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

A realistic prudent investment test

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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, no study has yet investigated the financial effect 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 pension fund investment processes. We analyze 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 show zero indications that the integration of aggregated or disaggregated corporate environmental responsibility ratings into pension fund investment processes has any detrimental financial effect. Robustness tests for temporal consistency confirm this finding. 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

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1 Introduction

Pension funds have recently shown an increasing interest in considering environmental, social or governance (ESG) criteria in their investment processes (Cox, Brammer and Millington, 2004; Cumming and Johan, 2007; Petersen and Vredenburg, 2009). 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).

Indeed, many jurisdictions impose strict legal duties on pension fund decision makers which prevent them from an unconditional consideration of ESG criteria. Moreover, 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 concluded 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.

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

> 'What is the financial impact of ESG criteria consideration on a pension fund portfolio that complies with the legal duty of prudent action for proper purpose?'

This 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 analyze our research question, we develop a test of the prudent integration of any ESG criterion in realistic 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 abnormal financial performance of 25 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 concerned about the environment. 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 do not prohibit 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 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 analyzes 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 in an investment context was a marginal occurrence based on primarily religious beliefs having little to do with the financial merits of the moral standpoint manifested in the investment decision (Bengtsson, 2008a; 2008b; 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 organizations (Derwall, Koedijk and Ter Horst, 2011; Emel, 2002; Gifford, 2010). The use of ESG criteria seems to have become more about augmenting investment return than anything else. The United Nation's Environmental Programme Finance Initiative (UNEP FI), for example, depicts the purpose of ESG asset management as "*[...] enhance and supplement and not replace an asset manager's investment decision process [...]" (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 attractive risk adjusted 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 externalize (Amalric, 2006; Hawley and Williams, 2000; 2007; Mattison, Trevitt, van Ast, Gifford, Mnatsakanian, Watson, Zimmerman, Piani, Hoepner, Clemens-Hunt, Bacani and Mulder, 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 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 *"subvert .. a fiduciary's common law duty of undivided loyalty"* (Rounds, 2005: : 76).

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

Indeed, many jurisdictions' legal frameworks impose strict requirements on pension fund trustees to invest in a prudent fashion which is usually understood as taking all necessary precautions and aiming to achieve the best economic outcome for beneficiaries. 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') pension has dramatically changed (Dhaliwal, Radhakrishnan, Tsang and Yang, 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. It should strive for diversification and high risk adjusted return by investing according to the risk parameters specified in the investment policy and by making no other decisions than those in good faith for the economic benefit of the beneficiaries (Berry, 2011; Freshfields Bruckhaus Deringer, 2005; Richardson, 2007). A clear example of this understanding from US legislation can be found in Employee Retirement Income Security Act of 1974 (ERISA). ERISA § 404 states that a fiduciary shall discharge his duties:

> *"with the care, skill, prudence, and diligence under the circumstances then prevailing that a prudent man acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with like aims; [and] by diversifying the investments of the plan so as to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so".*

Similarly, in a 2008 US Department of Labor Bulletin, it is clarified that there is no permission for a pension fund to base an investment decision on any other factor than an economic one. The bulletin concludes: "*ERISA's plain text does not permit fiduciaries to make investment decisions on the basis of any factor other than the economic interest of the plan.*" (Interpretive Bulletin 2509.08-1).

Legal interpretations are similar in other common law countries. The British Pension Law Review Committee endorsed in 1993, what should later become known as the 'tie-break principle'. This principle suggests pension fund trustees to select the one of two investment strategies which beneficiaries would prefer from on ethical grounds if and only if the two investments offer the same financial benefits to beneficiaries (Goode, 1993). Australian pension fund legislation knows the sole purpose test, which requires trustees to ensure that an investment strategy is solely developed for the purpose of providing monetary benefits to beneficiaries upon retirement. (Freshfields Bruckhaus Deringer, 2005; Richardson, 2007). 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 barely be interpreted to include any meaningful support of pension funds' ESG integration. Table 1 summarises the pension fund legislation in the nine largest developed economies worldwide, which are jointly home to the majority of the world's 20 largest pension funds (Thamotheram and Wildsmith, 2007). It highlights that 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.[3]

