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Does pension funds' fiduciary duty prohibit the integration of environmental responsibility criteria in investment processes? A realistic prudent investment test

By *Andreas G. F. Hoepner, Michael Rezec and Sebastian Siegl*

Abstract: Pension funds have recently developed an increasing interest in environmental, social or governance (ESG) criteria, but critics claim that the integration of any of these non-financial criteria into pension fund investment processes conflicts with fiduciary duties. On this matter, the 2005 Freshfields report concluded that pension funds' fiduciary duties (e.g. prudent action for proper purpose) only permit the consideration of an ESG criterion, if this process has no detrimental financial effects. While a body of research exists on the general relationship between ESG criteria and financial performance/risk management, no study has yet investigated the financial and risk implications of integrating any ESG criterion into an investment process from the perspective of pension funds, whose unique financial and legal characteristics require a specialised research design (e.g. a prudent, very large scale investment process). To study this effect, we develop a test of the prudent integration of ESG criteria in realistic and synthetic pension fund investment processes. We analyse over 1,500 firms from 26 developed countries over a 77 months period using aggregated and disaggregated corporate environmental responsibility ratings supplied by EIRIS. Our results are twofold. First, we find zero indications that the integration of aggregated or disaggregated corporate environmental responsibility ratings into pension fund investment processes has any detrimental financial effect. Second, findings from our risk analysis even support integrating corporate environmental criteria into pension fund investment processes, as the downside volatility is substantially lower. Robustness tests for temporal consistency and industry controls for sector bias confirm these findings. Hence, we conclude that pension funds' fiduciary duties do not appear to prohibit the integration of environmental responsibility criteria into their investment processes. Future research might want to investigate the effect of integrating other ESG criteria into a realistic prudent pension fund investment process.

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Does pension funds' fiduciary duty prohibit the integration of environmental responsibility criteria in investment processes?

A realistic prudent investment test

Andreas G. F. Hoepner[ab]*, Michael Rezec[a] & Sebastian Siegl[c]

[a] *School of Management, University of St Andrews, The Gateway, North Haugh, St Andrews, KY16 9RJ, UK;*
[b] *Principles for Responsible Investment, PRI Secretariat, c/o UN Global Compact, DC2-612, United Nations, New York, NY 10017, USA;*
[c] *School of Business and Economics, Abo Akademi University, Tuomiokirkontori 3, FI-20500 Turku, Finland*

Abstract:

Pension funds have recently developed an increasing interest in environmental, social or governance (ESG) criteria, but critics claim that the integration of any of these non-financial criteria into pension fund investment processes conflicts with fiduciary duties. On this matter, the 2005 Freshfields report concluded that pension funds' fiduciary duties (e.g. prudent action for proper purpose) only permit the consideration of an ESG criterion, if this process has no detrimental financial effects. While a body of research exists on the general relationship between ESG criteria and financial performance/risk management, no study has yet investigated the financial and risk implications of integrating any ESG criterion into an investment process from the perspective of pension funds, whose unique financial and legal characteristics require a specialised research design (e.g. a prudent, very large scale investment process). To study this effect, we develop a test of the prudent integration of ESG criteria in realistic and synthetic pension fund investment processes. We analyse over 1,500 firms from 26 developed countries over a 77 months period using aggregated and disaggregated corporate environmental responsibility ratings supplied by EIRIS. Our results are twofold. First, we find zero indications that the integration of aggregated or disaggregated corporate environmental responsibility ratings into pension fund investment processes has any detrimental financial effect. Second, findings from our risk analysis even support integrating corporate environmental criteria into pension fund investment processes, as the downside volatility is substantially lower. Robustness tests for temporal consistency and industry controls for sector bias confirm these findings. Hence, we conclude that pension funds' fiduciary duties do not appear to prohibit the integration of environmental responsibility criteria into their investment processes. Future research might want to investigate the effect of integrating other ESG criteria into a realistic prudent pension fund investment process.

Keywords: corporate environmental responsibility, environmental management, ESG investment, fiduciary duty, institutional investors, non-financial criteria, pension funds, responsible investment, socially responsible investing

1 Introduction

Pension funds have recently shown an increasing interest in considering environmental, social or governance (ESG) criteria in their investment processes (Cox et al., 2004; Cumming and Johan, 2007; Petersen and Vredenburg, 2009; Sievänen et al., 2013) Proponents argue that this practice has many advantages not only for pension funds but also for those economies, on whose financial wellbeing pension funds depend and whose citizens depend on pension funds. Their main argument is simple. Pension funds with their enormous investor power have the ability to ensure not only economic stability but also stable environmental, social and corporate governance conditions in those global economies, to which their internationally diversified portfolios are exposed. As a consequence, this stability allows these economies to flourish, which leads to healthy financial returns for pension funds (Clark and Hebb, 2005; Hawley and Williams, 2007; Sethi, 2005). Critiques, however, fear inappropriate political influence in pension fund decision making and exposure to financial risks. Especially, they argue that the integration of ESG criteria into pension fund investment processes *"subvert[s] .. a fiduciary's common law duty of undivided loyalty"* (Rounds, 2005: 76).

The conditions under which ESG consideration is permissible appeared hidden in a complex web of legislation until 2005, when a report by Freshfields Bruckhaus Deringer gained prominence for its precise analysis of these conditions. The report concludes that pension funds are legally required to consider an ESG criterion, if there is a clear consensus amongst beneficiaries in favor of this criterion or the criterion is believed to be financially beneficial. Pension funds may also voluntarily consider an ESG criterion in case it does no financial harm, but otherwise pension funds are legally prohibited from integrating any ESG criteria in their investment process (Freshfields Bruckhaus Deringer, 2005). This conclusion has become widely accepted (Gitman et al., 2009)

While the analysis and conclusions of the Freshfields report have provided a lot of conceptual clarity, the report did not represent a practical breakthrough as it left many practical uncertainties untouched (Collie and Myers, 2008; Freshfields Bruckhaus Deringer, 2005; OECD, 2007; Richardson, 2007, 2011; Sandberg, 2011; Taylor and Donald, 2007; Woods and Urwin, 2010). Furter, Sandberg argues that the Freshfields report does not call for much optimism, as it does not explain what type of ESG considerations can be made (Sandberg, 2011). Above all, the

majority of institutional investors continue to ignore ESG considerations (Sandberg, 2011; UNEP FI 2009; Woods 2009).

The possibly most important remaining uncertainty relates to the following research question:

> What are the financial and risk implications of ESG criteria consideration on a pension fund portfolio that complies with the legal duty of prudent action for proper purpose?

We analyse this question using the Freshfields report as a starting point and with a special emphasis on fiduciary duties, without a thorough analysis of other obstacles pension funds might encounter when considering ESG such as market short-termism or incentive structures (for example (Friends Provident Foundation, 2011; Lydenberg, 2009; Poerio et al., 2011)

This research question seems completely overlooked by two streams of literature. One stream conducted many quantitative studies of the relationship between ESG criteria and investment performance but ignored the pension fund perspective with its unique research design requirements resulting from pension funds' financial characteristics and legal duties (e.g. Kempf and Osthoff, 2007; Lo and Sheu, 2007; Scholtens, 2008; Scholtens and Zhou, 2008). Another stream provided detailed explorations of pension funds' fiduciary duties with respect to ESG criteria but did not undertake any empirical analysis of the financial implications of ESG integration (e.g. Martin, 2009; Richardson, 2009; Sandberg, 2011; Woods and Urwin, 2010). Hence, we consider this paper to represent the first attempt to bridge the gap between these two literature streams and investigate this relevant research question.

To analyse our research question, we develop a test of the prudent integration of any ESG criterion in realistic and synthetic pension fund investment processes. We ensure a prudent integration of ESG criteria by only using standard assets and investment transactions with a relatively low risk. The realistic nature of the pension fund investment processes derives from aspects such as their billion US$ size, their investment universe including 26 developed countries or our recent 77 months sample period ending in May 2010. We use corporate environmental responsibility ratings, which EIRIS currently also supplies to several large pension funds and many (very) large asset managers.[1] Our test compares the return and risk characteristics of 25

[1] While we design our realistic prudent investment test to be applicable to any ESG criteria, it is unfortunately beyond the scope of a single academic article to apply this test to a high number of environmental, social or governance criteria. The reason for this scope limitation lies in the need to provide a reliable, precise account of our

hypothetical pension fund portfolios with five different degrees of responsibility in five different corporate environmental responsibility criteria (one aggregated measure and four disaggregated measures). It appears very reliably, as our econometric analysis explains between 89% and 98% of any pension fund portfolio's return variations.

Our results provide zero indications that the integration of aggregated or disaggregated corporate environmental responsibility criteria into investment processes has detrimental financial performance effects for pension funds. More interestingly, we find evidence that corporate environmental responsibility criteria considerably reduces the downside risk of pension funds' financial performance. Related studies investigating the relationship between corporate social responsibility and financial risk support our findings. These studies collectively conclude that social irresponsibility carries a cost, unlike social responsibility which provides "insurance-like" protection of firm value against negative events (Godfrey et al., 2009; Jo and Harjoto, 2012; Jo and Na, 2012; Oikonomou et al., 2012).

Not a single portfolio with an average or above average degree of environmental responsibility underperforms its benchmarks at any common significant level. Robustness tests for temporal consistency confirm this finding. Only one portfolio comprising firms with weak environmental management systems displays a significantly negative abnormal financial performance. This individual observation implies that pension fund might in some cases even be able to avoid financial complications through integrating corporate environmental responsibility standards in their investment processes. In conclusion, we are confident to have found no evidence of a detrimental financial impact resulting from a consideration of environmental responsibility standards in pension fund investment processes. As a consequence, our results suggest that fiduciary duties or other legislation are not a constraint for the integration of corporate environmental responsibility standards into pension fund investment processes in any of the nine large jurisdictions studied by Freshfields and us (US, UK, Canada, Australia, Japan, Germany, France, Italy and Spain).

The subsequent text is structured as follows. Section two discusses legal interpretations of the relationship between pension funds, their fiduciary duty and ESG criteria to inform about the

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test design and especially our 26 country data sample to allow for replication of our analysis, which does not leave sufficient space for an analysis of various sets of environmental, social or governance criteria. Due to a recent public focus on problems of environmental damage, we select a set of corporate environmental responsibility criteria for our analysis in this article and expect future research to investigate other ESG criteria.

relevant background underlying the motivating of our research question. The third section develops the research design, the test of the prudent integration of ESG criteria in realistic pension fund investment processes. Section four analyses and interprets our test results before the last section concludes.

2 Background: Pension funds, fiduciary duty and ESG criteria

2.1 The debate on pension funds and ESG criteria

Historically, the use of non-financial criteria was solely a moral or religious statement and not an investment strategy (Bengtsson, 2008a, b; Richardson and Cragg, 2010; Sparkes and Cowton, 2004). Today's situation is quite different with the integration of environmental, social or governance (ESG) criteria in investment strategies increasingly attracting attention of a vast number of different institutions such as asset managers, pension funds, governmental or non-governmental organisations (Derwall et al., 2011; Emel, 2002; Gifford, 2010). The use of ESG criteria is more about augmenting investment returns(UNEP FI, 2009: 29).

As a consequence of this surge in attention and perceived potential, a heated debate emerged on the question, if ESG criteria represent relevant and appropriate considerations in investment processes of pension funds. Proponents usually argue along three lines. First, they suggest that, at least in some cases, the consideration of ESG criteria, especially ESG risks, simply represents a pension fund investment strategy that delivers stable returns (Clark and Hebb, 2005; Kiernan, 2007; Sethi, 2005). Second, proponents argue that pension funds and other institutional investors such as insurance companies have grown so enormously large in size over recent decades that they now jointly own the majority of all financial assets worldwide and deserve to be titled *'universal owner'*. Due to their sheer size, the financial performance of those universally owning pension funds will largely dependent on the performance of financial markets as a whole instead of the returns to individual assets. Hence, universal owners have an incentive to integrate any ESG criteria which affects the world economy into their investment processes instead of just considering those ESG criteria that individual corporations cannot externalise (Amalric, 2006; Hawley and Williams, 2000, 2007; Mattison et al., 2011; Thamotheram and Wildsmith, 2007). Third, some proponents consider it to be simply an implicit responsibility of pension funds to be concerned about the wellbeing of society and the natural environment and

hence integrate ESG factors in their investment approaches (Berry, 2011; Lydenberg, 2007; Richardson, 2009; Solomon, 2009).

Critiques of ESG criteria consideration by pension funds originate from a more extremely held view and are fewer in numbers than proponents, but as vocal as possible (Entine, 2005; Munnel and Sundén, 2005; Rounds, 2005). They also argue broadly along three lines, as they consider ESG integration (i) to represent an inappropriate political interference in pension funds' investment strategies, (ii) to be financially risky and (iii) to undermine the fiduciary duty of undivided loyalty (ibid.).

2.2 Legal interpretations of pension funds' fiduciary duty with respect to ESG criteria

As noted above, some critiques of ESG considerations claim that ESG is in conflict with pension fund trustees' legal obligations to invest in a prudent way.

Since many defined benefit pension schemes are facing deficits these days, the pension fund industry sees risk management as a top priority (Franzen D, 2010; McKillop D and Pogue M 2010). Consequently, the question of what impact ESG considerations might have on the financial risks and returns of a pension fund is of paramount importance. For example, CalPERS Global Principles of Accountable Corporate Governance states: "CalPERS believes that environmental, social, and governance issues can affect the performance of investment portfolios to varying degrees across companies, sectors, regions, and asset classes over time." (Mercer, 2011: ii; The California Public Employees' Retirement System (Calpers), 2010: 15)

While some regulatory changes concerning the fiduciary responsibility of pension funds in relation to ESG investment have taken place over the last decade in countries such as Australia, France, Germany or the UK, there is little evidence to suggest that the legal interpretation of the duties of (especially common law countries) pensions has dramatically changed (Dhaliwal et al., 2010; Freshfields Bruckhaus Deringer, 2005; Richardson, 2008, 2011; Richardson and Cragg, 2010; Sandberg, 2011; Sturm and Badde, 2001).[2]

According to the 'traditional interpretation' of pension funds' fiduciary duties, a pension fund should follow certain generally accepted principles such as utilizing diversification to achieve competitive risk-adjusted returns in accordance with the risk parameters specified in the

[2] We recognise recent calls for a re-interpretation of fiduciary obligations such as the one by Berry (2011) for Fair Pensions. However, the degree of their success remains to be seen.

investment policy. All decisions are to be made in good faith for the economic benefit of the beneficiaries (Berry, 2011; Freshfields Bruckhaus Deringer, 2005; Richardson, 2007). Recent KPMG reports encapsulate the traditional view in a straightforward way, whereby the fiduciary duties of institutional investors implicitly emphasize maximizing financial returns (KPMG, 2005, 2011).

