Performance of Socially Responsible Investment: Evidence from Dutch Pension Funds.

Author: Leon Takens
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

ABSTRACT,

This paper investigates the influence of ESG integration on pension fund performance. The determinants of pension fund performance are discussed, which include ESG integration, the ratio of active to retired plan participants and the funds' size. Using a dataset of the largest 45 Dutch pension funds over the period 2013-2018, different pension fund performance measures in relation to the ESG integration are investigated, including the funding ratio, the absolute performance (Return) and the relative performance (Jensen's Alpha). It is found that there is only one significant relationship, which is the relationship between ESG integration and the funding ratio. The relationships found between ESG integration and the absolute performance (Return) and between ESG integration and the relative performance (Jensen's Alpha) were found to be not significant. Therefore ESG integration can be considered as an element that is pressured by society to be more present without any real significant advantages of increased performance. The results of this research are in alignment with prior studies, which show nonnegative or positive relationships between fund performance and ESG integration.

Graduation Committee members

First Supervisor: dr. X. Huang

Second Supervisor: Prof. Dr. M.R. Kabir

Keywords

Socially Responsible Investment (SRI), ESG integration, financial performance, Absolute performance, Funding Ratio, Jensen's Alpha, Dutch pension funds

1. INTRODUCTION

1.1 Problem Statement

Sustainability is an area of growing importance in all sectors of the economy. The societal pressure on the integration of economic, social and environmental impacts are increasing and higher than ever before. Furthermore, pension funds provide the main source of income for the elderly and the retired. The role of pension funds and life-insurance companies in the economy has increased with ageing populations and government policies promoting private pension savings (*Coletta and Zinni, 2013*). Furthermore, there is empirical evidence that growth of funded pension systems has a positive effect on economic growth in OECD countries (*Bijlsma, Ewijk, Haaijen, 2014*).

Recent developments, such as the interest rate decision of the American Federal Reserve in March 2019, have put a lot of pressure on the system. It is therefore of critical importance to analyse and understand factors that are driving the performance of pension fund investment. One possibility mentioned in literature could be Socially Responsible Investing.

The assessment of the level of Socially Responsible Investment includes environmental, social and governance (ESG) integration that covers governance, policy, implementation and accountability (*VBDO, 2013-2018*). Existing literature has addressed several drivers for consideration of Socially Responsible Investing (SRI). The most mentioned one being the societal pressure on sustainability, including environmental, social and governance issues: 'Further externalities might be internalised in the future under pressure from governments, such as social and environmental regulations and taxes, societal pressure from NGOs and consumers, and technological developments, such as low-cost solar and wind energy' (*Schoenmaker, 2017*). Another driver for consideration of Socially Responsible Investing that is mentioned is the fund´s size. Larger pension funds tend to have sustainable investment policies that are developed and implemented in far more detail than those of smaller funds (*De Nederlandsche Bank, 2016*). Furthermore, reputation risk is playing a particularly important role in the investment decisions of larger pension funds (*VBDO, 2013-2018*).

1.2 Research Objectives & Research Question

This research paper investigates whether Socially Responsible Investing leads to higher financial performance of funds. Thus, the research question which will be investigated is*: "Does the level of Socially Responsible Investing (SRI) in terms of ESG integration of Dutch pension funds improve their financial performance?"*

1.3 Research Contribution

This paper adds to the existing empirical literature by assessing economic impact as a consideration for SRI and as an explanation of increasing SRI among Dutch pension funds, instead of societal pressure and social impact (*Schoenmaker, 2017*) (*Jonas Nilsson, 2007*). Research has been done on ESG integration by, for example, US mutual funds and their financial performance relative to passive portfolios (*Borger et al., 2015*).

And also, for Bangladesh the relationship between ESG integration and financial performance has been analysed (*Sultana et al., 2018*). However, little literature exists on if ESG integration will have economic benefits for Dutch pension funds and SRI should therefore be promoted as an extra driver for consideration of Socially Responsible Investment with the aim to foster the growth of the pension funds and the respective Dutch economy.

1.4 Outline of This Paper

This paper is structured into three parts. The first part includes the theoretical framework, which covers theoretical portfolio construction with asset allocation and security selection. The second part gives an overview of Socially Responsible Investing (SRI), this includes the history, the definition and the impact of SRI. Based on the theoretical framework and the assessment of the impact of SRI on fund performance, a hypothesis will be formulated. The third part includes the research methods, in which the formula to investigate the hypothesis and an overview of the variables is given. In the fourth part the subject of analysis is given, and an elaboration is given on the data collection method. When all the data are collected, analyzed and when the empirical results are defined, a conclusion that will answer the formulated research question will be written. Lastly recommendations for future research are mentioned.

2. THEORETICAL FRAMEWORK

2.1 Theoretical portfolio construction

An investment decision is an important process that involves selecting a security from a wide range of options available. The performance attribution model describes the distinction of two performance contributors; superior stock selection or superior market timing. The model compares the total return of the managers actual investment holdings with the return for a predetermined benchmark portfolio and decomposes the difference into a selection effect and an allocation effect (Brinson et al., 1986).

2.1.1 The optimal asset allocation

Asset allocation is of major concern to investment managers. It aims to balance risk and reward by apportioning a portfolio's assets according to an individual's goals, risk tolerance and investment horizon. Asset/liability management (ALM) is commonly used especially for pension funds to find the best investment solution (Binsbergen & Brandt, 2007). There are three main asset classes in which pension funds invest; bonds, equities and real estate (Bikker et al., 2017).

The allocation between these assets ultimately lead to a funding ratio. The funding ratio is one of the most important performance indications of a pension fund. Furthermore, pension funds also must meet certain solvency requirements. Usually these are higher than 100% as the solvency requirement considers certain amounts of risk that pension funds are exposed to such as market risk, currency risk, commodity risk and real estate risk (Nijman, 2005).

ALM helps determining the optimal asset allocation by balancing the risk and reward. Pension funds have a large obligation towards their policy holders. Therefore, it is necessary develop an investment strategy that balances expected return with volatility. While the expected return must suffice to earn the promised interest for the clients, the volatility should not be too high. Otherwise, years with very low capital market return could lead to a stronger decrease of the funding ratio and thus put the solvency at risk (Müller and Wagner, 2018).

