THE INFLUENCE OF SOCIALLY RESPONSIBLE INVESTMENTS AND SIZE ON PERFORMANCE: A SEARCH FOR DETERMINANTS OF PERFORMANCE IN DUTCH INDUSTRY-WIDE PENSION FUNDS

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G.K. Kruiger

MSc. Business Administration Financial Management

University of Twente

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Student:	Gerhard K. Kruiger Msc. Business Administration Financial Management School of Management and Governance University of Twente
1st supervisor:	Ir. H. Kroon
2nd supervisor:	Dr. P.C. Schuur
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ABSTRACT

Abstract

Size influences the performance of a singular year according to Huang and Mahieu (2012), who found this investigating the performance persistence among Dutch industry-wide pension funds. Sievanen, Rita and Scholtens (2013) investigated the drivers of social responsible investments among European pension funds and they show that size influences the level of social responsible investments. The reason to look into social responsible investments is the empirical evidence that show a positive relationship between corporate social behavior and financial performance. A good corporate social behavior results in better long-term performance and better performance during crisis. It is assumed this also applies to socially responsible investments.

This thesis explored the influence of socially responsible investments and size on the performance of Dutch industry-wide pension funds.

The z-score was used as performance indicator and collected from the Federation of Dutch Pension Funds. The long-term performance, short-term performance and the performance during crisis is examined. For the long-term performance data from 1998-2012 was used to calculate the standard deviation. Based on this standard deviation a top and bottom group were created. The size is measured with total assets and active participants retrieved from the annual reports of 2008 and 2010. For measuring the level of socially responsible investments a proxy was used, the required data is also retrieved from the annual reports of 2008 and 2010. With Spearman's rho Correlations the correlation between variables was checked. This showed no relationship with the standard deviation of pension funds. In addition this relationship was also checked using the Mann-Whitney rank sum test.

The results show that pension funds who have a stable performance outperform pension funds who have an unstable performance during crisis. Both size and socially responsible investments influences the performance of a singular year, but no support was found for the influence of size or socially responsible investments during crisis or long-term performance. In addition a positive relationship between size and socially responsible investments was confirmed. This confirms the previous literature of Sievanen, Rita and Scholtens (2013).

Remarkable is that over the years for size as for socially responsible investments the same values are assumed. In the research of Huang and Mahieu (2012) the assumption for size is also made. For socially responsible investments it is likely this assumption will not hold, because after the 2008 crisis a lot of developments took place.

Future research should focus on exploring and finding the determinants of stable performance. At this moment there are already pension funds who are able to have such stable performance. These funds did not have to reduce the retirement benefits of their participants.

Index of abbreviations

ANOVA	Analysis of variance
CAPM	Capital asset pricing model
CSR	Corporate social responsibility
CFP	Corporate financial performance
CSP	Corporate social performance
ESG	Environmental, social and governance
GDP	Gross domestic product
OECD	Organization for economic co-operation and development
SPSS	Statistical package for the social sciences
SRI (MVB)	Socially responsible investments (maatschappelijk verantwoord beleggen)
VBDO	Dutch abbreviation for association of investors for sustainable development (Vereniging van beleggers voor duurzame ontwikkeling)

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1 Introduction

This chapter start with the problem indication, which will discuss the relevance of the topic of this thesis for the society and the academic literature. Next the problem statement is discussed and will produce a research question together with sub questions. This chapter will finish with an outline of the thesis, with a short description of what can be expected in every chapter.

1.1 Problem indication: Pension funds problems insuring pensions

After the 2008 crisis pension funds focus more and more on socially and responsible investments. The coverage ratio of pension funds was not sufficient. Many pension funds could not compensate participants against inflation and some funds needed to reduce retirement benefits to meet the coverage ratio that is required by law. Pension funds mainly blamed the financial crisis and also the fact that people are living longer. To avoid such situations in the future stable performance is needed.

It looks like socially responsible investments (SRI) is becoming more and more standard these days. The trend is also spilled over to institutional investors, who nowadays encourage firms more and more to be corporate social responsible (CSR). What is meant with SRI? The definition of SRI that is used in this thesis are the investments that encourage CSR. Robeco stated that empirical evidence shows that sustainable firms perform better on the long term, especially during crisis. Robeco and several other institutional investors assume this benefit also applies to investors. The question is if this pattern also recognizable in SRI? Before narrowing down the scope of this thesis, first a look at the broader perspective.

According to the organization for economic co-operation and development (OECD) the Netherlands has, as percentage of GDP, the largest pension fund assets. Also the Netherlands has, after Denmark, the highest investment return 2011. According to Mercer (2013) the Netherlands are second best regarding pension fund sustainability. On average Dutch pension funds are performing well, compared to other countries. In Figure 1-1 the investment returns of pension funds from several countries are shown. In the end of 2007 the crisis started and a lot of pension funds were affected by this, what resulted in a downfall of the investment returns in 2008.

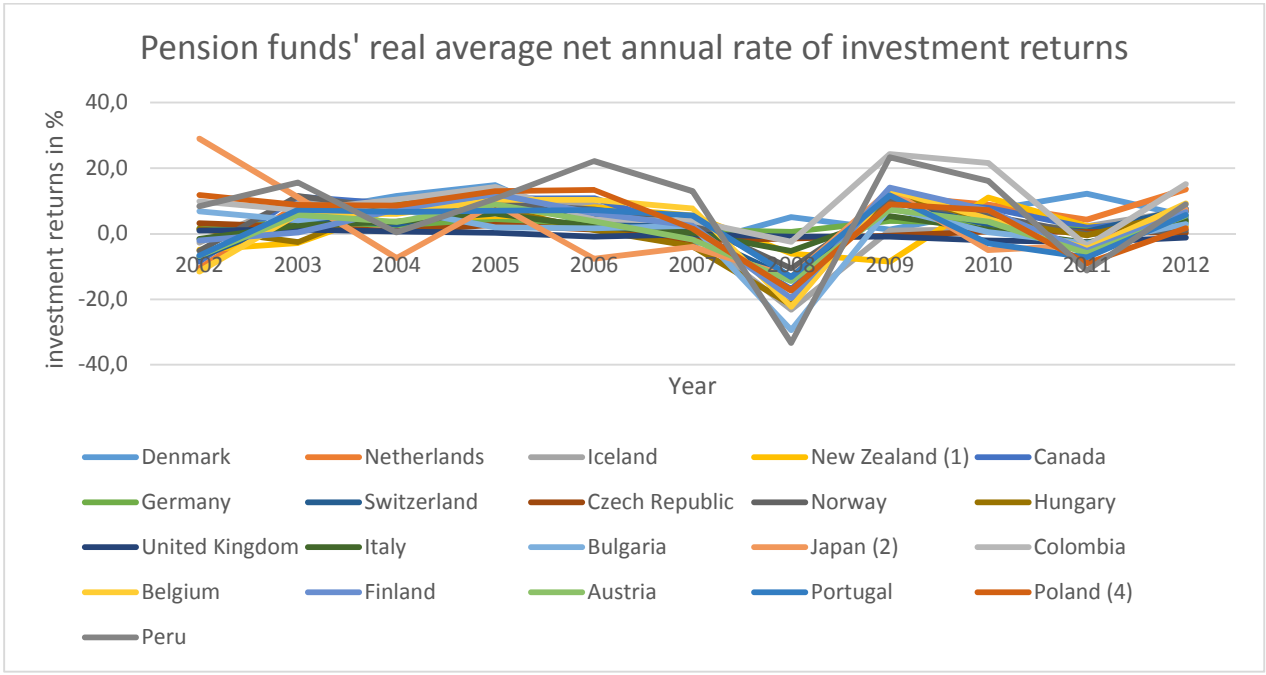

Figure 1-1 Pension funds' real average net annual rate of investment returns based on OECD Global Pension Statistics

Checking for news items regarding to pension funds and socially responsible investing several articles were found (e.g. "*Pressure on Israeli banks from investors intensifies*", *"Dutch pension group halts Wal-Mart investments, cites labor concerns"* and "*Dutch Pension Fund Blacklists Tobacco Companies*"). It looks like Dutch pension funds really care about the environment making decisions like these. Sadly it is not only praise for the funds, after Zembla (a Dutch TV program) noticed in 2007 that pension funds finance nuclear weapons there is not much changed. According to the report "Don't Bank on the bomb", published by ICAN (2013), there are still a lot of pension funds who are mentioned in the Hall of Shame and still financing, directly or indirectly, nuclear bombs. As stated on their website, 'ICAN is a global campaign coalition working to mobilize people in all countries to inspire, persuade and pressure their governments to initiate and support negotiations for a treaty banning nuclear weapons'. In other words SRI is still a very current issue, but it remains to be seen if SRI result in stable performance within pension funds.

There is not much research done about SRI in combination with pension funds, at least only a few could be found. SRI and the performance persistence of pension funds is also discussed in a few articles. To contribute to the academic literature this thesis explores both topics and will try to determine if there is reason to believe there is a relationship between performance persistence within pension funds and their SRI policy.

1.2 Problem statement: the determinants for performance within pension funds

Several news items go about the decisions of pension funds regarding their investment decisions. A positive relationship between SRI and financial performance within pension funds is assumed, based on the positive relationship between CSR and financial performance within firms. The limited available academic literature points not in one direction regarding this relationship. The objective is to find determinants for stable performance. This thesis explores this assumption together with size to decide if these variables are determinants for stable performance. This thesis explorers if size and SRI are determinants for stable performance in Dutch industry-wide pension funds. The z-score is used as performance indicator. Huang and Mahieu (2012) also used this variable and the z-score is available from every mandatory industry-wide pension fund in the Netherlands. A proxy is developed and used for measuring SRI. It is assumed that pension funds, who invest in a social responsible way report, this behavior also mention in their annual report. Sievanen, Rita and Scholtens (2013) measured size with participants and the total assets of a pension fund. This is adopted in this research. The research question is the following:

> What is the influence of socially responsible investment and size on the performance within Dutch industry-wide pension funds?

The research question is divided in two sub questions:

> What is the influence of SRI on performance within pension funds?
>
> What is the influence of size on performance within pension funds?

The influence on performance is measured in a single year, during crisis and long term. Several elements in the research question and the sub questions can be interpreted differently and can create wrong expectations. Therefore these elements will be further explained. The pension funds that are examined in this thesis are the mandatory industry-wide pension funds in the Netherlands. These funds are obliged to report a performance variable, the z-score. The financial crisis started in at the end of 2007, but in 2008 it became a global crisis and giants on Wall Street began to fall. For that reason 2008 is used as crisis year. To determine the long term influence the z-scores from 1998 to 2012 are used.

1.3 Thesis outline

To answer these questions first a literature review is executed to develop hypotheses and develop a theoretical framework for measuring SRI. Subsequently the research method and the necessary data are explained. The chapter starts with a, literature based, research model followed by a description of how the model is tested together with the required data. After that the analyses are performed and the results are shown. Then the conclusion is presented and will link back to the hypotheses. Finally the results are interpreted, the limitations are discussed and recommendations are made for future research in the discussion.

