Optimised ESG portfolios

Does sustainability sacrifice profit?

Exploring the relationship between ESG and financial return using efficient diversified portfolios optimised to degrees of risk, as well as equally weighted portfolios.

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Abstract

The purpose of this thesis is to investigate the relationship between ESG and portfolio investment. More specifically, we investigate if sustainable portfolios that focus on good ESG performance requires sacrificing profit or if it is possible to maintain a sustainable portfolio with a high financial gain. The thesis focuses on the Swedish financial market and uses 56 different assets to investigate the relationship between profit and ESG. The relationship between sustainability and profit is analysed by creating different portfolios based on ESG scores and by measuring and comparing the performances of these portfolios. Half of the portfolios are created using Markowitz method and Sharpes ratio to create diversified efficient portfolios with optimised mean return per unit of risk, while the other half are equally weighted portfolios. The thesis also includes the results of two surveys sent to firms in the financial sector to evaluate ESGs prevalence in Sweden. The thesis finds that there is a positive correlation between the social aspect of ESG and investment profit, while it shows a negative correlation between the environmental aspect of ESG and profit.

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1. Introduction

Over the last few decades, the idea of sustainable investment and companies has become more prevalent. This can be seen with the creation and evolution of the concept named ESG which stands for environmental, social and corporate governance. The aspects of this concept should be seen as guidelines for what companies should adhere to when it comes to the management of their firm. This concept was the brainchild of the UN General-Secretary Kofi Annan. The concept of sustainable development and investments that we today refer to as ESG was first coined in the 2005 report named "Who cares wins". When this report was introduced, it had the backing of the United Nations Global Compact and twenty large banks, financial firms and institutions in nine countries that managed assets of a value totalling more than six trillion dollars (Who Cares Wins, 2005). Today, this same organization that managed and ordered the development of the report (2005), the UN Global Compact has the backing of 15,268 companies in 163 countries (UN Global Compact, 2022), representing 62 trillion dollars under management (Chesebrough, 2022), thus showing the growing importance of ESG and the position it holds in the financial market. It also shows in the Global Sustainable Investment Review published 2018 by Global Sustainable Investment Alliances (GSIA, 2018). In this report we can observe a 34 percent growth of sustainable investment in five major markets[1]. However, it is not just the financial sector where the prevalence of sustainable development has been noticed lately, but also in the public sector. This can be noticed by events such as Greta Thunberg and her school strikes for the environment that took the world by storm and gained attention from the mainstream media as well as influential world leaders (Kraemer, 2021). It can also be noted by the actions of the local governments such as the Swedish government that in an effort to improve the country's sustainability impact proposed a plastic tax that was past into effect 1st of May 2020 (Olsson, 2021). All these events have resulted in that people who are generally not engaged in the in the financial sector or the workings of it, has started taking greater interest in its impacts from a sustainability viewpoint, in addition to demanding more corporate responsibility and that the companies have a greater sustainable development focus. This can be observed in Riedl and Smeets paper that was published 2017, where they investigated why people hold sustainable equites and found that investors are willing to sacrifice financial profit to invest assets that are more in line with their sustainability preferences (Reidl & Smeets, 2017). At the same time as the public demand for corporate

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[1] Europe, United states, Japan, Canada and the Australia/New Zealand markets.

responsibility and transparency increases, companies such as Bloomberg (Bloomberg, n.d) have introduced measurements that presents how well a company performs in ESG. Making it easier for private people to engage in the subject and holding their companies responsible.

The accessibility to ESG performances of companies have also made it easier for studies to be conducted on the concept's relation to the companies and their financial performances. This can for example be seen in the 2009 study by Statman and Glushkov which analyses the relationship between stocks social responsibility scores and profit (Statman & Glushkov, 2009). There is also a more resent paper from 2020 written by Barber, Morse and Yasuda where they compare and investigates the relation between funds with sustainability aspects and normal venture capital funds (Barber, Morse & Yasuda, 2020). All of these reports help investigating the relations of sustainability and profit in addition to the impact that the sustainability mindset has on the financial market.

1.1 Purpose of the paper and problem

There are relatively few studies exploring the relationship between ESG and profit in the Swedish financial market, as well as investigating the prevalence of ESG in the country's financial sector. The purpose of the thesis is to explore these relationships and questions as well as exploring some of the driving forces behind ESG. The thesis aims to investigate this by answering the following questions:

1. *Is there a trade-off between profit and ESG when it comes to Swedish companies, or is there a symbiotic relation between them?*
2. *Is ESG prevalent in the Swedish financial market and is the pension sector an important part of the drive?*
3. *Can portfolio optimisation improve the ESG, profit comparing to the standard method?*

The thesis strives to answer these questions using two primarily methods of collecting data. The first method is an empirical method, where portfolios are created using Harry Markowitz "Modern Portfolio Theory" (Markowitz, 1952). Some of these portfolios are also created by optimising the weights to generate the highest Sharpe ratio. However almost all of these portfolios are created with ESG scores, and some focuses extra on certain aspects of ESG. This allows us to create several portfolios whose performances differ in ESG scores, Sharpe ratios,

mean return, revenue and standard deviations. Sixteen of the portfolios are created with the aim of maintaining certain degrees of different ESG scores. The portfolios are divided in to two main categories using two different methods. The first method creates equally weighted portfolios, without optimisation. Meanwhile the second category uses Markowitz method and Sharpes' measurement to create efficient portfolios whose weights are optimised based on their risk-return relationship.

The second method used to collect data is through surveys. The surveys are sent to different sectors in the financial market and aims to measure the prevalence of ESG in the Swedish financial sector as well as finding out the future development of the financial sector in relation to ESG.

1.2 Limitations and boundaries

The paper is bound to the Swedish financial market, analysing the historical returns of 56 stocks and the OMXS 30 index. The stocks are selected by including 29 out of the 30 stocks that make up the OMXS 30 index as well as 50 stocks with available ESG score. These financial assets overlap with each other totalling 56 individual assets and 1 index. The companies that are selected are required to have historical stock price data over a 10-year period stretching from 29th of April 2011 to 31st of Mars 2021. The empirical stock price data that are being used in the thesis have been collected exclusively from Nasdaq OMX Nordic and the ESG scores are collected from Bloomberg. The historical prices of the assets are limited to the closing prices each month during the 10-year period that the empirical research takes place. The surveys sent out were limited to investment firms, private equity firms and pension firms/funds who operates in Sweden.

1.3 Disposition

The thesis is structured in the following approach: Chapter 2 provides information on the theories that create the foundation of the thesis as well as an insight into previous research conducted on the subject. Chapter 3 goes through the methodology used when conducting the research for the thesis, while Chapter 4 presents the results from the conducted empirical study and survey. Chapter 5 discusses the results, how they answer the thesis questions as well as discussing improvements and future studies conducted in the same field. Chapter 6 concludes the thesis based on the discussion in chapter 5.

2. Theories and literature

This chapter provides insight into the theories that form the base for how the thesis is conducted, as well as providing some insight into previous studies conducted on the relationship between environmental, social, corporate governance and profit.

2.1 Modern Portfolio Theory

In 1952, Harry Markowitz published his text "Portfolio Selection" (Markowitz, 1952) which introduced his Modern Portfolio Theory that would become one of the fundamental theories of portfolio selection. Modern Portfolio Theory focuses on the relationship between the expected return and the variance of a portfolio. It concentrates on the idea that an investor considers a higher expected return as desirable and variance of the return as something unwelcomed. He reasons that in theory there exist a vast number of portfolios with different degrees of expected return and variance return fitting most investors. These portfolios may vary between investors as some would be willing to take on a greater degree of variance for a higher expected return.

Markowitz considers that diversification is essential in creating a portfolio with an optimal degree of variance return and expected return. He also believes that theories or maxims that does not include diversifications should be rejected as the benefits of diversification both is observed and sensible (Markowitz, 1952). He argues that by diversifying the assets in a portfolio an investor would find a portfolio with both higher expected return and a lower variance. He retains that there might still exist an individual asset with both a lower variance and a higher expected return than any diversified portfolio, but this would be a rarity, with the E-V rule producing a wide range of efficient diversified portfolios. In the Modern Portfolio Theory, Markowitz (Markowitz, 1952, p. 89) points out that the variance of a portfolio with two assets generally is lower than the variance of the two individual assets if both assets had the same variance return. The variance of the portfolio can never be higher, and it will only remain the same as the two assets if the two are perfectly correlated. This proves that the diversification of portfolios provides benefits over non-diversified portfolios, but it also points out an important aspect of diversification. Markowitz noticed that you should diversify the portfolio for the "right reason" and also use the "right kind" of diversification (Markowitz, 1952, p. 89). If you create a portfolio with several assets that all are related to the same industry, then you will be faced with the problem that it is highly likely that they perform poorly at the same moment in time. To prevent this problem, it is important to look at the covariance of the

assets in the portfolio, as the benefit of diversification is limited if the covariance of the assets is high. By combining the information, an investor can create efficient portfolios that are diversified with a lower degree of variance and a higher degree of expected return.

2.2 Mutual Fund Performance

In 1966 William F. Sharpe published his work named Mutual Fund Preference (Sharpe, 1966), which is a continuation on Harry Markowitz's "Modern Portfolio theory" (1952). In this publication Sharpe introduced a measurement that he refers to as the reward-to-variability ratio which will later be known as Sharpe ratio. This measurement is an alteration to James Tobin's previous measurement and is used to help identify the efficient diversified portfolios that Markowitz introduced. Tobin introduced a measurement (Sharpe, 1966, p. 122) where an investor invested in portfolios using predicted performances in expected rate of return and predicted variability or risk.

$$E = \left(\frac{E_i - p}{\sigma_i} \right) \tag{1}$$

$E = reward - to - variability$
$E_i = The\ expected\ rate\ of\ return$
$p = riskfree\ intrest\ rate$
$\sigma_i = Predicted\ variability\ or\ risk$

The portfolio with the highest result in reward-to-variability is the best performing efficient diversified portfolio. The problem with this measurement however that Sharpe noted (Sharpe, 1966, p. 122), was that this model deals with the predicted future performance of E_i and σ_i. And as it dealt with predictions of future values, that meant that it could not be tested and applied in a satisfying manner as there is no clear way of obtaining the predicted future variables of the formula.