There are some who argue that pension funds should only invest in bonds, allowing them to match their assets to their liabilities

and achieving a funding ratio of 100% (Bikkers et al., 2012). Others argue that a pension fund should invest more in real estate. The main reasons for an addition of real estate to the portfolio include: diversification and reduction of the overall risk of the portfolio, hedging against inflation, and delivering steady cash flows to the portfolio in the form of rental income (Andonov et al. 2013). While others argue that equity should be more invested in since the market for index linked bonds is severely underdeveloped, effectively preventing pension funds from investing large fractions of their wealth in ILBs. Also due to the mean-reverting character of equity, the risk of equity decreases over time, which makes equity an interesting security for parties that have a long-term investment horizon (Hoevenaars et al., 2008)

2.1.2 Security selection

The traditional economic theory assumes that people are rational agents and make decision objectively based on their knowledge, experience and expectations and are capable of taking advantage of the opportunities available to them. It describes how risk-averse investors construct portfolios to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward. The theory approaches an "efficient frontier" to construct optimal portfolios offering the maximum possible expected return for a given level of risk (Markowitz, 1952).

However, the investment decision process of investors is not unique to all investors, but rather is heterogeneous to various investors. Different investors use different strategies in security selection.

Managers will give in to emotional inclination. Either based on patterns of the past or through psychological biases of human beings (Cohen and Kudryaytsev, 2012). The theory of planned behaviour states that drivers of decisions of an agent are based on acting on intention. This intention comes forth out of the attitude towards the behaviour and the effect, how the environment perceives the behaviour (subjective norms) and the agents estimated competence (perceived control) (Ajzen, 1985).

Investment decisions were previously followed by an ordinary triangle covering risk, liquidity, and return; however, a growing number of investors nowadays use the square, covering liquidity, risk, return and sustainability (von Wallis and Klein, 2015). This can be described by the societal pressure and social movements which have created subjective norms and attitudes in favour of integration of ESG issues. The formation of social movements will be elaborated on in section 2.1 history of SRI.

One group of investors might base their investment only on financial outcomes, while another group of investors might base their investment decisions on not solely financial outcomes but also on the perception and judgement of society and therefore choose to implement ESG issues as a criterion for their investment decisions. The trade-off that might arise is that of investing in ESG issues and losing return. In the next section a deeper view is given on Socially Responsible Investing (SRI) and its link with profitability.

3. SOCIALLY RESPONSIBLE INVESTING

3.1 History of SRI

The modern roots of SRI can be traced back to the political climate of the 1960´s to the 1980´s. During these decades, series of movements changed the worlds consciousness about the issues of social responsibility and accountability.

Then, with the natural disasters of Bhopal, Chernobyl, and Exxon Valdez these movement began to move further to the forefront of the minds of socially concerned investors. In 1989, as a response to the Exxon Valdez oil spill, a group of investors (Ceres) announced the Ceres Principles (Smith, 1993). The Principles address all major environmental areas and can be characterized as a "ten-point code of corporate environmental conduct to be publicly endorsed by companies as an environmental mission statement or ethic."

Further movements have been made on the area of corporate environmental conduct and responsible investment. The United Nations (UN) launches six Principles for Responsible Investment (PRI) in 2006. The principles were to be used to incorporate ESG into investment strategies (United Nations, 2006). In the beginning the principles were launched at the New York Stock Exchange (NYSE), however as of today, the principles have almost 1,500 signatories in more than 50 countries.

3.2 Definition of SRI

In the 70's it was argued that companies have minimal ethical obligations beyond maximizing profits and obeying the law (Friedman, 1962). This viewpoint on business has changed drastically over the decades.

Due to the movements that occurred as a result of incidents regarding the environment and human safety, Corporate Social Responsibility (CSR) began to move to the forefront. CSR is defined as treating the stakeholders of the firm ethically or in a responsible manner (Hopkins, 2003). It can be understood as an organisation's understanding and responsible care towards the community and environment in which it operates. A CSR policy can become a competitive advantage due to the ability of distinction from competitors (Hill, Ainscough, Shank, & Manullang, 2007).

If this concept is applied to the investment industry it leads to socially responsible investing (SRI). SRI distinguishes itself from traditional investment strategies by incorporating ESG issues: Environmental, Social and Governance. Investment decisions are nowadays not only based on risk, return and liquidity, but sustainability has also become a factor. ESG issues are used to measure a company's interaction with its stakeholders to determine the sustainability of investments and the company's ethical impact.

As aforementioned the ESG concept was proposed by the UN in its six Principles of Responsible Investment. Since then investors have been considering ESG performance as a criterion for their investment decisions. These ESG issues cover:

- ***Environmental:*** Greenhouse gas (GHG) emissions, biodiversity loss, pollution and contamination, carbon regulation exposure, renewable energy.
- ***Social:*** Labour practices, community displacement, human rights, health and safety, financial inclusion.
- ***Governance:*** Corruption and bribery, fraud, reputation, management effectiveness.

A variety of ESG advocates state that a change of attitude and actions is needed to promote the responsible and sustainable practices, in order to achieve long-term sustainability and economic development. Environmental and social issues need to be factored into investment decisions and corporate decision-making processes, alongside traditional financial metrics, leading to the square of risk, return, liquidity, and sustainability. Investors use six methods for bringing ESG considerations into their decision making: exclusionary screening, best-in-class selection, thematic investing, active ownership, impact investing,

and ESG integration. These methods are not mutually exclusive and are often used in combinations (Hayat, 2015).

3.3 Impact of SRI

3.3.1 Meta study

In a meta study in 2015, the relation between environmental, social and governance (ESG) criteria and corporate financial performance (CFP) was researched (Friede, Busch, & Bassen, 2015). This study combines the findings of about 2200 individual studies. A meta study had been done before which analyzed just a fraction of existing primary studies, making findings difficult to generalize. To overcome this shortcoming, the study extracted all primary and secondary data of previous academic review studies.

The results showed that roughly 90% of studies find a nonnegative ESG-CFP relation. Even more so, a large majority of studies report positive findings. The meta study can be generalized due to its inclusion of a large review size and even highlights that the positive ESG impact on CFP appears stable over time.

3.4 Hypothesis formulation

ALM would suggest that pension funds should allocate their assets to achieve the funding ratio and that the expected return must suffice to earn the promised interest for the clients. There is a major importance to balance risk and return and therefore ALM takes a more risk-averse approach. In a study, the Centre for European Economic Research (ZEW) found that most SRI indices carry a higher risk (Schröder, 2005). This theory would therefore suggest that SRI would have a risky/negative impact on pension funds.