2 Theoretical Framework

The literature is used to develop hypotheses, a theoretical framework and to determine how to measure socially responsible investments (SRI). In order to answer the research question first the existing literature about the influence of SRI on financial performance is examined in paragraph 2.1. Subsequently the influence of size on SRI and the pension fund performance is discussed. Then the power of pension funds to persuade corporate social behavior and the need for this is discussed. Finally the hypotheses are developed. The next chapter describes the theoretical framework and how this is tested.

2.1 The influence of socially responsible investments on financial performance

Breen and Wild (Alfred 2013) state that sustainable firms in the long run perform better than unsustainable firms, especially during crisis. They assume this positive effect has also its influence on SRI. To check this in the literature first the performance persistence is described. After that the relation between SRI and financial performance is described.

The performance of pension plans is very important, because when high returns are realized the participants can enjoy their pension without deductions. Pension plans have to be managed for a long time and an interesting question is if they can persist in their performance. In Spain Marti (2011) investigated the performance persistence of individual pension plans. She shows, using contingency tables and transition matrixes, that individual pension plans in Spain persist in their performance over time. The case of Colombia investigated by Berggrun and Jaramillo (2011) shows that there is only persistence in the short-run. They investigated mandatory, voluntary and severance pay funds. The persistence was only found in the voluntary funds, with the other funds the evidence for persistence is very little. They argue that a possible explanation for the lack of performance persistence within the mandatory funds could be the lack of competition. In the Netherlands, Huang and Mahieu (2012) investigated Dutch industry-wide pension funds. They found that pension funds cannot beat their self-selected benchmarks consistently.

Literature shows a positive relationship between CSR and financial performance. In research from van Beurden and Gossling (2008) is stated that only old researches show a negative or no relationship between these two variables. Several articles show a positive relationship between these variables. Some quotes like '*it pays to be green*' (Russo and Fouts 1997) and '*good ethics is good business*' (Tang, Hull and Rothenberg 2012) are repeated in several studies. In most of these studies an accounting based measure is used for the financial performance. When a market based performance measure is used the relationship does not point in one direction. However there are articles that show a significant positive relationship between CSR and its market value (Lo and Sheu 2007).

The question is if the positive relationship between CSR and financial performance also applies for SRI. Hillman and Keim (2001) investigated the influence of involvement of stakeholder, engagement, on the financial performance. It will increase value when stakeholders can contribute and be part of the firm. Only the primary stakeholders have a positive effect on value creation of the firm. The primary stakeholders are shareholders, employees, suppliers, customers, the community and the natural environment. According to Mathis (2004) customers, shareholders and employees are the three most important stakeholder groups that have most influence with regard to the decision making process within a company. Institutional investors can become shareholders and influence the company through their voting rights. According to previous mentioned research this will increase the value of the company.

Scholtens (2005) shows that in the period from 1995 to 2001 special tax regulation was responsible for half of the growth within SRI in the Netherlands. A positive effect is that investors are likely to keep their investments even when the tax benefit will disappear. The returns of SRI is not significantly different than the benchmark, but the risk is higher. One should not expect that from SRI. Benson, Brailsford and Humphrey (2006) also state that there is no difference between SRI and conventional funds. However they also show

that SRI has different beta's but vary from year to year, suggesting to be more volatile. Scholtens (2006) could not find a simple one-to-one relationship between financial and sustainable development, but he found several, indirect, linkages. He also noticed that a lot of the literature focuses on engagement when it comes to change corporate behavior and performance in a more sustainable way.

Cortez, Silva and Areal (2009) show that the performance of socially responsible funds in Europe does not differ in relation to conventional and social responsible benchmarks. Nevertheless social responsible funds seem to perform a bit higher when funds are compared to the social responsible benchmark. Based on their research they show that an investor can add a social screen to their European investments without endanger the financial performance.

Fernando et al (2009) state that improved environmental performance decreases the cost of capital and the cost of equity capital. This results in lower cost for new investments. Fernando et al also found that individuals are becoming more attracted to sustainable firms. Only sustainable firms have a smaller amount of institutional investors. Sustainability has the opposite effect on institutional investors. A sustainable firm might be less volatile and therefor can raise capital for lower cost, it also means less return for the investor. It looks like this contradicts the research that the influence of shareholder can increase value, but that is not necessarily true. Another explanation is that CSR decreases the cost of capital and increase the firm value at the same time. If the increase is parallel to the decrease there will be no benefit, unless the government has special tax regulations for SRI. Humphrey, Lee and Shen (2012) shows also that that investors or managers can implement a CSP investment or business strategy without incurring significant financial cost (or benefit) in terms of risk and return. Cortez, Silva and Areal (2012) investigated the performance of social responsible funds in Europe, the US and Austria. They show that the performance of SRI in Europe does not significantly differ from conventional funds. However they also show that the US and Austrian social funds have an underperformance. All suggesting that SRI does not adds additional value to a firm.

The bases is a positive relationship between CSR and the financial performance. It is also shown that this argument is used to justify SRI. The literature shows that shareholder engagement can increase value, but will decrease a firms cost of capital. Without any benefits like special tax regulations the performance of SRI in Europe does not significant differ from conventional funds. The level of sustainability might be even that high in firms that they can easily find other, individual, investors.

In the literature several different time frames are used. Some studies focus on long-term performance and others focus on short-term performance. Some studies find performance persistence over time others find only short-term persistence. In the case of the Netherlands no performance persistence is found. This study looks at the effect on long-term performance, short-term performance and on the performance during crisis.

The standard deviation is used to express the long-term performance of the pension fund. This is based on the CAPM model, more risk means more return and less risk return means less return. Firms who are applying CSR perform better during crisis, which indicates that the performance is less volatile. Above is mentioned that SRI funds seems to be more volatile, because of the fluctuating beta's. Opposite of that is that CSR create a lower cost of capital what indicates low volatility. Therefore is chosen to use the standard deviation of the pension funds to divide the pension funds into groups.

2.2 The influence of size on socially responsible investments and performance

In the reviewed literature a link between size and SRI is found and between size and pension fund performance is found. Huang and Mahieu (2012) showed in their research, by using a cross-sectional portfolio, that the largest pension funds outperform the smallest funds. After this study Sievanen, Rita and Scholtens (2013) found that larger funds are more likely to have responsible investments than smaller funds. Therefore the influence of size is also included in this study.

2.3 The power of pension funds to persuade to corporate social behavior

In this paragraph several articles about SRI are discussed to identify the concepts with the purpose to determine how SRI can be measured.

Schueth (2003) identified three strategies for SRI. Screening, include or exclude firms based on social and environmental criteria. Shareholder advocacy, also known as engagement, where investors engage through dialogue and use their voting rights to influence corporate behavior. The last strategy is community investing. Invest in people, in low-income and at-risk communities, who have difficulties to raise capital through conventional channels. Schueth indicates that investors apply SRI to 'feel good' or to encourage improvements in quality of life, social change.

Sjostrom (2008) synthesized research of shareholder activism so far. She found several reasons for shareholder engagement by pension funds. Hess (2007) states that public pension funds can be powerful to persuade firms to corporate social behavior. Engagement is justified and the right thing to do, because it affect the long-term value creation. Hess found that pension funds are not as active as they claim to be. He recommends to motivate the pension funds by require them to disclose the extent to which they look into social and environmental issues in their investment activities. Clark and Hebb (2004) investigated the underlying reasons for public pension funds to engage in firms and address social and environmental issues. They found four drivers: pension funds often invest in passive index funds, last two decades governance pressure for accountability and transparency has grown fast, growing trend of SRI spilled over to pension funds and last the increase of the global pressure. Most drivers are self-explanatory, but passive index funds probably need some explanation. Passive index funds are funds where the investor cannot exit when he is dissatisfied. Engagement is the only way to ensure long-term value.

According to Sparkes and Cowton (2004) the SRI philosophy is more and more adopted by institutional investors creating a new form of shareholder pressure. When most of the investors apply SRI, firms have to change their behavior to those standards. Institutional investors are more likely to have success with shareholder engagement, probably because they are more active (Gillan and Starks 2000). Several studies show us that shareholders have an influence on the behavior of a firm, but there are also studies that do not find such evidence. There is a lack of power for creating changes within a firm (Haigh and Hazelton 2004; Prado-Lorenzo, Gallego-Alvarez and Garcia-Sanchez 2009). Most likely firms will fulfil the demands of the shareholders or make it look like they fulfil it.

Sethi (2005) argues that pension funds and for that matter other mutual funds must be concerned with the long-term survival and growth of corporations. Pension funds must choose for a strategy for their investments to encourage firms to take into account the long-term effects on environment, sustainability. Sethi also states that those practices are not only desirable activities, but necessary to long-term survival. Only corporations and public pension funds, and other large institutional holders, will ignore it even though it will harm themselves.

In Wood's model of corporate social performance (CSP) it is shown that stakeholder management is part of the processes of social responsiveness and will have an impact on the natural and physical environment (Wood 2010). Wood also concluded in her literature that studies about CSP need to focus on stakeholders and society.

2.4 Hypotheses

This paragraph gives an overview of the hypotheses that are developed with the use of the literature that is discussed above. To contribute to the existing literature, as discussed above, the following hypotheses are developed. In the next chapter is explained how these hypotheses are tested.

The first hypothesis regards the influence of size on the performance. In the literature is shown that size has a positive influence on the performance in a singular year. Its assumed that this also applies on the long-term and during crisis. Therefore the following hypotheses:

H1A: Size, measured by total assets and active participants, has a positive effect on the performance, measured by the z-score of a singular year.

H1B: Size, measured by total assets and active participants, has a positive effect on the long-term performance, measured by the standard deviation of the z-score.

H1C: Size, measured by total assets and active participants, has a positive effect on the performance during crisis, measured by the z-score of the 2008 crisis..

The second hypothesis regards the influence of SRI on performance. In literature is shown that a positive relation between CSR and CSF is found amongst firms. It is assumed this also applies to institutional investors like pension funds. In the literature there is no measurement found for SRI, therefor a self-made proxy is used in this thesis. This proxy is based on concepts that are discussed in the literature and will be developed in next chapter. Pension funds most likely will apply engagement, because articles about screening and community investing were not found. The increasing pressure by governments for accountability and disclosure suggest that this will be included in the annual reports. Frijns et al. (2010) and Goudswaard et al. (2010) both investigated how to improve the Dutch pension system and both advocate for more transparency. This results in the following hypotheses:

H2A: SRI, measured by a proxy, has a positive effect on the performance, measured by the z-score.

H2B: SRI, measured by a proxy, has a positive effect on the long-term performance, measured by the standard deviation of the z-score.

H2C: SRI, measured by a proxy, has a positive effect on the performance during crisis, measured by the z-score of the 2008 crisis.

3 Research Methodology

This chapter start with describing the research design. This design will show, based on the previous chapter, the existing relations between variables and a new relation that is tested. Subsequently the procedures, of how the relations from the model are tested, are explained. In the final part the variables who are needed for testing are explained.