The measurement that Sharpe introduces to amend this problem (Sharpe, 1966), is structured the same way but replaces the expected rate of return and predicted variability. He replaces the expect rate of return with the average annual rate of return of the portfolio, and the predicted variability with the standard deviation of annual rate of return. This meant that the model could be tested and later applied. This measurement that Shape presents in his work is the ratio

depicting the reward per unit of variability. Sharpe explains this (Sharpe, 1966, p. 123) by pointing out that the numerator in the model shows the reward the investor receives from his investment for taking on risk, as it shows the difference of the portfolios "average annual rate of return" and the risk-free rate. Whiles the denominator shows the amount of risk that the portfolio entails.

2.3 ESG; environmental, social and governance

ESG as we know it today began with the United Nation Global Compact initiative. The compact was announced in the year 1999 by United Nations Secretary-general Kofi Annan (Kofi Annan, 1999) at the World Economic Forum. He addressed his wishes for a partnership between the UN and the private sector, and that the two-years leading up to the WEF meeting in the year 1999 had proven that such a partnership was plausible. This led to implementation of the United Nation Global Compact (UNGC) in the year 2000, which introduced nine principles drawn from three different texts, meant to inspire corporations to adhere to good corporate practice (Wilkinson, 2013). The nine principles of the UNGC are voluntary. Later on, these nine principles were increased to ten with the addition of a new principle from a fourth text (The Ten Principles | UNGC). These ten principles focus on four primary areas: human rights, labour, environment and anti-corruption.

The term ESG was first coined with the 2005 publication of the report called "Who Cares Wins" by the UNGC with the endorsement and joint initiative of twenty of the world's largest banks, financial firms and institutions (Who Cares Wins, 2005). The focus of the report was to establish guidelines and recommendations regarding the way in which environmental, social and corporate governance (ESG) issues could be integrated with the financial markets, stock and security exchanges. In the report they presented a selection of ESG issues that impacts companies, their investment values (Who Cares Wins, 2005) and that helps define the environmental, social and corporate governance aspects of ESG. These issues are presented in following table (Who Cares Wins, 2005, p 6):

Table 1: *The information in the table is collected from the UN Global Compact publication called Who Cares Wins, published in 2005 on page 6, titled "exhibit 6" (Who Cares Wins, 2005, p 6). It depicts different ESG issues that effects most companies according to the UNGC*

Environmental issues

"Climate changes and related risks"

"The need to reduce toxic releases and waste"

"New regulation expanding the boundaries of environmental liability with regard to products and services"

"Increasing pressure by civil society to improve performance, transparency and accountability, leading to reputational risks if not managed properly"

"Emerging markets for environmental services and environment-friendly products"

Social issues

"Workplace health and safety"

"Community relations"

"Human rights issues at company and suppliers' /contractors' premises"

"Government and community relations in the context of operations in developing countries"

"Increasing pressure by civil society to improve performance, transparency and accountability, leading to reputational risks if not managed properly"

Corporate governance issues

"Board structure and accountability"

"Accounting and disclosure practices"

"Audit committee structure and independence of auditors"

"Executive compensation"

"Management of corruption and bribery issues"

From the issues mentioned in the UNGC paper, we are able to define the purposes of the three categories. The environmental category focuses on companies direct and indirect impact on the environment. This could for example be done by lowering their direct carbon dioxide emissions, taking into regard the environmental impact of their subsidiary companies and partners as well as considering the impact the firms they do business with have on the environment. The social category addresses the relationships of the firm and their employees as well as their impact on the society that they exist in. Such as making sure that your employees are treated well and

equally, making sure that the company lives up to the human right standards at all levels in which they choose to operate. They should also focus on improving the society that they exist in. The last category is corporate governance which focuses on the running of the company, maintaining transparency and that all are held responsible for their actions.

2.4 Previous research on the relationship between ESG and profit

This section focuses on previous studies conducted on the relationship between ESG and financial profitability. There has been plenty of different studies conducted on ESG and financial profits by using different methods. The aim of the section is to provide insight in previous research on the topic.

In 2021 a paper was published by Whelan, Atz, Van Holt and Clark (Whelan, Atz, Van Holt & Clark, 2021), where they conducted a meta-analysis on the aggregated results of more than 1000 studies that had analysed the relation between ESG and financial performance. They divided up the previous studies in to two categories, those focusing on corporate financial performance and those focusing on investment performance. The studies that they analysed had either found positive, negative or natural relations between ESG and financial performance. What they found was that out of the studies that focused on corporate financial performance (2021, p. 2), 58 percent showed a positive relationship between ESG and financial performance and 21 percent showed mixed results. They also found that 13 percent of the studies focusing on corporate performance showed a neutral relation between ESG and financial performance whiles 8 percent showed a negative relation. The "investment focused" studies that used risk adjusted attributes such as Sharpe ratio revealed that a higher degree of the studies were positive (2021, p. 2), with 59 percent showing a positive relation between ESG and financial performance, whiles 14 percent of the studies showed a negative relation and the remaining showing mixed results. This indicates that it is highly plausible that we find a positive relation between ESG and profit. Whiles the mixed results points out that there might be some aspects of ESG performing better in relation to financial performance than others, it is also unclear how these results reflect the relationship between ESG and financial performance in Sweden.

In 2015 another aggregated study was published by Friede, Busch and Bassen (Friede, Busch & Bassen, 2015). This study investigated the relationship between ESG and corporate financial performance (CFP) by summarising the aggregated results of 2200 individual studies. The study

found that around 10 percent of the studies exhibited negative relations between ESG and CFP whilst the remaining 90 percent of studies depicted nonnegative relations. With 48.2 percent of the nonnegative study results showing a positive relation between ESG and CFP (2015, p. 218).

Hong and Kacperczyk published a paper in 2009 (Hong & Kacperczyk, 2009), were they researched the effects of social norms on the financial market, particularly the effects of social norms on "sin stocks", which they describe as stocks that are *"publicly traded companies involved in the production of alcohol, tobacco, and gaming"* (Hong & Kacperczyk, 2009, p. 16). The paper shows that "sin stocks" have higher expected returns than non "sin stocks". This is explained as the result of "sin stocks" being neglected by norm-constrained intuitions such as pension firms or other companies that have to be transparent about their investments and that are bound to social opinions. Hong and Kacperczyk claim (Hong & Kacperczyk, 2009) that this means that the price of the stock is depressed relative to its fundamental values. This means that they should have a higher expected return than the ESG companies.

In 2012, Humphrey, Lee and Shen published a paper (Humphrey, Lee & Shen, 2012) investigating whether firms' corporate social performance (CSP) effected their financial performance by analysing UK firms. The firms in the study were rated according to general ESG criteria as well as criteria tailored to their specific industries. The result of the study was that they found no indications of difference in risk-adjusted performances between UK firms that had high CSP scores or low. This indicated that firms would not suffer significant financial cost if they decide to focus on improving their ESG performance. Meaning that UK firms could choose to improve their ESG performances and commitments without having to sacrifice financial performance in doing so.

3. Method

The data used for the survey can be divided in to two different primary categories, an empirical data section and a survey. The empirical category can be subdivided into equally weighted portfolios and optimised weighted portfolios as these are the two primary methods that the empirical part of the thesis was conducted in.

3.1 Method empirical section

This section of the method chapter covers the use of the stock and index data in the thesis. The data is used for the creation of portfolios that will help explore the relationships between sustainable investments and financial performance. The portfolios and the index will be presented in a table depicting their individual performances in 8 different result categories. This table will be referred to as Table 2 and will depict 18 different portfolios as well as the OMXS 30 index. The portfolios will be created with the use 56 individual stocks. The information needed to create the portfolios and their results as well as the results of the OMXS 30 index is obtained from Nasdaq OMX Nordic (Nasdaq, n.d.) and from Bloomberg (Bloomberg, n.d.). Nasdaq provides us with the price data of the stocks that is needed to be able to create portfolio, whiles Bloomberg provides us with an ESG scoring for the companies used in the thesis.

The relevant stock data downloaded from Nasdaq OMX Nordic consists of the closing prices of the stocks and the index. Out of these observations, we pick the last observed closing price each month of the test period. This leaves us with 120 observations for each stock and the index. This information is then used to calculate the monthly changes in prices using the following formula:

$$r_t = \frac{P_t}{P_{t-1}} - 1 \tag{2}$$

This formula provides us with the time index returns for the individual stocks r_t, where the r represents the return itself and the subscript stands for the calculate month. P_t stands for the closing price in the end of month t. To be able to access the growth rate of the asset we need to take a price observation and then divide it with the price observation of the previous month which is represented by P_{t-1}. This will leave us with value representing the size of stocks price

in that month compared to the previous months price. By now subtracting 1 from the value, we are left with the growth of the stock.