According to Traditional Economic theory, investment decisions were previously followed by an ordinary triangle covering risk, liquidity, and return (*Cohen and Kudryavtsev, 2012*). This theory would suggest that the asset managers are risk-averse, meaning they prefer a less risky portfolio to a riskier one for a given level of return. This implies that an investor will take on more risk only if he or she is expecting more reward. Therefore, this theory would suggest that pension fund's performance would be higher if they include 'sin-stocks', investments in alcohol, tobacco, gambling, sex-related industries and weapon manufacturers, in their portfolio. Because they are suggested to have a higher return (*Fabozzi et al., 2008*). Therefore, this theory shows that investment in SRI generally would not be more beneficiary than investment in sin-stocks.

Theory of Planned Behaviour would suggest that the agents would exclude 'sin-stocks' based on the factor of how the environment thinks about the behaviour of including 'sin-stocks'. It explains that societal pressure is one of the key drivers of sustainability and of Socially Responsible Investment. This theory results in choosing sustainable strategies instead of unstainable approaches and as several studies have shown that showing unsustainable behaviour will lead to a higher reputation cost (*VBDO, 2015*). Theory of planned behaviour would lead to a higher fund performance by mitigating these reputation costs.

Both ALM and Traditional Economic Theory suggest that SRI would not positively impact the pension fund. Both ALM and Traditional Economic Theory prescribe a more risk-averse approach, with selecting the best return for the least risk. As investment in sin-stocks are suggested to have a higher risk-adjusted return, they suggest that that is a preferable option over investment in SRI.

However, the theory of planned behaviour suggests that the societal pressure that drives the recent hype for sustainability and SRI, will reduce reputation costs and therefore suggests that SRI would have a positive impact on the pension funds. Furthermore, the meta study showed a grey area with signs of a nonnegative relationship with ESG integration and some outlier studies which show a positive relationship between ESG integration and fund performance. And therefore, suggest that SRI would have a positive impact on pension fund's performance.

SRI is suggested to be less preferable as sin stocks are suggested to have a higher return. However, it results in a decrease of reputation costs and furthermore the meta study show that there is a non-negative or even positive relationship between ESG integration and fund performance.

As aforementioned, there is a lot of discussion on the type of impact SRI has. As most studies reflect on it as not having a positive impact and also not a negative impact on performance, but moreover as an element that is pressured to be more present without any advantages, and since the theories describe either positive impacts or describe SRI as less preferable, I formulate the following hypothesis:

H1: Socially *Responsible Investment (SRI) has a non-negative impact on the fund's performance.*

4. METHODOLOGY

This research uses OLS regressions models to analyse the relationship between Socially Responsible Investing (in terms of ESG integration) and the fund performance. Two distinctive ways to investigate this relationship will be used. The first being a regression with a dataset based on each variable per fund. And the second being interpretations of the patterns based on a creation of hypothetical portfolios of Dutch pension funds ranked highly, middle-level and lowly against ESG factors.

4.1 Variable Defining

The formula that will be used in this study is:

$$FundPerf_{i,t} = B_0 + B_1 ESG\ Score_{i,t} + B_2 RatioActiveToRetired_{i,t} + B_3 FundSize_{i,t} + e_{i,t}$$

Where:

B_0: $Constant$
$FundPerf_{i,t}$: $Funding\ Ratio, Return\ or\ Jensen's\ alpha, of\ fund\ i\ over\ period\ t$
$ESG\ Score_{i,t}$: $ESG\ Score\ of\ fund\ i\ in\ period\ t$
$RatioActiveToRetired_{i,t}$: $Ratio\ of\ active\ to\ retired\ plan\ participants\ of\ fund\ i\ in\ period\ t$
$FundSize_{i,t}$: $Size\ of\ fund\ i\ in\ period\ t$
$e_{i,t}$: $Error\ term\ of\ fund\ i\ in\ period\ t$

4.1.1 Dependent Variable

The first measurement of performance, and on which the pension funds are tested and should oblige, is the funding ratio. The second performance measure that will be used is the return of the fund. However, measurements of the performance of a pension fund's portfolio should not only address the absolute return but it is important that it addresses the relative return of the fund. Two ratios are often used to measure the relative return: the Sharpe Ratio (SR) and the Information Ratio (IR) (Israelsen, 2004). The SR relates the return of a portfolio with the risk-free rate. The IR compares the return with a relevant benchmark index. This research addresses the topic of how pension funds perform compared to each other due to difference in ESG integration. Therefore, the risk-free rate, which is used in the Sharpe Ratio is less applicable and the information ratio would be more applicable. However, a better measure has been

mentioned in literature, the Jensen's Alpha. This measure has been chosen because it has been proved to be accurate and is used in several other studies (Kempf & Osthoff, 2007) (Hill, Ainscough, Shank, & Manullang, 2007).

The formula for Jensen's Alpha is:

$$\alpha^j = R(i) - (Rf) + \beta * \big(R(m) - R(f)\big) + \varepsilon_i$$

Where:
R(i): return of fund
R(m): return of market index
R(f): risk-free rate of return
β: beta of the portfolio with respect to the chosen market index
Which is determined by: $\frac{COV(R(i),R(m))}{Var\ R(m)}$

4.1.2 Independent Variable

The independent variable is the score on Socially Responsible Investment of Dutch pension funds given by the report published yearly by the Dutch Association of Investors for Sustainable Development (VBDO).

The report on the level of SRI of Dutch Pension funds published by the Dutch Association of Investors for Sustainable Development (VBDO) will form the basis for the scope of SRI for this thesis (VBDO,2013-2018). This report provides a detailed overview of the current status and trends of Dutch pension funds regarding socially responsible investment.

The benchmark of SRI in this report, covers four focus areas; Governance, policy, implementation and accountability. Governance includes governance of pension funds on responsible investment, including the role of the board, its steering capacity, the sources of the information used and the consulting of participants. Whereas, policy focuses on the responsible investment policy in-place. Its applicability to the entire portfolio, its depth, and its quality. Implementation refers to the use of responsible investment strategies to six different asset classes; public listed equity, corporate bonds, government bonds, real estate, private equity and alternatives. Accountability discusses transparency about responsible investment policies, strategies, results and reports.

VBDO assessed these four areas and added them up using weighted percentages, to reach an overall score for all pension funds included in the research. The weighting percentage for implementation was 50% because especially this category determines the final output and quality of the socially responsible investment practices of a pension fund. All other categories were assigned a weight of 16,6%. These respective scores will be used in the regression model as the independent variable ESG score.

4.1.3 Control Variables

Furthermore, some control variables must be considered. These control variables could have a possible influence on the relationship between the dependent and independent variable. The first control variable will be related to the investment horizon, which is the ratio of active to retired plan participants. The second control variable is fund size. The measurement of the size of the funds will be the total invested capital of the pension fund. A study investigating the performance among Dutch industry-wide pension funds found that size influences the performance of a singular year (Huang and Mahieu, 2012)

5. DATA

Data from in total 45 pension funds will be analysed. The funds chosen are the funds that have been within the top 50 largest Dutch pension funds that are in this top 50 each respective year of the sample period 2013-2018. Since the VBDO only gives the largest 50 funds an ESG score each year.

