital structure is positioned in the denominator. The outcome of this might be the reason for the outcomes regarding ROE ratio hypotheses. Firm managers seem to have the knowledge how to, or randomly navigate their business around ESG Risk Exposure to continuously stay profitable from a Return on Equity perspective.

Related to the analysis above, it might be problematic to counterbalance added costs operationally, as isolated firms alone are not decisive in the market. This should have left firm management in a position to rearrange the capital structure to make the ratio symmetric and independent of ESG risk. The potential evolution of changes in capital structure might be one reason for the significant results regarding P/B-ratio and effects from the cumulative ESG Risk Rating and ESG Risk Management Rating.

In the regression analysis for P/B-ratio, the correlation is shown to be significantly moderate in a positive direction. This means companies with a higher ESG Risk Rating are valued higher for its equity in relation to its underlying book value. From a market logic perspective this should mean that investors have priced equity higher when it is riskier. This aligns with well-known risk theory and holds true with the fact that businesses that must rearrange capital structure with more debt to keep the ROE-ratio stable, which also holds true with an even higher risk from financial distress in relation to the firms leverage. Cornell (2021) states that low ESG Risk Rating results in lower cost of capital, hence a lower P/B-ratio. Cornell states that the expected return on investments in companies with lower ESG risks is higher because of the reward of bearing risks. The result shown in the regression analysis for P/B-ratio could be explained by the fact that companies with better sustainable performance are less affected by climate shocks, changes in sustainably regulations and other unpredictable risks related to ESG.

There is a quite clear pattern in the scatter plot between P/B-ratio and ESG Risk Rating, with the pattern showing a higher risk result in a higher P/B-ratio. Looking closer at the plot it is possible to notice two companies with much higher P/B-ratio than the rest of the companies. These two points deviates from the linear pattern, which can inform about a non-linear relationship between the two variables. Though, the result shows a linear relationship with moderate strength. This is interesting since even with this small sample out of the population, there still is a significant relationship between ESG Risk Rating and P/B-ratio. There are of

course many factors in play when analysing these types of variables and it is important to remember that correlation does not imply causality.

This result is interesting since the majority of previous research on real estate mostly shows a positive correlation between ESG performance and financial performance. This study finds an opposite relationship. The P/B-ratio is a ratio based on investors view on value of a company's asset, which makes this finding interpretable as investors value assets with high risk more. This is contradictory to Friede, Busch and Bassen (2015) paper, stating ESG portfolios on average performs better. A logic assumption from their paper would be investors would buy low risk ESG companies which would raise the price and due to that increase the P/B-ratio. In addition, Awaysheh, Heron, Perry, and Wilson (2020) mention how the evolving expectations concerning CSR influence investors to prefer the high performing CSR companies. If this is true, the same logic, as for Friede, Busch and Bassen (2015), could be applied here and the price should go up if investors rush to ESG companies.

Even though it is interesting to speculate what drives the price of assets of a company, it must be remembered there are many more factors. Kempeneer, Peeters and Compennolle (2021) point out how the real estate industry is undeveloped in the regard of sustainability and there are much room for improvements. Since real estate is lagging behind other industries with regards to sustainability there is a chance investors and stakeholders are not concerned about ESG performance yet. Maybe the technology to make smart buildings are still too expensive to be profitable enough to attract investors and the correlation will change in the future.

The third hypothesis regarding if the mean value of P/B-ratio depends on ESG Risk Management Rating shows a significant result. The company in the weak category has the highest mean value, almost twice as high as strong. Though, the variance is much higher in the weak category than the other two. The weak category includes only five samples which is not much for a statistical analysis, and the variance can be very high since it might not mirror the entire population.

The ESG Risk Management rating category might be a subject of information asymmetry since the management might withhold important information that is not beneficial to publish. Stiglitz (2002) mention how different actors always have different insight and knowledge, and this is true even in the case between the company and the rating agency. The management decide what information will be available to the rating company and this creates information asymmetry on

the market when the rating is published. EU (2019) created a new regulation 2019 to avoid companies to only spread positive information about itself. The regulation is trying to increase the transparency of how companies work with ESG. Hopefully, this regulation decreases the information asymmetry, and it will become easier for investors to find investment opportunities based on their ESG preferences. As mentioned before, the real estate industry is lagging in its work with these questions and this regulation might push the industry in the right direction. In case of this happening, the result from this study might change and companies with strong ESG Risk Management Rating can become more valuable.