[Insert Table 1 about here]

In this context, Freshfields Bruckhaus Deringer (2005) wrote a report aiming to answer a question raised by the Asset Management Working Group of the United Nation's Environmental Programme Finance Initiative (UNEP FI). This question can be read as follows:

> *"'Is the integration of environmental, social and governance issues into investment policy … voluntarily permitted, legally required or hampered by law and regulation; primarily as regards public and private pension funds … ?" (Freshfields Bruckhaus Deringer, 2005: : 6)*

The Freshfields report concluded that ESG consideration by pension funds is not only voluntarily permitted but legally required, if (i) it could reasonable be believed *"to be subject of clear consensus amongst beneficiaries"* or (ii) the ESG consideration is expected to have a positive effect on financial performance. Furthermore, the report suggests that as long as ESG considerations are motivated by proper purpose and do not adversely affect the financial performance of the entire portfolio, pension funds may take them into account in their investment decision making. However, whenever 'environmental', 'social' or 'governance' criteria might adversely affects the investment returns, pension funds are not permitted to consider them (Freshfields Bruckhaus Deringer, 2005: : 14).

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 as shown in Figure 1 (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 specialized 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?

(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?

[Insert Figure 1 about here]

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 institutionalized 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 performance exists to date (e.g. Kempf and Osthoff, 2007; Lo and Sheu, 2007; Scholtens, 2008; Scholtens and Zhou, 2008). Other studies have 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 pension fund equity investment strategies. We limit our test to equity investment strategies for three reasons. First, motivating, developing and analyzing 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 and jointly represent the vast majority of all pension funds' assets (Ferreira and Matos, 2008; OECD, 2010). Third, the integration of ESG criteria into investment portfolios is, from a financial performance perspective, criticized 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, Stambaugh and Levin, 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 maximize .. economic return[…] and therefore need not be defended - and cannot be attacked -*

as a social pursuit" (Simon, Powers and Gunnemann, 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).

Second, we aim to embed our test in a realistic and generic pension fund investment process, which can be customized 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. 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."* 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 and Urwin, 2008; Clark, Salo and Hebb, 2008; Figge and Hahn, 2004; Martin, 2009; Nilsson, Cunnigham and Hassel, 2008; Thamotheram and Wildsmith, 2007; Thomas, Repetto and Dias, 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. Our aim to nest our test in a doubtlessly prudent investment process is also the reason for us to construct long

only portfolios and prohibit more complex and potentially risk transactions such as short selling or derivatives.[4] Similarly, to ensure a clearly prudent diversification, we value weight all equities in our portfolios and prohibit other approaches such as equal weighting. 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 reallocation. If we permitted equal weighting, this scenario would represent a possibly substantial bias of our results.

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 asset worth at least several billion US$ (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 customize in anyway 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 and to accommodate a realistically large set of practical investment styles, which could be implemented in our ESG criteria considering baseline pension fund portfolios.[5] 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. Since we do not make any investment style choice prior to the construction of these sub-universes, which function as our 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 analyze the financial performance difference between a median ESG rated portfolios and its peers with a more extreme ESG rating.[6]

3.3 ESG data provider

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, 2011d). Second, EIRiS is an independent, non-for-profit organization 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 organizational structure for an institution assessing corporate ESG performance worldwide. All competitors are for-profit organizations, 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; 2011c; Jahn, 2004; MISTRA, 2005; Schäfer, Beer, Zenker and Fernandes, 2006). Third, EIRIS is not only a non-for-profit organization 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, Beer, Zenker and Fernandes, 2006).