For the funding ratio and the return, the dataset will be on an annual basis, resulting in 243 observations each. However, for the Jensen's Alpha, the dataset will be on a periodical basis of 2013-2018, because the internal benchmark (return of market index), needed for the Jensen´s Alpha, is provided on annual basis. Therefore, it is not possible to calculate the beta of the portfolio of each fund for each year, resulting in a dataset of 44 observations. In this dataset one more pension fund is excluded because that fund did not state an internal benchmark.

Within the portfolio analysis, the funds will be separated in three equally sized groups based on the level of ESG score.

5.1 Data collection method

The data for the first performance measure, funding ratio, is stated in the annual reports of each respective pension fund under 'meerjarenoverzicht'. The return of the fund, which is the second performance measure, is also given in the same overview. The third performance measure, Jensen's Alpha, will need data of the portfolio return and of the benchmark return. Data for the portfolio return and data for the benchmark return will be collected from the annual reports of each individual pension fund. The risk-free rate will be the annual return on long-term Netherlands Government bond, which are given by several investing websites Furthermore data for the control variables, ratio of active to retired plan participants and the size of the fund in terms of total invested capital, are also given in the annual reports.

The independent variable, ESG score, will need data on the level of ESG integration. Data for this will be collected from the yearly report *Responsible Investment of Pension Funds in the Netherlands,* which covers the 50 largest Dutch pension funds of the period 2013-2018 (VBDO, 2013-2018).

6. EMPIRICAL RESULTS

First the funding ratio, absolute return, Jensen´s alpha, ESG score, Ratio of active to retired pension plan participants and the Size of the pension funds' portfolios is analyzed per fund. Second the relationship between the performance measure and the control variables, Ratio active to retired participants and Size, is investigated. Thirdly, the influence of the ESG score the performance measure is investigated. Then a portfolio analysis is done, by separating the funds into 3 equally sized groups based on the level of ESG score. For this portfolio analysis the same steps are repeated.

In table 1 the mean, standard deviation, minimum and maximum values of the Funding Ratio, the Return and the Jensen's Alpha for the period 2013-2018 are given.

The mean of the Funding Ratio 107,41%, meaning that on average the pension funds all cover the value of the accrued pensions to be paid now and in the future. The database of De Nederlandsche Bank shows that the average funding ratio over the period 2013-2018 for the Dutch pension sector stood at 105,68. This shows that our sample is representative for the whole sector. To put this in perspective, the funding ratio required in 2018 is 104,2%, meaning that on average the pension funds oblige to this. The standard deviation of the Funding Ratio is 8,68%, meaning that there is a relatively high variance. Some pension funds in the sample are way above the mean and thus above the required funding ratio in 2018 and some are way below

the required funding ratio. As can also be interpreted by looking at the minimum value of 77%.

The mean of the Return is 6,87%, meaning that on average the pension funds achieve a positive return. However, as the standard deviation of 6,94% indicates, there are pension funds present in the sample that achieve either very high positive returns but also very high negative returns. The Return of 6,87% over the period 2013-2018 is highly representative, as the OECD reported a 7,1% return of the whole Dutch pension fund sector over the period 2013-2018. This shows that our sample is representative for the whole Dutch pension fund sector.

The mean of the Alpha is 0,31%, showing that the excess returns the funds earn on average is 0,31%. A positive Alpha is always desirable by portfolio managers, as it shows that they outperform the market.

As the funding ratio and the return have a high standard deviation, there must be a factor that determines these differences and shows that the investigation of the impact of the ESG score and the control variables could possibly explain the differences. Just as the funding ratio and the return, Jensen's alpha shows a lot of differences in this variable, as can be interpreted from the high standard deviation of 0,81%. And as aforementioned these large differences could possibly be explained by the ESG score and the control variables.

Table 1 also shows the mean, standard deviation, minimum and maximum value of the ESG score, Ratio of active to retired plan participants and the Size over the period 2013-2018. The mean of the ESG score is 2,73, meaning that on average the pension funds score relatively high on the scale of 1-5. The standard deviation is 0,95, showing that there are also large differences in this variable. The mean of the Ratio of active to retired plan participants is 1,72. Every retired plan participant's pension is covered by 1,72 active plan participants, over the period of 2013-2018. The mean of the Size is given on a logarithmic scale and is 3,955. Translated it results in an average size of 26473,5873 million. If multiplied by the number of pension funds, 45 in total, the total size over the period 2013-2018 is approximately 1,19 billion. To put this in perspective, the total size of the Dutch pension fund sector in 2018 was approximately 1,6 billion in total. Meaning that our sample size is 74,4% of the total size of the whole sector, which again shows that our sample is a good representation of the whole sector.

6.1 Regression Analysis

6.1.1 Model 1.1: Funding Ratio

Table 2 shows the correlation matrix between the Funding Ratio, and the independent variables. The correlation between the Funding Ratio and the ESG score is 0,1402. Showing that they are weakly positively related. Correlations between Funding Ratio and the control variables are small and negative, showing that they are weakly negatively related. As no correlations are close to -1 or +1, all the variables have either a weak negative relationship or a weak positive relationship. This indicates that the impact of the independent variables on the Funding Ratio might not be significant.

Table 4 shows the coefficient, the statistical significance of the control variables and the R-squared. The coefficient of the Ratio of active to retired plan participants is -0,44, showing that the relationship is negative and that for every increase of 1 in the Ratio of active to retired plan participants, the Funding Ratio will decrease by 0,44%. This low coefficient indicates that this variable does not have a statistical significant negative impact on the Funding Ratio. This is proven by the fact that this variable has a higher p-value than the alpha of 0,05 (0,248>0,05). The coefficient of LogSize is -2,75, showing that the relationship is negative and that for every increase of 1 in LogSize (increase of 6693,53 million in real size), the Funding Ratio will decrease by 2,75%. This high coefficient indicates that this variable might have a statistically significant negative impact on the Funding Ratio. This is proven by the fact that this variable has a lower p-value than the alpha of 0,05 (0,007<0,05). The explained variance, R-squared, of the control variables on Funding Ratio is 0,032. Meaning that 3,2% of the variance in the Funding Ratio is explained by the Ratio of active to retired plan participants and the Size. Furthermore, the p-value of the model is lower than the alpha (0,019<0,05), showing that there is a significant relationship between the Funding Ratio and the control variables.