The fourth hypothesis is not significant and therefore not possible to draw any conclusions from. A way to solve this could be including more data from different data sources to obtain more real estate companies with ESG data. Both hypotheses concerning ROE do not show significance, which might imply that ESG does not influence the financial performance of companies in the real estate industry. This implication is also found in Awaysheh et al., (2020) where they conclude that a company with better rating will not necessarily have better financial performance. This again points in the direction that ESG has not yet been well established in the real estate industry.

To conclude the analysis the study has one null hypothesis which is rejected. It is the third dealing with the mean value of P/B-ratio and ESG Risk Management Rating. With this result it is possible to conclude the second research question. The mean is highest for the category with weak management. This could lead to further investigation on why investors are not concerned with ESG Risk Management Rating in the real estate industry. Regarding the first research question, the none of the null hypotheses could be rejected, which inspire to more research of the correlation between ESG Risk Rating and financial performance.

6.2 Discussion

The real estate is in an interesting paradigm shift towards a more sustainable approach. This study statistically tests if there are any linear relationship between ESG performance and financial performance in terms of ROE. It also scrutinises whether investors prefer companies with high ESG Risk Rating and good ESG Risk Management Rating. Unfortunately, a relatively

small amount of the Scandinavian real estate companies has a rating from Sustainalytics which made the size of the dataset suboptimal. A way to obtain more data could be to increase the number of included countries. However, by including a wider spread of countries more country specific regulation will affect the study. These regulations are hard to measure. Another solution is to include not only companies labelled as Real Estate Owners & Developers, but also construction builders and other companies involved in the industry.

The choice of using Sustainalytics might have limited the size of the dataset and using other sources for ESG could be proficient. By including data from more sources and not only risk rating but other factors as well, it would be possible to track a broader width of how ESG correlate with corporate financial performance, as the ESG rating providers include and weight information differently. By using data from more and ESG providers, the correlation and conclusions would be exhaustive in this matter for any examined industry or region.

Furthermore, as some companies had to be cherry picked by manual filtering, a proper reflection about how to filtrate data points would improve the outcome and reliability of this study. An improvement would be to use all the companies listed under Real Estate on Avanza. However, looking up every single company would be too time consuming and having 30 data points is sort of the golden number to be able to perform statistical analysis, due to CLT.

Regarding the analysis there is no strong linear relationship in any hypothesis, which leads the thoughts to a non-linear analysis is to prefer for future research. Moreover, most of the assumptions of the linear regression do not show that a linear regression is suitable for this problem. This enhances the argument of using a non-linear method in future research.

The correlation between ESG Risk Rating and P/B-ratio seem to add more value to already existing knowledge on the field of financial risk. As the relationship goes in a positive direction instead of the predicted negative direction. Most of the previous research regarding the topic of ESG performance and financial performance concludes that companies with better ESG performance also have better financial performance. Because of this, we expected that the result of this thesis would show to the same conclusion. However, overall it did not.

There are a lot of possible reasons for this outcome, the most obvious being that investors requires a higher return when the risk is higher – which leads to second thoughts about what ESG really are. An interesting perspective of ESG is that the acronym and its rating are a

defined measurement of already known information such as environment-managing activities, contracts, and risk exposures, and therefore might be a measurable part of market and business risk comparable with inflation or other macroeconomic variables. Another point of view being that the investors do not care about the ESG Risk Rating of companies within the real estate industry. This thesis already explains that the real estate industry is lagging when it comes to sustainability awareness, and this could influence the result of this report. We believe that more investment in green-buildings and other sustainability activities will lead to improved sustainability awareness within the industry. Increased sustainability awareness will lead to increased investment in green projects which further will increase the financial performance amongst the companies with low ESG Risk Rating.

Since this is a quantitative study and not qualitative, the individual companies have not been investigated. One reason for this relationship can be that small companies have acquired exclusive property and it is a large proportion of the companies' assets with high growth anticipation which increases the price of the stock. Meanwhile, the companies are too new to have started their ESG management and hence, is lagging behind their peers in the industry when it comes to managing ESG. There could be many explanations to why the outcome shows this result. However, in this case the result is significant, and it is interesting what the future holds.

7. Conclusions and Contribution

7.1 Conclusions

This study shows expected and unexpected results based on previous research. Previous study usually shows either positive correlation between ESG performance and financial performance or no correlation at all. This leads to expectation of investors to invest their funds into companies with high ESG performance, despite that, the findings in this report suggests the investors prefer companies with higher ESG Risk Rating and weak ESG Risk Management

Rating. Hence, there is a question mark regarding whether ESG is an important factor in the real estate industry or not when it comes to investing. To examine this, a quality investigation with fund managers could be performed to obtain information whether ESG plays a big part in the investment calculations in the real estate industry.