Fourth, EIRIS has an excellent track record with academics and non-governmental organizations (NGOs). Academics have criticized 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, Levine and Toffel, 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, Brammer and Millington, 2004; 2007; Dam and Scholtens, 2010; Dam, Scholtens and Sterken, 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, 2011d; 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 analyze 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; 2011a).

3.4 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.[7] Inevitably, our article 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 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, Brammer and Millington, 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).

3.5 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 in 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,[8] as we acknowledge that the US is (still) the most powerful and hence potentially least risky economy in the world.

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, Koedijk and Otten, 2005; Kempf and Osthoff, 2007; Statman and Glushkov, 2009). 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, Koedijk and Otten, 2005; Bauer, Derwall and Otten, 2007; Hoepner, Rammal and Rezec, 2011; Renneboog, Ter Horst and Zhang, 2008b). The size factor SMB is generated as the return difference between a portfolio of stocks in the lower half of the market capitalization 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.[9]

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

4.1 Descriptive Statistics

We display descriptive statistics for our 25 large pension fund portfolios in Table 2, 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 2 about here]

4.2 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 3 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 Rsquared 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 3 about here]

4.3 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 4. 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 4 about here]

5 Robustness tests[10]

We conduct sets of two robustness tests of the temporal stability of our results. 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.

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 recognize 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 is the financial impact 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 analyze 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 results 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. As the Adjusted Rsquared values of our 25 analyses are very high (between 89 and

98%) and our results are consistent over time, we are confident to conclude that the integration of corporate environmental responsibility criteria into the investment processes of environmentally interested pension funds does not seem to have any significant detrimental financial effect. 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 are arguably the most important asset class for pension funds' financial performance (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.

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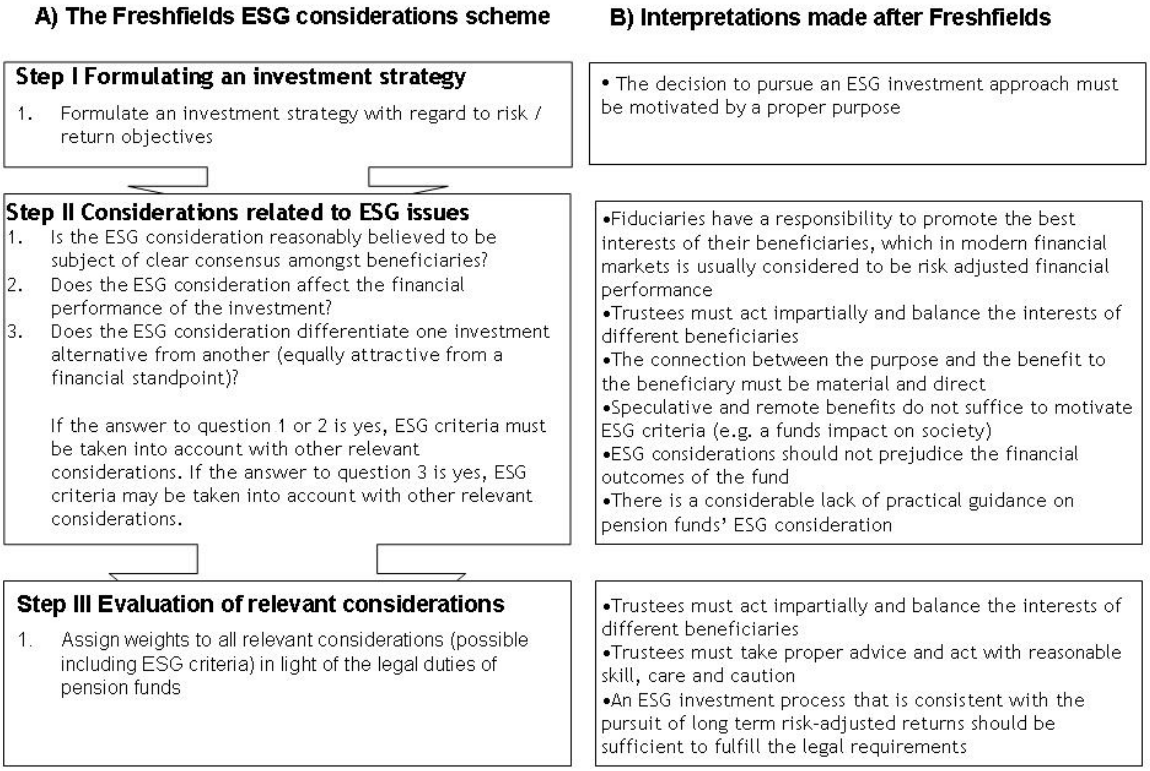
Tables and Figures