The time index returns that are calculated are then used to calculate the Arithmetic mean of the stocks and the market index which is also known as the expected return. This is done by adding together all the time index returns of stock or index and then divide them with the number of observations. This gives us the Arithmetic mean as shown with in the formula (GALLANT, 2021):

$$\bar{r} = \frac{r_1 + r_2 + r_3 + \dots r_n}{n} \tag{3}$$

To be able to use this information to create portfolios, we then have to calculate the covariance and variance of the stocks. This measures the relationship between the returns of two different assets. A positive result means that the assets move in a similar manner indicating that they are affected by similar things in the financial market. The covariance is calculated in accordance with the formula below (Bodie, Kane & Marcus, 2018, p. 196):

$$Cov(r_a, r_b) = E[r_a - E(r_b)][r_b - E(r_a)] \tag{4}$$

We calculate the covariances and use them in a covariance matrix showing how all the assets relate to each other. We will then use the covariance matrix to calculate the standard deviations of the portfolios.

$$Cov\ Matrix = \begin{matrix} cov(r_a, r_a) & cov(r_b, r_a) & \dots & cov(r_a, r_x) \\ cov(r_a, r_b) & cov(r_b, r_b) & \dots & cov(r_b, r_x) \\ \dots & \dots & \dots & \dots \\ cov(r_a, r_x) & cov(r_b, r_x) & \dots & cov(r_x, r_x) \end{matrix} \tag{5}$$

The benefits of using a covariance matrix are explained by Markowitz in his 1952 publication. Here he talks about the benefits of diversifying your portfolio and the importance of doing it in the right way, as diversifying the assets that make up a portfolio in the wrong manner might have mitigated benefits (Markowitz, 1952). Meaning if we have two companies working in the same industry then they might be affected by the same problems, same as if there are two companies in industries related to each other. This will lead to their stocks moving in a similar

fashion. What the covariance matrix does is that it shows us is if the assets move in a similar manner to each other, which helps in minimizing the portfolios risk and thus the standard deviation.

Standard deviation is a measurement that is used to show the volatility of an asset or of a portfolio. It measures probability of deviations from the expected mean return of the portfolio thus showing us how volatile it is. This is normally done with the formula below (Bodie, Kane & Marcus, 2018, p. 198):

$$\sigma_p = \sqrt{\sigma_p^2} = \sqrt{w_a^2 \sigma_a^2 + w_b^2 \sigma_b^2 + 2 w_a w_b \rho_{a,b} \sigma_a \sigma_b} \tag{6}$$

When measuring the standard deviations of the portfolio we use the weights of the portfolio and the covariance matrix. The weights of the portfolio has a sum of 1. The covariance matrix shows the variance and covariance of the stocks, and the weights allows us to allocate the risk to different assets in an attempt to lower the standard deviation of the portfolio. This is done by multiplying the transposed weights of the portfolio with the covariance matrix and the weights as they are. The product of this calculation then leaves us with the variance of the portfolio, which we then take the square root of. This leaves us with the standard deviation of the asset portfolio. This is shown in the subsequent formula:

$$\sigma_p = \sqrt{\sigma_p^2} = \sqrt{w_T \bullet \Sigma \bullet w_p} \tag{7}$$

After having calculated the standard deviation of the portfolios, we have to calculate their expected returns. We do this by multiplying the expected returns of the individual assets in a portfolio with their allocated weights and then adding them all together. This gives us the expected return of a portfolio. Formula (Bodie, Kane & Marcus, 2018, p. 196):

$$E(r_p) = w_a E(r_a) + w_b E(r_b) + \dots w_x E(r_x) \tag{8}$$

The remaining measurement of the portfolios are their Sharpe ratios. The Sharpe ratio of the portfolio is obtained by subtracting the risk-free rate from the expected return of the portfolio

and then dividing the difference with the standard deviation of the portfolio. The quotient of this calculation is the portfolios Sharpe ratio (Bodie, Kane & Marcus, 2018, p. F-2).

$$S_p \frac{E(r_p) - r_f}{\sigma_p} \qquad (9)$$

The risk-free rate is the expected return of an investment with zero risk. This is often the rate of return of a state bond with a duration of five to ten years. For the Swedish markets risk-free rate, the information can be obtained from "Riksgälden". When this study is conducted, the current risk-free rate is 0,2 percent (Statslåneräntan, n.d.). This is the risk-free rate used in the empirical calculations of the paper.

The portfolios will also include a measurement that is called total revenue. This measurement depicts the development of a 100 $ investment in the portfolio during the 10-year period. The measurement is calculated by first adding 1 to the returns of time index returns of all the assets in the portfolio with a greater weight than 0. This means that the first result of the time index return is 1 representing the 100 percent original investment in that asset. This allows us to distribute the 100 $ between the assets in the portfolio in accordance with their weight allocations. We do this by multiplying their individual weights with 100 and then multiplying the product with the first observed time index return of the individual asset:

$$R_a = (w_a * 100) * r_{a1} \qquad (10)$$

When we have the product R_a, we then multiply it with r_{a2}. The product of this is will then be multiplied with the next time index return. We continue this trend until the last time index return is multiplied with the product of the previous time index return. This gives us the total revenue of this asset in the portfolio. By adding all the revenues of the assets in the portfolio, we are able to get the total revenue of the portfolio for a 10-year period.

The OMXS 30 index results is created in accordance with the methods described above. The main difference however is that the index data is downloaded as an index and thus not as its 30 individual assets. This means that the calculations that needs to be done to get the results for the OMXS 30 index is conducted with a single asset. Meaning that its weight is 1 or 100 percent and that its covariance matrix only contains its covariance with itself, thus being its variance.

The ESG statistics are obtained from Bloomberg analytics. Bloomberg analytics have created an ESG index, where they score companies on their ESG performance by analysing how they perform regarding the different components that make up ESG. They have four different ESG scores for each company. All scores are scored in a score range of 1-100 were 100 is best and 1 is the worst. The four categories are, Environmental, Social, Corporate Governance and ESG. The three first categories describe how a company performs in the individual aspects of ESG whilst the last category is a summation covering a company's total ESG performance.

The thesis contains a total of 50 assets that have ESG scores. This means that the portfolios created that are dependent on an ESG score category are limited to only using these assets. We enter the four ESG scores of the 50 assets into a table depicting their performance in each score category. This table allows us to order the companies from best to worst performing in each category, making it easier to create portfolios using the best or worst performing assets.

To get the scores in each ESG category for the portfolios, the weights of the assets in the portfolio are multiplied with their respective individual ESG scores and then added together to create the ESG scores for the portfolio in each of the four categories.

3.1.1 Equally weighted portfolios

When it comes to the portfolios analysed in the thesis, eight will be referred to as equally weighted. Four of these will put an emphasis on maintaining high ESG scores in the four different ESG score categories. Meaning that one will focus on maintaining a high total ESG score, one maintaining high environmental score, one high social score and the last one will maintain a high corporate governance score. The remaining four will be constructed as the previous ones but instead putting an emphasis on maintaining low scores in the four categories. These will be created by picking the ten best or worst performing companies in their respective categories depending on which category the portfolio focuses on. For example, when we create the equally weighted portfolio that emphasis on maintaining a high total ESG score, we start by picking the ten individual assets with the highest total ESG score. The portfolio is then constructed in accordance with the methods described in subchapter 3.1. The main aspect however that differentiates the equally weighted portfolio from the others is that the ten assets that make up each of these portfolios will be equally weighted.

3.1.2 Optimised weighted portfolios

The remaining ten portfolios included in the thesis will be referred to as optimised. This because they are created using portfolio optimising. We do this by altering the weights of the assets that make up the portfolios in an effort to increase the Sharpe ratio. We optimise the Sharpe ratios of the portfolios using the solver, which tries several combinations by changing the weights of the assets in the portfolios. This continues until the solver finds the combinations of weights that produces the highest Sharpe ratio[2]. The portfolio with the highest Sharpe ratio is the combination of weights that produces the best trade-off between expected return and standard deviation. This might lead to that some of the assets weights in the portfolios might be put to zero and thus not being included in the portfolio. The portfolios that will be optimised will be the OMXS 30 portfolio, ESG benchmark portfolio, four portfolios that aim to maintain high ESG scores in their respective ESG categories as well as achieving a high Sharpe ratio and four aiming to maintain low ESG scores but high Sharpe ratios.

We create the OMXS 30 portfolio by including the 29 available assets that make up the OMXS 30 index. We then start by creating the portfolio in the manner that is described in subchapter 3.1 but we do not include the ESG aspect of the subchapter. This due to that not all the companies that are included in the index have received ESG scores from Bloomberg. When this is done, we have to optimise the portfolio. We do this as described in the previous section by using the Solver tool in Excel. This then leaves us with an optimised portfolio created out of 29 of the 30 stocks that make up the OMXS 30

The portfolio called ESG benchmark is created in a similar way to the OMXS 30 portfolio. The main difference between the two is that we include the 50 stocks that have received an ESG score from Bloomberg instead of the 29 available OMXS 30 stocks. This then also permits us to include their ESG score ratings which are handled as described in chapter 3.1. As with the previous portfolio, not all the included stocks will be part of the finished portfolio as when it is optimised for high Sharpe, some assets weights will be put to zero and thus not be a part of the finished portfolio.

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[2] Objective of the Solver is set to change the Sharpe ratio to maximum by changing the weights with the constraint that the sum of the weights always should equal 1. The solver should be put to "GRG non-linear" and the box that says to make unconstrained variables non-Negative should be ticked, this ensures that no short sales are permitted.

The remaining eight portfolios that we create are similar to the equally weighted portfolios, being that we start by picking ten stocks for each of the portfolios. As with the equally weighted portfolios these stocks are picked either because they are the ten best performing in there ESG category or because they are the worst, which leaves us with eight different portfolios. These portfolios are then created in manner described in chapter 3.1, however what we do after this is what differentiates these from the equally weighted portfolios is that we now optimise the portfolios with a focus on high Sharpe ratio. This also means that not all of the finished eight portfolios will contain ten different assets as some may have been removed.