The findings about ESG and financial performance show no significance and the null hypothesis cannot be rejected. Both hypotheses could need more data to form a more robust consensus, or there currently is no linear relationship between ESG and financial performance in the real estate industry. More research around the topic is necessary to conclude how ESG affects the financial performance.

7.2 Contributions

The contributions for research on this field are limited due to lack of reliability. The first limitation is the retrieved sample which is small but somehow relatively large in comparison to an approximate population. Secondly, the sample is a subject to selection bias as the data gathering are not made from one sole source and filtration. A further discussion on this limitation can be made on the fact that our first 21 collected data points were used because they were the only available from Sustainalytics out of the 61 from the Bloomberg Terminal filtering. The final 9 data points were also double checked against the Sustainalytics database as the tests depended on availability from this. Why just a few datapoints had available data is out of the authors control, but the associated dilemma should not be dismissed regardless. The third limitation is the inferential statistics used for hypotheses one and two, as all assumptions for bivariate regression are not fulfilled.

However the results shows one significant output which is the relation between ESG Risk Management and P/B-ratio. This, with lacking reliability can somehow contribute by showing future researchers a direction on where to make more studies in order to get more knowledge on the field, especially in the Scandinavian region. Even though the contribution of this thesis is limited in its findings due to its limitations, potential patterns has been shown and also possibilities of how to succeed to make findings with other and more reliable methods.

7.3 Future Research

As mentioned in the contribution section, there are some interesting aspects for future research. A multivariate regression test can perhaps make an improvement for this thesis. Some empirically proven independent variables which are known to be affecting financial performance can be used as control variables in the test to explain more of the change in the dependent variables. For example, we could not reject the first null hypothesis even though the tested sample shows an almost nonexistent positive correlation. With known explanatory control variables added to the regression, the residuals in the current test would be smaller due to a higher degree of explanation from the added variables. This would increase the reliability of the ESG variable as explanatory for the financial dependent variables in the tests.

A larger sample would also increase the reliability of the tests. As the sample size increases, the more representative the sample would be in relation to the population. For example, a residual plot analysis could be used in a more helpful way to screen and the four required assumptions for bivariate regression, if the sample size would be larger. A larger sample size can potentially show heteroscedasticity, which means the variables need to be transformed into a state where the assumptions are fulfilled. A larger sample size would also help to make a better statement from the ANOVA-test. As the total of the 30 datapoints are scattered into 3 categories, the sample size within each category is relatively small. The estimated mean value would probably be closer to the real population mean if the sample size was increased, even though it could also go the other way around, as it is hard to know.

For further research on the ESG and corporate financial performance relation, a few suggestions is made. For instance, a time series data analysis is of interest to research how the relationship has developed through different states of economic change, as this century has encountered different influential global events which could have had impact on the relationship. For example: a fast-paced development within tech, the financial crisis 2008 and a pandemic. What is significant in one economic state, might not be in another.

Additionally, as previous research has shown ambiguous results of the relationship within the real estate sector, an exhaustive meta-analysis to map the results from different delimitations such as regions would clarify the overall relationship. Further, more delimited aspects such as more operations-focused ratios would be interesting to study, especially within different economies. Moreover, more advanced analyses would gain value to existing knowledge as it should yield contribution at a larger extent.