Often, in a US context, The Employee Retirement Income Security Act of 1974 (ERISA) is mentioned since it was clarified in a 2008 US Department of Labor Bulletin, that ERISA prohibits investment decisions based on any factors other than economic (financial) ones (Interpretive Bulletin 2509.08-1). If nothing else, sound risk and return management over a portfolio is the focal point of ERISA (Richardson, 2008).

However, in Board of Trustees v. City of Baltimore, 1989 none of Baltimore City's three employee pension plan funds was allowed to remain invested in companies doing business in or with South Africa. While Baltimore City's Ordinance No.765 was challenged by the Board of Trustees of each pension plan on constitutional grounds, it was upheld by the court ("Board of Trustees of Employee Retirement System of the City of Baltimore v. City of Baltimore 317 Md.," 1989; Freshfields Bruckhaus Deringer, 2005; Richardson, 2008; Smith, 1990). This was, however, not the first example of US case law dealing with the use of ESG criteria. In 1978 the Associated Students of the University of Oregon challenged the opinion that divesting corporations operating in South Africa would violate Oregon's prudent investment rule (Richardson, 2008).

Today, more than a few large US pension funds subscribe to various methods of ESG investing such as CalPERS, or TIAA-CREF (Mercer, 2011; Richardson, 2008). The growing acceptance for responsible investment practices originates from a number of reports prompting increased investment values and decreased risks (Mercer, 2011).

Similarly, the UK view on pension fund's ESG consideration has moved beyond the traditional view held in the famed ("Cowan v. Scargill, 1 Ch. 270," 1985) where the purpose of a trust is seen as to act in the "best interests" of the beneficiaries, which has been translated into best financial interests (Thornton and Fleming, 2011).

Freshfields Bruckhaus Deringer, for example, argues that Cowan v. Scargill is widely misinterpreted, whereby investment decision makers have come to believe that they are required to maximise financial goals in each individual investment. Additionally, Freshfields Brukhaus

Deringer contend that the profit-maximisation approach commonly said to characterise Cowan v. Scargill is questionable, and that the duty is to implement an investment strategy which incorporates risk and return objectives suitable to the trust (Freshfields Bruckhaus Deringer, 2005). For example, our analysis in this paper shows that even naive contemporaneous ESG investment strategies are capable of achieving this goal without breaching trustees' fiduciary duties.

Another famous UK court case on ESG investing is Harries v. Church Commissioners in which the court emphasised the trustees' obligation to abide by the purpose of the trust ("Harries v Church Commissioners 1 WLR at 1247," 1992; Freshfields Bruckhaus Deringer, 2005). Further, the Charity commission, supervising charities under the 1993 UK charities act, has made it clear that charities shall only aim to invest for best possible financial results, as long as it advances the organisation's charitable purpose (CharityCommission, 2011; Freshfields Bruckhaus Deringer, 2005; Richardson, 2008).

Martin v. Edinburgh (City) District Council, 1988 is another UK case. According to Richardson (2008) this case shows that a UK court interpreted the duty of loyalty as to seek a reasonable rate of return not as to maximize financial returns. However, Penner (2012) notes that the decision to disinvest companies with South African interests was found to be a breach of trust, due to the fact that the disinvestment was made without considering the best financial interests of the beneficiaries. Thornton and Fleming (2011: 52) brings the discussion together by stating "...the fundamental duty of pension fund trustees must be the proper fiscal management of the fund to provide reasonable returns to the benficiaries" (ibid.).

As long as the overriding objective (sound fiscal management) is adhered to, ESG considerations are acceptable (while some would argue in fact that ESG consideration would be a criteria for sound fiscal management). This standard is noticeable in the so called 'tie-break' principle by which a pension fund trustee has the power to select an investment over another based on environmental or social considerations when the investments are expected to have the same financial benefits (Baker and Nofsinger, 2012; Freshfields Bruckhaus Deringer, 2005; PensionsRegulator, 2007).

Finally, on the topic of fiduciary duty in the UK, The Companies Act 2006 has obligated corporate directors to include community and environmental interests in their decision process.

According to section 172 the long-term success of a company, called 'enlightened shareholder value' should be pursued (Richardson, 2008; Thornton and Fleming, 2011; UNEP FI, 2009).

The legal situation is even less elaborated in other major economies such as Australia and Canada. Due to lacking case law on fiduciary duties of pension fund trustees in relation to ESG investing in these countries, UK case law tends to guide Australian and Canadian courts (Freshfields Bruckhaus Deringer, 2005). Particularly, the widely misinterpreted Cowan v. Scargill case is heavily relied upon. One example of continuing misinterpretation of fiduciary duties in general, and Cowan v. Scargill in particular, can be found in Australia's largest industry pension fund, Australian Superannuation Fund. The pension fund's ESG investment beliefs state "Our fiduciary duty to members is critical. Appropriate ESG investment activities will be explored, but will not be undertaken at the expense of its fiduciary duty." (Australian Super, 2013; Financial Services Institute of Australasia, 2012). The funds' investment philosophy implicitly mirrors the profit maximisation intent and highlights that ESG integration may be costly (or perceived as an expense).

Furthermore, in Australia there is a so called “sole purpose test”, stating that a trustee of a superannuation is obliged to ensure that the fund is managed solely in order to provide monetary benefits to members, and a portfolio should be characterized by sound risk and return objectives (Freshfields Bruckhaus Deringer, 2005; Richardson, 2008). Nevertheless, critics argue that the sole purpose test of fiduciary duty, which constitutes the duty of loyalty, takes a narrow focus on solely maximising financial benefits to beneficiaries, thus, encouraging investments in highly unethical investment opportunities because of their potential rewards (Gray, 2012). Further, critics perceive the sole purpose test as major barrier to ESG adoption (Freshfields Bruckhaus Deringer, 2005). However, according to Keith Johnson, in a commentary to Gray (2012: 18), this is a "popular misconception about fiduciary duty for at least two reasons. First, he argues that fiduciaries are required by law to ensure a sustainable balance between short- and long-term risks and returns. Second, fiduciary duties, including the sole purpose test are dynamic fiduciary laws (evolved and re-interpreted over time) with the purpose of guiding rather than prescribing trustees' investment decisions (Hawley et al., 2011). More recently, proponents of the sole purpose test conclude that it is not seen as a major barrier to ESG integration, however, calls for more guidance on how to integrate ESG issues, from institutions such as the Australian Prudential Regulation Authority (APRA), have been voiced (Carlisle, 2011).

Although, Canadian legislation on ESG investing is rather rare, some regional developments in the provinces of Manitoba and Ontario are noteworthy. For example, amendments have been made to Manitoba's Trustee Act in 1995 and Pension Benefits Amendment Act, 2005, enabling trustees to lawfully consider non-financial criteria as long as the trustees exercises the judgment and care that a prudent person would do (Manitoba Law Reform Commission, 1993). As long as trustees demonstrate duty of care, investment decisions can be based on non-financial factors such as ESG criteria (Richardson, 2008). Similarly, in the province of Ontario, "Ethical" investing is permitted, if the positions are disclosed in the funds' statement of investment policies (SIP) and clearly communicated to the members of the plan (Financial Services Commission of Ontario, 1992; Richardson, 2008).

Furthermore, Ontario was the first Canadian province to enforce the South African Trust Investments Act in 1990 with the aim of discouraging Ontarian trusts, charities, and pension funds from making investments in companies with ties to the Apartheid system.

Despite country-wide legislation in Canada still being in its infancy, calls for increased disclosure on ESG concerns by pension funds and other financial institutions remain high. For example, a recent report urges Canadian pension funds to disclose, a) the degree to which ESG information is utilised in investment decisions, b) how this information is considered in proxy voting and corporate engagement activities, c) proxy voting activities (National Round Table on the Environment and the Economy, 2007). Other Canadian legislation, such as, Canada's Bank Act, S.C. 1991, however calls for, among other things, adequate portfolio diversification (Richardson, 2008).

After reviewing landmark legal cases on fiduciary duties of pension funds in common law countries in the last decade,[3] we come to conclude that several regulatory changes support a development towards increased flexibility, sustainability, and transparency.

However, while there seems to be increasing advocacy for considering ESG issues in pension funds from a legal perspective, acts and initiatives are rather vague and it is far from clear how pension funds can actively integrate ESG criteria in a sensible way, without compromising their duty to act in the best interest of their beneficiaries. From a practical perspective, we see strict

[3] For a comprehensive review of fiduciary duties related to ESG investing in civil law countries the reader is referred to the Freshfields Report (Freshfields Bruckhaus Deringer, 2005). There may have been further legal developments in civil law countries since its first publication in 2005.

negative screening (promoted by the widely misinterpreted Cowan v. Scargill case) as major barrier to advance the topic. Thus, we advise pension funds to implement contemporaneous ESG investment strategies, many of which already incorporate corporate governance and related concerns into investment processes, as these are less likely to compromise fiduciary duties.

While pension fund legislation in the largest developed economies based on civil law (France, Germany, Italy, Japan, Spain) is possibly a little more open to ESG considerations than its common law counterparts, it can be barely interpreted to include any meaningful support of pension funds' ESG integration. As the traditional interpretation of pension funds legal duties is problematic for proponents of pension funds' ESG consideration especially in common law countries and foremost in the US, we limit our legal analysis to common law countries.[4]

2.3 Remaining uncertainties for pension funds

Several authors have subsequently discussed this conclusion and raised many relevant contextual factors which should be included in any interpretation of the results of the Freshfields report (Collie and Myers, 2008; OECD, 2007; Richardson, 2007, 2011; Sandberg, 2011; Taylor and Donald, 2007; Woods and Urwin, 2010). These contextual factors highlight the lack of conceptual and especially practical guidance for pension fund decision makers in assessing (i) a possible consensus amongst their beneficiaries on ESG considerations, (ii) the financial impact of ESG considerations on their portfolios and (iii) the relevance of possible ESG considerations compared to other (economic) considerations. This lack of guidance is particularly problematic, since pension fund decision makers have to conduct these rather complex assessments in a manner that complies with their fiduciary duty to act prudent with specialised skill, knowledge and proper advice in the best interest of their beneficiaries. In short, the Freshfields report can be argued to have a high conceptual value, but it did not represent a practical breakthrough for pension funds, as it left three crucial uncertainties unaddressed:

(1) How to assess a possible consensus amongst beneficiaries on ESG considerations while complying with the legal duty to act prudently and for proper purpose?

[4] It should be noted though that a few countries exist worldwide, whose pension funds legislation includes (some) support of the integration of ESG criteria in pension fund investment processes. Examples are the Netherlands and Sweden (Freshfields Bruckhaus Deringer, 2005; Hamilton and Eriksson, 2011; Renneboog et al., 2008b).

(2) What is the financial impact of integrating ESG considerations in pension fund investment processes while complying with the legal duty to act prudently and for proper purpose?

(3) How to weight possible ESG considerations against other (economic) considerations, while complying with the legal duty to act prudently and for proper purpose?

A lack of clarification on crucial uncertainties tends to result in conservative decision making by pension funds for three reasons. First, fiduciary duty requires pension fund decision makers to act prudently and thereby instructs them to avoid uncertainties. Hence, a lack of guidance usually leads to a status quo bias in pension fund decision making. Second, pension funds are requested to take advice from consultants, whose role Monks (2007) describes as mainly legal liability protection with a highly problematic economic value added. Consultants, whose expertise lies possibly less in providing valuable investment information but more in offering a legal firewall, have any incentive to advise pension funds to stay away from uncertainties. Third, pension fund trustees have no personal economic incentive to explore uncertainties and therefore tend to prefer minimalist and risk averse investment strategies (Martin, 2009; Monks, 2007; Richardson, 2007; UNEP FI, 2009).

Some pension funds might be comfortable to address the first uncertainty (prudent assessment of consensus amongst beneficiaries) by means of an institutionalised survey or election mechanism. Many pension funds might currently be less concerned about the third uncertainty (prudent weighting of considerations), which is simply of less immediate nature, as it depends on the former two. However, the second uncertainty about the prudent assessment of the financial impact of ESG considerations appears especially problematic, since few pension fund decision makers or consultants are likely comfortable to bear the risk of a law suit for imprudent ESG integration following a poor performance of an ESG criteria considering investment approach.

As a community, researchers interested in ESG investments have the training, resources and skill to generate empirical evidence mitigating or even removing this uncertainty. A rich body of literature on the impact of ESG criteria on investment return and more recently risk

performance exists to date (e.g. Bauer et al., 2005; Kempf and Osthoff, 2007; Lee and Faff, 2009; Lo and Sheu, 2007; Renneboog et al., 2008b; Scholtens, 2008; Scholtens and Zhou, 2008)

However, these studies are usually conducted from a mutual fund perspective. Some studies have qualitatively explored pension funds' fiduciary duty with respect to ESG criteria (e.g. Martin, 2009; Richardson, 2009; Sandberg, 2011; Woods and Urwin, 2010). However, we are not aware of a single quantitative study on the financial impact of ESG integration, which takes the perspective of pension funds in general or a prudent pension fund investment process in specific. Equivalently, we do not know a single analysis of pension funds' fiduciary duty which empirically investigates the question of the financial impact of integrating ESG criteria in a prudent pension fund investment process. Hence, we believe to be the first to address this question. With our analysis, we aim to (substantially) mitigate the uncertainty perceived by pension fund decision makers and consultants regarding the financial impact of integrating environmental, social or governance criteria into a pension fund investment process that complies with the legal duty to act prudently and for proper purpose.

3 Research Design: A realistic prudent pension fund investment test

3.1 Rationale for Research Design

To address our research question, we develop a realistic and prudent test of the financial impact of the integration of ESG criteria into Defined Benefit (DB) and Defined Contribution (DC) pension fund equity investment strategies.[5] Although, our test applies more to DB pension plan types, due to their different underlying liabilities, ESG integration can also benefit DC pension plans (Sievänen et al., 2013). We limit our test to equity investment strategies for three reasons.