6.1.2 Model 1.2: Funding Ratio

To investigate the impact of ESG score on the Funding Ratio, this variable needs to be added as an independent next to the control variables. Table 4 shows the coefficient, the statistical significance of the ESG score and the control variables and the R-squared. The coefficient of ESG score is 1,96, showing that the relationship is positive and that for every increase of 1 in ESG score the Funding Ratio increases by 1,96%. The coefficients of both control variables are negative, with LogSize having a p-value that shows significance. Furthermore, the ESG score also has a p-value that shows significance. The explained variance, R-squared, of the control variables and the ESG score on the Funding Ratio is 0,073. This shows that adding ESG score, results in an increased explained variance of 0,041. Meaning that the ESG score adds an explanation power of 4,13%. Furthermore, the p-value is lower than the alpha (0,000<0,005), showing that there is a significant relationship between the Funding Ratio and the control variables and the ESG score.

6.1.3 Model 2.1: Return

Table 2 shows the correlation between the Return and the independent variables. The correlation is negative and is -0,009. As the correlation is not close to -1, it shows a weak negative relationship. The control variables both have positive correlations, but as the correlations are not close to +1, it shows weak positive relationships. This indicates that the impact of the independent variables on the Return might not be significant.

Table 4 shows the coefficient, the statistical significance of the control variables and the R-squared. The coefficient of the Ratio of active to retired plan participants is 0,157, showing that the relationship is positive and that for every increase of 1 in this variable, the Return increases by 0,157%. This low coefficient indicates that this variable does not have a statistically significant negative impact on the Return. This is proven by the fact that this variable has a higher p-value than the alpha (0,614>0,05). The coefficient of LogSize is 0,33, showing that the relationship is positive and that for every increase of 1 in LogSize (increase of 6693,53 million in real size), the Return will increase by 0,33%. This low coefficient indicates that this variable does not have a statistically significant positive impact on the Return. This is proven by the fact that this variable has a higher p-value than the alpha (0,688<0,05). The explained variance, R-squared, of the control variables on the Return is 0,0015. Meaning that 0,15% of the variance in the Return is explained by the Ratio of active to retired plan participants and the Size. Furthermore, the p-value is higher than the alpha (0,832>0,05), showing that there is no significant relationship between the Return and the control variables.

6.1.4 Model 2.2: Return

To investigate the influence of ESG score on the Return, this variable needs to be added as an independent next to the control variables. Table 4 shows the coefficient, the statistical significance of the ESG score and the control variables and the R-squared. The coefficient of ESG score is -0,122, showing that the relationship is negative and that for every increase of 1 in ESG score the Return decreases by 0,122%. The coefficients of both control variables are weak and positive. All independent variables have a p-value that shows no significance. The explained variance, R-squared, of the control variables and the ESG score on the Return is 0,0018. This shows that adding ESG score, results in an increased explained variance of 0,0003. Meaning that the ESG score adds an explanation power of 0,03%. Furthermore, the p-value is higher than the alpha (0,9345<0,005), showing that there is no significant relationship between the Return and the control variables and the ESG score.

6.1.5 Model 3.1: Jensen's Alpha

Table 3 shows the correlation between the Jensen's Alpha and the independent variables. The correlation between the Jensen´s Alpha and the ESG score is 0,131. Showing that they are weakly positively related. The correlation between Jensen´s Alpha and the Ratio of active to retired plan participants is weakly negatively related, as it is not close to -1. The correlation between Jensen's Alpha and LogSize is 0,290. The low correlations indicate that the impact of the independent variables on the Jensen's Alpha might not be significant.

Table 5 shows the coefficient, the statistical significance of the control variables and the R-squared. The coefficient of the Ratio of active to retired plan participants is -0,31, showing that the relationship is negative and that for every increase of 1 in the Ratio of active to retired plan participants, the Jensen's Alpha will decrease by 0,31%. This low coefficient indicates that this variable does not have a statistical significant negative impact on the Jensen's Alpha. This is proven by the fact that this variable has a higher p-value than the alpha of 0,05 (0,109>0,05). The coefficient of LogSize is 0,368, showing that the relationship is positive and that for every increase of 1 in Logsize (increase of 6558,99 million in real size), the Jensen's Alpha will increase by 0,368%. This variable has a lower p-value than the alpha of 0,05 (0,007<0,05) and thus does have a significant relationship with the Jensen's Alpha. The explained variance, R-squared, of the control variables on Jensen's Alpha is 0,1404. Meaning that 14,04% of the variance in the Jensen's Alpha is explained by the Ratio of active to retired plan participants and the Size. Furthermore, the p-value is lower than the alpha (0,045>0,05), showing that there is a significant relationship between the Jensen's Alpha and the control variables. The control variables in isolation have no significant relationship, however when added together in the model they do have a significant relationship with the Jensen's Alpha.

6.1.6 Model 3.2: Jensen's Alpha

To investigate the influence of ESG score on the Jensen's Alpha, this variable needs to be added as an independent next to the control variables. Table 5 shows the coefficient, the statistical significance of the ESG score and the control variables and the R-squared. The coefficient of ESG score is 0,028, showing that the relationship is positive and that for every increase of 1 in ESG score the Jensen's Alpha increases by 0,028%. The coefficient of the Ratio of active to retired participants is -0,13. Thus for every increase of 1 in the Ratio, Jensen's Alpha will decrease by 0,13%. The coefficient of LogSize is 0,352. Thus, for every increase of 1 in LogSize (every increase of 6558,99 million in real size), Jensen's Alpha will increase by 0,352%. Furthermore, in this model none of the independent variables have a significant relationship with the Jensen's Alpha, as each p-value is higher than the alpha of 0,05. The explained variance, R-squared, of the control variables and the ESG score on the Jensen's Alpha is 0,1413. This shows that adding ESG score, results in an increased explained variance of 0,0009. Meaning that the ESG score adds an explanation power of 0,09%. Furthermore, the p-value is higher than the alpha (0,1038<0,005), showing that there is no significant relationship between the Jensen's Alpha and the control variables and the ESG score.

6.2 Portfolio Analysis

The data investigated in the portfolio analysis are based on a creation of hypothetical portfolios of Dutch pension funds ranked highly (group 1), middle-level (group 2) and lowly (group 3) against ESG factors. This portfolio analysis has been done for two performance measures; the Funding Ratio and the Return.

In table 6 summary statistics are given for the Funding Ratio, the Return, and the ESG score are given. These means are given categorized by group for each year.