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Appendix

Appendix A

Table A.1: List of companies and their variables

Enterprise	ESG Management	ESG Risk Rating	ROE	P/B	
Wihlborgs fastigheter*	Strong		12,00	16,20	1,60
Hufvudstaden*	Average		14,40	9,90	0,90
Nyfosa*	Average		15,60	20,40	1,90
Fastighets Trianon AB*	Weak		25,50	29,00	2,20
Diös Fastigheter*	Strong		7,90	22,10	1,70
Genova Property Group*	Average		22,20	19,80	1,80
Atrium Ljungberg*	Strong		8,10	15,60	1,10
K-Fast Holding AB*	Weak		25,20	28,10	4,80
Heba Fastighets AB*	Average		20,70	21,70	1,90
FASTIGHETS AB BALDER-B SHRS**	Average		13,83	27,25	1,57
AKTIEBOLAGET FASTATOR PUBL**	Weak		29,00	16,23	4,77
LOGISTEA AB-A**	Average		19,20	0,64	2,30
EASTNINE AB**	Average		14,20	21,09	0,91
SELVAAG BOLIG ASA**	Average		21,50	20,65	1,94
AKELIUS RESIDENTIAL AB-D**	Average		18,66	38,60	0,88
WALLENSTAM AB-B SHS**	Strong		12,27	7,73	1,65
STENDORREN FASTIGHETER AB**	Weak		23,40	8,10	1,32
COREM PROPERTY GROUP AB-A**	Average		17,30	-2,90	1,14
BRINOVA FASTIGHETER AB**	Average		22,50	9,21	1,22
CIBUS NORDIC REAL ESTATE AB**	Weak		22,64	8,75	1,45
CASTELLUM AB**	Strong		11,25	18,03	1,00
SAGAX AB-A**	Average		18,36	37,01	3,12
JOHN MATTSON					
FASTIGHETSFORET**	Average		22,30	31,14	1,41
K2A KNAUST & ANDERSSON-B SHR**	Average		23,70	17,15	2,72
FASTPARTNER AB-A**	Strong		11,20	12,23	1,38
PANDOX AB**	Average		14,85	2,49	1,06

CATENA AB**	Average	15,52	28,57	2,07
SAMHALLSBYGGNADSBOLAGET I NO**	Strong	11,68	49,23	1,77
NP3 FASTIGHETER AB**	Average	21,30	15,25	1,43
PLATZER FASTIGHETER HOLD-B**	Average	17,10	16,50	1,47

*: RETRIEVED FROM AVANZA BANK FILTERING

** : RETRIEVED FROM BLOOMBERG TERMINAL FILTERING

Appendix B

Table B.1: Excel Output from ANOVA

ROE				
Classes	<i>n</i>	Mean	Variance	
Weak	5	18,0363	102,4249	
Average	18	18,5798	136,5601	
Strong	7	20,1606	184,4830	

ANOVA ROE

Variationsursprung	KvS	<i>fg</i>	Mkv	<i>F</i>	<i>p</i> -värde	<i>F</i> -krit
Mellan grupper	16,6458846	2	8,32294231	0,05854935	0,9432511	3,35413083
Inom grupper	3838,11995	27	142,152591			
Totalt	3854,76584	29				

P/B				
Classes	<i>n</i>	Mean	Variance	
Weak	5	2,9091	3,0410	
Average	18	1,6515	0,3975	
Strong	7	1,4574	0,0932	

ANOVA P/B						
Variationsursprung	KvS	fg	MKv	F	p-värde	F-krit
Mellan grupper	7,36213839	2	3,6810692	5,10208558	0,01319544	3,35413083
Inom grupper	19,4800473	27	0,72148323			
Totalt	26,8421857	29				

Table B.2: Excel Output from Regression Analysis for ROE

OUTPUT SUMMARY ROE

Regressionsstatistik

Multipel-R	0,01097029
R-kvadrat	0,00012035
Justerad R-kvadrat	-0,03558964
Standardfel	11,7325888
Observationer	30

ANOVA

	fg	KvS	MKv	F	p-värde för F
Regression	1	0,46391085	0,46391085	0,00337013	0,95411887
Residual	28	3854,30192	137,65364		
Totalt	29	3854,76584			

	Koefficienter	Standardfel	t-kvot	p-värde	Nedre 95%	Övre 95%
Konstant	19,269087	7,39666799	2,60510368	0,01454154	4,11769947	34,4204745
ESG-RATING	-0,02311698	0,39820588	-0,05805283	0,95411887	-0,83880476	0,7925708

Table B.3: Excel Output from Regression Analysis for P/B-ratio

OUTPUT SUMMARY P/B

Regressionsstatistik

Multipel-R	0,53932574
R-kvadrat	0,29087225
Justerad R-kvadrat	0,26554626
Standardfel	0,82450285
Observationer	30

ANOVA

	<i>fg</i>	<i>KvS</i>	<i>Mkv</i>	<i>F</i>	<i>p-värde för F</i>
Regression	1	7,80764707	7,80764707	11,4851283	0,00210143
Residual	28	19,0345386	0,67980495		
Totalt	29	26,8421857			

	<i>Koefficienter</i>	<i>Standardfel</i>	<i>t-kvot</i>	<i>p-värde</i>	<i>Nedre 95%</i>	<i>Övre 95%</i>
Konstant	0,12969383	0,5197978	0,24950823	0,80478906	-0,9350637	1,19445135
ESG-RATING	0,09483615	0,02798375	3,38897157	0,00210143	0,03751403	0,15215827