[5] Our 25 hypothetical pension fund portfolios appear to be imitating one of four basic pension fund models established in Clark (2000). This type of pension fund is large and internally managed, and thus most commonly associated with defined benefit plans. We therefore implicitly assume that we integrate social responsibility criteria into DB pension funds' investment processes.
Sievänen et al.(2013), however, recently determined that the type of pension plan is not a substantial driver of social responsibility in the European pension fund market. Based on their findings, it seems plausible to argue that our analysis is not only relevant for DB, but also DC and other hybrid pension fund models. While we aim to integrate sustainability criteria in all pension scheme types, we are aware of the different underlying liabilities of defined benefit (DB) and defined contribution (DC) pension schemes. As DB plans are currently facing enormous deficits, i.e. have larger liabilities than assets, risk management has become a top priority besides investment performance (Franzen, 2010; McKillop and Pogue, 2010). In the DC pension environment the main source of risk is the investment performance of the pension portfolio over the working life of an employee (Baker et al., 2004). Therefore, our empirical analysis focuses on both underlying risks, the investment performance and risk management component to address DB and DC underlying risks.

First, motivating, developing and analysing realistic and prudent tests of large and potentially complex pension fund portfolio processes for multiple asset classes is simply beyond the scope of an individual article.

Second, equities and fixed income are by far the largest asset classes in international pension fund portfolios (58.63 and 31.21 percent, respectively), and jointly represent the vast majority of all pension funds' assets (Aglietta et al., 2012; Ferreira and Matos, 2008; OECD, 2010). Third, the integration of ESG criteria into investment portfolios is, from a financial performance perspective, criticised much more for equities than for fixed income which appears to be relatively compatible with the consideration of ESG risk factors (Derwall and Koedijk, 2009; Geczy et al., 2005; Menz, 2010; Munnel and Sundén, 2005)

In designing our test, we put special emphasis on two aims. First, we aim to embed our test in doubtlessly prudent investment process to comply with the legal duty of prudence. With this ambition, we follow in the footsteps of three of the founding fathers of ESG investment, who aimed to outline an *"investment policy ... [that] is legally justifiable as a sophisticated attempt to maximise .. economic return[...] and therefore need not be defended - and cannot be attacked - as a social pursuit"* (Simon et al., 1972: 137). To develop a doubtlessly prudent investment process, we select the prudent (conservative) option whenever we have any discretion on any aspect of the investment process (e.g. we use long only investment and do not engage in complex and potentially risky financial engineering products). Our prudent investment approach is motivated by recent findings on pension fund investor sophistication and rationality. Dreu and Bikker (2012) find varying degrees of investor sophistication across pension funds. They establish that pension funds with low investment expertise tend to be more risk-averse. Generally, pension funds' investment policies signal investor (un)sophistication by rounding asset allocations to multiples of five percent, investing little to nothing in complex asset classes and favouring home markets. Additionally, Clark (2010, 2012) argues that individuals (including pension fund managers, but possibly to a lesser extent) are exposed to "self-defeating", or behavioural biases that strongly influence decision-making in a non-optimal manner.

Second, we aim to embed our test in a realistic and generic pension fund investment process, which can be customised according to any asset manager's investment style preferences, to achieve a high practical value for our results and therefore (substantially) reduce the

uncertainties of real pension fund decision makers.[6] Indeed, our aim appears in line with a recent trend towards increased practical relevance not only in business ethics journals but more generally in research published across numerous journals which investigates the relation between ESG factors and various aspects of business (e.g. Clark, 2012; Clark and Monk, 2011; Clark et al., 2008; Clark and Urwin, 2008; Figge and Hahn, 2004; Martin, 2009; Nilsson et al., 2008; Thamotheram and Wildsmith, 2007; Thomas et al., 2007; Woods and Urwin, 2010).

Technically, we develop our test by making research design choices on six aspects: (i) investment universe, (ii) portfolio construction, (iii) ESG integration, (iv) ESG data provider, (v) ESG criteria, and (vi) financial performance assessment.

3.2 Investment universe, portfolio construction and ESG integration

We select stocks listed in the world's developed economies as investment universe, since equity investments in emerging markets might be perceived as imprudent due to higher risks. Since we aim to nest our test in a doubtlessly prudent investment process, we limit ourselves to constructing long only portfolios and prohibit more complex and potentially risky transactions such as short selling or derivatives.[7] Similarly, to ensure prudent diversification, we value-weight all equities in our portfolios and prohibit other approaches such as equal- weighting.[8]

To realistically and prudently integrate ESG criteria into pension fund investment processes, we define three objectives: First, we need to construct portfolios which reflect the enormous size of large pension funds and hence hold assets worth at least several billion US$

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[6] In this ambition, we are inspired by Young (2007: 1), who assumes that *"[t]he challenge for business ethics is not so much enunciating the unyielding call of moral perfection but rather providing practical wisdom relevant to the needs of business decision-makers."*

[7] Besides our concern for a doubtlessly prudent investment process, this research design practice acknowledges that some jurisdictions limit the types of assets selectable by pension funds and even the practice of loaning out pension fund shares to allow other financial market participants to short sell these is under close scrutiny from regulators, who are concerned about the effect of the resulting downward market pressure on the pension funds' and the economy's long term financial performance. Besides this legislative restrictions or reservations, most pension funds are simply far too large to engage in less liquid trading activities at reasonable transaction costs or reasonable negative price impacts due to personal trading. For instance, the sheer size of a lot of pension funds prevents them from many short selling activities, as there are simply no market participants to lend them a meaningful number of shares given the size of their portfolios (Financial Services Authority, 2002; Freshfields Bruckhaus Deringer, 2005; OECD, 2010)

[8] This research design choice also simply recognizes the gigantic size of many pension funds. Having tens and sometimes even hundreds of billions US$ assets under management (Ferreira and Matos, 2008; OECD, 2010; Thamotheram and Wildsmith, 2007), these pension funds can unlikely equal- weight their entire portfolio without potentially affecting market prices themselves as consequence of their asset re-allocation. If we permitted equal-weighting, this scenario would represent a possibly substantial bias of our results.

(Ferreira and Matos, 2008; OECD, 2010; Thamotheram and Wildsmith, 2007). Second, we aim to integrate ESG criteria into baseline pension fund portfolios, which asset managers can subsequently customise in any way according to investment style preferences (e.g. in terms of country, industry or small cap exposure). This aim allows our research design to isolate the effect of ESG integration from effects of other investment style choices.[9] Third, to prudently integrating ESG criteria in pension fund investment processes, we require a very simple integration approach which does not constrain portfolio diversification.

We meet these objectives by simply dividing our very large developed country investment universe in several, still very large, sub-universes according to the constituents' ESG ratings. For instance, we group all firms with the worst ESG rating in one portfolio, all firms with the second worst ESG rating in another portfolio and so on. In essence, we are creating prudent equity investment portfolios with different ESG ratings for hypothetical pension funds and study their monthly returns to inform our research question about the financial impact of ESG integration on pension fund portfolios. This portfolio construction approach is inspired by Gompers et al. (2003) and recently common practice in the ESG Finance literature (Bebchuk et al., 2009; Edmans, 2011; Kempf and Osthoff, 2007). We illustrate our portfolio construction approach in Figure 1 .

[Insert Figure 1 about here]

To reflect potential changes in ESG ratings, we update our portfolios annually at the end of December. Since we do not make any investment style choice prior to the construction of these baseline pension fund portfolios, we isolate the ESG integration from any other step in a pension fund portfolio construction. As long as we do not construct an excessive number of portfolios, even the smallest of our portfolios should be of sufficient size and diversification for a reliable analysis of the financial effects resulting from the integration of ESG criteria in pension fund investment processes. Since some researchers argue that the relationship between ESG criteria and financial performance is parabolic (e.g. U-shaped or inverted U-shaped) instead of linear (Barnett and Salomon, 2006; Ullmann, 1985), we aim to construct an odd number of portfolios to

[9] With the aim to accommodate a realistically large set of practical investment styles, which could be implemented in our ESG criteria considering baseline pension fund portfolios. This is inspired by UNEP FI's view that the purpose of ESG asset management is to "*[...] enhance and supplement and not replace an asset manager's investment decision process [...]" (UNEP FI, 2009: 29)*

analyse the financial performance difference between a median ESG rated portfolios and its peers with a more extreme ESG rating.[10]

3.3 ESG data

EIRIS compiles hundreds of individual ESG items on over 80 ESG research areas. For a single academic article aiming to integrate ESG criteria in a realistic, prudent, billion US$ pension fund investment process covering a developed country universe and a sufficiently long time sample, this is too much ESG information to comprehend.[11] Although the Freshfields report suggested that any ESG criteria not harming financial performance should be voluntarily considered, we inevitably can only investigate, if pension funds' fiduciary duties *prohibit* the integration of certain environmental, social or governance criteria. We cannot investigate in a single article and possibly not even in a single monograph, if pension funds' fiduciary duties *permit* the integration of any environmental, social or governance criteria. Hence, we aim for modesty and select a feasible set of environmental, social or governance criteria thereby accepting the inevitable limitation that the investigation of our research question with regard to other ESG criteria will remain a challenge for future research.

Motivated by recent very large scale corporate environmental disasters (BP's Gulf of Mexico oil spill, Tepco's Fukushima nuclear catastrophe), which we expect to concern many pension fund beneficiaries across the world for years to come, we select a set of corporate environmental responsibility assessments for our test. Specifically, we employ EIRIS' assessments in four core processes of corporate environmental responsibility: (i) quality of corporate environmental policy and commitment, (ii) quality of corporate environmental management systems which implement the corporate environmental policy, (iii) improvements of

[10] This research design cannot only be understood as a test of pension fund ESG integration at the portfolio level, it can equivalently be interpreted as analysis of the aggregated results from thousands of tests of pension fund ESG consideration at the level of an individual stock. In fact, if researchers wanted to conduct a statistical analysis of pension fund ESG integration at the level of the individual stock, it is very likely that they would employ a conceptually very similar, if not equivalent, research design, since statistical analysis always requires a sufficient high number of individual observations (i.e. ESG integrations at the individual stock level), which can be grouped or otherwise classified along a variable.

[11] Previous studies investigating several ESG criteria compromised on analytical scope through a much smaller (usually single country) investment universe, a very short time period and/or a complex, potentially subjective process to aggregate individual ESG data items to overall ESG scores and thereby reduce the number of ESG variables, which is not necessarily doubtlessly prudent (e.g. Dam and Scholtens, 2010; Kempf and Osthoff, 2007; Statman and Glushkov, 2009). As our research design does not allow us to compromise our analysis in these ways, we inevitably have to limit the number of our ESG variables to remain within the analytical scope of one article.

actual environmental performance by corporation as result of the environmental policy and management systems, and (iv) quality of corporate environmental reporting on the previous three processes. All four criteria are assessed by EIRIS on a five point scale. The three quality measurements (environmental policy, environmental management, environmental reporting) are assessed from the worst to the best judgement as 'inadequate', 'weak', 'moderate', 'good', or 'exceptional' quality of the respective process. The actual environmental performance indicator is assessed from the worst to the best judgement as 'no or inadequate data', 'no improvement', 'minor improvement', 'major improvement', or 'significant improvement'. In addition to these four individual (disaggregated) indicators, we calculate the average of these four indicators by transforming the ordinal textual assessments in consecutive integer values following previous studies based on EIRIS data (e.g. Brammer and Pavelin, 2006; Cox et al., 2004, 2007; Dam and Scholtens, 2010). We use this 'average environmental rating' as fifth (aggregated) indicator, whereby we sort the firms in five groups according to quintiles of the rating scale (i.e. firms rated with values in the smallest 20% of the rating scale are categorised in the worst rated group, companies with values above 20% but no larger than 40% of the rating scale are clustered in the second worst group and so on).

We have access to EIRIS' end of calendar year assessments from 2003 to 2009 for constituents of the FTSE All World Developed, one of the leading global stock market indices for developed countries. During our sample period, this index listed companies from 26 developed countries and is hence an ideal investment universe for realistic prudent pension fund investment test. These 26 countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel (upgraded to developed country in 2008), Italy, Japan, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Singapore, South Korea (upgraded to developed country in 2009), Spain, Sweden, Switzerland, UK, US. This investment universe comprises, on average, around 1,850 firms, whereby a double digit number of firms are listed with multiple share classes (i.e. A and B shares) each year. EIRIS makes every attempt to provide corporate ESG assessments for each firm in this investment universe, but naturally it needs a bit of operational time to react to each addition to FTSE's constituent list. This operational time lag effect and some random occasional unavailability of financial data from Datastream resulted in our sample investment universe comprising on average 1,519 firms at the

beginning of each year following an EIRIS end of year assessment (2004: 1,504 / 2005: 1,465 / 2006: 1,551 / 2007: 1,520 / 2008: 1,541 / 2009: 1,531 / 2010: 1,519).

3.4 Financial performance assessment

For this sample universe, we retrieve monthly simple return data and market valuations for all firms from Datastream for our 77 months sample period from January 2004 to May 2010. The return data is inclusive of distributions and both data types are denoted in US$. Based on these simple return data, we construct 25 large equity portfolios, whereby each portfolio only includes firms with one of the five assessment steps of our five corporate environmental responsibility criteria. The portfolios are value weighted based on one month lagged information with multiple share classes being appropriately considered. The portfolio constituents are updated at the beginning of each January as reaction to EIRIS' new environmental responsibility assessments supplied annually at the end of December. Once portfolio returns are calculated based on the simple returns of the individual firms, the portfolio returns are transformed into continuously compounded returns to avoid an upwards bias in our statistical analysis. In line with Jensen's (1968) original data transformation, we subsequently deduct the continuously compounded (c.c.) risk free rate from our c.c. portfolio returns to calculate the c.c. excess returns of our portfolios. As risk-free rate for our developed country universe, we employ the monthly investment yield on a thirteen weeks US Treasury bill supplied by Datastream,[12] as we acknowledge that the US is (still) the most powerful and hence potentially least risky economy in the world. A potential downgrade on US Treasuries might result in increasing interest rate yields, signalling an increasingly risky economy.