3.2 Method survey

The second part of the research conducted for the thesis is conducted as two surveys sent out to companies in the financial sector. The first survey is sent to companies that work with investments and private equity. The second survey is sent to pension firms/funds. The surveys that we send out consists of two sets of predetermined questions that are written in emails sent to companies that are applicable for the respective surveys. The reason for why we insert the questions directly in the email is due to that most companies have policies preventing them from opening attachments in mails from external sources. The emails also contain a statement of purpose for the survey as well as information regarding to how the information gained form the surveys is to be used in the thesis. The questions that made up the survey will be presented below, starting with the questions of the survey aimed at investment firms and private equity. Followed by the survey questions aimed at pension funds/firms:

Investment firms and Private equity:
1. *Is ESG an important factor when it comes to the management of your company?*
2. *When you invest your capital into companies, do you then factor in how these companies perform from an ESG perspective?*
3. *If it comes to a choice between higher profit or a higher ESG score, what would your company priorities?*
4. *How do you think ESG will reshape the financial market from your standpoint?*
5. *Would you classify pension funds/companies as an important source of capital for your company?*

Pension funds and firms:

1. *When it comes to the capital that you are managing, are you investing it into Investment firms and Private equity firms?*
    a. *If your firm invests into Investment firms and Private equity firms. Do you place any ESG requirements on them?*
2. *Is ESG a factor when you manage your capital?*
3. *Is there any of the criteria's that you put an extra focus on achieving?*
    a. *Is there any of the three primary ESG criteria's that you expect companies you invest in to achieve?*
4. *If it comes to a choice between higher profit or a higher ESG score, what would your company priorities?*
5. *How do you think ESG will reshape the financial market from your standpoint?*

The companies that are sent the survey and those who chooses to be part of the study will remain anonymous, as this is a policy and requirement that most firms have regarding the type of questions in the surveys. The results of the survey will be presented in two tables shown in the ensuing chapter.

4. Result

This section of the paper covers the results of the empirical studies and its implications. It starts with the results comprised of the portfolio analyses that were conducted for the paper, after which it turns to the results of the surveys conducted with the assistance of pension funds/firms and other companies, as well as with the assistance of private equity and investment firms. The succeeding chapter will further analyse and discuss the implications of the results and how they relate to previous studies.

4.1 Portfolio analysis

This section of the chapter handles the results of the portfolios and the index. They are presented in a table that displays all their individual results which allows us to interpret their relations and trends, we will refer to this table as Table 2. It presents the performance of each of the portfolios in eight result categories. The first four result categories are Expected return, Standard deviation, Sharpe ratio and Total revenue. The result category that is named Total revenue refers to the evolution of a hundred-dollar investment in a portfolio during the ten-year period that the thesis focuses on. The four remaining result categories are the different ESG scores. One of them is the total ESG score of the portfolio. The other three shows the scores in the individual ESG aspect, Environmental, Social and Governance.

The eighteen portfolios and the index included in Table 2 can be divided in to five different groups. The first of these groups includes the OMXS 30 index, the optimised portfolio created out of the stocks that comprised the index and the portfolios referred to as ESG benchmark. These portfolios and index are grouped together as they are all distinct from each other and the other portfolios in the manner that they are created. The remaining sixteen portfolios can be divided in to four different portfolio categories. The first and second of these are comprised of portfolios that are equally weighted. However, what separates them is that the first category is comprised of equally weighted portfolios, where each portfolio encompasses ten assets that are picked because they are the ones with the highest ESG score in the category from which the portfolio is named. The second portfolio category is comprised of portfolios whose assets where the ten worst performing in the categories. The remaining two portfolio categories are made up by optimised portfolios. The first of these categories, called the third portfolio category, contains portfolios whose assets have high ESG scores. The fourth and last portfolio category assets have low ESG scores.

Table 2: This table depicts all the portfolios and the OMXS 30 index as well as their individual common financial variables, total revenues and ESG scores. The table divides the portfolios in to four portfolio categories based on the manner that they are constructed.

		Expected Return	Standard deviation	Sharpe Ratio	Total Revenue	ESG Score	Envir score	Social score	Gov score
	OMXS 30 index	0.006	0.043	0.146	188.578	N/A	N/A	N/A	N/A
	OMXS 30 Portfolio	0.013	0.042	0.316	407.025	N/A	N/A	N/A	N/A
	ESG Benchmark Portfolio	0.014	0.036	0.402	442.849	64.801	62.796	65.877	66.176
1. Equally weighted	High ESG Portfolio	0.007	0.048	0.149	176.872	80.831	84.314	78.030	78.959
	High Envir Portfolio	0.006	0.045	0.135	157.368	78.239	86.916	73.285	74.840
	High Social Portfolio	0.007	0.049	0.147	200.531	76.650	74.271	80.435	74.182
	High Gov Portfolio	0.008	0.054	0.143	202.124	74.644	72.266	69.667	83.644
2. Equally weighted	Low ESG Portfolio	0.013	0.044	0.298	403.164	57.997	52.714	59.673	62.181
	Low Envir Portfolio	0.014	0.046	0.301	405.931	60.233	50.916	65.022	65.473
	Low Social Portfolio	0.010	0.047	0.207	266.794	60.804	62.759	56.675	66.113
	Low Gov Portfolio	0.012	0.042	0.279	349.771	60.365	61.778	61.204	59.758
3. Optimised	High ESG Portfolio	0.009	0.045	0.205	230.186	83.001	88.942	75.231	82.623
	High Envir Portfolio	0.008	0.042	0.188	173.144	81.965	91.415	72.233	80.313
	High Social Portfolio	0.014	0.049	0.288	455.652	66.469	52.604	79.109	67.032
	High Gov Portfolio	0.013	0.054	0.231	323.931	73.130	70.511	65.184	85.294
4. Optimised	Low ESG Portfolio	0.015	0.042	0.361	497.350	58.763	53.542	62.376	60.685
	Low Envir Portfolio	0.015	0.042	0.361	509.581	60.411	52.123	66.977	62.250
	Low Social Portfolio	0.014	0.048	0.297	433.336	55.468	52.161	55.503	59.037
	Low Gov Portfolio	0.015	0.041	0.360	492.422	58.673	53.619	62.431	60.165

4.1.1 Sharpe ratio

When analysing the results in Table 2, we can note that one portfolio clearly outperforms all the others in the Sharpe ratio result category, the ESG benchmark portfolio. The portfolios closest to achieving a similar degree of Sharpe ratio are the optimised low ESG, environmental and corporate governance portfolios who are all part of the fourth portfolio category. Meanwhile, the portfolios who generates the lowest performing Sharpe ratios are the ones in the first portfolio category who are equally weighted and created using assets with high ESG scores, as well as the OMXS 30 index. The portfolio which provides the very lowest Sharpe ratio in table 2 is the equally weighted who is constructed with assets that have high environmental scores.

As we mentioned, ESG benchmark portfolio is the portfolio with the highest Sharpe ratio at 0,402 which is 0,041 more than its closest competitors. This portfolio is one of the few portfolios who has not been self-restricted by ESG preferences, such as those in portfolio category one through four. This allows the portfolio to pick its assets from a greater range of assets than the other portfolios. This in turn means that the portfolio has more possible combinations of assets and thus can diversify its components in a more efficient manner than the other portfolios. Assets can therefore be picked with lower covariance which makes it possible for the portfolio to find a combination with lower standard deviation than the other portfolios while still maintaining a high expected return. From Table 2 we observe that the portfolio has the second highest degree of expected return, as well as a much lower standard deviation than the others in the table. Thus, leading to the portfolio having the highest Sharpe ratio meaning that it provides a higher degree of profit per unit of risk.

The fourth portfolio category generally has the best Sharpe ratios after the ESG benchmark portfolio, with the optimised weighted low ESG, environment and corporate governance portfolios performing better than all except the aforementioned benchmark portfolio. However, this trend does not include the optimised weighted portfolio with assets that has low social score performance. The three portfolios with the high Sharpe ratios have lower degrees of standard deviation than the majority in Table 2 as well as performing the highest expected returns, which explains their high Sharpe ratios. Meanwhile the social portfolio does have one of the highest expected returns, where the standard deviation is much higher than that of the others in its portfolio category. Only four other portfolios in the table have a higher degree of standard deviation than the social portfolio in the fourth portfolio category, hence explaining why its Sharpe ratio is lower than the others in the category.

From analysing the Sharpe ratios of Table 2, we can observe what might be a correlation between Sharpe ratio and social score. This observation indicates a positive correlation between the two measurements, as the best performing portfolios in the categories whose assets were picked due to their high sustainability scores are the ones focusing on social scores. Meanwhile, the portfolios with the lowest Sharpe ratios in portfolio category two and four whose assets were picked due to their low sustainability scores, are the portfolios whose assets were picked due to their low social scores. This then indicates that there is a positive correlation between social score and Sharpe ratio.

We are also able to observe a negative correlation between environmental performance and Sharpe ratio. This is the case as the portfolios with high environmental scores has the lowest Sharpe ratios in their respective portfolio categories in Table 2, meanwhile the portfolios with low environmental scores are the best performing in their categories. Consequently, this is an indication of a negative correlation between the two as the lower the environmental score a portfolio has, the higher the Sharpe ratio is.

4.1.2 Standard deviation

This subchapter focuses on the standard deviation observed in Table 2. What we can observe from the previous subchapter is that the portfolio with the lowest standard deviation is the ESG benchmark portfolio. We have however already covered this portfolio and its standard deviation in the previous subchapter, meaning that we will not focus on it in this. The portfolios that measure the highest degrees of standard deviations in Table 2 are the equally weighted portfolio that is constructed with high corporate governance score assets as well as the optimised weighted portfolio constructed with high corporate governance score assets. Both of these portfolios have a standard deviation of 0.054 which is 0.018 higher than the ESG benchmark portfolio.

When we analyse the results of Table 2, we can observe a relationship between corporate governance and standard deviation. As we mentioned in the previous section, the two portfolios constructed with high performing corporate governance assets are the portfolios with the highest standard deviation in the table and in their respective portfolio categories. At the same time, we can also observe that the portfolios constructed with low corporate governance assets have the lowest degrees of standard deviations in their respective portfolio categories. This indicates that there is a negative correlation between corporate governance score and standard deviation, which can also be observed in most of the other portfolios.

One of the portfolios that seem to deviate from the relationship between standard deviation and corporate governance score is the ESG benchmark portfolio. This is the case as even though it has a low corporate governance score it is not amongst the lowest, meanwhile it does have the lowest degree of standard deviation observed in Table 2. This deviation from the observed relationship can be explained by the fact that this portfolio is the most diversified portfolio with the highest amount of assets. The deviation could also be a result of the covariance between the

assets being lower than most other portfolios. This is explained by Markowitz in his Modern Portfolio Theory, where he explains that "If the two original portfolios have equal variance then typically the variance of the resulting (compound) portfolio will be less than the variance of either original portfolio" (Markowitz, 1952, pp. 89-90).