3.1 Research design

The model below is created based on the literature. The objective is to test if there is reason to reject the assumption of the positive relationship between SRI and performance. According to Huang and Mahieu (2012) there is a positive relation between high performance and the size of a pension fund. Explanations of this phenomena are mainly economies of scale. They argue that large pension funds have lower operational cost and have the ability to support a full-time professional management team. The model therefore shows a positive relation between size and performance. This only applies for the performance in one year and this thesis tested if this relationship holds during crisis and in the long run.

This thesis starts with the assumption that SRI has a positive effect on the performance, especially on long term performance and during crisis. This gives participants more certainty that they in the future will get their retirement benefits. Participants like to know in advance on which pension they can count.

Besides the positive effect of size on the performance of a pension fund does size also influence the level of SRI. According to Sievanen, Rita and Scholtens (2013) size has a positive influence on the level of SRI. They measured size by total active and the number of participants. The level of SRI is determined by sending questionnaires to pension funds. In the questionnaire the pension funds had to estimate their level of SRI on a scale of seven.

The final relation that is shown in the model is the relation between SRI and performance. This relationship is based on the positive relation between CSP and CSF in firms (Russo and Fouts 1997; van Beurden and Gossling 2008; Waddock and Graves 1997).

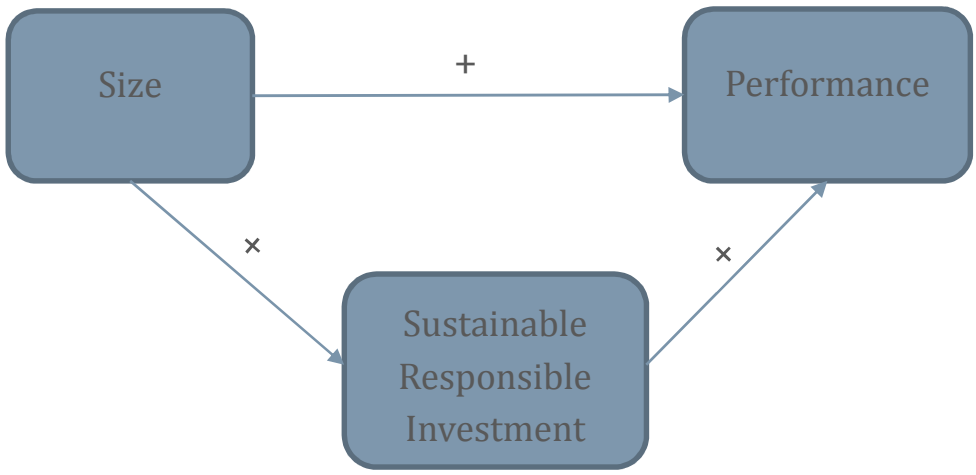

Figure 3-1 Research model

3.2 Operationalization

In this paragraph is explained which tests and associated procedures are used to answer the research question. To be able to answer the sub questions who help answer the research question first the performance on the long term has to be calculated. The performance of the Dutch industry-wide pension funds of the last fifteen years are used. When that is done it is possible to answer the sub questions and determine the influence of size and SRI on the performance of pension funds.

3.2.1 Performance of Dutch Pension funds

The performance of Dutch industry-wide pension funds is examined. With the performance is meant the performance stability on the long term, the performance during crisis in the performance in one year. The stability of the performance is measured with the standard deviation using z-scores over fifteen years. A low standard deviation means that the performance of a pension fund is stable. A high standard deviation means the opposite and tells that the performance of the pension fund is unstable. It is possible that a pension fund has a stable performance, but performs below standard. This fact is not taken into account. The reason to look also at the stability of the performance is that the theory suggest that SRI reduces risk which causes stable returns. In addition stable performs gives more certainty to participants about the retirement benefits they can expect in the future. This part describes how a distinction is made between the pension funds which perform stable and unstable. At the end of this paragraph is explained how these groups perform during the 2008 crisis. In the introduction is shown that globally pension funds have very low investment returns in this year compared to other years.

In order to determine the performance of pension funds is chosen to exclude pension funds with less than ten year available data. Next the standard deviations are, with the use of statistical program SPSS, per pension fund calculated.

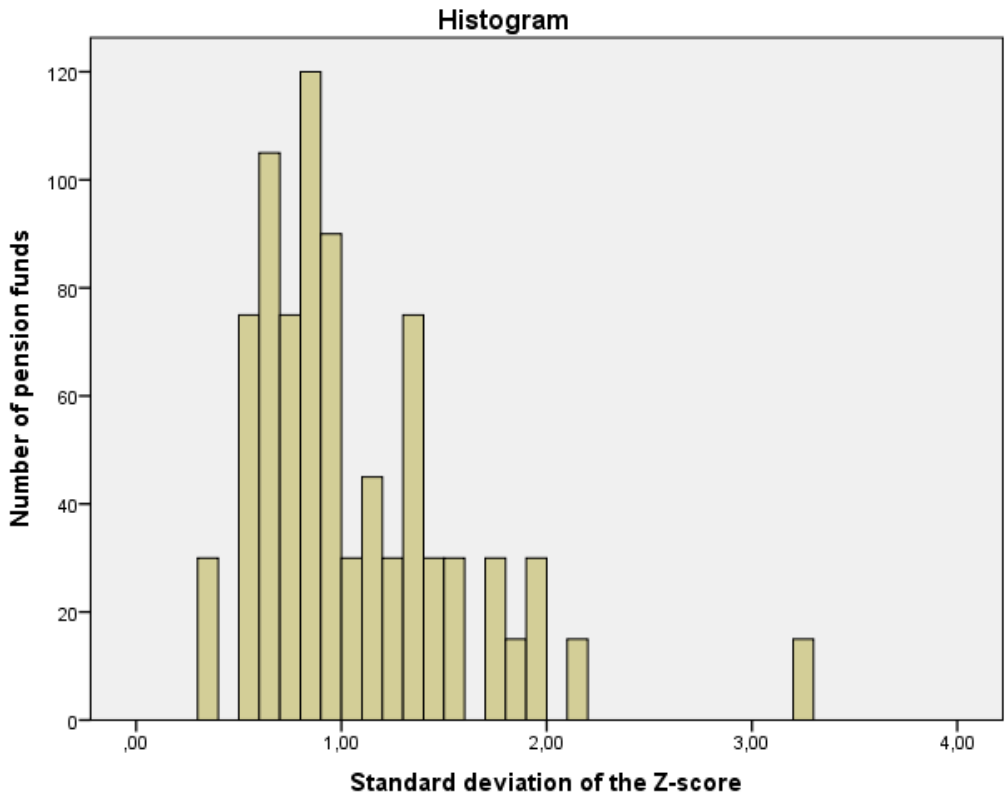

Figure 3-2 Histogram of the z-score SD

The data consist of approximately sixty pension funds. To execute a statistical test it is advised to have a minimum group size of fifteen. In Figure 3-2 the frequencies are shown of the standard deviation of the z-score. The picture shows that the distribution is not normally distributed. In appendix 3 the histogram of the means of the z-scores suggest a normal distribution, but the figure above shows that it is not. Most pension funds have a standard deviation of 1,50 or less. The pension funds with a larger standard deviation is smaller than fifteen. Since no groups can be identified and the group size should have a minimum of fifteen, the data is divided in three equal groups. The groups are created based on the standard deviation of the pension funds. This way the groups meet the minimal group size and at the same time there is a top group and a lower group. The objective is to look for differences in the SRI policy of funds and their size to determine if those variables influence the performance. To check if there are significant differences between these two groups a decision is made between a parametric test and a non-parametric test. A significant result means that an observed relationship is not coincidence.

A parametric test uses more data and is therefore more powerful than a non-parametric test. A non-parametric test on the other hand is distribution free and ranks the data in groups. Previous research that also used the z-score as performance indicator used a parametric t- test (Huang and Mahieu 2012). Assumptions for a parametric test are: independent groups, equal variance and the data has to be normally distributed. It is not certain that the groups are independent from each other, because many pension funds are managed by the same pension fund manager resulting in pension funds who are not totally independent. The second assumption that has to be met is the equal variance. A Levene's test is used to determine if it is reasonable to assume equal variance within the groups.

	1998	1999	2000	2001	2002	2003	2004	2005
Mean	,26	,29	,24	,07	-,90	,12	-,42	,33
Median	,14	,20	,28	-,08	-1,01	,04	-,40	,26
Maximum	2,25	3,43	1,71	3,84	,80	1,74	1,33	2,30
Minimum	-3,07	-1,22	-1,59	-2,30	-2,91	-1,14	-1,79	-,87
Std. Deviation	,89	,93	,69	,92	,80	,56	,57	,62
Skewness	-,39	,79	-,48	,76	-,25	,77	,18	1,17
Kurtosis	2,99	1,20	,93	4,31	,38	1,54	,58	1,89
Observations	59	59	60	62	62	67	69	59
Levene' s Test[a]	2,92*	2,75*	6,62***	1,17	6,66***	2,68*	,45	3,20**

a. (*), (**), (***) indicate respectively a significance at the 10%, 5% or 1% level.

	2006	2007	2008	2009	2010	2011	2012	Pooled
Mean	,30	-,24	-1,15	,49	,54	,11	,11	,00
Median	,12	-,25	-1,50	,43	,30	,08	,10	,00
Maximum	2,27	1,08	9,85	4,09	6,65	4,14	2,04	1,31
Minimum	-,58	-1,45	-5,60	-2,66	-2,51	-3,37	-6,34	-1,26
Std. Deviation	,54	,58	2,49	1,31	1,22	1,15	1,09	,33
Skewness	1,21	,27	1,66	,56	2,73	,63	-4,03	,67
Kurtosis	2,19	-,10	5,48	1,65	12,30	2,97	24,36	2,39
Observations	59	55	60	59	61	59	52	902
Levene' s Test[a]	,90	3,92**	6,23***	10,50***	9,58***	4,140**	3,59**	45,17***

a. (*), (**), (***) indicate respectively a significance at the 10%, 5% or 1% level.

Figure 3-3 Descriptive statistics of the z-scores from the Dutch industry-wide pension funds

The data that is used in this thesis is the z-score, in paragraph 3.3.1 there is more explained about this variable. The figure above shows that in the period of 1998-2006, with the exception of 2000, 2002 and 2005 the Levene's test is not significant with a 5% significance level. This means that may be assumed that there is equal variance in that period. In the period from 2007-2012 the results of the Levene's test are not significant at a 5% significance level. This means that for that period it may not be assumed there is equal variance. When all the data is aggregated the result is also significant and means that the assumption of equal variance is not met. The third assumption is to check if the data is normally distributed. The histogram of the z-scores, which can be found in the appendix, looks like a normal distribution. Only after calculating the skewness and the kurtosis of the data there must be concluded that this is not true. A normal distribution should have a skewness and a kurtosis of approximately one. In the figure above is shown that the data deviate from this. Therefor a non-parametric test is used to compare both groups on significant differences.