To assess the financial performance of our 25 large equity portfolios, we use the Carhart (1997) model, the current standard assessment method for equity portfolios (e.g. Bauer et al., 2005; Kempf and Osthoff, 2007; Statman and Glushkov, 2009). Related studies use similar models to investigate the financial performance of pension funds (Goyal and Wahal, 2008;

[12] We use the investment yield instead of the discount yield, as it calculates the return on a U.S. treasury bill based on its purchase price instead of its face value, respectively. Hence, it is the more accurate approximation of a risk free investment's return. To transform it in the continuously compounded return, which an investors would receive at the end of the months following their investment, we use three steps. First, we transform the per annum stated risk free return in a 91 days return by multiplying each observation stated as percentage in the retrieved series by 91/365.25. Second, we add one to the result and take the sum to the power of 30.4375/91, whereby 30.4375 is one twelfth of 365.25. Third, we compute the natural logarithm of the result of the second step, which leaves us with the continuously compounded monthly risk free investment return.

Tonks, 2005). As performance measurement of institutional investors (including public and private retirement plans, endowments, and multi-employer unions) have been found to be sensitive to the choice of model employed, we follow Busse, Goyal and Wahal (2010) who also use a four-factor model. In particular, they find performance persistence using Fama and French's 3-factor model, however, the evidence vanishes after employing unconditional and conditional versions of Carhart's 4-factor model.

The Carhart model can be written as in equation (1),

$$r_{xp,t} = \alpha_p + \beta_p r_{xm,t} + \gamma_p SMB_t + \delta_p HML_t + \lambda_p MOM_t + \varepsilon_{p,t} \quad (1)$$

where $r_{xp,t}$ and $r_{xm,t}$ represent the c.c. excess return of a pension fund portfolio (p) and our value weighted investment universe of an average 1,519 firms denoted m over the risk free asset return, respectively. In the Carhart model, the financial performance assessment measure is α_p. It represents the systematic financial performance differential between the portfolio and the investment universe benchmark controlling for the known equity portfolio performance drivers size (SMB_t), intangible assets (HML_t) and share price momentum (MOM_t) (Carhart, 1997; 1992, 1993). β_p denotes the portfolio's systematic exposure to the investment universe's equity market benchmark, while where γ_p, δ_p, and λ_p measure the exposure of a portfolio to the respective driver of equity performance. $\varepsilon_{p,t}$ captures the random components of a pension fund's portfolio's excess return for each observation (t).

For an equivalent developed country universe, we construct the control factors representing the known equity performance drivers 'size', 'intangible assets', and 'momentum' using the online research tool of Style Research Limited, which is based on the Worldscope database and has been used extensively in previous research (e.g. Bauer et al., 2007; Bauer et al., 2005; Hoepner et al., 2011; Renneboog et al., 2008a). The size factor SMB is generated as the return difference between a portfolio of stocks in the lower half of the market capitalisation ranked investment universe and a portfolios of stocks in the upper half of the same universe. The intangible assets factor (HML), also called Value vs. Growth factor, is based on the investment universe ranked according to book value to market value ratio. It represents the difference between the return of a portfolio of the Top 30% stocks and the return of a portfolio of the Bottom 30% stocks. The momentum factor (MOM) originates from the investment universe ranked according to each stock's return over the previous twelve months. It is calculated as the

return difference between a portfolio of the Top 30% stocks (previous winners) and a portfolio of the Bottom 30% stocks (previous losers) in this ranking. The MOM factor is updated monthly, while the SMB and HML factor are update annually at the end of June in line with Fama and French (1993). All six portfolios underlying our three control factors are value weighted based on one month lagged information and their returns are continuously compounded.[13]

3.5 Risk management opportunities

Risk management is a central concern to pension funds of all funding types which are found to substantially amend their asset management strategies depending on their risk management ability and success (An et al., 2013; Rauh, 2009).[14] Hence, the impact of ESG integration on risk is the second big question to address in order to understand if fiduciary duty prohibits ESG integration (Becker and Strömberg, 2012; Warburton, 2011)

Inspired by Blake, Rossi, Timmermann, Tonks, Wermers (2013), we empirically examine the riskiness of our 25 hypothetical equity pension fund portfolios by comparing several risk performance measures. The risk analysis comprises the following four conventional and downside risk performance measures: a) Standard deviation, b) Semi Standard Deviation, c) Lower partial moments (LPM), and d) Worst-Case Loss.

Our first and only conventional risk measure, standard deviation, is commonly used to calculate a portfolio's exposure to total volatility/risk (diversifiable and systematic risks). Generally, total volatility measures portfolio uncertainty of upside and downside return swings. We therefore calculate total risk as in equation (2),

$$s_{xp,t} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(r_{xp,t} - \overline{r}_{xp,t})^2} \qquad (2)$$

where $s_{xp,t}$ represent the standard deviations of the c.c. excess return on each of our 25 hypothetical pension portfolios. $\overline{r}_{xp,t}$ is the mean excess return of pension portfolio i at time t.

Our second risk measure, semi standard deviation, can be seen as a special case of the conventional standard deviation, where we only take into account the negative volatility/risk. In

[13] As Style Research does not offer the construction of the size (SMB) and intangible assets (HML) factor precisely according to Fama and French (1993) and Carhart (1997), we follow Renneboog et al.'s (2008a) slightly amended procedure. Renneboog et al. (2008a) find that their 'factors are virtually identical' to the ones of Fama and French (1993).

[14] Besides return and risk, Goyal and Wahal (2008) show that the termination of investment managers by pension trustees is not always due to financial underperformance, but can also result from non-performance related attributes such as personnel turnover, merger of investment firms or regulatory actions.

the perspective of a portfolio manager, a distinction between upside (good) and downside (bad) variance is very desirable, because "good" variance increases portfolio returns, whereas "bad" variance decreases them. We compute the semi standard deviation as in following equation (3),

$$ssd_{xp,t} = \sqrt{\frac{1}{N-1}\sum_{r<\bar{r}}^{N}(r_{xp,t} - \bar{r}_{xp,t})^2} \quad (3)$$

where $ssd_{xp,t}$ are semi standard deviations of the c.c. excess returns on each of the 25 hypothetical pension portfolios. The condition $r < \bar{r}$ restricts the inclusion of returns below the mean.

Lower Partial Moments (LPM) is our third risk measure that is commonly applied to compute downside volatility/risk in more severe market conditions. The model assumes highly risk-averse investors, such as prudent pension funds because it punishes larger negative returns stronger than smaller negative returns. Generally, the magnitude of risk-aversion increases when the exponent of the LPM increases (Eling and Schuhmacher, 2007; Kaplan and Knowles, 2004). We calculate LPM as in equation (4),

$$lpm_{xp,t} = \sqrt[3]{\frac{1}{N-1}\sum_{r<\bar{r}}^{N}(\bar{r}_{xp,t} - r_{xp,t})^3} \quad (4)$$

where $lpm_{xp,t}$ are the lower partial moments of the c.c. excess returns on the 25 hypothetical pension portfolios. We use an exponent and square root of 3.

Finally, to assess the highest possible loss of our hypothetical pension portfolios, during extreme market conditions, we compute the worst case loss. The result of the worst loss gives us a fairly good indication of whether integrating ESG information into pension portfolios protects highly risk-averse investors. We calculate the risk measure as in equation (5),

$$loss_{xp,t} = \min_{xp,t} \quad (5)$$

where $min_{xp,t}$ represents the minimum c.c. excess return on each of the 25 hypothetical pension portfolios.

4 Results: No evidence of any financial harm through ESG integration

4.1 Descriptive Statistics

We display descriptive statistics for our 25 large hypothetical pension fund portfolios in Table 1 , which offer five interesting indications. First, we succeeded in constructing large investment portfolios most of which holding hundreds of firms. Of course, pension funds would in reality

never own 100% of all firms in each of our constructed portfolios. Hence, we make the prudent conservative assumption that a pension fund portfolio would own 1% of each firm in our entire portfolios, which still results in all our pension fund portfolios being worth, on average, between 7 and 115 billion US$. Second, firms average environmental rating and especially their actual environmental performance increases over the years with the better rated portfolios including proportionally more companies. This might reflect an increase in environmental awareness among developed countries' firms and populations as found by Barkemeyer et al. (2009).

Third, the 25 pension fund portfolios' standard deviations are relatively evenly distributed, which indicates that there appears to be no diversification advantage for more or less environmentally responsible portfolios. The two portfolios with the lowest standard deviation (moderately rated on environmental management and significant improvement in environmental performance) include a medium and a small number of stocks, respectively. This suggests that all portfolios are well diversified, as larger portfolios do not seem to have any diversification benefits. Fourth, mean excess returns are also relatively evenly spread across portfolios with different ESG ratings implying that financial performance differences between them might be small. Fifth, while mean returns, standard deviations and maximum returns are all evenly spread across ESG assessments, minimum returns are not. Curiously, the portfolio with the best rating has clearly the lowest minimum return in case of any ESG criteria. This suggests that portfolios with high EIRIS' environmental responsibility scores might experience insurance like benefits from their responsibility as recently observed by Godfrey et al. (2009).

[Insert Table 1 about here]

4.2 Return results

4.2.1 Aggregated Measure: Average Environmental Rating

We begin our discussion of our financial performance assessment results discussing the five portfolios constructed according to the aggregate measure (average environmental rating) to see, if there is any general trend. Our results displayed in Table 2 show that not a single portfolio out- or underperforms the investment universe benchmark at any conventional statistical significance level (1%, 5% or 10%). Hence, the values of the α-coefficients, which are anyway small in absolute size, appear meaningless since there is a high probability that they occurred purely by

chance. These results are highly reliable as shown by the Adjusted R-squared values of between 92.4% and 97.2%, which represent the degree to which our econometric (Carhart) model is able to explain the excess return variation of our pension fund portfolios. In other words, there is only a little bit of pension fund excess return variation left, which our model cannot explain, and the smaller the unexplained component in a regression analysis the larger is the confidence that the respective results are empirically 'true' and are not potentially biased by any omitted explanatory variable. However, this reliable result for average environmental rating does not necessarily mean that the integration of individual, disaggregated corporate environmental responsibility portfolios in realistic pension fund investment processes may not be financially detrimental.

[Insert Table 2 about here]

4.2.2 Disaggregated Measures: Environmental Policy, Environmental Management, Environmental Performance, and Environmental Reporting

The results for the pension fund portfolios with different assessments on the four disaggregated criteria are shown in Table 3. The estimations for the portfolios rated on environmental policy, environmental performance and environmental reporting are very similar to the overall results for the aggregated corporate environmental responsibility rating. No portfolio significantly under- or outperforms its market benchmark and α-coefficients are small in size. The Adjusted Rsquared values are again very high (89% to 98%), which indicates the reliability of the observation that our baseline pension fund portfolios considering corporate environmental responsibility perform financially insignificantly different from the market portfolio.

Of all 25 pension fund portfolios, only one of the five portfolios constructed based on corporate environmental management scores significantly underperforms its market benchmark. This pension fund portfolio comprises firms with a weak environmental management and does not only statistically significantly underperform but also has an absolute α-coefficient that is twice as large as any other α-coefficient. Hence, an investment in this portfolio can clearly not be recommended from a financial perspective. Pension funds with a preference for companies with weak environmental management would experience detrimental financial effects from integrating corporate environmental responsibility scores in their investment process. However, pension funds currently interested in the integration of corporate environmental responsibility criteria in their investment processes have a preference for high(er) degrees of environmental responsibility

and might even disapprove firms scoring low in this regard. Hence, the statistically and economically significant underperformance of a portfolio of firms with below average environmental management is not problematic but beneficial for them, as they aim to underweight these less responsible firms in their portfolio.

In summary, we have found zero evidence that pension fund portfolios with sub-standard environmental responsibility assessments outperform market benchmarks or that pension fund portfolios with average of above assessments underperform the investment universe. The very high Adjusted Rsquared values of all our econometric estimations provide us with a high degree of confidence regarding the reliability of our findings. Thus, we interpret our overall results as clear empirical support for the view that the integration of environmental responsibility criteria in the investment processes of pension funds concerned about the environment does not harm their financial performance. Hence, based on our results we conclude that pension funds' fiduciary duty does not appear to prohibit the integration of environmental responsibility criteria into their investment processes, at least with respect to environmental responsibility data supplied by EIRIS.

[Insert Table 3 about here]

4.3 Risk results

This section discusses our results of the comprehensive risk analysis for each of the 25 hypothetical pension portfolios on a) aggregate environmental ratings and b) disaggregate environmental ratings including environmental policy, management, performance, and reporting.

4.3.1 Aggregated Measure: Average Environmental Rating

Figure 2 shows standard deviations across all 25 hypothetical pension portfolios. On aggregate level, we find all pension funds to have undistinguishable total monthly volatilities of just below 5 percent. The results suggest very evenly distributed standard deviations and no diversification benefits for better or worst rated corporate environmental pension portfolios.

Semi standard deviations, as displayed in Figure 3, indicate a slight trend. We observe that our "Best" rated pension fund (including firms with highly rated corporate environmental performance) has the lowest downside volatility compared to our "Worst" rated pension portfolio.

The results suggest that on average, exceptionally rated environmental portfolios provide somewhat better risk management.

This finding is intensified when we choose the perspective of a highly risk averse investor, such as with the LPM risk measure. Figure 4 indicates that our "Best" rated pension portfolio has a significantly lower downside variance than any of the competing pension portfolios. For example, the difference between the downside variance of the "Best" and "Worst" rated pension portfolios is a remarkable 6.84 percent per annum. We can observe an even higher annual difference between the "Best" and "2nd Worst" with 8.52 percent. These findings highlight the downside risk protection potential of pension funds with good corporate environmental ratings. For a highly risk-averse investor, such as a pension fund the differences are large.

Our final risk measure takes the perspective of an extremely risk averse investor. Figure 5 shows the worst-case losses across all 25 hypothetical pension funds. On average, the "Best" rated pension portfolio, by far, protects the investor against large losses and excels in preserving value. The difference between the "Best" and "Worst" rated hypothetical pension funds is a stunning 4.6 percent in that month.

4.3.2 Disaggregated Measures: Environmental Policy, Environmental Management, Environmental Performance, and Environmental Reporting

Similarly, Figure 2 displays our findings of the hypothetical pension funds' standard deviations for each of the individual corporate environmental ratings. Total monthly volatilities are equally distributed, except for one of the portfolios, 'Environmental Policy', where the total risk ranges from 4.45 to 6 percent. The results suggest, as previously for the aggregated ratings, very evenly distributed standard deviations and no diversification benefits for better or worst rated corporate environmental pension portfolios.