4.1.3 Expected return

When looking at expected return in Table 2, we can observe that the same three portfolios in the fourth portfolio category, which shows the highest Sharpe ratios after the ESG benchmark portfolio all also have an expected return of 0.015, which is the highest measured expected return in the table. The lowest expect return showing in the table is 0.006 and belong to the OMXS 30 index, closely followed by the equally weighted portfolio with high ESG assets that has an expected return of 0.007.

The results of Table 2 show a trend were the portfolios composed of assets with low sustainability scores generally have a higher expected return than those composed with high sustainability scores. Most of the portfolios with low expected return are in the first portfolio category which is comprised of equally weighted portfolios with high sustainability scores. If we now examine the portfolios from the perspective of their sustainability aspects, then we can observe what looks like two clear negative correlations between total ESG score and expected return, as well as between environmental score and expected return. The main focus here should be on the relation of the environmental score, because the total ESG score is a compounded score of the three individual ESG categories. When observing the environmental oriented portfolios, we can note that the ones comprised of assets with high environmental scores have the lowest expected returns in their categories while the portfolios with low environmental scores performs the best in their respective portfolio categories. This shows a negative correlation between environmental score and expected return. We can also observe that the opposite trend occurs with the social score of portfolios, indicating a positive correlation between social score and expected return. If we now turn back to the total ESG score, we can spot that the portfolios react in the same manner to expected return as the environmental oriented portfolios. From analysing these portfolios, we are also able to establish that the environmental scores have a greater impact on expected return than the social scores have. This is noticed as the scores of the environmental category is higher and lower than the social scores, depending on the focus of the portfolios. For example, the optimised portfolio with low ESG score has a lower environmental score than social, and as the portfolio shows a negative

correlation between ESG score and expected return. This means that the negative correlation between environmental score and expected return has a greater impact on the ESG relation than the positive correlation of social score has.

4.1.4 Total revenue

When we look at the fourth result category called total revenue in Table 2, the thesis shows that the portfolio that experiences the greatest growth of revenue during the time period is the optimised portfolio that has a low environmental score focus. The revenue of this portfolio is 509.581 dollars which is an increase of 409.581 percent of the initial investment. The portfolio that experiences the lowest revenue growth in the table is the equally weighted portfolio comprised of assets with high environmental scores. This portfolio sees the hundred dollars grown to 157.368 dollars, which is an increase of 57.368 percent from the initial investment during a ten-year period. This portfolio performs worse than the OMXS 30 index which has experienced an increase of 88.578 percent of the initial investment. By observing the environmental portfolios, we can spot a pattern. The portfolios that focus on high environmental scores in their composition of assets perform the worst in all portfolio categories. Meanwhile the portfolios comprised of assets with low environmental scores perform the best in their portfolio categories.

The fact that the portfolios composed of stocks with low environmental scores generally performed better than their counterparts that are composed of stocks that have high environmental scores, indicates a trend that shows that high environmental score has a negative impact on the profitability of stocks. This observation supports the previous observations made in the preceding subchapters of chapter four, which support the idea of a negative correlation between environmental performance and financial gain. By looking at the relation between total revenue and social performance we are able to back the previous observations of a positive correlation between social score and financial probability. This can primarily be noticed by observing the third and fourth portfolio categories, as the optimised portfolio focusing on high social score has a revenue of 455.652 dollars which is the fourth highest revenue out of the eighteen portfolios and the index. It is the portfolio with the highest revenue in its portfolio category and it outperforms the optimised portfolio that focuses on low social score in the fourth portfolio category. The optimised low social score portfolio is also the portfolio that performed the worst out of the portfolios in the fourth portfolio category. This indicates a positive correlation between profit and social score.

Figure 1: depicting the evolution of a 100$ investment into each portfolio.
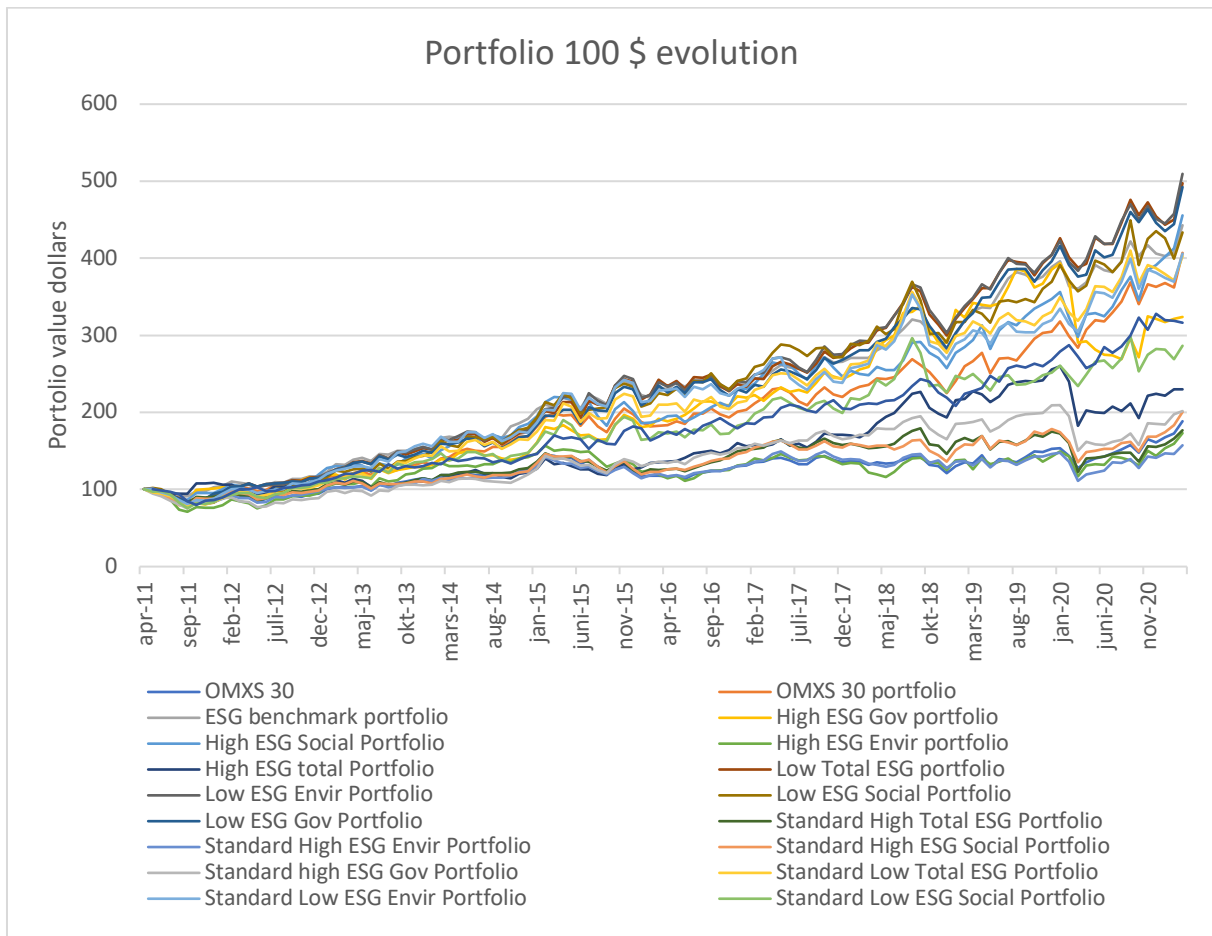
Lastly, by looking at Figure 1 we can visualise the evolution of the portfolios during the ten-year period which the data is collected from. The figure shows that most of the portfolios seem to follow the market trends but also that most of them performed better than the market index. We can also observe that even though most portfolios experience the same trends as the market index most of them experience a higher growth during this time period. We can also see that eleven of the portfolios are able to recover relatively quickly after the corona pandemic first hit in Mars 2020 and now perform better than they did before the pandemic began.

4.1.5 ESG scores

This subchapter focuses on the ESG scores of the portfolios and their performances. In the thesis and Table 2, ESG is divided into four different categories: Total ESG, Environmental, Social and Governance score. This allows us to do a more in-depth analysis on the impact that

ESG has on portfolio analysis and on the financial market. It makes it possible to see how the individual aspects of ESG and compounded ESG score effects the composition of portfolios and its mean returns.

If we start by looking at the result category called "ESG score", we can note that the three portfolios with the highest ESG scores are: the optimised portfolio with high ESG score that has a total ESG score of 83.001, the optimised portfolio with high environmental score with an ESG score of 81.965 and the equally weighted portfolio with high ESG score assets which has an ESG score of 80.831. The first of these three portfolios, has a revenue of 230.186 dollars, which is in the lower bracket of the result category. It also has a low Sharpe ratio of 0.205 and an expected return of 0.009. The second of these portfolios has a revenue of 173.144 dollars, a Sharpe ratio of 0.188 and a degree of expected return at 0.008. The last of portfolios revenue is 176.872 dollars, its Sharpe ratio is 0.149 and its expected return is 0.007. Meanwhile the portfolio with the lowest ESG score is optimised portfolio which focuses on low social score which has an environmental score of 55.468, a revenue of 433.336 dollars, a Sharpe ratio of 0.297 and an expected return of 0.014. These results indicate that there is not a clear correlation between the ESG score and profitability of a portfolio, as with the first three portfolios we can note a decrease in profitability with the decrease of ESG score. But at the same time, we can see that the latest mentioned portfolio has a higher profitability than the first three mentioned portfolios but with a much lower ESG score. We can also note that this is not an anomaly as the two other bottom most portfolios in the ESG score category also have a much higher rate of profitability than the three first mentioned portfolios. These results indicate that the ESG score might be correlated with another or several other ESG scores that are themselves directly correlated with the profitability of the portfolios. This observation thus supports the relationship discussed in chapter 4.1.3, where we determined that the compounded ESG score is primarily affected by the environmental score when it comes to expected return.