After the groups are made and tested for significant differences, using the non-parametric Mann-Whitney test, the influence of SRI and size will be explored. Significant differences show that results that are found are not random. This is also done with the Mann-Whitney test, because in this case the same assumptions are not met.

The Mann-Whitney rank sum (or Wilcoxon rank sum) test ranks all data from both groups from small to large. Subsequently every rank receives a number, these numbers are used in the formula. With exception of very small samples, who are smaller than seven, a z-test can be used to test the hypotheses. The formulas below are used for this calculation (De Veaux et al., 2008).

$$z = \frac{W - \mu W}{SD\ (W)} \qquad \mu W = \frac{n1(N+1)}{2} \qquad SD(W) = \sqrt{\frac{n1n2(N+1)}{12}}$$

Figure 3-4 Formulas for the Mann-Whitney rank sum test

To calculate the statistical z-score using the Mann-Whitney rank sum test all ranks of one group, in the formula n1, has to be summed up. This number is the letter W in the formula. The mean of W, in the formula μW, is calculated by multiplying the size of n1 with the total size, N, of both groups plus one divided by two. This number has to be subtracted from W. To calculate the z-score W minus μW has to be divided by the standard deviation of W, in the formula SD (W). This is calculated by taking the square root of the multiplication of n1 with the other group, in the formula n2, multiplied with the total size plus one divided by twelve.

3.2.2 Disclosure of SRI and size within the annual reports of Dutch Pension funds

Previous literature (Russo and Fouts 1997; Waddock and Graves 1997) used a regression analysis to determine the relation between CSR and CFP. A condition to perform a regression is that equal variance can be assumed (De Veaux et al., 2008). The Levene's test is used to determine if is justified to assume equal variance. The results of this test, as described in previous paragraph, are significant with a 5% significance level. This means that it may be assumed that there is now equal variance in these groups. Another condition for a regression is a minimum sample size of fifty. That data is available, but the available time for this thesis limits the number of annual reports that can be analyzed. Therefore a regression analyses will not be applied. The results of this thesis can therefore not be compared with previous literature.

A parametric t-test is preferred over a non-parametric Mann-Whitney rank sum test. However a t-test needs the condition of an equal variance. Besides the distribution is not normally distributed. Therefore to compare the data of both groups a non-parametric Mann-Whitney test is used. To test for correlation between the variables a Spearman's rho correlation test is used.

3.3 Data

In the previous paragraph is formulated which statistical tests are used and the variables required for this. These variables are the performance indicator z-score, a proxy for SRI and finally total assets and active participants for size. The z-score and the proxy for SRI will be further explained. In the first section is explained why is chosen for the z-score, what is meant with this variable and how the data is retrieved. In the second part is explained how the level of SRI is determined and also how the data is retrieved. The total assets and the active participants of a pension fund as measures for size do not need a lot of explanation and are therefore included in the second part.

3.3.1 Measuring performance with the z-score

Previous research also used the z-score as performance indicator. To compare the results of this study with previous research it is necessary to use the same variable. However In order to increase the robustness of the model, it is desirable that, in addition to the z-score, other performance indicators are used as well. Unfortunately, the z-score is the only indicator which is mandatory for all industry pension funds. This results in a lower availability of other variables and therefore the long-term performance can only be measured with the z-score.

The investment performance of the mandatory pension funds is tested annually. To do this a standardized nor was developed, the z-score. The z-score is the number that indicates the deviation of the real investment return a, by the industry-wide pension fund determined, predefined benchmark. Below the formula as defined by Huang and Mahieu (2012).

$$Zi,t = \frac{(Rp,i,t - Cp,i,t) - (Rb,i,t - Cb,i,t)}{Ei,t}$$

Figure 3-5 Formula for calculating the z-score

To calculate the z-score for pension fund i at time t the internal investment costs are deducted from the gross investment return . After that the result of the benchmark has to be subtracted from that. The result of this has to be divided by the risk of the portfolio mix, resulting in the z-score of the pension fund.

The calculation of the benchmark has great influence on the outcome of the z-score . The pension fund is responsible for a good benchmark . A pension fund therefore often relies on the advice of the pension fund manager . So a poor z-score does not automatically mean a bad investment performance , but can also be an indication that the benchmark is not set properly.

The data used are all from industry-wide pension funds , which are required by law to report a so-called z-score return on investment. The data is collected from the website of the pension federation.[1] This organization represented the interests of the Dutch pension funds. With the data available on this site is a dataset with z - scores of 1998-2012 compiled .

A nice way to get a good first impression of the data is using boxplots. The advantage of such plots is that you can place them side by side to compare multiple years. This way patterns can be recognized if there are any. Figure 3-6 displays the box plots of the z-scores per year. Before 2008 the boxes look a lot like each other and there are only a few outliers. In 2008 this changes and more extreme outliers appear, the boxes however keep their position around zero.

[1] http://www.pensioenfederatie.nl/services/kerncijfers/pages/default.aspx

In 2002 , 2004, 2007 and 2008, see the box plots shoot below zero. This can be explained by the financial events that took place. In 2002, investors lost confidence in the stock market , a result of the terrorist attacks of September the eleventh 2001 and corporate scandals such as Enron. In 2004 the mean z-score drops just below zero. A possible explanation could be the start of the war in Iraq in 2003. In late 2007 , the mortgage crisis began , which grew into a global crisis in 2008. Based on this boxplot is therefore chosen as the 2008 crisis year . Will be how the funds with high and low standard deviations perform in this year examined.

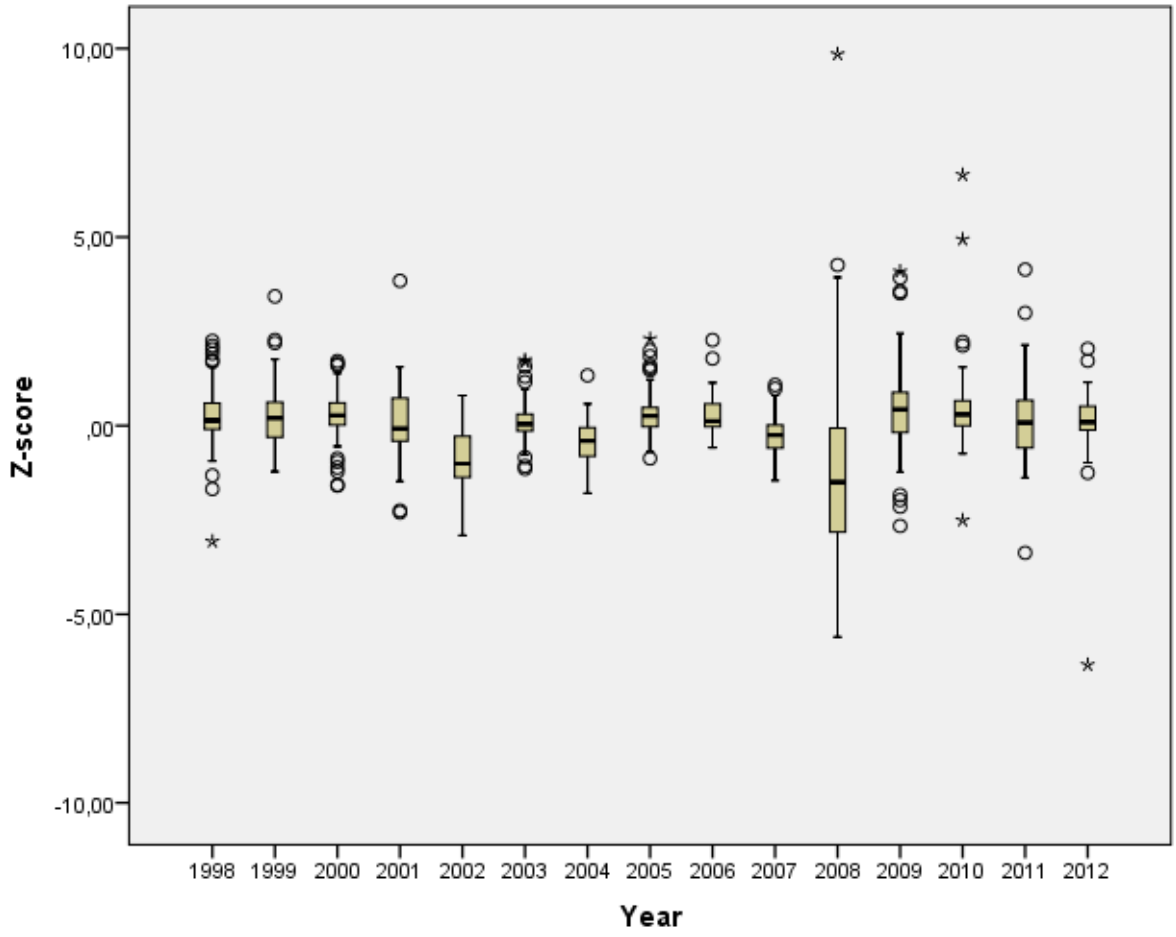

Figure 3-6 Boxplot of z-scores per year

3.3.2 Measuring socially responsible investments

There is no method available to determine the level of SRI and, since pension funds do not disclose how they invest, therefore a search for keywords in the annual reports of the pension funds will be done. This with the assumption that pension funds who invest in a social responsible way this also mention in their annual reports.

To compare the two groups on the information of SRI they mention in their annual reports, qualitative data has to be quantitated. In previous research (Scholtens 2006) used a matrix to determine SRI. Based on this research and additional literature a number of keywords are established. The annual reports of 2008 and 2010 will be checked for each pension fund for these keywords. These keywords are counted resulting in a total score which will represent the SRI-score of a pension fund. Almost all keywords are Dutch, because all pension funds are Dutch.

The keywords are: uitsluiten, screening, wapens, engagement, dialoog, stemmen, mensenrechten, milieu, corruptie, corporate governance, transparantie, maatschappelijk verantwoord beleggen, MVB, SRI, sustainable en duurzaam.

The translation of these words in English are: exclusion, screening, weapons, engagement, dialogue, voting, human rights, environment, corruption, corporate governance, transparency, social responsible investment, the Dutch acronym for SRI, SRI, sustainable and the Dutch translation for sustainable. Only the annual reports from 2008 and 2010 who are online available on the pension funds website are investigated. Earlier is mentioned that there is a possibility that some pension funds invest in the same way, because they are managed by the same pension fund manager. To check for the influence of the pension fund manager this also noted.

3.3.3 Measuring size with total assets and active participants

The influence of the size on the performance is investigated in the research Sievanen, Rita and Scholtens (2013). They measure size with total assets and with participants. In this study size is therefore also measure with total assets and with active participants. The data is retrieved from the analyzed annual reports.

4 Analysis

The previous chapter described which procedures are followed to answer the sub-questions. In this chapter, the results of these executed procedures are shown. The results are divided into three sections. The first part shows an overview of the performance, the retrieved SRI-score and the size of the pension funds. Subsequently the correlation between these variables is discussed. Finally the influence of SRI and size on the performance is tested.