Disaggregated semi standard deviations displayed in Figure 3 are broadly in line with previous aggregated results. One pension portfolio, 'Environmental Policy', tends to display marginally higher downside volatility than its peers.

Our LPM risk results for the individual pension portfolios are shown in Figure 4 and indicate very clear downside risk protection for 'Best' rated environmental portfolios relative to '2nd Worst' rated portfolios, and some evidence for better downside risk management for the

'Best' rated portfolios relative to 'Worst' rated portfolio. In particular, the 'Best' Environmental policy portfolio tends to outperform the '2nd Worst' portfolio, but performs rather equal to the 'Worst' Environmental policy portfolio.

Once again, our final risk measure, worst case loss, shows remarkable preservation of investor value for the 'Best' rated pension portfolio across all disaggregated environmental ratings. These findings suggest that "Best" rated pension funds clearly outperform their peers and protect institutional investors, such as extreme risk-averse pension funds, against large losses. For example, for two disaggregated portfolios we can observe a minimum difference of 2.2 percent (Environmental Management) and a maximum difference of 5.9 percent (Environmental Performance) between the "Best" and "Worst" rated hypothetical pension portfolios.

5 Robustness tests[15]

We conduct two broad sets of robustness tests, one for temporal stability of returns and another for sector bias. The first set of temporal stability tests is again subdivided into two parts. First, we run an equivalent econometric analysis for two similar sized sub-samples, one until February 2007 (38 months) and the other from March 2007 onwards (39 months). We do not find any evidence of a significant underperformance of any portfolio with (above) average environmental responsibility in any sub-sample period. Second, as the early years of our sample period (2004, 2005) might be less representative to estimate effects of ESG integration in the foreseeable future, we also repeat our analysis twice excluding the first and the first two years of our sample period (i.e. 2005-2010 and 2006-2010). Again, both robustness regressions do not lead us to find any evidence suggesting that pension funds concerned about the environment would experience a financial performance penalty resulting from the integration of environmental responsibility criteria in their investment processes. Our second set of robustness tests addresses the issue of sector bias. In order to account for sector bias, we re-run equation (1) with additional industry controls for each of the ten industry groups in the Industry Classification Benchmark (ICB). These include Oil & Gas (0001), Basic Materials (1000), Industrials (2000), Consumer Goods (3000), Health Care (4000), Consumer Services (5000), Telecommunications (6000), Utilities (7000), Financials (8000), and Technology (9000). Our additional regression results are not

[15] Results of the robustness tests are available upon request.

qualitatively different to the original analysis. We can confidently conclude that our analysis is stable over time and robust to sector bias.

6 Conclusion

In this paper, we aim to extend the analysis of the Freshfields (2005) report on the question, if fiduciary duty legally requires, voluntarily permits or legally prohibits the integration of specific ESG criteria in pension fund investment processes. In line with other commentators, we recognise the Freshfields report as welcome contribution due to its conceptual value, but do not consider it to represent a practical breakthrough due to several uncertainties, which it leaves unaddressed. The possibly most important unaddressed uncertainty results from the Freshfields report providing no guidance on the question 'what are the financial and risk implications of the consideration of an ESG criterion on a pension fund portfolio that complies with the legal duty of prudent action for proper purpose?'

To the best of our knowledge, we are the first to empirically analyse this question. For our analysis, we develop prudent pension fund equity investment processes with realistic characteristics (e.g. billion US$ size, developed country universe) and integrate specific ESG data in these over a 77 months sample period through May 2010. Our specific ESG dataset comprises five corporate environmental responsibility ratings supplied by EIRIS for a universe of over 1,500 firms from 26 countries. As each rating includes five assessment steps, we generate 25 realistic pension fund portfolios of firms sharing an assessment in one of the ratings. Our two main results are as follows: First, our tests provide zero indications that the integration of corporate environmental responsibility criteria into pension fund investment processes has detrimental financial performance effects, at least with respect to pension funds with a preference for corporate environmental responsibility as assessed by EIRIS. Second, our complementary risk analysis shows that from a risk management perspective specific ESG criteria have a positive effect on the downside risk protection of pension portfolios. Thus, we are confident to conclude that the integration of corporate environmental responsibility criteria into the investment processes of pension funds does not seem to have any significant detrimental financial and risk implications. As the Adjusted R-squared values of our 25 analyses are very high (between 89 and 98%) and our results are consistent over time. Hence, we find that fiduciary duties or other legislation do not appear to prohibit the integration of environmental responsibility standards into

pension fund investment processes in any of the nine large jurisdictions studied by Freshfields and us (US, UK, Canada, Australia, Japan, Germany, France, Italy and Spain).

Our study is, however, subject to a few limitations. First, we do not consider the expense a pension fund incurs in acquiring the environmental responsibility assessments from a data provider such as EIRIS. However, in relation to the hundreds of millions or even billions of pension fund assets, subscription prices for ESG data are infinitesimally small. Furthermore, Gil-Bazo et al. (2010) recently observed ESG integrating mutual funds to have similar expense ratios as equivalent peers with an alternative active investment strategy, which indicates that ESG integration is no more or less expensive than the average active management strategy. Second, our results are directly only applicable to the large equity component in pension fund portfolios. While equities and fixed income are arguably the most important asset classes for pension funds' financial performance (Aglietta et al., 2012; Ferreira and Matos, 2008; OECD, 2010), the less volatile asset classes bonds and cash are also relevant. Cash investments and low risk bond investments are very useful to manage liquidity or reduce a portfolio's leverage but they have a marginal impact on pension funds' financial performance compared to an equivalently leveraged market universe. Hence, their consideration would unlikely change our results in any meaningful way. The integration of ESG criteria into higher risk bonds could lead to a result different from ours. However, research on ESG criteria and bonds outside of pension fund investment processes does not observe any relevant harmful financial effects of ESG integration (Derwall and Koedijk, 2009; Menz, 2010). Third, due to the limited scope of a single academic article, our results directly only apply to corporate environmental responsibility criteria and of these only to those produced by EIRIS. Hence, promising routes for future research might lie in conducting similar analyses for different ESG criteria, possibly using bond instead of equity investment processes in some cases.

References

Aglietta M, Brière M, Rigot S, Signori O, 2012, "Rehabilitating the role of active management for pension funds" *Journal of Banking & Finance* **36** 2565-2574

Amalric F, 2006, "Pension funds, corporate responsibility and sustainability" *Ecological Economics* **59** 440-450

An H, Huang Z, Zhang T, 2013, "What determines corporate pension fund risk-taking strategy?" *Journal of Banking & Finance* **37** 597-613

Australian Super, 2013, "Our investment governance" *Corporate Website (Available at: http://www.australiansuper.com/investments-and-performance/approach-and-holdings/our-investment-governance.aspx)*

Baker A, E.Logue D, S.Rader J, 2004 *Managing Pension and Retirement PlansA Guide for Employers, Administrators, and Other Fiduciaries* ('Oxford University Press')

Baker H K, Nofsinger J R, 2012 *Socially Responsible Finance and Investing: Financial Institutions, Corporations, Investors, and Activists* (John Wiley & Sons, Hoboken, New Jersey)

Barkemeyer R, Figge F, Hahn T, Holt D, 2009, "What the Papers Say: Trends in Sustainability" *Journal of Corporate Citizenship* **33** 69-86

Barnett M L, Salomon R M, 2006, "Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance" *Strategic Management Journal* **27** 1101-1122

Bauer R, Derwall J, Otten R, 2007, "The Ethical Mutual Fund Performance Debate: New Evidence from Cananda" *Journal of Business Ethics* **70** 111-124

Bauer R, Koedijk K G, Otten R, 2005, "International Evidence on ethical mutual fund performance and investment style" *Journal of Banking & Finance* **29** 1751-1767

Bebchuk L, Cohen A, Ferrell A, 2009, "What Matters in Corporate Governance?" *Review of Financial Studies* **22** 783-827

Becker B, Strömberg P, 2012, "Fiduciary Duties and Equity-debtholder Conflicts" *Review of Financial Studies* **25** 1931-1969

Bengtsson E, 2008a, "A History of Scandinavian Socially Responsible Investing" *Journal of Business Ethics* **82** 969-983

Bengtsson E, 2008b, "Socially Responsible Investing in Scandinavia - a Comparative Analysis" *Sustainable Development* **16** 155-168

Berry C, 2011, "Protecting Our best Interests. Rediscovering Fiduciary Obligation",

Blake D, Rossi A G, Timmmermann A, Tonks I, Wermers R, 2013, "Decentralized Investment Management: Evidence from the Pension Fund Industry" *The Journal of Finance* n/a-n/a

"Board of Trustees of Employee Retirement System of the City of Baltimore v. City of Baltimore 317 Md.", 1989,

Brammer S, Pavelin S, 2006, "Corporate Reputation and Social Performance: The Importance of Fit" *Journal of Management Studies* **43** 435-455

Busse J A, Goyal A, Wahal S, 2010, "Performance and Persistence in Institutional Investment Management" *The Journal of Finance* **65** 765-790

Carhart M M, 1997, "On persistence in Mutual Fund Performance" *Journal of Finance* **52** 57-82

Carlisle S, 2011, "Legal issues in sustainable responsible investment" *Presentation (Available at: http://www.buseco.monash.edu.au/blt/wclrg/carlisle-presentation-8-06.pdf)*

CharityCommission, 2011, "Charities and Investment Matters: A guide for trustees" *Report, Available at: http://www.charitycommission.gov.uk/media/93859/cc14text.pdf*

Chatterjii A K, Levine D L, 2006, "Breaking Down the Wall Of Codes: Evaluating Non-Financial Performance Measurement" *California Management Review* **48** 29-51
Chatterjii A K, Levine D L, Toffel M W, 2009, "How Well Do Social Ratings Actually Measure Corporate Social Responsibility" *Journal of Economics and Management Strategy* **18** 125-169
Clark G L, 2000, "The functional and spatial structure of the investment management industry" *Geoforum* **31** 71-86
Clark G L, 2010, "HUMAN NATURE, THE ENVIRONMENT, AND BEHAVIOUR: EXPLAINING THE SCOPE AND GEOGRAPHICAL SCALE OF FINANCIAL DECISION-MAKING" *Geografiska Annaler: Series B, Human Geography* **92** 159-173
Clark G L, 2012, "From Corporatism to Public Utilities: Workplace Pensions in the 21st Century" *Geographical Research* **50** 31-46
Clark G L, Hebb T, 2005, "Why should they care? The role of institutional investors in the market for corporate social responsibility" *Environment and Planning A* **37** 2015-2031
Clark G L, Monk A H B, 2011, "Pension Reserve Funds: Aligning Form and Function" *Rotman International Journal of Pension Management* **4** 18-25
Clark G L, Salo J, Hebb T, 2008, "Social and environmental shareholder activism in the public spotlight: US corporate annual meetings, campaign strategies, and environmental performance, 2001-2004" *Environment and Planning A* **40** 1370-1390
Clark G L, Urwin R, 2008, "Best-practice pension fund governance" *Journal of Asset Management* **9** 2-21
Collie B, Myers H, 2008, "Responsible Invesstment: Five Tests of an SRI/ESG Policy" *Viewpoint Russel Research, August 2008*
"Cowan v. Scargill, 1 Ch. 270", 1985,
Cox P, Brammer S, Millington A, 2004, "An Empirical Examination of Institutional Investor Preferences for Corporate Social Performance" *Journal of Business Ethics* **52** 27-43
Cox P, Brammer S, Millington A, 2007, "Pension Fund Manager Tournaments and Attitudes Towards Corporate Characteristics" *Forthcoming in the Journal of Business Finance & Accounting*
Cumming D, Johan S, 2007, "Socially Responsible Institutional Investment in Private Equity" *Journal of Business Ethics* **75** 395-416
Dam L, Scholtens B, 2010, "Investor Type and CSR Policy of European Multinational Enterprises",
Dam L, Scholtens B, Sterken E, 2007, "Corporate Governance and International Location Decisions of Multinational Enterprises" *Corporate Governance: An International Review* **15** 1330–1347
Delmas M, Doctori Blass V, 2010, "Measuring corporate environmental performance: the trade-offs of sustainability ratings" *Business Strategy and the Environment* **19** 245-260
Derwall J, Koedijk K, 2009, "Socially Responsible Fixed-Income Funds" *Journal of Business Finance & Accounting* **36** 210-229
Derwall J, Koedijk K, Ter Horst J, 2011, "A Tale of Values Driven and Profit Seeking Social Investors" *Forthcoming Journal of Banking & Finance*
Dhaliwal D, Radhakrishnan S, Tsang A, Yang Y G, 2010, "Nonfinancial Disclosure and Analyst Forecast Accuracy: International Evidence on Corporate Social Responsibility (CSR) Disclosure",
Dreu J, Bikker J A, 2012, "Investor sophistication and risk taking" *Journal of Banking & Finance* **36** 2145-2156