The pattern of the funding ratio over the years, is that group 2 has outperformed group 1, in the years 2013-2017, with the exception of 2018. In 2018, group 2 had a lower mean funding ratio of 0,27%. Furthermore group 3 had the lowest mean funding ratio for all the years. From this pattern we can interpret that ESG score does have a positive effect on the funding ratio, since the lowest group on ESG score had the lowest mean funding ratio over all the years. However, since group 2 outperformed group 1 for all years, with the exception of 2018, it shows that ESG integration does not have a major impact on the funding ratio. Moreover, it can be suggested that ESG integration is a factor, that if not present, will lead to a lowered performance, but when present it does not ultimately result in the highest performance.

For the Return over the years, no pattern can be found. Group 1 outperforms the other groups for the years 2013, 2016 and 2017. Group 2 outperforms the other groups in 2014 and 2018. And group 3 outperforms the other groups in 2015. It is not possible to find a pattern here, and therefore it can be suggested that ESG score has no impact on the Return.

7. SUMMARY AND CONCLUSION

In this paper the relationship between the ESG integration of a fund and the performance of a pension fund is investigated. A sample of 45 funds is chosen. On this sample an regression analysis and a portfolio analysis in which the 45 funds are classified into three different ESG score categories. The performance of the funds is separated into three different performance measures: the funds' funding ratio, the absolute performance of the investment portfolio (Return), the relative performance in the form of Jensen's Alpha. The independent variable is ESG score and the control variables are the ratio of active to retired plan participants and the size. Table 7 shows an overview of the results of the models of the regression analysis

For the regression analysis it turns out there is a positive relationship between the ESG score and the funding ratio and between the ESG score and the Jensen's Alpha. Between the ESG score and the Return there is a negative relationship.

The positive relationship between ESG score and the funding ratio turns out to be significant with a coefficient of 1,96, even

though the correlation is close to zero, and the added explanation power is only 4,13%. The negative relationship between the ESG score and the Return turns out to be not significant, as indicated by the negative correlation close to zero, the coefficient of -0,0091 and the added explanation power of 0,03%. The positive relationship between the ESG score and the Jensen's Alpha turns out to be not significant, as indicated by the positive correlation close to zero, the coefficient of 0,028 and the added explanation power of 0,09%.

The portfolio analysis showed the presence of a pattern between ESG score and the funding ratio. This pattern showed that the ESG score does have a positive impact on the funding ratio. However, as suggested, this impact implies that if there is a low presence of ESG integration, performance is substantially lower, and if there is a medium or high presence of ESG integration, performance is higher. However, high presence of ESG integration does not outperform medium presence. Furthermore the portfolio analysis showed that no pattern could be found between ESG integration and the absolute performance measure (return).

The fact that only the relationship between ESG score and the funding ratio in the regression analysis turned out to be significant, it can be concluded that this study shows that ESG integration has a statistically not significant impact on fund performance. ESG integration does show a positive relationship with both the funding ratio and the Jensen's Alpha. Furthermore the portfolio analysis pointed out that ESG integration has a positive impact on the funding ratio, but is not the major factor contributing to performance.

Therefore ESG integration can be considered as an element that is pressured by society to be more present without any real significant advantages of increased performance. To answer the research question, it can be said that according to this research ESG integration has a not-significant positive impact on fund performance.

8. LIMITATIONS, DISCUSSION AND FUTURE RESEARCH

8.1 Data Limitations

It is important that the sample and data is representative. This is proven, as aforementioned, by the fact that the average funding ratio, return and the size of the sample over the period 2013-2018 is closely matched to that of reports on the whole Dutch pension fund sector by the DNB and OECD. Since this research compares a representative sample, it makes generalization for the whole Dutch pension fund sector possible.

8.2 Method Limitations

Using different measurements for a variable might alter the relationship completely. First of all, the measurement value of the funding ratio could be questioned. Since this measurement only accounts for nominal liabilities, it might not truly reflect the level of solvency. Furthermore, the Jensen's Alpha, uses the measurement of a self-selected benchmark. These benchmarks are elaborated upon and reflected on in the annual reports, but if a different benchmark would be selected, the results could differ.

8.3 Discussion

Little literature exists on the relationship between ESG integration and fund performance in the Dutch pension fund sector. A study has been done on the style and performance of Dutch mutual funds, which has shown a not statistically significant relationship between mutual funds classified as socially responsible and mutual funds classified as conventional (Scholtens, 2005). These results align with the results found in this thesis.

Furthermore, as aforementioned, a meta study in 2015 which investigated the relation between ESG criteria and corporate financial performance, found that out of 2200 individual studies, 90% of studies found a nonnegative ESG-CFP relation. And even more so, a large majority found a positive relationship. In this meta study only a small number found a significant relationship (Friede, Busch, and Bassen, 2015). The results of this thesis align with a large proportion of these other studies by showing a non-significant positive relationship.

8.4 Future Research

The outcome of this study indicates that the performance of pension funds is influenced by other variables since only one significant relationship was found.

As solvency requirements considers certain amounts of risk that pension funds are exposed to such as market risk, currency risk, commodity risk and real estate risk, these types of risk should be used as extra predictor variables. Furthermore longevity risk has to be considered, which is any potential risk attached to the increasing life expectancy of pensioners and policy holders, which can eventually result in higher pay-out ratios than expected for many pension funds and insurance companies and thus altering the funding ratio.
The other performance measures, return and Jensen's Alpha, might be explained by other determinants mentioned in the literature of performance such as income investment proportion, equity investment proportion etc. It is recommended that the risks associated with the funding ratio and other determinants such as the proportion of type of investment, is considered in future research as extra predictor variables.

9. ACKNOWLEDGEMENTS

This bachelor thesis was made possible thanks to the support of several people in my life. First of all, I would like to thank my first supervisor Xiaohong Huang and my second supervisor Rez Kabir. Especially Xiaohong Huang has been very helpful throughout the process, which gave me the motivation to continue. Furthermore, I am thankful for their constructive feedback and ideas of inspiration throughout this process.

Secondly, I would like to thank study advisors Sanne Spuls and Lena Ay and their colleagues for the support during my studies.