4.1 Overview of the used data

Before making the correlation table and testing the influence of SRI and size on the performance of pension funds the required data is collected. In the first paragraph an overview of the performance indicator is shown. In the second paragraph an overview of the SRI-score and size per pension fund is given.

4.1.1 The performance of industry-wide pension funds

After merging all documents with the z- scores, retrieved from the Pension Federation, the standard deviation is calculated for every individual pension fund. Based on this created variable, the data is divided into three equal groups, resulting in a top and bottom group . In these two groups is checked if the 2008 Annual Report is online available . It has been observed that in the top group four annual reports were missing and in the bottom group ten. In the top group two funds merged until 2014 and in the bottom group five pension funds merged with other funds . This resulted in the following table.

	Industry-wide pension fund	Std. Dev. 1998-2012	z-score 2008	z-score 2010
Non-volatile performance	Bouwnijverheid	0,7	0,56	-0,41
	Detailhandel	0,4	-0,57	-0,14
	Dranken	0,58	-0,98	0,27
	Film- en Bioscoopbedrijf	0,65	-1,55	-0,08
	Reiswerk	0,67	-0,84	-0,16
	Grafische Bedrijven	0,62	-1,02	0,35
	Levensmiddelenbedrijf	0,34	-0,77	0,13
	Schoenmakerij	0,59	1,23	-0,09
	Slagersbedrijf	0,67	1,32	-0,24
	Tandtechniek	0,51	-0,49	0,12
	Wonen	0,52	-1,05	0,33
Volatile performance	ABP	1,16	-3,07	2,12
	Agrarische en Voedselvoorzieningshandel	1,3	-1,01	0,55
	Medewerkers Apotheken	1,24	-2,8	-0,23
	Bitumineuze Dakbedekkingsbedrijf	1,89	1,03	-2,51
	Herwinning Grondstoffen*	1,36	3,93	
	Groothandel in Levensmiddelen	1,53	-3,9	0,2
	Metalektro	1,21	-3,15	1,52
	Metaal en Techniek	1,42	-4,18	1,4
	Zorg en Welzijn	1,3	-2,18	0,91
	* Merged on 1 January 2010 with industry-wide pension fund Nederlandse Groothandel			

Figure 4-1 Industry-wide pension funds with non-volatile and volatile performance

Now it will be examined how these groups are performing through the years and how they relate to each other. A larger confidence interval of 90% is used, because of the small group size. The table below shows the significance levels per year. The mean ranks are attached in appendix eight. It shows that in 2000, 2001, 2002 and 2008, the top group has a higher z-scores than the bottom group . Looking at the financial events of those years it appears that there was crisis in those moments. In 2000 there was a technology bubble, the internet was the future and the shares of computer companies were given too much value. Eventually, the stock market collapsed and investors had huge investment losses. As discussed before, the terrorist attack of September the eleventh and securities fraud caused crisis in 2001 and 2002. In 2008, several factors led to a global crisis . With the exception of 2000 , these differences are significant. This shows that the top group outperform the bottom group during crisis.

Test Statistics[a]

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Mann-Whitney U	102,000	81,000	103,000	66,500	72,000	64,000	119,500	106,000	39,500
Wilcoxon W	207,000	186,000	293,000	256,500	262,000	184,000	239,500	226,000	159,500
Z	-1,129	-1,894	-1,093	-2,423	-2,222	-2,723	-,798	-1,266	-3,574
Asymp. Sig. (2-tailed)	,259	,058	,274	,015	,026	,006	,425	,205	,000
Exact Sig. [2*(1-tailed Sig.)]	,271[b]	,060[b]	,287[b]	,014[b]	,026[b]	,006[b]	,430[b]	,215[b]	,000[b]

a. Grouping Variable: Std. Dev. z-score

b. Not corrected for ties.

Test Statistics[a]

	2007	2008	2009	2010	2011	2012	Pooled 1998-2012
Mann-Whitney U	93,500	68,000	87,500	57,000	76,000	35,500	23103,000
Wilcoxon W	198,500	258,000	192,500	162,000	181,000	126,500	45894,000
Z	-1,013	-2,368	-1,463	-2,461	-1,266	-2,513	-3,713
Asymp. Sig. (2-tailed)	,311	,018	,144	,014	,206	,012	,000
Exact Sig. [2*(1-tailed Sig.)]	,316[b]	,017[b]	,145[b]	,013[b]	,217[b]	,010[b]	

a. Grouping Variable: Std. Dev. z-score

b. Not corrected for ties.

Figure 4-2 Performance difference between industry-wide pension funds over the years

4.1.2 Socially responsible investment and size within industry-wide pension funds

Figure 4-3 shows an overview of the SRI-scores, the pension fund managers, the total assets and the active participants per industry-wide pension fund. The first two columns show the end result of the word count of the SRI keywords. Appendix five and six show a detailed report of the word counts. A few pension funds do not outsource the management of their pension funds, but do this in-house. Often this is a separated group with a own board within the fund that focuses on the management of the pension fund.

	Industry-wide pension fund	SRI-score (2008)	SRI-score (2010)	Pension fund manager	Participants (2008)	Total assets* (2008)	Participants (2010)	Total assets* (2010)
Non-volatile performance	Bouwnijverheid	31	19	APG	237.590	24.488.529	208.884	29.718.359
	Detailhandel	30	8	Syntrus Achmea	239.714	7.178.855	249.703	9.093.045.000
	Dranken	3	11	Syntrus Achmea en F&C	4.418	303.003	4.274	389.219
	Film- en Bioscoopbedrijf	4	14	Syntrus Achmea en F&C	2.045	140.159	2.630	171.474
	Reiswerk	12	20	Syntrus Achmea	8.015	72.737	7.217	238.867
	Grafische Bedrijven	44	45	In-house	45.306	8.438.000	42.483	11.309.000
	Levensmiddelenbedrijf	11	35	Syntrus Achmea	67.106	1.539.229	75.465	2.111.898
	Schoenmakerij	8	8	Syntrus Achmea	1.660	82.566	1.756	150.297
	Slagersbedrijf	30	35	Syntrus Achmea	14.243	1.278.378	13.833	1.472.838
	Tandtechniek	28	44	Syntrus Achmea	3.993	440.062	4.069	538.082
	Wonen	27	37	Syntrus Achema	32.700	1.424.340	30.153	1.787.988
Volatile performance	ABP	69	40	APG	1.133.000	249.294.000	1.159.000	260.592.000
	Agrarische en Voedselvoorzieningshandel	16	19	Miscellaneous	18.029	519.228	17.540	634.595
	Medewerkers Apotheken	33	25	In-house	22.745	907.492	23.499	1.256.244
	Bitumineuze Dakbedekkingsbedrijf	16	14	APG	4.915	157.725	4.450	227.541
	Herwinning Grondstoffen**	7		AEGON	2.169	67.387		
	Groothandel in Levensmiddelen	6	7	Robeco	9.423	401.596	9.639	522.696
	Metalektro	27	27	MN Services	157.395	21.786	139.054	24.415.000
	Metaal en Techniek	27	20	Mn Services	424.940	31.112.000	17.730	38.496.000
	Zorg en Welzijn	100	92	PGGM	1.145.100	84.480.000	1.229.500	107.524.000

* In thousands of Euro
** Merged on 1 January 2010 with industry-wide pension fund Nederlandse Groothandel

Figure 4-3 SRI-score, pension fund manager and size per industry-wide pension fund

4.2 The correlation between size, socially responsible investments and performance

In the previous section a group that has a stable performance, called top group, and a group that has a unstable performance, called bottom group, have been formed. It has been shown that the bottom group usually outperform the top group. However, in times of crisis the top group outperforms the bottom group. This paragraph explorers the correlation between the variables. This table is made using Spearman 's rho correlations, a non -parametric correlation test. In the correlation table below shows, as already shown in previous research, a relationship between the size of a pension fund and the level of SRI. In addition, the table shows also that the performance depends on the pension fund manager. The relation between these variables is negative in 2008, but positive in 2010. Figure 4-3 shows that the top group mainly is managed by Syntrus Achmea. The negative correlation between SRI and the performance during the 2008 crisis is not significant. The positive correlation between SRI and the performance is however in 2010 significant. It strikes that, crisis or not, the relationship between size and SRI is positive. This suggests that large pension funds do not change their SRI policy because of the crisis. The relationship between size, SRI and performance are all negative in 2008 and positive in 2010. This suggest that small pension funds perform better during crisis.

	Std. Dev. pension funds	Z-score (2008)	Z-score (2010)	Participants (2008)	Total assets (2008)	Participants (2010)	Total assets (2010)	Pension fund manager	SRI-score (2008)	SRI-score (2010)
Std. Dev. pension funds	_____									
Z-score (2008)	-,291	_____								
Z-score (2010)	,119	-,712***	_____							
Participants (2008)	,087	-,484**	,461**	_____						
Total assets (2008)	-,083	-,274	,289	,785***	_____					
Participants (2010)	,065	-,318	,37	,951***	,716***	_____				
Total assets (2010)	-,001	-,321	,435*	,958***	,802***	,925***	_____			
Pension fund manager	,365	-,67**	,551**	,178	-,041	,079	,111	_____		
SRI-score 2008	,021	-,163	,135	,717***	,712***	,72***	,739***	-,035	_____	
SRI-score 2010	-,221	-,272	,389*	,5**	,53**	,454*	,455**	,071	,699***	_____

*(*), (**), (***) indicate significance levels at respectively 1%, 5% and 10%.*

Figure 4-4 Spearman's rho correlations

4.3 The influence of size and socially responsible investments on long-term performance

Previous chapter shows no significant differences between the long-term performance of a pension fund, measured with the standard deviation, and the other variables. This study started with the assumption that the statement that sustainable firms have a better long-term performance and perform better during crisis also applies to SRI. The begin of this chapter shows that the top group indeed performs better during crisis. The correlation table indicates no strong relationship between size and performance or between SRI and performance. In this paragraph this is checked with the Mann-Whitney test. In Figure 4-5 the mean ranks of both groups are shown. The bottom group has the highest mean rank, with the exception of the SRI-score of 2010.

Ranks

	Group	N	Mean Rank	Sum of Ranks
Active participants 2008	Top group	11	9,09	100,00
	Bottom group	9	12,22	110,00
	Total	20		
Total assets 2008	Top group	11	10,45	115,00
	Bottom group	9	10,56	95,00
	Total	20		
SRI-score 2008	Top group	11	9,82	108,00
	Bottom group	9	11,33	102,00
	Total	20		
Active participants 2010	Top group	11	8,73	96,00
	Bottom group	8	11,75	94,00
	Total	19		
Total assets 2010	Top group	11	9,00	99,00
	Bottom group	8	11,38	91,00
	Total	19		
SRI-score 2010	Top group	11	10,86	119,50
	Bottom group	9	10,06	90,50
	Total	20		

Figure 4-5 Mean ranks of size and SRI versus long-term performance

Figure 4-6 shows in the bottom row the p-values of the differences between stable and unstable performance for each variable. A significant difference means that the probability of errors are very small, in this study a significance level of 10% is used. This means that a difference is significant if the p-value is 0,10 or smaller. In this case there are no significant differences between the total assets, active participants and the long-term performance.