Edmans A, 2011, "Does the stock market fully value intangibles? Employee satisfaction and equity prices" *Journal of Financial Economics* **101** 621-640
EIRiS, 2003, "EIRiS 1983-2003: The First 20 years",
EIRIS, 2007, "Why clients choose EIRIS",
EIRIS, 2011a, "About us",
EIRIS, 2011b, "Global research for responsible investment",
EIRIS, 2011c, "Our clients",
EIRIS, 2011d, "Our research",
Eling M, Schuhmacher F, 2007, "Does the choice of performance measure influence the evaluation of hedge funds?" *Journal of Banking & Finance* **31** 2632-2647
Emel J, 2002, "An inquiry into the green disciplining of capital" *Environment and Planning A* **34** 827-843
Entine J, 2003, "The myth of Social Investing. A critique of Its Practice and Consequences for Corporate Social Performance Research" *Organization & Environment* **16** 352-368
Entine J, 2005, "The Politization of Public Investment", in *Pension Fund Politics. The Dangers of Socially Responsible Investing* Ed J Entine (The AEI Press, Washington, D. C.) pp 1-12
Fama E F, French K R, 1992, "The Cross-Section of Expected Stock Returns" *Journal of Finance* **47** 427-465
Fama E F, French K R, 1993, "Common risk factors in the returns on stocks and bonds" *Journal of Financial Economics* **33** 3-53
Ferreira M A, Matos P, 2008, "The colors of investors' money: The role of institutional investors around the world" *Journal of Financial Economics* **88** 499-533
Figge F, Hahn T, 2004, "Sustainable Value Added - measuring corporate contributions to sustainability beyond eco-efficiency" *Ecological Economics* **48** 173-187
Financial Services Authority, 2002, "Short Selling",
Financial Services Commission of Ontario, 1992, "Ethical Investments" *Bulletin 2/4*
Financial Services Institute of Australasia, 2012, "Implementing Environmental, Social & Governance Principles in investment decisions" *Report, Available at: http://www.finsia.com/docs/default-document-library/pol11_11_esg_web.pdf?sfvrsn=0*
Franzen D, 2010, "Managing Investment Risk in Defined Benefit Pension Funds" *OECD Working Papers on Insurance and Private Pensions* **38**
Freshfields Bruckhaus Deringer, 2005, "A legal framework for the integration of environmental, social and governance issues into institutional investment",
Friends Provident Foundation, 2011, "Overcoming the barriers to long-term thinking in financial markets" *Report, Available at: http://www.forumforthefuture.org/sites/default/files/project/downloads/long-term-thinking-fpf-summary-july-11.pdf*
Geczy C C, Stambaugh R F, Levin D, 2005, "Investing on Socially Responsible Mutual Funds",
Gifford E J M, 2010, "Effective shareholder engagement: the factors that contribute to shareholder salience" *Journal of Business Ethics* **92** 79-97
Gil-Bazo J, Ruiz-Verdú P, Santos A A P, 2010, "The Performance of Socially Responsible Mutual Funds: The Role of Fees and Management Companies", in *Journal of Business Ethics* pp 243-263
Gitman L, Chorn B, Fargo B, 2009, "ESG in the Mainstream: The Role for Companies and Investors in Environmental, Social and Governance Integration" *Available at:*

http://www.bsr.org/reports/BSR_ESG_Integration_Report_Sept_2009_final.pdf (Accessed: 20/05/2013)
Godfrey P C, Merrill C B, Hansen J M, 2009, "The relationship between corporate social responsibility and shareholder value: an empirical test of the risk management hypothesis" *Strategic Management Journal* **30** 425-445
Gompers P, Ishii J, Metrick A, 2003, "Corporate Governance and Equity Prices" *The Quarterly Journal of Economics* **118** 107-156
Goyal A, Wahal S, 2008, "The Selection and Termination of Investment Management Firms by Plan Sponsors" *The Journal of Finance* **63** 1805-1847
Gray J, 2012, "Misadventures of an Irresponsible Investor" *Rotman International Journal of Pension Management* **5** 8-20
Hamilton I, Eriksson J, 2011, "Influence strategies in shareholder engagement: a case study of all Swedish national pension funds " *Journal of Sustainable Finance & Investment* **1** 44-61
"Harries v Church Commissioners 1 WLR at 1247", 1992,
Hawley J, Johnson K, Waitzer E, 2011, "Reclaiming Fiduciary Duty Balance" *Rotman International Journal of Pension Management* **4**
Hawley J P, Williams A T, 2000 *The rise of fiduciary capitalism. How institutional investors can make corporate America more democratic* (University of Pennsylvania Press, Philadelphia)
Hawley J P, Williams A T, 2007, "Universal owners: challenges and opportunities" *Corporate Governance: An International Review* **15** 415-420
Hoepner A G F, Rammal H G, Rezec M, 2011, "Islamic Mutual Funds' Financial Performance and International Investment Style: Evidence from 20 Countries " *Forthcoming in European Journal of Finance*
Jahn F, 2004 *Zur Qualität von Nachhaltigkeitsrating. Zwischen Anspruch und Wirklichkeit* (IKO-Verlag für Interkulturelle Kommunikation, Frankfurt am Main)
Jensen M C, 1968, "The Performance of Mutual Funds in the Period 1945-1964" *Journal of Finance* **23** 389-416
Jo H, Harjoto M, 2012, "The Causal Effect of Corporate Governance on Corporate Social Responsibility" *Journal of Business Ethics* **106** 53-72
Jo H, Na H, 2012, "Does CSR Reduce Firm Risk? Evidence from Controversial Industry Sectors" *Journal of Business Ethics* **110** 441-456
Kaplan P D, Knowles J A, 2004, "Kappa: A Generalized Downside Risk-Adjusted Performance Measure" *Morningstar Associates and York Hedge Fund Strategies*
Kempf A, Osthoff P, 2007, "The Effect of Socially Responsible Investing on Portfolio Performance" *European Financial Management* **13** 908-922
Kiernan M J, 2007, "Universal Owners and ESG: leaving money on the table?" *Corporate Governance: An International Review* **15** 478-485
KPMG, 2005, "International Survey of Corporate Responsibility Reporting" *Discussion Paper (Available at: http://www.kpmg.com.au/Portals/0/Kpmg%20Survey%202005_3.pdf)*
KPMG, 2011, "International Survey of Corporate Responsibility Reporting" *Discussion Paper (Available at: http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/corporate-responsibility/Documents/2011-survey.pdf)*
Lee D D, Faff R W, 2009, "Corporate Sustainability Performance and Idiosyncratic Risk: A Global Perspective" *Financial Review* **44** 213-237

Lo S-F, Sheu H-J, 2007, "Is Corporate Sustainability a Value-Increasing Strategy for Business?" *Corporate Governance: An International Review* **15** 345-358
Lydenberg S, 2009, "Building the case of long-term investing in stock markets : breaking free from the short-term measurement dilemma" *Working Paper, Available at: http://www.domini.com/common/pdf/finance_for_a_better_world_lydenberg.pdf (Accessed: 19/05/2011)*
Lydenberg S D, 2007, "Universal Investors and Socially Responsible Investors: a tale of emerging affinities" *Corporate Governance: An International Review* **15** 467-477
Manitoba Law Reform Commission, 1993, "Ethical Investments by Trustees" *Winnipeg: Manitoba Law Reform Commission*
Martin W, 2009, "Socially Responsible Investing: Is Your Fiduciary Duty at Risk?" *Journal of Business Ethics* **90** 549-560
Mattison R, Trevitt M, van Ast L, Gifford J, Mnatsakanian N, Watson O, Zimmerman C, Piani V, Hoepner A G F, Clemens-Hunt P, Bacani B, Mulder I, 2011 *Univeral Ownership: Why environmental externalities matter to institutional investors* (United Nations Environmental Programme Finance Initiative, New York)
McKillop D, Pogue M, 2010, "Pension Plan Risk: The Impact upon the Financial Markets" *Unknown Publisher*
Menz K-M, 2010, "Corporate Social Responsibility: Is it Rewarded by the Corporate Bond Market? A Critical Note" *Journal of Business Ethics* **96** 117-134
Mercer, 2011, "Responsible Investment's second decade: Summary report of the state of ESG integration, policy and reporting" *Discussion Paper (Available at: http://www.calpers.ca.gov/eip-docs/investments/video-center/view-video/mercer-report-second-decade.pdf)*
MISTRA, 2005, "Screening of Screening Companies",
Monks R A G, 2007, "Two Challenges for Fiduciary Capitalism" *Corporate Governance: An International Review* **15** 486-492
Moore G, 2001, "Corporate Social and Financial Performance: An Investigation of the U.K. Supermarket Industry" *Journal of Business Ethics* **34** 299-315
Munnel A H, Sundén A, 2005, "Social Investing: Pension Plans Should Just Say "No"", in *Pension Fund Politics. The Dangers of Socially Responsible Investing* Ed J Entine (The AEI Press, Washington) pp 13-55
National Round Table on the Environment and the Economy, 2007, "Capital Markets and Sustainability - Investing in a sustainable future" *Available at: http://neia.org/wp-content/uploads/2013/04/NRTEE-capital-markets.pdf*
Nilsson H, Cunnigham G M, Hassel L G, 2008, "A Study of the Provision of Environmental Information in Financial Analysts' Research Reports" *Sustainable Development* **16** 180-194
OECD, 2007, "Recent trends and regulatory implications in socially responsible investment for pension funds",
OECD, 2010, "Pension Markets in Focus",
Oikonomou I, Brooks C, Pavelin S, 2012, "The Impact of Corporate Social Performance on Financial Risk and Utility: A Longitudinal Analysis" *Financial Management* **41** 483-515
Oxfam, 2004, "Oxfam GB Supplier Questionnaire",
Penner J, 2012 *Law of Trusts* (Oxford University Press)
PensionsRegulator, 2007, "Pensions Regulator Guidance from the Pensions Regulator: Guidance for Trustees" *Discussion Paper (Available at: http://www.thepensionsregulator.gov.uk/guidance/guidance-for-trustees.aspx)*

Petersen H L, Vredenburg H, 2009, "Morals or Economics? Institutional Investor Preferences for Corporate Social Responsibility" *Journal of Business Ethics* **90** 1-14
Poerio M, Myers D, Zouaghi-Maulet N, 2011, "Crossing the Pond...In Search of Better Executive Compensation Practices" *Corporate Governance Advisor*
Rauh J D, 2009, "Risk Shifting versus Risk Management: Investment Policy in Corporate Pension Plans" *Review of Financial Studies* **22** 2687-2733
Renneboog L, Ter Horst J, Zhang C, 2008a, "The Price of Ethics and Stakeholder Governance: The Performance of Socially Responsible Mutual Funds" *Journal of Corporate Finance* **14** 302-322
Renneboog L, ter Horst J, Zhang C, 2008b, "Socially Responsible Investments: Institutional Aspects, Performance, and Investor Behaviour" *Journal of Banking & Finance* **32** 1723-1742
Richardson B, 2009, "Keeping Ethical Investment Ethical: Regulatory Issues for Investing for Sustainability" *Journal of Business Ethics* **87** 555-572
Richardson B J, 2007, "Do the Fiduciary Duties of Pension Funds Hinder Socially Responsible Investment?" *Banking and Finance Law Review* **22** 145-201
Richardson B J, 2008 *Socially Responsible Investment Law: Regulating the Unseen Polluters* (Oxford University Press, Oxford)
Richardson B J, 2011, "From Fiduciary Duties to Fiduciary Relationships for Socially Responsible Investing: responding to the will of beneficiaries" *Journal of Sustainable Finance & Investment* **1** 5-19
Richardson B J, Cragg W, 2010, "Being Virtous and Prosperous: SRI's Conflicting Goals" *Journal of Business Ethics* **92** 21-39
Rounds C E, Jr., 2005, "Why Social Investing Threatens Public Pension Funds, Charitable Trusts, and the Social Security Trust Fund", in *Pension Fund Politics. The Dangers of Socially Responsible Investing* Ed J Entine (The AEI Press, Washington) pp 56-80
Rowley T, Berman S, 2000, "A Brand New Brand of Corporate Social Performance" *Business & Society* **39** 397-418
Sandberg J, 2011, "Socially Responsible Investment and Fiduciary Duty: Putting the Freshfields Report into Perspective" *Forthcoming in Journal of Business Ethics*
Schäfer H, Beer J, Zenker J, Fernandes P, 2006 *Who is who in Corporate Social Responsibility Rating? A survey of internationally established rating systems that measure Corporate Responsibility* (Bertelsmann Foundation, Gütersloh)
Scholtens B, 2008, "A note on the interaction between corporate social responsibility and financial performance" *Ecological Economics* **68** 46-55
Scholtens B, Zhou Y, 2008, "Stakeholder Relations and Financial Performance" *Sustainable Development* **16** 213-232
Semenova N, 2010, "Corporate Environmental Performance: Consistency of Metrics and Identification of Drivers",
Sethi S P, 2005, "Investing in Socially Responsible Companies is a Must for Public Pension Funds - Because There is no Better Alternative" *Journal of Business Ethics* **56** 99-129
Sharfman M, 1996, "The construct validity of Kinder, Lydenberg; Domini Social Performance ratings Data" *Journal of Business Ethics* **15** 287-296
Sievänen R, Rita H, Scholtens B, 2013, "The Drivers of Responsible Investment: The Case of European Pension Funds" *Forthcoming in Journal of Business Ethics* 1-15
Simon J G, Powers C W, Gunnemann J P, 1972 *The Ethical Investor: Universities and Corporate Social Responsibility* (Yale University Press, New Haven)

Smith G M, 1990, "Board of Trustees v. City of Baltimore: Public Pension Fund Divestment of South African Securities Upheld 49 Md. L. Rev., 1040"
Solomon J F, 2009 *Pension Fund Trustees and Climate Change* (ACCA Research Report No. 106, London)
Sparkes R, Cowton C J, 2004, "The maturing of socially responsible investment: A review of the developing link with the corporate social responsibility" *Journal of Business Ethics* **52** 45-57
Statman M, Glushkov D, 2009, "The wages of social responsibility" *Financial Analysts Journal* **65** 33-46
Sturm A, Badde M, 2001, "Socially Responsible Investment by Pension Funds. A State-of-the-Knowledge Report",
Taylor N, Donald S, 2007, "Sustainable Investing: Marrying sustainability concerns with the quest for financial return for superannuation trustees" *Russel Research, August 2007*
Thamotheram R, Wildsmith H, 2007, "Increasing Long-Term Market Returns: realising the potential of collective pension fund action" *Corporate Governance: An International Review* **15** 438-454
The California Public Employees' Retirement System (Calpers), 2010, "Global Principles of Accountable Corporate Governance" *Report, Available at: http://www.calpers-governance.org/docs-sof/principles/2010-5-2-global-principles-of-accountable-corp-gov.pdf*
Thomas S, Repetto R, Dias D, 2007, "Integrated Environmental and Financial Performance Metrics for Investment Analysis and Portfolio Management" *Corporate Governance: An International Review* **15** 478-485
Thornton P, Fleming D, 2011 *Good Governance for Pension Schemes* (Cambridge University Press)
Tonks I, 2005, "Performance Persistence of Pension Fund Managers" *The Journal of Business* **78** 1917-1942
Ullmann A A, 1985, "Data in Search of a Theory: A critical examination of the relationships among social performance, social disclosure, and economic performance of U.S. firms " *Academy of Management Review* **10** 540-557
UNEP FI, 2009, "Fiduciary Responsibility: Legal and Practical Aspects of Integrating Environmental, Social and Governance Issue into Institutional Investment",
Warburton J A, 2011, "Do fiduciary duties matter?" *Corporate Governance* **11** 541-548
Woods C, Urwin R, 2010, "Putting Sustainable Investing into Practice: A Governance Framework for Pension Funds" *Journal of Business Ethics* **92** 1-19
WWF, 2007, "New WWF report ranks luxury companies and advises celebrities not to promote dirty brands",
Young S B, 2007, "Fiduciary Duties as a Helpful Guide to Ethical Decision-Making in Business" *Journal of Business Ethics* **74** 1-15

APPENDIX:

ESG data provider - EIRIS

As ESG data provider, we select EIRIS for five reasons. First, EIRiS currently provides ESG data to large multibillion US$ pension funds such as French FRR or Danish ATP. It is also more generally a global leader in the provision of corporate ESG ratings with its data being used by the FTSE4Good index series and some of the world's largest asset managers such as BlackRock, Legg Mason, Legal & General or Morgan Stanley (EIRIS, 2011c). Second, EIRiS is an independent, non-for-profit organisation with over 25 years of experience in assessing and engaging with corporate ESG performance which does not offer any additional financial or legal advice to its clients. No competitor has such an ideal organisational structure for an institution assessing corporate ESG performance worldwide. All competitors are for-profit organisations, have substantial additional business operations with obvious potential for conflicts of interest (e.g. MSCI, Sustainable Asset Management), have less experience and/or cover only a small number of companies in a few countries (EIRiS, 2003, 2007, 2011a; Jahn, 2004; MISTRA, 2005; Schäfer et al., 2006). Third, EIRIS is not only a non-for-profit organisation without conflicts of interest it also does not aggregate its individual ESG rating items like most of its competitors and instead provides its clients hundreds of individual ESG rating items in over 80 ESG research areas. Hence, many of EIRIS' competitors implicitly impose a personal judgement about the relevance of different ESG rating items on user of their data which can lead to biases in academic studies that cannot appear in case of EIRIS data (EIRIS, 2011b; Schäfer et al., 2006).