11. REFERENCES

1. Ajzen I. (1985) From Intentions to Actions: A Theory of Planned Behavior. *SSSP Springer Series in Social Psychology*. Retrieved from: https://link.springer.com/chapter/10.1007/978-3-642-69746-3_2
2. Andonov, A., Kok, N., & Eichholtz, P. (2013). A Global Perspective on Pension Fund Investments in Real Estate. *The Journal of Portfolio Management, 39*(5), pp. 32-42. Retrieved from: https://www.researchgate.net/publication/275906521_A_Global_Perspective_on_Pension_Fund_Investment sin_Real_Estate
3. Beebower, L., Brinson, G.P. & Hood, L.R. (1986). Determinants of portfolio performance. *Financial*

Analysts Journal. 42(4), pp. 39-44. Retrieved from: https://tandfonline.com/doi/abs/10.2469/faj.v42.n4.39

4. Bijlsma, M. Ewijk, C. Haaijen, F. (2014). Economic Growth and Funded Pension Systems. *SSRN Electronic Journal.* Retrieved from: https://www.netspar.nl/assets/uploads/030-Van-Ewijk-revised-February-2017.pdf
5. Bikker, J. A., Broeders, D. W. G. A., Hollanders, D. A., & Ponds, E. H. M. (2012). Pension Funds' Asset Allocation and Participant Age: A Test of the Life-Cycle Model. *Journal of Risk and Insurance, 79(3)*, pp. 595-618. Retrieved from: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1539-6975.2011.01435.x
6. Bikker, J. A., Broeders, D. W., & Dreu, J. D. (2017). Stock market performance and pension fund investment policy: Rebalancing, free float, or market timing? *Pension Fund Economics and Finance: Discussion Paper,* pp. 07-27. Retrieved from: https://www.ijcb.org/journal/ijcb10q2a3.htm
7. Binsbergen, J. H., & Brandt, M. W. (2007). Optimal asset allocation in asset liability management. *Cambridge, MA: National Bureau of Economic Research.* Retrieved from: https://ideas.repec.org/p/nbr/nberwo/12970.html
8. BlackRock Investment Institute. (2018). Sustainable investing: A "why not" moment. Retrieved from: https://www.blackrock.com/us/individual/insights/blackrock-investment-institute/sustainable-investing-is-the-answer
9. Blitz, D., & Fabozzi, F. J. (2017). Sin Stocks Revisited: Resolving the Sin Stock Anomaly. *The Journal of Portfolio Management*. Retrieved from: https://www.robeco.com/media/5/1/c/51c8cae37b9d4e28a1f8b6cb3388ef00_sin-stocks-revisited-resolving-the-sin-stock-anomaly_tcm20-9602.pdf.
10. Borgers, A., Derwall, J., Koedijk, K., & Horst, J. T. (2015). Do social factors influence investment behavior and performance? Evidence from mutual fund holdings. *Journal of Banking & Finance, 60*, pp. 112-126. Retrieved from: https://research.tilburguniversity.edu/en/publications/do-social-factors-influence-investment-behavior-and-performance-e
11. Cohen, G. Kudryavtsev, A. (2012). Investor Rationality and Financial Decisions. *Journal of Behavioural Finance.* Retrieved from: https://www.tandfonline.com/doi/abs/10.1080/15427560.2012.653020
12. Coletta, M. and Zinni, B. (2013). Insurance corporations and pension funds in OECD countries. *Questioni di Economia e Finanza (Occasional Papers) 165, Bank of Italy, Economic Research and International Relations Area.* Retrieved from: https://ideas.repec.org/p/bdi/opques/qef_165_13.html
13. Consultancy Nederland. (2018, April 19). Nederland heeft zesde grootste pensioenkapitaal ter wereld. Retrieved from : https://www.consultancy.nl/nieuws/17289/nederland-heeft-zesde-grootste-pensioenkapitaal-ter-wereld
14. De Nederlandsche Bank. (2016). Sustainable investment in the Dutch pension sector. Retrieved from: https://www.dnb.nl/en/binaries/Sustainable%20investement%20in%20the%20Dutch%20pension%20sector_tcm47-346418.pdf.
15. Fabozzi, F. J., Ma, K.C., Oliphant, B.J., (2008). Sin stock returns. *Journal of Portfolio Management 35*, pp. 82–94. Retrieved from: https://www.fondsnieuws.nl/system/storage/serve/157285/Sin%20Stocks.pdf.
16. Fama, E. F., & Jensen, M. C. (1983). Separation of Ownership and Control. *Journal of Law and Economics*, *26*(2), pp. 301–325. Retrieved from: https://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=1460236
17. Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment, 5*(4), pp. 210-233. Retrieved from: https://www.tandfonline.com/doi/full/10.1080/20430795.2015.1118917
18. Hayat, U. (2015). Environmental, Social, and Governance Issues in Investing. *CFA Institute Magazine,* pp. 8-8. Retrieved from: https://www.cfainstitute.org/en/advocacy/policy-positions/environmental-social-and-governance-issues-in-investing-a-guide-for-investment-professionals
19. Hoevenaars, R. P. M. M., Molenaar, R. D. J., Schotman, P. C., and Steenkamp, T. B. M. (2008). Strategic asset allocation with liabilities: Beyond stocks and bonds. *Journal of Economic Dynamics and Control, 32(9),* pp.2939-2970. Retrieved from: https://www.netspar.nl/assets/uploads/schotman0506.pdf.
20. Huang, X. H., & Mahieu, R. J. (2012). Performance Persistence of Dutch Pension Funds. *Economist, 160(1),* pp. 17-34. Retrieved from: https://research.utwente.nl/en/publications/performance-persistence-of-dutch-pension-funds
21. Israelsen, C.L. (2004). A refinement to the Sharpe ratio and the information ratio. Retrieved from: http://www.bertrand-maillet.net/bibliography/Isra%C3%ABlsen_2005_Preview.pdf.
22. Jong, E.D. (2008). Pension fund investments and the valuation of liabilities under conditional indexation. *Insurance: Mathematics and Economics. 42(1),* pp. 1-13. Retrieved from: https://www.netspar.nl/en/publication/pension-fund-investments-and-the-valuation-of-liabilities-under-conditional-indexation-2/
23. Kempf, A., & Osthoff, P. (2007). The Effect of Socially Responsible Investing on Portfolio Performance. *European Financial Management*, *13*(5), pp. 908-922. Retrieved from: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-036X.2007.00402.x
24. Nijman, T. (2005) Solvency Tests for Dutch Pension Plans. *Network for Studies on Pensions, Aging, and Retirement,* pp. 273-276. Retrieved from: http://www.netspar.nl/assets/uploads/NijmanSN0508.pdf
25. Nilsson, J. (2007). Investment with a Conscience: Examining the Impact of Pro-Social Attitudes and Perceived Financial Performance on Socially Responsible Investment Behavior. *Journal of Business Ethics, 83(2),* pp. 307-325. Retrieved from: https://link.springer.com/article/10.1007/s10551-007-9621-z