Test Statistics[a]

	Active participants 2008	Total assets 2008	SRI-score 2008	Active participants 2010	Total assets 2010	SRI-score 2010
Mann-Whitney U	34,000	49,000	42,000	30,000	33,000	45,500
Wilcoxon W	100,000	115,000	108,000	96,000	99,000	90,500
Z	-1,178	-,038	-,571	-1,156	-,908	-,304
Asymp. Sig. (2-tailed)	,239	,970	,568	,248	,364	,761
Exact Sig. [2*(1-tailed Sig.)]	,261[b]	1,000[b]	,603[b]	,272[b]	,395[b]	,766[b]

a. Grouping Variable: Group

b. Not corrected for ties.

Figure 4-6 P-values of the differences between stable and unstable performance

5 Conclusion

In this study the influence of SRI and size on Dutch industry-wide pension funds' performance is explored. In Figure 5-1 an overview with the correlations that are found in this study is shown. The variables are also mentioned in the table, because size is measured by total assets and with active participants and SRI is measured for 2008 and 2010. In particular, stable performance is important . A pension fund cannot afford not to withhold participants their retirement benefits, which they have accrued during their life. Through a stable performance can be better assessed what a participant can expect when they eventually retire . The results show that in times of crisis, the pension funds that perform stable outperform pension funds which have an unstable performance. During the 2008 crisis the size of a pension fund and the level of SRI have a negative impact on the performance of a pension fund. However, in 2010 the relationship between size and the level of SRI is positive.

Influence of	Variable	Stable performance	Z-score 2008	Z-score 2010
Size on performance	Total assets	-1% .997	-27,4% .243	43,5% .063
	Active participants	6,5% .792	-48.4% .031	37,0% .119
SRI on performance	SRI-score 2008	2,1% .930	-16,3% .493	38,9% .100
	SRI-score 2010	-22,1% .349		
Pension fund manager on performance	Pension fund manager	36,5% .124	-67,0% .002	55,1% .014
Size on SRI	Total assets		71,7% .000	45,5% .050
	Active participants		71,2% .000	45,4% .051

Figure 5-1 Overview with correlations

Besides looking at the impact of size and SRI on the performance of an industry-wide pension fund, also the relation between size and SRI is explored. Results show a strong relationship between these variables, with 71% in 2008 and 45% in 2010. In addition, the role of the pension fund manager is also investigated. The relation between the pension fund manager and the pension fund performance is reasonable large. The correlation between stable performance and their manager is 36.5%. The correlation for a single year is even higher; in 2008 and 2010 it was over fifty percent.

CONCLUSION

In the figure below an overview of the hypotheses that are developed in chapter two. Hypotheses H1A is partially confirmed. In the singular year 2010 a positive relationship was found, but in the singular year 2008 the relationship is negative. Therefore the hypotheses is partially confirmed. Hypotheses H1B and H1C are both not confirmed. The relationship between size and crisis seems negative. For the hypotheses H2A, H2B and H2C the same rules seems to apply as for size.

Hypotheses	Description	Confirmed
H1A	Size, measured by total assets and active participants, has a positive effect on the performance, measured by the z-score of a singular year.	Partially
H1B	Size, measured by total assets and active participants, has a positive effect on the long-term performance, measured by the standard deviation of the z-score.	Not
H1C	Size, measured by total assets and active participants, has a positive effect on the performance during crisis, measured by the z-score of the 2008 crisis.	Not
H2A	SRI, measured by a proxy, has a positive effect on the performance, measured by the z-score of a singular year.	Partially
H2B	SRI, measured by a proxy, has a positive effect on the long-term performance, measured by the standard deviation of the z-score.	Not
H2C	SRI, measured by a proxy, has a positive effect on the performance during crisis, measured by the z-score of the 2008 crisis.	Not

Figure 5-2 Overview of the hypotheses

6 Discussion

In previous chapter is amongst other things concluded that size and SRI do not influence the stable, long term, performance. In this chapter the interpretations of the results are discussed, these are divided into a theoretical and practical part. Subsequently the limitations are examined. Finally recommendations for future research are addressed.

6.1 Interpretations

This thesis confirms what Sievanen, Rita and Scholtens (2013) also found in their research, namely that there is a strong relationship between size and SRI within pension funds. The results show that in one separate year both size and SRI have influence on performance. During the 2008 crisis this relationship is negative and in 2010 this relationship is positive. A possible explanation for this phenomena is that small funds take less risk than larger pension funds, because they have less resources to compensate huge losses. This thesis also confirms the research of Huang and Mahieu (2012). They found that size influences the performance of one year, only this does not hold with a term of fifteen year.

Pension funds assumed that the positive relationship between CSR and CSF also applies for institutional investors. Many pension funds started with SRI after the 2008 crisis. This suggests that other variables cause the stable performance within industry-wide pension funds in the Netherlands. In this thesis the influence of size and SRI on stable performance is investigated. Results suggest that both barely have influence on stable performance. It is assumed that both size and the level of SRI did not change over time. Regarding SRI this is not the case, because, as mentioned before, many pension funds started after 2008 involve SRI policies. Besides SRI pension funds would be wise to search for more causes of stable performance.

6.2 Limitations

This paragraph discusses the limitations of this research and its results. These limitations are divided into three categories. First the limitations of the data is discussed, followed by de limitations of the method. Finally the results are discussed.

The groups, used in this thesis, are based on the standard deviation of the z-scores from 1998 to 2012. After 2008 many pension funds changed their investment policy and began to focus more on sustainable investments. It is possible that, because of that, the distribution between stable and unstable pension funds changed in the last five years. In addition before 2008 sustainable investments were not yet part of the investment policies of pension funds. This could mean that stable performance is not dependent on the level of SRI or that some pension funds already invest in a social responsible way. Another limitations on the z-score is that since January 2007 Dutch industry-wide pension funds can change their investment policy during the year. This might influence the outcome of the benchmark. These changes can result in a more stable z-score and ultimately influences the calculation of the standard deviations of the pension funds. Another limitations is that in this thesis is assumed that pension funds are heterogeneous, but this might not be the case looking at the pension fund managers. Almost all stable pension funds are managed by Syntrus Achmea and none of the unstable pension funds are managed by them. It is not known if in the period from 1998 to 2012 changes of the pension fund manager took place. This makes it difficult to draw conclusions about the influence of a pension fund manager.

A wrong measurement of the SRI variable could wrongly weaken or strength a relationship between variables. In this thesis is assumed that the level of SRI is directly related to the disclosure of this in the annual reports. It is possible that pension funds might report about a sustainable policy, because of their participants, but in reality not much concerned with SRI. This unreliability might lead to different results. For example this influences the strength of the relationship between SRI and size of a pension fund. This thesis uses also a limited number of variables, as performance indicator only the z-score and for the SRI

variable a self-made measurement is used. A major disadvantage of the z-score is that pension funds can determine for themselves the benchmark they use. Using only a few variables and only one method could cause that a certain relationship does not hold when measured with other variables.

In this research only a few pension funds are compared, making generalization difficult. The results are found within the industry-wide pension funds of the Netherlands and, because of the small scale, only applies to this group. The available data could have led to wrong conclusions. The 2008 annual report of some pension funds were not available anymore. Especially the lower group missed considerably data compared to the top group. It is possible that very poor performance in 2008 withhold pension funds to make that annual report any longer online available. These missing report could cause wrong conclusions for all industry-wide pension funds.

6.3 Future research

This research has a lot of possibilities for research in the future. It is important that in future pension funds will be able to pay the retirement benefits of their participants and compensate for inflation. Knowing the determinants of stable performance are crucial to realize this. The focus of the academic literature at the moment is persistence in performance. It is recommended for future research to find determinants for stable performance. As the results indicate it is likely that pension fund managers have an influence on the performance of pension funds. It is noticed that APG is both pension fund manager of ABP, a pension fund for government and education, and of Bouwnijverheid, a pension funds for employees in construction. However the performance of ABP is unstable and the performance of Bouwnijverheid is stable.

In this research the z-score is used as performance indicator and a self-made variable for SRI. In the chapter about the data is described how the z-score is calculated. The investment return is compared with a predefined return. This subjective element in the formula may lead to wrong conclusions. Its recommended to use multiple performance indicators in future research. Also the use of a universal method for determining the level of SRI of a pension fund is recommended. In this way a more robust result can be obtained.

During this research is discovered that the Association of Investors for Sustainable Development VBDO has developed a benchmark which measures the extent to which pension funds have a responsible investment policy and endeavor to put this policy into practice and disclose it. They called the benchmark: 'Benchmark Responsible Investment by Pension Funds in the Netherlands'. More and more industry-wide pension funds join the VBDO and are evaluated every year on their SRI policy and its implementation. The calculation of the scores are described in every report that is published. The association uses only data that is publicly available, like annual reports and information on websites.

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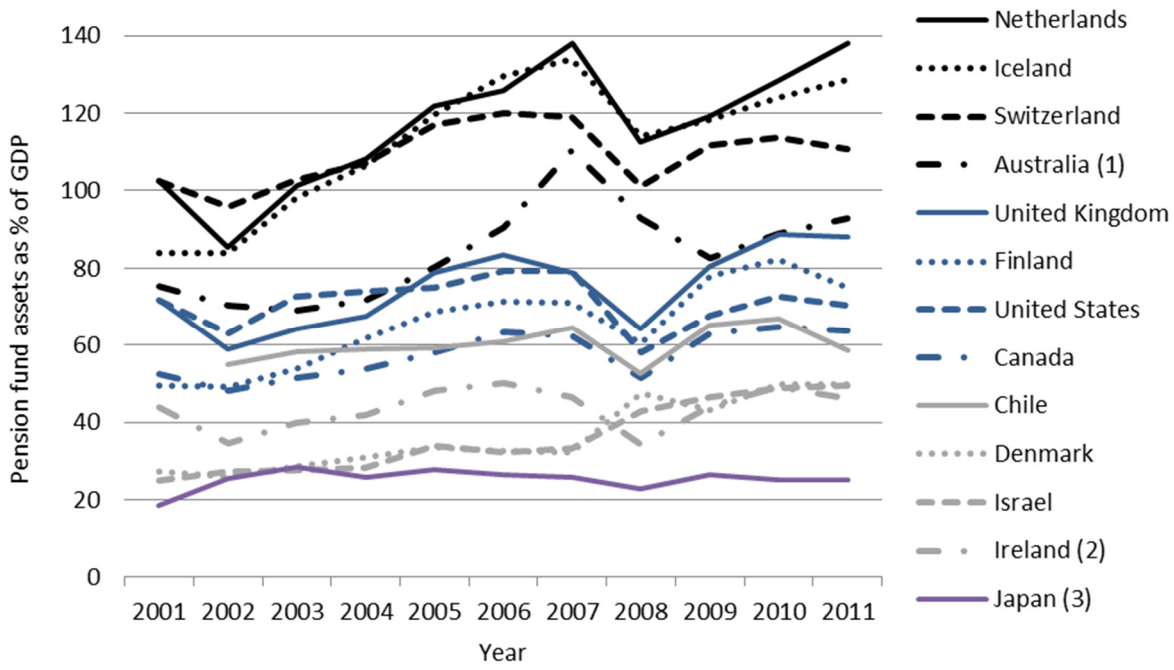
Appendix 1: Trends in pension fund assets

Trends in pension fund assets: OECD countries with mature markets, 2001-2011
As a percentage of GDP



1. Data refer to the end of June of each year.
2. Source: IAPF Pension Investment Survey.
3. Source: Bank of Japan.

Source: OECD Global Pension Statistics.