Table 1: Overview on international pension fund legislation

	Country	Disclosure of ESG considerations requirement	Diversification requirement	Legal duty to…	Other considerations
Fiduciary Duties	Australia	Yes	Yes	… act prudently* and to act for proper purpose**	Sole purpose test
	Canada	No	Yes	…act prudently* and to act for proper purpose**	
	UK	Yes	Yes	… act prudently* and to act for proper purpose**	Tie-break principle
	US	No	Yes, based on Modern Portfolio Theory	… act prudently* and to act for proper purpose**	Modern prudent investor rule
Civil Law Duties	France	Yes	Yes- "adequate spread of risks."	… act prudently and insure profitability by maximizing investment returns	
	Germany	Yes	Risk and liquidity requirements	… manage investments professionally to ensure highest possible security and profitability (sustainable profit)	Neither requirement for pension funds to consider ESG nor prohibition against. If, pension considers ESG, transparency is needed
	Italy	Yes	Requirements with regard to investment limits and eligible assets	…to act professionally in the interests to obtain the best result given the level of risk	Ensure fair dealing and act as *bonus pater familias* (good father of family). Little legal guidance on how to implement ESG.
	Japan	No	Profit maximization principle. Screening or other ESG criteria must be used in order to maximize return.	… act in good faith and exercise reasonable care of a hypothetical good manager	Due diligence based on generally accepted practices
	Spain	No	Explicit diversification requirement	…act diligently in the interests of the beneficiaries the and to ensure profitability	No legal provisions for, or explicit prohibitions against, making ESG considerations.

Notes: This Table is an adaptation of a "Duties diagram 1: Pensions" in Freshfields Bruckhaus Deringer (2005: 15) complemented with additional information from Berry (2011), Dhaliwal et al. (2010), Freshfields Bruckhaus Deringer (2005), Renneboog et al. (2008a) and UNEP FI (2009). *Act prudently means; a) act reasonably, b) apply special skill and knowledge, c) consider the suitability of investments, d) make relevant considerations, e) act with care, skill, and diligence, f) diversify the investments and f) take proper advice. **In the Freshfields report, proper purpose is given the following meaning a) carry out the terms of the trust and b) act in the best interest of the beneficiary.

Figure 1: An update of Freshfield Bruckhaus Deringer's (2005) ESG consideration scheme



Notes: Column A is an adaptation of table "Taking ESG considerations account scheme" in Freshfields Bruckhaus Deringer (2005: 14). Column B is based on interpretations made after the Freshfields report by Sandberg (2010), Richardson (2007; 2011), OECD (2007), Taylor and Donald (2007), and Collie and Myers (2008). It also includes references to Cowan v. Scargill [1985] 1 Ch 270, as this case has been viewed to be of similar importance as the Freshfields report.

Table 2: 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 3: 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 4: 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.

Endnotes

[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 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.

[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.

[3] 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, ter Horst and Zhang, 2008a)

[4] 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)

[5] This aim 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)*

[6] 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.

[7] 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.

[8] 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.

[9] 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 (2008b) slightly amended procedure. Renneboog et al. (2008b: 307) find that their 'factors are virtually identical' to the ones of Fama and French (1993).

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