26. Markowitz, H. (1952). Portfolio selection. *Journal of Finance 7*, pp.77-91. Retrieved from: https://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=1980472
27. Müller, P., Wagner, J., (2018). Optimal Asset Allocation in Pension Funds Under Consideration of Higher Moments. *Department of Actuarial Science.* Retrieved from: http://actuarweb.aegean.gr/samos2018/wp-content/uploads/2018/04/Mueller.pdf.
28. OECD. (2018). Pension Markets in Focus 2018. *Organization for Economic Cooperation and Development.* Retrieved from: https://www.oecd.org/pensions/private-pensions/pensionmarketsinfocus.htm
29. Schoenmaker, D. (2017). Investing for the common good: a sustainable finance framework. *Essay and Lectures Series, Bruegel.* Retrieved from: http://bruegel.org/2017/07/investing-for-the-common-good-a-sustainable-finance-framework/
30. Scholtens, B. (2005). Style and Performance of Dutch Socially Responsible Investment Funds. *The Journal of Investing, 14*(1), pp.63-72.Retrieved from: https://www.rug.nl/research/portal/publications/style-and-performance-of-dutch-socially-responsible-investment-funds(f66809df-5eab-4570-9b80-8dbf7efca61c)/export.html
31. Schröder, Michael, (2005): Is there a difference? The performance characteristics of SRI equity indexes. *Discussion Paper 05-50, Centre for European Economic Research, Mannheim.* Retrieved from: https://econpapers.repec.org/article/blajbfnac/v_3a34_3ay_3a2007-01_3ai_3a1-2_3ap_3a331-348.htm
32. Smith, J. A. (1993). The CERES Principles: A Voluntary Code for Corporate Environmental Responsibility, 18Yale J. Int'l L. Retrieved from: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-9388.1995.tb00209.x
33. Sultana, S., Zulkifli, N., & Zainal, D. (2018). Environmental, Social and Governance (ESG) and Investment Decision in Bangladesh. *Sustainability, 10*(6), pp.1831. Retrieved from: https://www.mdpi.com/2071-1050/10/6/1831
34. VBDO. (2013-2018). Benchmark Responsible Investment by Pension Funds in the Netherlands 2013-2018. Utrecht. Retrieved from: https://www.vbdo.nl/publicaties/
35. Von Wallis, M.; Klein, C. (2015). Ethical requirement and financial interest: A literature review on socially responsible investing. *Bus. Res. 8(1)*, pp.61–98. Retrieved from: https://link.springer.com/article/10.1007/s40685-014-0015-7

12. APPENDICES

Table 1. Summary Statistics of Funding Ratio, Return, Jensen's Alpha, ESG score, Active-retired and Size.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Funding Ratio (%)	243	107,410	8,683	77	131
Return (%)	243	6,868	6,935	-4,2	32,4
Jensen's Alpha (%)	44	,312	,807	-3,028	2,463
ESGscore	243	2,731	,954	,2	4,8
Active-Retired	243	1,717	1,453	,159	7,069
Logsize	243	3,955	,550	2,273	5,657

Table 2. Correlation Matrix of Funding Ratio, Return, ESG score, Active-retired and Size.

	Funding Ratio	Return	ESG score	Active-Retired	LogSize
Funding Ratio	1,000				
Return	0,061	1,000			
ESG score	0,140	-0,009	1,000		
Active-Retired	-0,049	0,029	-0,841	1,000	
Logsize	-0,164	0,021	0,330	-0,141	1,000

Table 3. Correlation Matrix of Jensen's Alpha, ESG score, Active-retired and Size.

	Jensen's Alpha	ESG score	Active-Retired	LogSize
Jensen's Alpha	1,000			
ESG score	0,131	1,000		
Active-Retired	-0,282	-0,071	1,000	
Logsize	0,290	0,347	-0,167	1,000

Table 4. Regression Analysis

	Model 1.1	Model 1.2	Model 2.1	Model 2.2
ESG score		1,960* (0,001)		-,122 (0,806)
Active-Retired	-0,443 (0,248)	-,394 (0,296)	,157 (0,614)	,154 (0,622)
Logsize	-2,751* (0,007)	-3,856* (0,000)	,330 (0,688)	,399 (0,647)
R-Squared	0,032	0,073	0,0015	0,0018
F-statistic	0,019*	0,000*	0,832	0,935
No. of Obs.	243	243	243	243

*The numbers in parenthesis represent the t-statistics. The asterisk * denote statistical significance at 5% level.*

Table 5. Regression Analysis

	Model 3.1	Model 3.2
ESG score		,028 (0,845)
Active-Retired	-,131 (0,109)	-,131 (0,114)
Logsize	,368* (0,096)	,352 (0,137)
R-Squared	0,1404	0,1413
F-statistic	0,045*	0,104
No. of Obs.	44	44

*The numbers in parenthesis represent the t-statistics. The asterisk * denote statistical significance at 5% level.*

Table 6. Summary statistics of Funding Ratio, Return, ESG score Active-retired and size.

	2013	2014	2015	2016	2017	2018
ESG score						
Group 1	3,407	3,627	3,58	3,897	3,96	3,486
Group 2	2,233	2,673	2,433	2,825	3,06	3,25
Group 3	1,407	1,587	1,553	1,849	2,027	3,233
Funding Ratio (%)						
Group 1	109,013	108,32	102,787	103,587	110,68	108,5
Group 2	113,46	113,333	106,46	105,713	112,22	108,233
Group 3	105,2	106,36	103,913	102,133	107,573	105,95
Return (%)						
Group 1	3,049	17,358	1,13	10,654	5,652	-1,086
Group 2	2,983	18,110	1,375	9,368	5,028	0,713
Group 3	2,854	18,107	2,117	9,415	4,899	-1,035

The groups represent classes of funds based on ESG score, with group 1 containing the 15 funds that are ranked highly against ESG score, group 2 containing the 15 funds that are medium-level ranked against the ESG score and group 3 containing the 15 funds that are ranked lowly against the ESG score.

Table 7. Overview of results of the regression Analysis.

Individual Analysis Model		***With control variables***	***With all variables***		***ESG score impact***
Funding Ratio	**F-Statistic**	0,019*	0,000*	**Correlation**	0,140
	R-Squared	3,23%	7,36%	**Coefficient**	1,960
Return	**F-Statistic**	0,8324	0,9347	**Correlation**	-0,009
	R-Squared	0,15%	0,18%	**Coefficient**	-0,122
Jensen's alpha	**F-Statistic**	0,0450*	0,1038	**Correlation**	0,1875
	R-Squared	14,04%	14,13%	**Coefficient**	0,028

*The numbers in parenthesis represent the t-statistics. The asterisk * denote statistical significance at 5% level.*