If we now turn to the Environmental result category, we can spot that the three best performing portfolios in this category have amongst the worst results in the Sharpe ratio, expected return and total revenue result categories. The equally weighted portfolio that focuses on high environmental score has the third highest environmental score of the portfolios in Table 2, but performs the worst in the three aforementioned result categories. Meanwhile the equally weighted portfolio that focuses on low environmental score performed more than twice as well in the three result categories than the equally weighted portfolio that focused on high

environmental score. The optimised portfolio that focuses on low environmental score has the second worst environmental score out of the portfolios. But it also has the highest observed expected return and revenue as well as the second highest Sharpe ratio.

The penultimate ESG category in Table 2 is the social score category. By analysing the results of this category, we can observe that most of the portfolios that focuses on low sustainability scores performs better than the portfolios that focuses on high sustainability scores in the different result categories. We can however notice that the portfolios focusing on high social score seem to break this trend as observed in the previous subchapters. These portfolios perform the best or second best in the financial performance result categories out of the portfolios in their respective portfolio categories, as can be seen with the optimised portfolio with high social score as it has the highest expected return, Sharpe ratio and total revenue out of the portfolios in its category. Meanwhile the equally weighted portfolio consisting of high social score assets performes second best in its portfolio category. We can also observe that the portfolios that focus on low social score performed better in the result categories than most of the portfolios that focuses on high ESG scores. This trend is interrupted by the optimised portfolio with high social scores. The portfolio that is equally weighted and focus on a low social score performs better than its counterpart that focus on a high social score, but worse than the other portfolios in its portfolio category. The portfolio that is optimised with low social scores performed worse than its counterpart that is optimised with high social scores as well as being the worst performing portfolio in its portfolio category.

The last ESG score category that can be observed in Table 2 is the corporate governance score result category. What we can observe from Table 2 is that the portfolios focusing on corporate governance performs relatively average in comparisons to the other portfolios. It did not generate the highest results in expected returns, Sharpe ratio and total revenue. However, it generally performed better than the portfolios constructed using high total ESG and environmental scores. The equally weighted portfolio constructed with high corporate governance assets has the highest expected revenue out of the portfolios in its portfolio category meanwhile it has the second to lowest Sharpe ratio in the same category. The optimised portfolio with high corporate governance score on the other hand has the second highest expected return and Sharpe ratio in its portfolio category, being outperformed by the optimised portfolio with high social score. Both the portfolios with low corporate governance scores generates the second lowest results in both, expected return as well as Sharpe ratio in their

respective portfolio categories. What we also can observe from the subchapter 4.1.2 is that both the portfolios with high corporate governance scores have the highest degrees of standard deviation at 0.054, meanwhile the portfolios with low corporate governance scores have amongst the lowest standard deviations in Table 2, only being out performed by the ESG benchmark portfolio.

4.1.6 Correlations

In this subsection we summarise the correlations that have been observed in chapter four. With the most noteworthy correlations being the negative correlation between environmental score and financial profitability, as well as the positive correlation between social score and financial profitability.

If we start with the relation between environmental score and profit, we can observe a negative correlation. This is due to the observations made in subchapter 4.1.1, 4.1.3 and 4.1.4. In these subchapters we observed that the portfolios with high environmental scores performed poorly in Sharpe ratios, expected returns and total revenues. Meanwhile the portfolios with low environmental scores generally performed the best in these results categories with the exception of Sharpe ratio where they were outperformed by the ESG benchmark portfolio. The observations show a negative correlation between environmental performance and financial profitability. Indicating that it is profitable to invest in companies with low environmental scores.

The positive correlation between social performance and financial profitability is also shown in subchapter 4.1.1, 4.1.3 and 4.1.4. In these subchapters we have shown that there is a positive correlation between social performance and financial profitability, which is primarily noticed when observing the optimised portfolios in portfolio category three and four. The optimised portfolio with high social score is the best performing in its portfolio category whilst its counterpart in portfolio category four is the worst performing. Whilst the correlation is not as clear between social performance and Sharpe ratios as it is between environmental performance and Sharpe ratio, it can still be observed as the optimised portfolio with high social score has the highest Sharpe ratio in its category whilst the Sharpe ratio of the portfolio with low social score is the worst performing in its category. The problem here however is that the portfolio with low social score still has a higher Sharpe ratio than the portfolio focusing on high social performance. The reason for this is that the portfolio with high social score has a higher

expected return than its counterpart, but it also has a higher standard deviation than the portfolio with low social score leading to its Sharpe ratio being lower. This can however be explained by the fact that the portfolio with high social score only include two assets which can be a cause for increased standard deviation. These aspects point out that there is a positive correlation between social score and financial profitability however that it might be a low degree of correlation.

In subchapter 4.1.3 we noted that the negative correlation of environmental performance and financial profitability is stronger than the positive correlation between social performance and profitability. The observation is done by comparing the sustainability scores of the ESG portfolios with the environmental and social portfolios. This shows that the ESG portfolios primarily perform in the same manner as the ones comprised by assets with high environmental score.

The last observation made in chapter 4 in regard to correlations is between corporate governance scores and standard deviation. We can note from the results that there is positive correlation between standard deviation and governance scores. The portfolios focusing on high governance scores measure the highest degrees of standard deviations, meanwhile the portfolios with low governance scores experienced the lowest degrees of standard deviation with the exception of the ESG benchmark portfolio who has the lowest degree of standard deviation in the thesis.

4.1.7 Optimised weights vs equally weighted

The most noticeable difference between the equally weighted portfolios and the portfolios that are optimised is that the optimised portfolios outperformed their respective counter parts in expected return, Sharpe ratio and total revenue as well as most of them having a lower or equal degree of standard deviation to that of their equally weighted portfolio counterparts, with the exception of the optimised portfolio with low social score which has a higher standard deviation than the equally weighted portfolio with low social score.

The ESG scores also varied more in the optimised portfolios. Meanwhile the equally weighted portfolios have more consistent ESG score in all four ESG categories. The scores of the equally weighted portfolios didn't vary to much from each other. The optimised portfolios that focus on maintaining high ESG scores are generally able to achieve a higher score in their respective

category than their equally weighted counterpart with the exception of the equally weighted portfolio that focuses on high social score which is outperformed in the social score category by the equally weighted portfolio that focused on high social score. Meanwhile the opposite is true for the portfolios focusing on low ESG scores. Most of the equally weighted portfolios are able to achieve lower ESG scores in their respective category than the optimised portfolios are able to, with the exception of the equally weighted portfolio with low social score which has a higher social score than the optimised portfolio with low social score.

The optimised weighted portfolios are also able to detect a correlation between social score and profit which is not clear from analysing the equally weighted portfolios, as well as indicating that the negative correlation between environmental score and profit seem to be stronger than the positive correlation between social score and profit.

4.2 Survey result

This section handles the results of the survey. The survey was conducted by electronic mail and was sent to several companies, out of which seven investment and private equity firms and six pension funds/companies answered. The firms will however not be mentioned by name and will remain anonymous in accordance with their wishes and policies. Table 3 depicts the results and questions asked to investment firms and private equity firms. Table 4 depicts the answers and questions directed to the pension funds and pensions firms. The answers will be presented in the order as they were described above.

Table 3: Depicts the results of the survey questions asked to investment firms and private equity firms.

1. Is ESG an important factor when it comes to the management of your company?
Yes?   No? 100%   0%
2. When you invest your capital into companies, do you then factor in how these companies perform from an ESG perspective?
Yes?   No? 100%   0%
3. If it comes to a choice between higher profit or a higher ESG score, what would your company priorities?
Profit   ESG   Symbiotic Relation 0%   0%   100%
4. How do you think ESG will reshape the financial market from your standpoint?
Increase regulations   More integration/data   Mainstream 57%   14%   29%
5. Would you classify pension funds/companies as an important source of capital for your company?
Yes?   No? 57%   43%

The answers to questions one through three are the same for all companies. They all agree that ESG is an important factor when it comes to the management of their companies as well as when it comes to the investment strategies of their firms. They found that ESG and the firm's performance are generally connected. Meaning that the better the ESG performance the higher the value of the company. A majority of the firms also answered that they think that ESGs prevalence in the financial market of today will lead to increased regulations of the sector, that will force companies to have a more sustainable ESG focus.

When it comes to question five whether or not they classify pension funds/firms as an important source of capital only 57 percent of the firms answered that they were. Whilst 43 percent of firms answered that pension funds/firms were not an important source of revenue for them, but that they instead rely heavily on equity or investments from other sources.

Table 4: Depicts the results of the survey questions asked to pension funds and companies

1. When it comes to the capital that you are managing, are you investing it into Investment firms and Private equity firms?

	Yes	No
	83%	17%

2. If your firm invests into Investment firms and Private equity firms. Do you place any ESG requirements on them?

	Yes	No
	100%	0%

3. Is ESG a factor when you manage your capital?

	Yes	No
	100%	0%

4. Is there any of the criteria's that you put an extra focus on achieving?

ESG	E	S	G	ES	EG	SG
25%	50%	0%	0%	0%	0%	25%

5. Is there any of the three primary ESG criteria's that you expect companies you invest in to achieve?

ESG	E	S	G	ES	EG	SG
25%	0%	0%	0%	75%	0%	0%

6. If it comes to a choice between higher profit or a higher ESG score, what would your company priorities?

Profit	ESG	Symbiotic relation
0%	0%	100%

7. How do you think ESG will reshape the financial market from your standpoint?

Mainstream	More data	Transparency and regulation
20%	40%	40%

Question one in Table 4 shows that 83 percent of pension firms and funds invested their capital into investment companies and private equity funds. Whilst 17 percent of the funds and firms answered that they managed their investments and capital development in house.

Question two show the result of a follow-up question to the one presented in question one. It proves that they all share a policy of requiring that the firms they entrust to manage their capital, has a ESG focus. They claim that they always analyse the sustainability of all their investments as can be proven by their answers presented in question three, where they unanimously

answered that ESG is an important factor when it comes to the management of the capital that they are entrusted with.