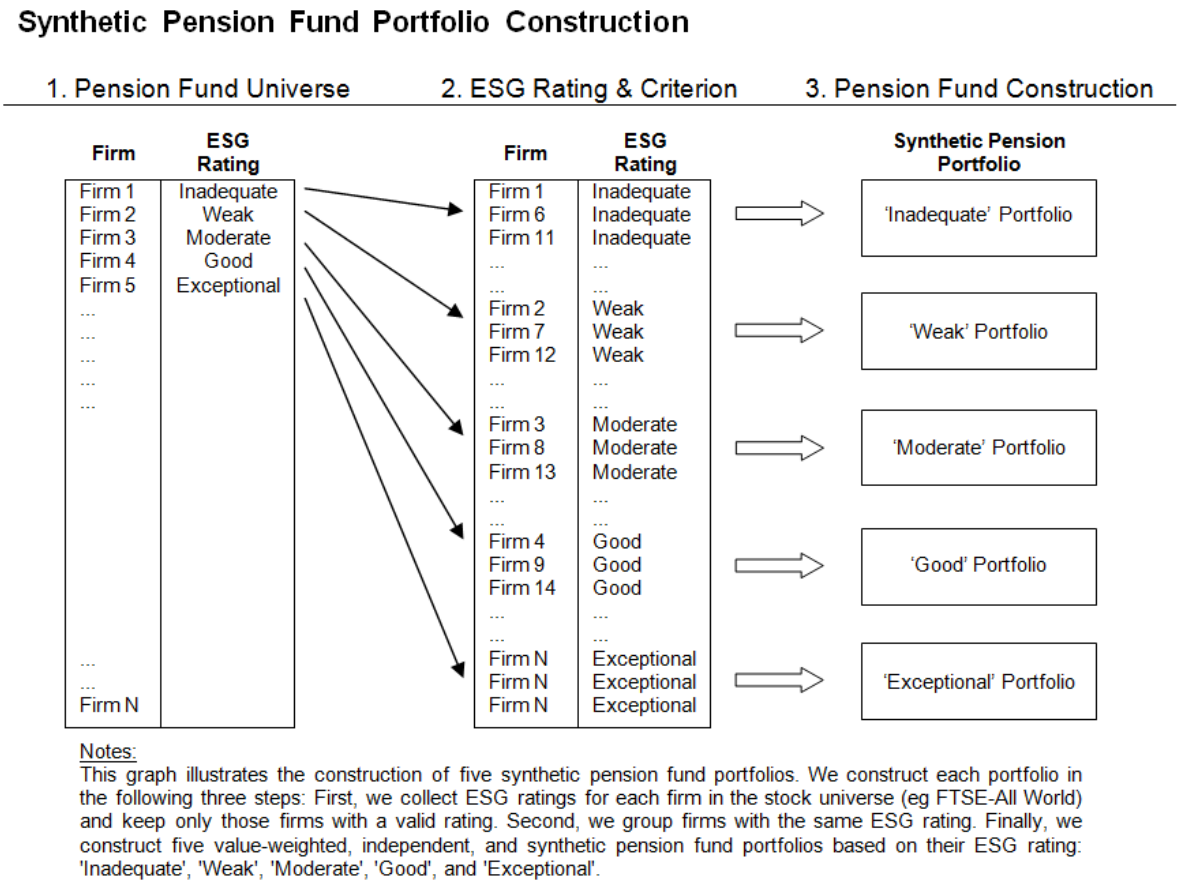
Fourth, EIRIS has an excellent track record with academics and non-governmental organisations (NGOs). Academics have criticised several corporate ESG rating data provider, especially KLD (now MSCI), with respect to the construct validity of their data but EIRIS has never been target of such a critique to date (Chatterjii and Levine, 2006; Chatterjii et al., 2009; Delmas and Doctori Blass, 2010; Entine, 2003; Rowley and Berman, 2000; Semenova, 2010; Sharfman, 1996). Previous academic studies using EIRIS data for empirical analyses also voice zero concern about the construct validity of EIRIS data (e.g. Brammer and Pavelin, 2006; Cox et al., 2004; 2007; Dam and Scholtens, 2010; Dam et al., 2007; Moore, 2001). Similarly, EIRIS' standing with charities appears excellent, as leading charities such as Oxfam or WWF trust its ESG data. WWF, for instance, employs EIRIS data for its own corporate ESG assessment reports

and Oxfam even requests EIRIS to check its ethical supplier questionnaire (EIRIS, 2011c; Oxfam, 2004; WWF, 2007).

Fifth, EIRIS' corporate ESG assessments are based on a consistent and exceptionally robust research process. Besides over 25 years of experience and a consistent research approach, EIRIS employs a large number of information sources including public company data, a company questionnaire, NGO reports, information from other media sources or data provided by regulators. Information is collected by EIRIS' analysts based in its London, Boston or Paris office or its international partners in countries such as Australia, Germany or South Korea. To interpret the data, EIRIS employs dedicated sector specialists, who analyse the information collected by their colleagues and update EIRIS corporate ESG assessment, whenever required due to relevant new ESG information. EIRIS' exceptional commitment to reliable and valid corporate ESG ratings is possibly best highlighted by their exceptional ex-post monitoring of their ESG assessments. To ensure the accuracy of their ESG data, EIRIS conducts ex-post audits of its ESG data and sends companies their ESG assessments every year to receive comments (EIRIS, 2007, 2011d).

Tables and Figures

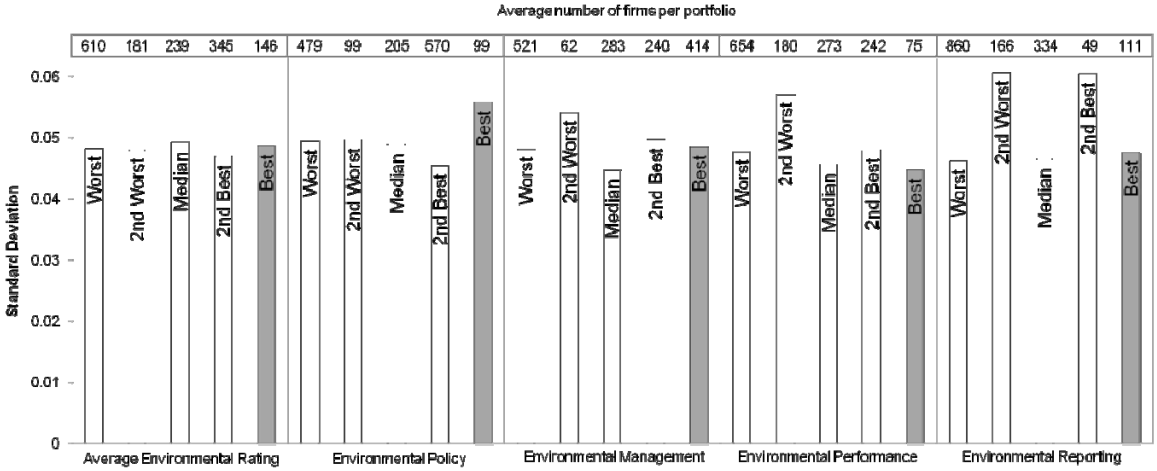
Figure 1 - Synthetic Pension Fund Construction[16]



Notes:
This graph illustrates the construction of five synthetic pension fund portfolios. We construct each portfolio in the following three steps: First, we collect ESG ratings for each firm in the stock universe (eg FTSE-All World) and keep only those firms with a valid rating. Second, we group firms with the same ESG rating. Finally, we construct five value-weighted, independent, and synthetic pension fund portfolios based on their ESG rating: 'Inadequate', 'Weak', 'Moderate', 'Good', and 'Exceptional'.

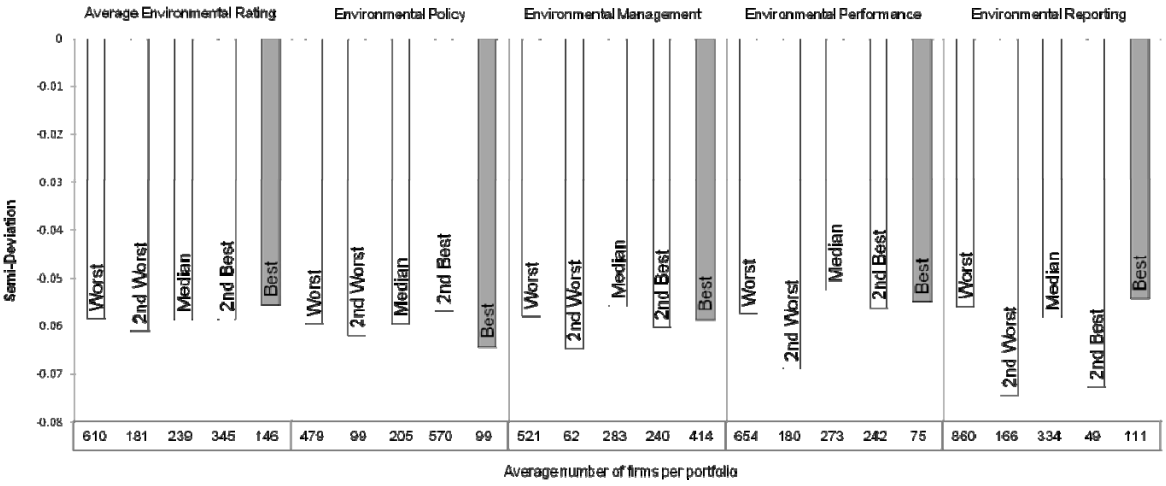
[16] Figure 1 depicts our hypothetical pension portfolio construction for the criterion "Quality of corporate environmental policy and commitment". We repeat following procedure for all five pension portfolios: First, we retrieve EIRiS' five point assessment for 'corporate environmental policy and commitment' ('inadequate', 'weak', 'moderate', 'good', or 'exceptional') for each firm (1 to N) in the FTSE All-World equity universe. Then, we group all firms with the same rating and update the groups at the beginning of each year. Third, we value-weight our portfolios and update each firm's weight annually. We identify the weights of each firm in the portfolio by its market capitalisation. Value-weighting is a realistic approach for our empirical tests because it distinguishes between the weights for smaller and larger companies proportionally.

Figure 2: Standard Deviation of portfolios with varying EIRiS environmental responsibility ratings



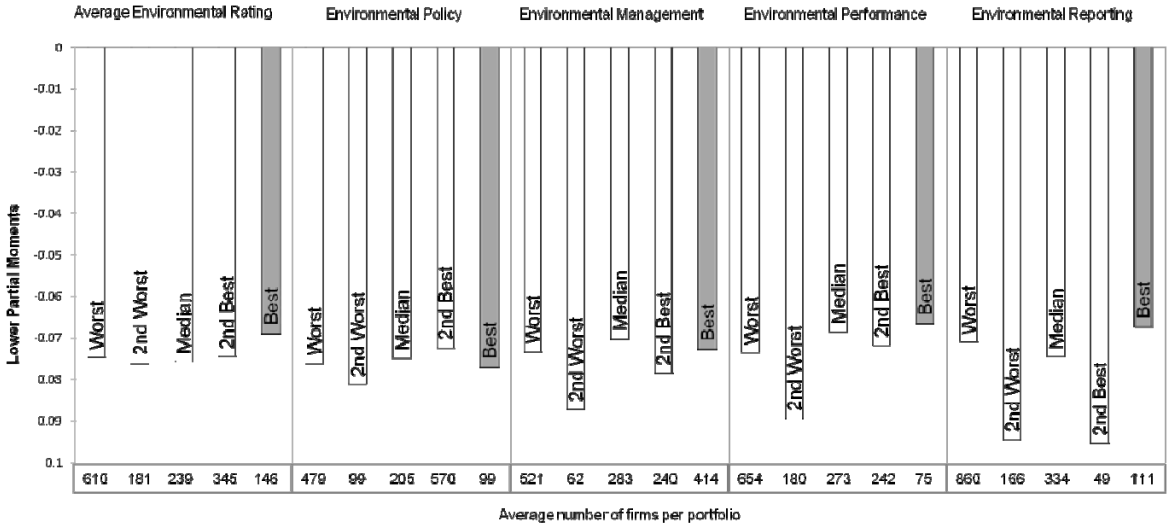
Notes: These bar graphs show the standard deviation of annually updated investment portfolios including stocks with a specific EIRiS environmental responsibility rating. The horizontal axis (x-axis) displays the five corporate environmental ratings from EIRiS: Average Environmental Rating, Environmental Policy, Environmental Management, Environmental Performance and Environmental Reporting. The Average Environmental Rating is calculated as the mean rating from the other four. For each environmental rating, five value-weighted portfolios with increasing environmental performance are calculated. The grey bars represent the portfolios with the "best" environmental rating, whereas the white bars represent portfolios rated lower than "best", such as, "2nd best", "median", "2nd worst", and "worst". The numbers on top of each bar represent the number of average constituents in that portfolio.