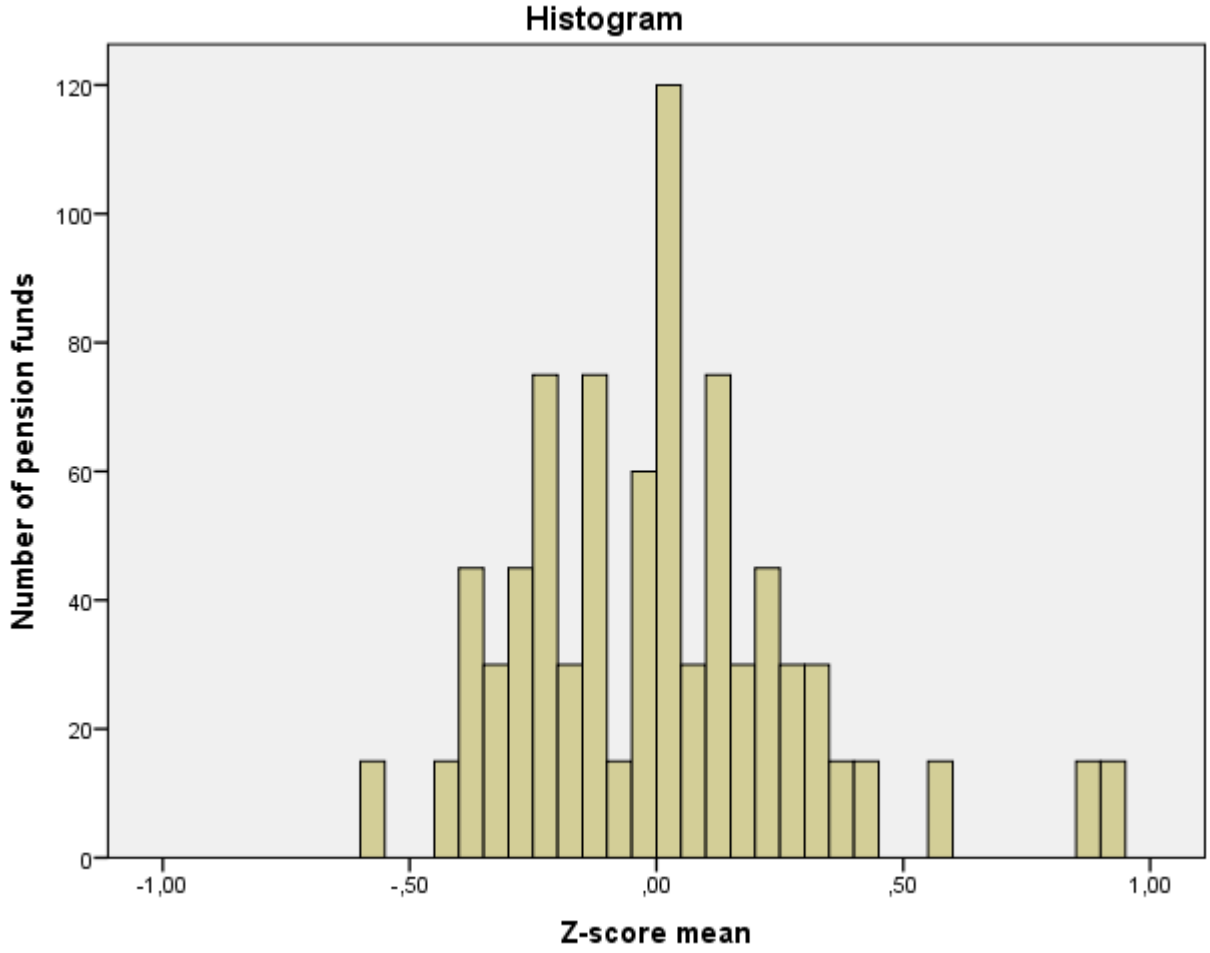
APPENDIX 2: MELBOURNE MERCER GLOBAL PENSION INDEX 2013

Appendix 2: Melbourne Mercer Global Pension Index 2013

Country	Overall Index Grade	Sub-Index Grades		
		Adequacy	Sustainability	Integrity
Australia	77.8	75.6	73.0	88.1
Brazil	52.8	63.3	26.0	73.6
Canada	67.9	72.4	57.9	74.5
Chile	66.4	58.6	65.6	79.9
China	47.1	61.1	28.9	50.0
Denmark	80.2	75.2	86.1	80.0
France	53.5	71.7	31.7	55.1
Germany	58.5	69.7	36.8	71.1
India	43.3	41.2	40.8	50.3
Indonesia	42.0	29.8	37.7	67.3
Japan	44.4	47.9	28.9	60.5
Korea (South)	43.8	43.7	41.0	47.9
Mexico	50.1	51.9	50.8	46.0
Netherlands	78.3	76.6	74.1	87.0
Poland	57.9	64.4	42.6	68.9
Singapore	66.5	59.0	67.5	77.2
Sweden	72.6	65.2	74.5	81.5
Switzerland	73.9	72.6	69.0	82.9
UK	65.4	68.2	48.0	85.4
USA	58.2	56.6	57.8	61.2
Average	**60.0**	**61.2**	**51.9**	**69.4**

Source: Melbourne Mercer Global Pension Index 2013

Appendix 3: Histogram of the mean z-score



Appendix 4: SPSS output: Spearman's rho correlations

Correlations

			Standard Deviation	Z-score 2008	Z-score 2010	Active participants 2008	Active participants 2010	Total assets 2008	Total assets 2010	Pension fund manager	SRI-score 2008	SRI-score 2010
Spearman's rho	Standard Deviation	Correlation Coefficient	1,000									
		Sig. (2-tailed)	.									
		N	20									
	Z-score 2008	Correlation Coefficient	-,291	1,000								
		Sig. (2-tailed)	,213	.								
		N	20	20								
	Z-score 2010	Correlation Coefficient	,119	-,712	1,000							
		Sig. (2-tailed)	,629	,001	.							
		N	19	19	19							
	Active participants 2008	Correlation Coefficient	,087	-,484	,461	1,000						
		Sig. (2-tailed)	,714	,031	,047	.						
		N	20	20	19	20						
	Active participants 2010	Correlation Coefficient	,065	-,318	,370	,951	1,000					
		Sig. (2-tailed)	,792	,185	,119	,000	.					
		N	19	19	19	19	19					
	Total assets 2008	Correlation Coefficient	-,083	-,274	,289	,785	,716	1,000				
		Sig. (2-tailed)	,729	,243	,229	,000	,001	.				
		N	20	20	19	20	19	20				
	Total assets 2010	Correlation Coefficient	-,001	-,321	,435	,958	,925	,802	1,000			
		Sig. (2-tailed)	,997	,180	,063	,000	,000	,000	.			
		N	19	19	19	19	19	19	19			
	Pension fund manager	Correlation Coefficient	,365	-,670	,551	,178	,079	-,041	,111	1,000		
		Sig. (2-tailed)	,124	,002	,014	,466	,749	,869	,651	.		
		N	19	19	19	19	19	19	19	19		
	SRI-score 2008	Correlation Coefficient	,021	-,163	,135	,717	,720	,712	,739	-,035	1,000	
		Sig. (2-tailed)	,930	,493	,583	,000	,001	,000	,000	,886	.	
		N	20	20	19	20	19	20	19	19	20	
	SRI-score 2010	Correlation Coefficient	-,221	-,272	,389	,500	,454	,530	,455	,071	,699	1,000
		Sig. (2-tailed)	,349	,246	,100	,025	,051	,016	,050	,774	,001	.
		N	20	20	19	20	19	20	19	19	20	20

Appendix 5: Calculation SRI-score 2008

	Industry-wide pension fund	SD	Pension fund manger 2008	Uitsluiten	Screening	Wapens	Engagement	Dialoog	Stemmen	Mensenrechten	Milieu	Corruptie	Corporate governance	Transparantie	Maatschappelijk verantwoord beleggen	MVB / SRI	Sustainable	Duurzaam	SRI-score
Non-volatile performance	Bouwnijverheid	0,7	APG and real estate by Bouwinvest					1	3	3	3		3	8	7	1		2	31
	Detailhandel	0,4	Syntrus Achmea			4	2		3	1	1	1	8	8	2				30
	Dranken	0,58	Syntrus Achmea and F&C				1							1	1				3
	Film- en Bioscoopbedrijf	0,65	Syntrus Achmea and F&C				1							2	1				4
	Reiswerk	0,67	Syntrus Achmea	1		1	1	1	1	1	1	1	1			3			12
	Grafische Bedrijven	0,62	Inhouse			3	1	3	4	1	3	1	3	10	5	5		5	44
	Levensmiddelenbedrijf	0,34	Syntrus Achmea						4				6			1			11
	Schoenmakerij	0,59	Syntrus Achmea							1	1	1	2	3					8
	Slagersbedrijf	0,67	Syntrus Achmea	1		4	3	2	4	2	2	2	6	1	2	1			30
	Tandtechniek	0,51	Syntrus Achmea	1		4	3	2	4	2	2	2	7	1					28
	Wonen	0,52	Syntrus Achema	1		4	3	2	4	2	2	2	6	1					27
Volatile performance	ABP	1,16	APG			1		15	2	10	16		8	6	1			10	69
	Agrarische en Voedselvoorzieningshandel	1,3	Miscellaneous				2	2	2	3	3		2	1				1	16
	Medewerkers Apotheken	1,24	Inhouse		1		6	1			2		2		3	12		6	33
	Bitumineuze Dakbedekkingsbedrijf	1,89	Cordares APG	1				1	3		1		4	1	3			2	16
	Herwinning Grondstoffen**	1,36	AEGON			1			1		1			1	3				7
	Groothandel in Levensmiddelen	1,53	Robeco											2				4	6
	Metalektro	1,21	Mn Services	1				4	4	2	3	1	1	4	6			1	27
	Metaal en Techniek	1,42	Mn Services			1		3	5	4	6	2	1	3	1			1	27
	Zorg en Welzijn	1,3	PGGM	1		5	22	7	13	8	12	1	6	13		3		9	100