Question four asks which criteria they put an extra focus on achieving and shows that 50 percent of them focuses on their environmental aspects. Whilst 25 percent say that they primarily focus on the social and corporate governance aspects of ESG, whilst the remaining answered that they do not priorities any of the ESG aspects but focuses equally on all of them.

The fifth question concerns if there is any ESG criteria that they expect the companies they invest in to achieve, to which 25 percent answered that they expect that they achieve all of the ESG criteria while the remaining 75 percent answered that they have an extra focus on making sure that they achieve the Environmental and Social aspects.

On the penultimate question, all the subjects answered that they consider ESG and profit to exist in a symbiotic relation. Some of them answered that they are obligated to focus on both aspects, both profit and sustainability. But that they ultimately must focus on the will of their clients as well as growing their capital.

In response to ultimate question regarding how they expect ESG to change the financial market from their point of view, most of them answered that they expected that the prevalence of ESG in today's financial market will lead to an increase in data regarding to ESG and firms ESG point of view and standing. They also answered that they expect it to lead to increased regulations on the market and firms in benefit of ESG as well as more transparency from firms regarding ESG.

5. Discussion

This chapter discusses the results obtained in the thesis and their implications. It does this by going through what the results answers, in relation to the questions asked by the thesis. It also achieves this by going through what improvements and future research that can be conducted with the assistance of the thesis results.

5.1 The meaning of the results

This section of the chapter answers the three questions asked by the thesis with the assistance of the data obtained.

5.1.1 Thesis question 1, trade-off

Is there a trade-off between profit and ESG when it comes to Swedish companies, or is there a symbiotic relation between them?

By looking at the graph and at subchapters 4.1 and 4.2 as well as Table 2, we can note that there is a clear negative correlation between the portfolios returns and environmental score. At the same time, it appears that there might be a negative correlation between total ESG score and profit. This can be observed as all the portfolios in portfolio category four, that are optimised portfolios with low ESG scores are amongst the portfolios with highest expected return and highest Sharpe ratios. We also observe that most of the portfolios in portfolio category three perform worse than the portfolios in portfolio category four this trend was also repeated by the equally weighted portfolios.

As explained in the result part 4.1.3 there is a clear negative correlation between environmental score and profit. This is observed as the portfolios with lower environmental score performs better than their counter parts with high environmental score. This is a trend that can be observed throughout Table 2. The clearest example of this relationship is observed by studying the optimised portfolio with low environmental score and the optimised portfolio with high environmental score. These two portfolios are the opposites to each other. The portfolio that focused on low environmental score outperformed the others in its category having the highest expected return and total revenue out of any of the portfolios in the thesis. It also has the second highest Sharpe ratio, only being outperformed by the optimised ESG benchmark portfolio. This,

outclassing of the high environmental score portfolios by the low environmental is also repeated by the equally weighted portfolios.

The negative correlation between environmental performance and financial profitability could possibly be explained by there being a cost for companies to improve their environmental footprint. This could be the case as it is highly likely that there is a conversion cost for companies to be able to decrease their carbon footprint, as this most likely requires change in operations, production and investments which would generate extra costs which would affect the stock price of the company.

We can also discern a positivise correlation between social score and profit. The best performing optimised portfolio focusing on high ESG scores is the optimised portfolio with high social score. This portfolio also outperformed its counterpart that focused on low social score. This trend can also be observed by the equally weighted portfolios but somewhat weaker. We see that the portfolio focusing on high social score in the first portfolio category, is one of the best performing in its category. We also observe that the equally weighted portfolio focusing on low social score was the worst performing in its category.

Total ESG score itself is not correlated to profit as this could be made up by either social scores or environmental scores or both. We see this trend in portfolio categories three and four. In the third portfolio category, we can notice that the portfolios with the highest total ESG scores are the worst financially performing. These however are also the portfolios with the highest environmental scores. Meanwhile in portfolio category four, we can see that the portfolio focusing on low environmental score has the highest profit and highest ESG score. This ESG score is high due to that the portfolio included a social score that was high relative to the others in the portfolio category.

These empirical observations also appear to support the results of Hong and Kacperczyk paper (Hong & Kacperczyk, 2009). They had observed that so called "sin" stocks have a higher expected return then the non "sin" stocks. This can be observed in the empirical data of the thesis, as the portfolios with the lowest ESG scores have the highest expected returns out of the portfolios and outperformed the positive ESG score portfolios. The results of empirical data also prove that there is a possibility that the Swedish and UK financial markets work in different ways, as the study conducted by Humphrey, Lee and Shen (Humphrey, Lee & Shen, 2012)

showed no relations between CSP and profit. Meanwhile the data from the thesis shows that there are correlations between the different ESG score categories and profit.

When discussing whether or not there is a trade-off between profitability and sustainable investment, we should look to the ESG benchmark portfolio. This portfolio has the highest Sharpe ratio in the thesis whilst not having any concern for sustainability when constructed. This allows the portfolio to pick from a greater quantity of assets than a portfolio with a sustainability focus in mind. Thus, being able to find a greater range of combinations of assets that generate higher returns per unit of risk. This observation is also strengthened by previous research done on the topic, such as the research conducted by Luo and Balvers in their 2017 publication (Luo & Balvers. 2017). In this publication they point out that people who choose to invest sustainably take on greater risk as they self-restrict their investment opportunities. Which is what we can observe in the thesis as the ESG benchmark portfolio has a lower standard deviation than the portfolios who self-restrict their options.

The empirical data result shows that there could exist symbiotic relationships between certain aspects of ESG and profit. But also, that environmental performance does not exist in a symbiotic relation with profit. This means that the empirical results of the thesis could be considered to clash with the survey information, as all the firms contacted claimed that they believed that there existed a symbiotic relation between ESG and profit. Meanwhile the empirical data only proves this connection with the social aspect of ESG and profit. This observation however contradicts the results of the surveys as all of the involved firms believe that there exists a symbiotic relationship between ESG and profitability.

5.1.2 Thesis question 2, ESG prevalence in Sweden

Is ESG prevalent in the Swedish financial market and is the pension sector an important part of the drive?

The survey results indicates that ESG is prevalent in the Swedish market as all the firms answered that they consider ESG to be an important aspect of their asset management. This is also indicated by the fact that 20 percent of all the pension firms/funds believe that ESG will become more mainstream, and 40 percent believe that there will become more ESG data available in the future. Meanwhile 29 percent of the investment firms and private equity firms

believe that ESG will become more mainstream, and 14 percent believe that there will be more data in the future.

The survey also shows that 83 percent of the pension firms/funds allocated the management of assets to investment firms and private equity firms. All of these pension firms/funds said that they require that the firms managing their capital all focus on ESG. At the same time, 57 percent of the investment/ private equity firms said that pension firms/funds are important sources of capital for them. These results confirm that pension firms/funds are in a strong position to influence the policies of investment firms and private equity, and that they are actively driving ESG to become a more prevalent an important topic in the financial market.

5.1.3 Thesis question 3, optimised portfolios

Can portfolio optimisation improve the ESG profit comparing to the standard method?

Both measurements successfully showed relations between ESG and profit. The optimised portfolios showed the clearest correlations between the different ESG aspects, and the profit/ portfolio selection measurements introduced by Markowitz and Sharpe. This could indicate that the optimised portfolios work better than the standard method using equally weighted portfolios when measuring ESGs relationship with profit.

The usage of optimised portfolios using Sharpe ratio could also be more favourable when exploring the relationship with ESG as this is the method more commonly used during portfolio creations and investments. However, the inclusion of both types of portfolios have proven beneficial for the thesis as they help support the findings of each other.

5.2 Measures to improve the thesis and future research

Measures that can be taken to improve the thesis would be to use an ESG scoring system that is more commonly used throughout the financial market to evaluate companies. This would make it easier to make conclusive statements in regard to ESG effects on the financial market and its relation to profit. It would also make it easier to compare different studies on the topic to each other.

The thesis could also be improved by the inclusion of more companies. It would mean that we would be able to create portfolios that are better optimised. It could also lead to portfolios that

perform better than the ones used in the study. The inclusion of more companies in the survey would also mean that the results will have more meaning and would be considered more valid. The thesis could also be improved by finding a more optimal way of deciding which companies would make up the composition of the ESG portfolio calculations.

The differences in results between the thesis and the paper published by Humphrey, Lee and Shen opens an opportunity for future studies comparing and investigating how the relationships of ESG and profit differentiates between the UK financial market and the Swedish financial market.

6. Conclusion

The purpose of the study was to investigate the relationship between ESG and profit, and answering three questions. The thesis succeeded in finding correlations between different aspects of ESG and financial profitability, as well as between ESG and the measurements used to calculate the profit of a portfolio. Primarily the negative correlation between the environmental aspect of ESG and profit, the positive correlation between the social aspect of ESG and financial profitability and the correlations between corporate governance and standard deviation are observed.

The thesis shows that there exist correlations between ESG aspects and financial performance. It also concludes that portfolio investments that do not self-restrict their options due to sustainability demands, produces a higher profit per unit of risk than portfolios that choose to self-restrict its investment options. This indicates that there is a trade-off between financial performance and sustainable investments, which is proven by the thesis portfolio results. Furthermore, the thesis provides evidence of the prevalence of ESG in the Swedish financial market, by showing its position in the mindsets of different companies within it. Lastly, it also provides insight to the use of portfolio optimisation when investigating the bonds of ESG and financial performance. This is illustrated, as the optimised portfolios more clearly showed the correlations of the ESG aspects to financial performance. However, it must be said that both types of portfolios helped complementing each other when investigating the correlations.

This study is nevertheless not perfect, as it is limited by the amount of assets, portfolios, and time. This means that it thus could be improved upon by expanding these measurements. One of these improvements could for example be done by creating several portfolios focusing on different time periods, and then comparing the relationship between ESG and financial performance over an expanded period of time. This would show how the relationship between the two develops over time. The possibility for this is however limited at the moment, as the ESG data stretching backwards in time is limited.