Figure 3: Semi Standard Deviation of portfolios with varying EIRiS environmental responsibility ratings



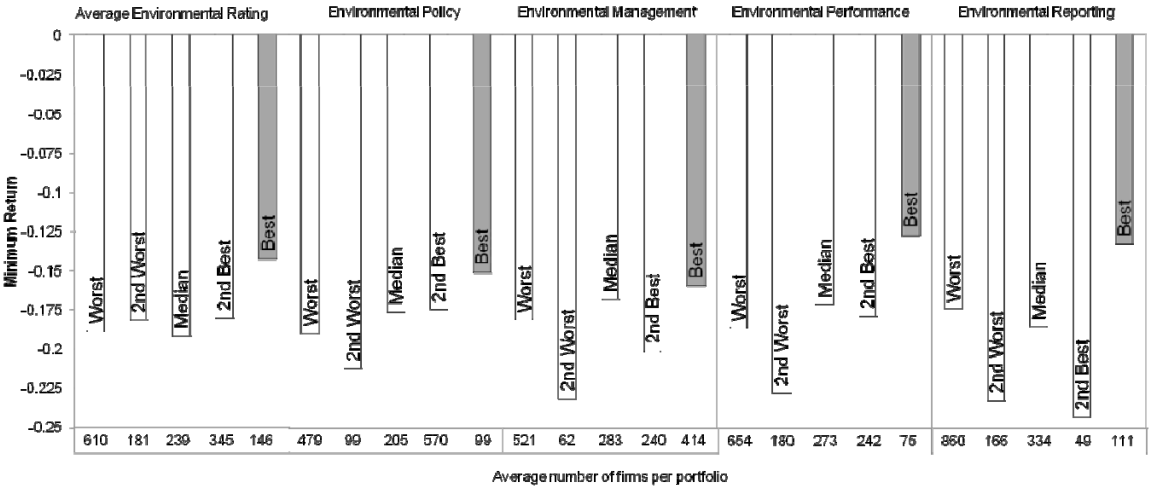
Notes: These bar graphs show the semi standard deviation of annually updated investment portfolios including stocks with a specific EIRiS environmental responsibility rating. The horizontal axis (x-axis) displays the five corporate environmental ratings from EIRiS: Average Environmental Rating, Environmental Policy, Environmental Management, Environmental Performance and Environmental Reporting. The Average Environmental Rating is calculated as the mean rating from the other four. For each environmental rating, five value-weighted portfolios with increasing environmental performance are calculated. The grey bars represent the portfolios with the "best" environmental rating, whereas the white bars represent portfolios rated lower than "best", such as, "2nd best", "median", "2nd worst", and "worst". The numbers at the bottom of each bar represent the number of average constituents in that portfolio.

Figure4: Lower Partial Moment - Kappa 3 of portfolios with varying EIRiS environmental responsibility ratings



Notes: These bar graphs show the lower partial moment of annually updated investment portfolios including stocks with a specific EIRiS environmental responsibility rating. The horizontal axis (x-axis) displays the five corporate environmental ratings from EIRiS: Average Environmental Rating, Environmental Policy, Environmental Management, Environmental Performance and Environmental Reporting. The Average Environmental Rating is calculated as the mean rating from the other four. For each environmental rating, five value-weighted portfolios with increasing environmental performance are calculated. The grey bars represent the portfolios with the "best" environmental rating, whereas the white bars represent portfolios rated lower than "best", such as, "2nd best", "median", "2nd worst", and "worst". The numbers at the bottom of each bar represent the number of average constituents in that portfolio.

Figure 5: Minimum (worst case) returns of portfolios with varying EIRiS environmental responsibility ratings



Notes: These bar graphs show the minimum return of annually updated investment portfolios including stocks with a specific EIRiS environmental responsibility rating. The horizontal axis (x-axis) displays the five corporate environmental ratings from EIRiS: Average Environmental Rating, Environmental Policy, Environmental Management, Environmental Performance and Environmental Reporting. The Average Environmental Rating is calculated as the mean rating from the other four. For each environmental rating, five value-weighted portfolios with increasing environmental performance are calculated. The grey bars represent the portfolios with the "best" environmental rating, whereas the white bars represent portfolios rated lower than "best", such as, "2nd best", "median", "2nd worst", and "worst". The numbers at the bottom of each bar represent the number of average constituents in that portfolio.

Table 1: Descriptive statistics of pension fund portfolios

Criteria	EIRiS Rating	Portfolio Excess Return				Number of Firms							Market Values (in billion US$)						
		Mean	Std. Dev.	Max	Min	2004	2005	2006	2007	2008	2009	2010	2004	2005	2006	2007	2008	2009	2010
Average Environmental Rating	5th Quintile	0.0093	0.0483	0.1454	-0.1886	733	634	631	597	598	549	523	84,746	78,010	81,383	81,982	72,546	34,698	43,662
	4th Quintile	0.0080	0.0481	0.1243	-0.1816	179	180	195	181	169	177	184	27,561	23,505	28,886	33,061	29,963	19,485	32,261
	3rd Quintile	0.0085	0.0492	0.1180	-0.1917	193	232	246	241	253	247	255	24,998	44,593	47,419	55,374	62,574	36,220	38,594
	2nd Quintile	0.0074	0.0470	0.1143	-0.1805	283	297	339	350	360	386	397	52,432	52,668	59,621	71,651	69,169	42,638	66,642
	1st Quintile	0.0083	0.0486	0.1183	-0.1427	116	122	140	151	161	172	160	19,926	26,693	44,205	53,019	54,711	35,418	47,447
Environmental Policy	Inadequate	0.0089	0.0495	0.1459	-0.1902	633	387	391	516	520	467	434	70,782	43,589	45,070	59,796	53,092	23,829	31,868
	Weak	0.0116	0.0497	0.1440	-0.2129	99	77	84	109	102	105	112	10,669	7,394	10,917	20,310	18,134	11,842	15,299
	Moderate	0.0104	0.0489	0.1340	-0.1766	200	175	180	216	219	225	219	24,671	20,936	25,846	41,194	38,019	20,757	26,560
	Good	0.0074	0.0455	0.1021	-0.1749	493	503	536	589	609	622	634	90,274	93,904	111,895	144,458	146,898	90,820	121,570
	Exceptional	0.0089	0.0558	0.1650	-0.1512	79	94	104	90	91	112	120	13,268	20,753	26,701	29,329	32,819	21,211	33,309
Environmental Management	Inadequate	0.0089	0.0482	0.1440	-0.1813	644	542	549	507	509	462	429	76,140	69,435	74,423	72,129	64,340	29,967	36,823
	Weak	0.0082	0.0542	0.1293	-0.2318	64	46	47	58	66	68	80	7,970	5,022	7,176	12,250	12,022	7,295	12,818
	Moderate	0.0086	0.0447	0.1065	-0.1686	251	283	298	293	275	284	297	39,014	46,994	55,065	69,704	59,652	37,503	48,578
	Good	0.0075	0.0498	0.1104	-0.2015	201	228	239	231	252	266	262	37,100	47,409	48,860	53,691	61,518	38,840	57,970
	Exceptional	0.0082	0.0485	0.1325	-0.1598	344	366	418	431	439	451	449	49,439	56,609	75,991	87,313	91,432	54,854	72,318
Environmental Performance	No or inadequate data	0.0085	0.0478	0.1374	-0.1869	746	618	704	652	667	620	566	102,382	80,929	89,391	89,979	85,586	46,350	55,311
	No improvement	0.0090	0.0571	0.1572	-0.2284	121	156	207	194	168	175	233	20,475	34,764	36,933	30,794	34,314	18,010	36,541
	Minor improvement	0.0083	0.0457	0.0993	-0.1719	153	198	323	310	303	300	321	27,313	41,598	59,073	74,751	57,960	37,751	50,254
	Major improvement	0.0069	0.0481	0.1253	-0.1793	113	125	250	273	298	330	305	25,919	32,543	53,112	64,991	72,269	47,505	58,678
	Significant improvement	0.0062	0.0447	0.0991	-0.1275	30	31	67	91	104	104	94	9,558	9,191	23,005	34,573	38,464	18,557	27,823
Environmental Reporting	Inadequate	0.0089	0.0462	0.1287	-0.1746	926	868	890	857	850	819	809	111,834	122,334	130,987	140,260	132,388	73,665	92,530
	Weak	0.0076	0.0607	0.1781	-0.2328	159	161	170	168	177	163	160	18,861	16,689	20,157	25,276	30,806	12,185	17,259
	Moderate	0.0072	0.0465	0.1153	-0.1860	283	286	330	326	348	380	382	55,271	51,117	65,680	74,156	71,086	48,021	72,747
	Good	0.0093	0.0605	0.1615	-0.2440	55	55	45	50	45	43	48	7,296	8,173	7,358	12,437	8,592	4,090	6,329
	Exceptional	0.0079	0.0477	0.1203	-0.1330	81	95	116	119	121	126	118	16,401	27,156	37,333	42,959	46,091	30,497	39,640

Notes: This Table reports descriptive statistics on each of the 25 pension fund portfolios, which are updated at the beginning of each year. The first column displays the environmental criteria integrated in the respective portfolios. The second column represents the rating of the respective portfolio. The subsequent four columns provide the descriptive statistics each portfolio's excess return (mean, standard deviation, maximum and minimum) over the sample period from 01/2004 to 05/2010. The number of firms included in each portfolio is displayed as of January of each year in the following seven columns. The last seven columns display the market value (in billion US$) of a pension fund portfolio as of January of the respective year, whereby we make the prudent conservative assumption that a pension fund portfolio would own 1% of each firm in our constructed portfolios (see Research Design section for our portfolio construction approach).

Table 2: Aggregated Measure: Average Environmental Rating

Environmental Criteria	EIRiS Rating	Carhart Model						
		α	β	SMB	HML	MOM	Obs.	Adj. R2
Average Environmental Rating	5th Quintile	-0.0012	0.9196***	-0.1936**	-0.0212	0.0087	77	0.9572
	4th Quintile	-0.0021	0.9464***	-0.1261	0.0372	0.0764**	77	0.9450
	3rd Quintile	-0.0003	0.9806***	-0.3089***	0.0297	0.1091***	77	0.9722
	2nd Quintile	-0.0007	0.9409***	-0.3308***	0.0746	0.0951***	77	0.9724
	1st Quintile	0.0001	0.9700***	-0.2962**	-0.0985	0.1461***	77	0.9241

Notes: This table reports Carhart model estimations for portfolios representing quintiles of average environmental rating, whereby the first (fifth) quintile portfolio includes firms with the highest (lowest) average environmental rating. Using market value weighted portfolios, we estimate the regressions according to equation (1) displayed in the text. The third column reports the results of the intercept (α). The next column is the market beta estimate. Column five to seven are coefficients of the common investment style factors size (SMB), intangible assets (HML), and momentum (MOM). The last two columns report the number of observations and the adjusted Rsquared, which can be understood as the percentage of explanatory power of our regressions. Coefficient covariances and standard errors are made heteroscedasticity and autocorrelation consistent based on Newey and West (1987). ***, **, and * indicate the 1%, 5%, and 10% significance level, respectively.

Table 3: Disaggregated Measures: Environmental Policy, Management, Performance & Reporting

Environmental Criteria	EIRiS Rating	Carhart Model						
		α	β	SMB	HML	MOM	Obs.	Adj. R2
Environmental Policy	Inadequate	-0.0019	0.9558***	-0.2048**	-0.0299	0.0099	77	0.9639
	Weak	0.0009	0.9110***	-0.0882	0.0479	0.0828**	77	0.9096
	Moderate	0.0007	0.9358***	-0.1109	-0.0292	0.0755***	77	0.9648
	Good	-0.0007	0.9325***	-0.3346***	0.0516	0.1203***	77	0.9765
	Exceptional	0.0005	1.0589***	-0.2279	-0.0619	0.1229*	77	0.9185
Environmental Management	Inadequate	-0.0014	0.9153***	-0.2427***	0.0279	0.0093	77	0.9492
	Weak	-0.0057**	1.1058***	0.0130	-0.1035	0.1178***	77	0.9301
	Moderate	0.0003	0.8951***	-0.3060***	0.0199	0.0934***	77	0.9626
	Good	-0.0004	1.0010***	-0.3418***	0.0582	0.1179***	77	0.9589
	Exceptional	-0.0006	0.9556***	-0.2131**	-0.0476	0.1044***	77	0.9615
Environmental Performance	No or inadequate data	-0.0019	0.9232***	-0.1570*	-0.0325	0.0217	77	0.9582
	No improvement	-0.0012	1.1263***	-0.2665***	-0.0448	0.0755***	77	0.9692
	Minor improvement	-0.0001	0.9238***	-0.2914***	-0.0221	0.1248***	77	0.9734
	Major improvement	-0.0013	0.9545***	-0.2861***	0.0918**	0.0944***	77	0.9702
	Significant improvement	-0.0012	0.8614***	-0.3057**	-0.0274	0.1291***	77	0.8902
Environmental Reporting	Inadequate	-0.0006	0.8960***	-0.2154***	0.0086	0.0560**	77	0.9616
	Weak	-0.0026	1.1745***	-0.1964*	0.0629	0.0513	77	0.9609
	Moderate	-0.0012	0.9239***	-0.2716***	0.0647	0.0873***	77	0.9692
	Good	-0.0012	1.1903***	-0.3773**	0.0341	0.1525***	77	0.9115
	Exceptional	0.0001	0.9645***	-0.3756***	-0.1188*	0.1554***	77	0.9064

Notes: This table reports Carhart model estimations for portfolios of firms with five different rating with respect to four EIRiS corporate environmental responsibility criteria (environmental policy, environmental management, environmental performance, and environmental reporting). Using market value weighted portfolios, we estimate the regressions according to equation (1) displayed in the text. The third column reports the results of the intercept (α). The next column is the market beta estimate. Column five to seven are coefficients of the common investment style factors size (SMB), intangible assets (HML), and momentum (MOM). The last two columns report the number of observations and the adjusted Rsquared, which can be understood as the percentage of explanatory power of our regressions. Coefficient covariances and standard errors are made heteroscedasticity and autocorrelation consistent based on Newey and West (1987). ***, **, and * indicate the 1%, 5%, and 10% significance level, respectively.

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