Appendix 6: Calculation SRI-score 2010

	Industry-wide pension fund	SD	vermogensbeheerder 2010	Uitsluiten	Screening	Wapens	Engagement	Dialoog	Stemmen	Mensenrechten	Milieu	Corruptie	Corporate governance	Transparantie	Maatschappelijk verantwoord beleggen	MVB / SRI	Sustainable	Duurzaam	SRI-score
Non-volatile performance	Bouwnijverheid	0,7	APG and real estate by Bouwinvest			1		2	2		3		1	3	2			5	19
	Detailhandel	0,4	Syntrus Achmea			4								1		3			8
	Dranken	0,58	State Street Global, F&C and Synstrus Achmea			2	1							4	2		1	1	11
	Film- en Bioscoopbedrijf	0,65	Syntrus Achmea and F&C		2		3	1	1		2			2	2	1			14
	Reiswerk	0,67	Syntrus Achmea	1		5	2	2	2	1	2	1	3	1					20
	Grafische Bedrijven	0,62	Inhouse			6	1	4	4	1	3	1	3	3	7	5		7	45
	Levensmiddelenbedrijf	0,34	Syntrus Achmea	1		4	6	2	5	1	3	1	10	2					35
	Schoenmakerij	0,59	Syntrus Achmea						1	1	1	1	2	1				1	8
	Slagersbedrijf	0,67	Syntrus Achmea	1		6	5	2	6	1	3	1	7	1	2				35
	Tandtechniek	0,51	Syntrus Achmea	1		4	8	4	6	1	4	2	8	5				1	44
	Wonen	0,52	Syntrus Achema	1		4	5	2	7	1	3	1	10	3					37
Volatile performance	ABP	1,16	APG			2	1	1	2	3	7		1	16	2			5	40
	Agrarische en Voedselvoorzieningshandel	1,3	Miscellaneous				1	1	1	2	2		1	3	2	5	1		19
	Medewerkers Apotheken	1,24	Inhouse		1		2	1			2		1	2	2	9	2	3	25
	Bitumineuze Dakbedekkingsbedrijf	1,89	APG	1	1			1	2		1		3	3				2	14
	Herwinning Grondstoffen**	1,36																	
	Groothandel in Levensmiddelen	1,53	Robeco		1	2			1					1	1			1	7
	Metalektro	1,21	Mn Services				1	9	8		1			1	6			1	27
	Metaal en Techniek	1,42	Mn Services			4	1	4	3				2	5				1	20
	Zorg en Welzijn	1,3	PGGM	2		5	11	16	6	7	16		6	18		2		3	92

Appendix 7: New items mentioned in the introduction

Pressure on Israeli banks from investors intensifies

January 19, 2014 5:33 am By Madison Marriage

ABP, the world's third-largest pension fund, and two major European investors are reviewing their holdings in Israeli banks over concerns that the banks finance illegal Israeli settlements in Palestinian-occupied territories.

As well as ABP, the Dutch pension fund with €300bn of assets under management, the investors include Nordea Investment Management, a €130bn Scandinavian fund house, and DNB Asset Management, a €60bn Norwegian fund group.

All three want more information from the Israeli banks about their involvement in financing the settlements, which contravene international human rights laws established under the Fourth Geneva Convention in 2004.

A spokesperson for KLP, one of the biggest Norwegian pension funds, with €45bn of assets, also confirmed that "dilemmas linked to financing [of Israeli settlements] will be discussed at KLP".

Palestinians see the settlements as an obstacle to achieving a viable state, and most countries consider the settlements illegal.

The reviews come after PGGM, the second-largest Dutch pension fund, two weeks ago became the first big investor to dump its holdings in five large Israeli banks : Bank Hapoalim, Bank Leumi, First International Bank of Israel, Israel Discount Bank and Mizrahi Tefahot.

PGGM said in a statement: "Given the day-to-day reality and domestic legal framework they operate in, the banks have limited to no possibilities to end their involvement in the financing of settlements in the occupied Palestinian territories.

"Therefore it was concluded that engagement as a tool to bring about change will not be effective in this case."

ABP has held talks with three of the banks over the settlement issue for a year. The pension fund might exclude the stocks "as a last resort" if the banks fail to act on ABP's complaints, a spokesperson said.

Nordea Investment Management has sent letters to Leumi and Mizrahi "regarding concerns about the violation of international norms", Sasja Beslik, Nordea's head of responsible investment, told FTfm.

The Scandinavian fund house plans to meet these banks in March before taking a decision on whether to withdraw their investment at a committee meeting in May.

DNB Asset Management's external consultancy GES is engaging with several Israeli banks on this issue.

Israel Discount Bank declined to comment. Banks Hapoalim and Leumi did not respond to requests for comment.

Mr Beslik expects other large investors to start looking at their investment policies on the Israeli settlement matter shortly.

He said: "Very few asset managers have a policy [on this issue], which means that the banks are not under pressure regarding these violations. The pressure on asset owners to live up to their values when it comes to these issues will increase, I am certain about that." ING Investment Management, the fund arm of Dutch Bank ING, said that it has requested research on the settlement issue from an independent third party.

Retrieved from:
http://www.ft.com/cms/s/0/93c1c0f2-7f7e-11e3-94d2-00144feabdc0.html#axzz2zM1pzhlb
Date: 18 April 2014

APPENDIX 7: NEW ITEMS MENTIONED IN THE INTRODUCTION

Dutch pension group halts Wal-Mart investments, cites labor concerns

July 1 Mon Jul 1, 2013 5:12pm EDT

(Reuters) - Dutch pension administrator PGGM Vermogensbeheer B.V. said on Monday it would no longer invest in Wal-Mart Stores Inc, saying the retailer was not willing to discuss its concerns, including possible labor issues in the United States.

Wal-Mart, the world's largest retailer, declined to comment.

Wal-Mart "was not prepared" to take concerns about what PGGM called "tense" U.S. labor relations into consideration and its board was not willing to participate in "fruitful dialogues" with shareholders, PGGM said in a statement.

PGGM is a Zeist, Netherlands-based pension administrator focused on pensions of employees of the Dutch healthcare and social work sector. It manages more than 140 billion euros ($182.50 billion) in assets.

PGGM said that it met with Wal-Mart multiple times about the issues of concern. In 2012, it questioned the company about the Wal-Mart de Mexico, or Walmex, bribery scandal, "but these questions were left unanswered," it said.

Wal-Mart has been criticized by community and labor groups for what they perceive as low wages and unfair working conditions. Among the critics is OUR Walmart, a group of employees that says it is not trying to unionize but is part of the United Food and Commercial Workers International Union.

PGGM held 2.76 million shares of Wal-Mart as of March 31, according to Thomson Reuters data. Shares of Wal-Mart closed at $74.59 on Monday, making the investment worth roughly $205.87 million.

PGGM's other investments include U.S. retailers such as TJX Companies Inc, Target Corp, Bed Bath & Beyond Inc and Costco Wholesale Corp, according to Thomson Reuters data.

Wal-Mart's largest investor is the family of founder Sam Walton, which holds roughly 51 percent of the retailer's stock.

To see the fund's statement, click: (here) ($1 = 0.7671 euros) (Reporting by Jessica Wohl in Chicago; editing by Matthew Lewis)

Retrieved from:
http://www.reuters.com/article/2013/07/01/walmart-pensionfund-pggm-idUSL2N0F71PK20130701
Date: 18 April 2014

APPENDIX 7: NEW ITEMS MENTIONED IN THE INTRODUCTION

Dutch Pension Fund Blacklists Tobacco Companies

July 1, 2013, 8:50 a.m. ET By Lara Hilmarsdottir

AMSTERDAM--A Dutch pension fund said Monday it has sold its stakes in tobacco companies and put them on its investment blacklist amid child-labor allegations and concerns over worker conditions in the sector.

PFZW, a pension fund for health-care workers, said it shed some 600 million euros ($780 million) in stakes in several tobacco companies, including Malboro-maker Altria Group Inc. and British American Tobacco PLC (BATS.LN). The pension fund said it decided to sell the stakes after the companies failed to address its concerns about the alleged use of child labor and labor conditions in general. It also cited objections to the way the companies market and sell tobacco products to young people.

"Although smoking is a personal choice, we have always recognized and highlighted the associated problems," PFZW Chairman Peter Borgdorff said in a statement. "We could not come to any other conclusion other than that these investments are unsuitable for us."

Altria and British American Tobacco weren't immediately available for comment.

PFZW is the second-largest Dutch pension scheme with EUR135 billion in assets, of which around 27% is invested in stocks. In the past years, the fund has sold its stakes in makers of nuclear weapons and cluster bombs, and backlisted some companies for failing to comply with human rights and environmental standards.

Separately, PGGM, which manages the assets for PFZW and some other pension funds, said Monday it had scrapped Wal-Mart Stores Inc. (WMT) from its investment portfolio and it is selling its EUR200 million stake in the company. The investor said Wal-Mart failed to alleviate concerns about worker conditions in the U.S., adding that the retailer's board "was not willing to participate in fruitful dialogues with its shareholders."

Wal-Mart wasn't immediately available for comment.

Write to Lara Hilmarsdottir at lara.hilmarsdottir@dowjones.com

Retrieved from:
http://online.wsj.com/article/BT-CO-20130701-704601.html
Date: 18 April 2014

Appendix 8: Mean ranks of top and bottom group per year

Ranks

	Zscore_sd (Binned)	N	Mean Rank	Sum of Ranks
1998	Top group	14	14,79	207,00
	Bottom group	19	18,63	354,00
	Total	33		
1999	Top group	14	13,29	186,00
	Bottom group	19	19,74	375,00
	Total	33		
2000	Top group	14	19,14	268,00
	Bottom group	19	15,42	293,00
	Total	33		
2001	Top group	14	21,75	304,50
	Bottom group	19	13,50	256,50
	Total	33		
2002	Top group	14	21,36	299,00
	Bottom group	19	13,79	262,00
	Total	33		
2003	Top group	15	12,27	184,00
	Bottom group	19	21,63	411,00
	Total	34		
2004	Top group	15	15,97	239,50
	Bottom group	19	18,71	355,50
	Total	34		
2005	Top group	15	15,07	226,00
	Bottom group	19	19,42	369,00
	Total	34		
2006	Top group	15	10,63	159,50
	Bottom group	19	22,92	435,50
	Total	34		
2007	Top group	14	14,18	198,50
	Bottom group	17	17,50	297,50
	Total	31		
2008	Top group	14	21,64	303,00
	Bottom group	19	13,58	258,00
	Total	33		
2009	Top group	14	13,75	192,50
	Bottom group	18	18,64	335,50
	Total	32		
2010	Top group	14	11,57	162,00
	Bottom group	17	19,65	334,00
	Total	31		
2011	Top group	14	12,93	181,00
	Bottom group	15	16,93	254,00
	Total	29		
2012	Top group	13	9,73	126,50
	Bottom group	13	17,27	224,50
	Total	26		