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Appendix

Table A1: This table presents the different ESG scores of the stocks that were used for the different ESG portfolios. The scores that have a plus sign next to them are the ten best performing in each category. The ones with a minus sign are the ten worst performing in each category. These stocks are also the ones used in the equally weighted portfolios.

	Total ESG Score	Governance Score	Social Score	Environment Score
Castellum	85.97+	86.18+	71.04	97+
Ericsson B	83.92+	69.18	89.92+	87.88+
Electrolux B	83.67+	77.8	78.5+	93.77+
SEB A	82.35+	83.17+	76.78	87.25+
Nordea Bank	80+	80	83+	77
Sandvik	79.24+	73.55	80.34+	81.85+
SKF B	79.11+	73.8	76.88	84.37+
Lundin Energy	79.08+	84.94+	79.26+	74.69
SHB A	78.75+	81.14	77.25+	77.33
SAAB B	76.22+	79.83	67.33	82+
SWED Bank A	75.14	64.31-	73.82	90.25+
Boliden	74.61	83.3+	70.41	73.2
Atlas Copco A	74.33	66.5	83.02+	71.64
AXFOOD AB	73.79	75	66.23	81.57
Assa Abloy B	73.57	76.04	68.79	76.21
Telia company	73.16	78.25	64.49	81.89+
SSAB A	72.69	69.81	72.84	74.58
Fabege AB	72.45	86.65+	61.92	69.69
Holmen B	72.08	64.7	75.68	73.54
SAS AB	71.95	83.25+	65.59	71.14
Cloetta B	71.61	77.67	76.98+	61.14
ALFA Laval	71.45	72.8	68.81	72.92
PEAB B	71.23	82.87+	70.67	60.33
Björn Borg Ab	71.01	66.25	76.99+	67.57
Mekonomen	70.2	81.45+	75.09	56.57-
Kungsleden	69.99	81.22+	66.25	64.38
Husqvarna B	69.36	67.88	65.22	75.16
Volvo B	69.1	70.29	61.7	74.8
Skanska B	68.88	71.92	63.52	73
Autoliv	68.78	68.24	69.47	68.37
Trelleborg B	68.61	81.45+	59.66-	68.41
Hufvudstaden A	68.37	65.52	64.79	73.19
SCA B	68.21	72.96	76.56	57.95-
ICA gruppen AB	67.36	68.7	62.16	72.33
Hennes & Mauritz B	66.46	70.54	61.76	68.92
Elekta B	65.85	62.53-	60.37-	79.7
Securitas B	65.6	71.29	67.93	60
Modern Times Groups B	64.92	79.4	58.77-	62.73
Investor A	64.89	64.79	79.09+	49.84-
Getinge B	63.61	62.33-	53.75-	82.9+
AAK AB	61.75-	63.91-	63.09	58.66-
Tele2 B	61.34-	67.45	57.32-	62.28
Swedish Orphan Biovitrum AB	60.95-	79.12	50.09-	58.7-
Wallenstam B	60.51-	60.91-	59.37-	61.06
Swedish Match	60.43-	63.35-	64.68	53.49-
Industrivärlden A	59.09-	57.92-	60.56-	59
Kinnevik A	58.63-	66.83	65.22	41.23-
Latour B	54.11-	52.3-	69.54	39.91-
Lundbergföretagen AB	53.25-	56.37-	57.51-	44.74-
Hexagon B	49.91-	53.65-	49.35-	48.07-

Table A2: This table depicts the weights of the assets that make up the Optimised Portfolios that focuses on maintaining high scores in the respective four ESG categories depending on the portfolio.

	Total ESG	Envir ESG	Social ESG	Gov ESG
Kinnevik A	-	-	-	-
Industrivärlden A	-	-	-	-
Swedish Match	-	-	-	-
Wallenstam B	-	-	-	-
Swedish Orphan Biovitrum AB	-	-	-	-
Tele2 B	-	-	-	-
AAK AB	-	-	-	-
Getinge B	-	9.5 %	88.9 %	-
Investor A	-	-	-	-
Modern Times Group B	-	-	-	-
Securtias B	-	-	-	-
Elekta B	-	-	-	-
Hennes & Mauritz B	-	-	-	-
ICA gruppen AB	-	-	-	-
SCA B	-	-	-	-
Hufvudstaden A	-	-	-	-
Trelleborg B	-	-	-	19.1 %
Autoliv	-	-	-	-
Skanska B	-	-	-	-
Volvo B	-	-	-	-
Husqvarna B	-	-	-	-
Kungsleden	-	-	-	-
Mekonomen	-	-	-	-
Björn Borg Ab	-	-	-	-
PEAB B	-	-	-	-
ALFA Laval	-	-	-	-
Cloetta B	-	-	-	-
SAS AB	-	-	-	-
Holmen B	-	-	-	-
Fabege AB	-	-	-	59.6 %
SSAB A	-	-	-	-
Telia company	-	-	-	-
Assa Abloy B	-	-	-	-
AXFOOD AB	-	-	-	-
Atlas Copco A	-	-	-	-
Boliden	-	-	-	-
SWED Bank A	-	-	-	-
SAAB B	8.5 %	6.9 %	-	-
SHB A	-	-	-	-
Lundin Energy	21.4 %	-	11.1 %	21.3 %
SKF B	-	-	-	-
Sandvik	6.5 %	12.3 %	-	-
Nordea Bank	-	-	-	-
SEB A	-	5.9 %	-	-
Electrolux B	-	-	-	-
Ericsson B	11.4 %	8.5 %	-	-
Castellum	52.3 %	56.9 %	-	-
Hexagon B	-	-	-	-
Lundbergföretagen AB	-	-	-	-
Latour B	-	-	-	-

Table A3: This table depicts the weights of the assets that make up the Optimised Portfolios that focuses on maintaining low scores in the respective four ESG categories depending on the portfolio.

	Total ESG	Envir ESG	Social ESG	Gov ESG
Kinnevik A	-	-	-	-
Industrivärlden A	-	-	-	-
Swedish Match	21.1 %	21.7 %	-	21 %
Wallenstam B	16.2 %	-	33.5 %	17.5 %
Swedish Orphan Biovitrum AB	3 %	3.6 %	8 %	-
Tele2 B	-	-	-	-
AAK AB	32.2 %	31.9 %	-	33.5 %
Getinge B	-	-	-	-
Investor A	-	22.6 %	-	-
Modern Times Group B	-	-	-	-
Securtias B	-	-	-	-
Elekta B	-	-	-	-
Hennes & Mauritz B	-	-	-	-
ICA gruppen AB	-	-	-	-
SCA B	-	-	-	-
Hufvudstaden A	-	-	-	-
Trelleborg B	-	-	-	-
Autoliv	-	-	-	-
Skanska B	-	-	-	-
Volvo B	-	-	-	-
Husqvarna B	-	-	-	-
Kungsleden	-	-	-	-
Mekonomen	-	-	-	-
Björn Borg Ab	-	-	-	-
PEAB B	-	-	-	-
ALFA Laval	-	-	-	-
Cloetta B	-	-	-	-
SAS AB	-	-	-	-
Holmen B	-	-	-	-
Fabege AB	-	-	-	-
SSAB A	-	-	-	-
Telia company	-	-	-	-
Assa Abloy B	-	-	-	-
AXFOOD AB	-	-	-	-
Atlas Copco A	-	-	-	-
Boliden	-	-	-	-
SWED Bank A	-	-	-	-
SAAB B	-	-	-	-
SHB A	-	-	-	-
Lundin Energy	-	-	-	-
SKF B	-	-	-	-
Sandvik	-	-	-	-
Nordea Bank	-	-	-	-
SEB A	-	-	-	-
Electrolux B	-	-	-	-
Ericsson B	-	-	-	-
Castellum	-	-	-	-
Hexagon B	9.1 %	4.5 %	24.9 %	10.6 %
Lundbergföretagen AB	-	-	33,5 %	-
Latour B	18.4 %	15.7 %	-	17.3 %

Table A4: This table depicts the two optimised portfolios created form a greater range of assets. Unlike the previous portfolios, these are not created with any regards to the four ESG categories.

	OMXS 30 portfolio	ESG benchmark
Kinnevik B	-	-
Kinnevik A	-	-
Industrivärlden A	-	-
Swedish Match	23.6 %	10.5 %
Wallenstam B	-	12.5 %
Swedish Orphan Biovitrum AB	-	0.9 %
Tele2 B	-	-
AAK AB	-	14.8 %
Getinge B	-	-
Investor A	-	1.5 %
Modern Times Group B	-	-
Securtias B	-	-
Elekta B	-	-
Hennes & Mauritz B	-	-
ICA gruppen AB	-	15.3 %
SCA B	2.5 %	-
Hufvudstaden A	-	-
Trelleborg B	-	-
Autoliv	-	-
Skanska B	-	-
Volvo B	-	-
Husqvarna B	-	-
Kungsleden	-	-
Mekonomen	-	-
Björn Borg Ab	-	-
PEAB B	-	-
ALFA Laval	-	-
Cloetta B	-	-
SAS AB	-	-
Holmen B	-	3.8 %
Fabege AB	-	-
SSAB A	-	-
Telia company	-	-
Assa Abloy B	8.5 %	4.2 %
AXFOOD AB	-	10.8 %
Atlas Copco A	-	-
Boliden	-	-
SWED Bank A	-	-
SAAB B	-	-
SHB A	-	-
Lundin Energy	-	9.2 %
SKF B	-	-
Sandvik	-	-
Nordea Bank	-	-
SEB A	-	-
Electrolux B	-	-
Ericsson B	-	-
Castellum	-	-
Hexagon B	16.1 %	2.5 %
Lundbergföretagen AB	-	13.9 %
Latour B	-	-
Investor B	38.7 %	-
SEB B	-	-
AstraZeneca	10.6 %	-
ABB	-	-
Atlas Copco B	-	-