



Can socially responsible investment for cleaner production improve the financial performance of Spanish pension plans?☆



Carmen-Pilar Martí-Ballester*

Business Department, Center for Studies and Research in Humanities, Universitat Autònoma de Barcelona, 08193 Bellaterra, Barcelona, Spain

ARTICLE INFO

Article history:

Received 27 September 2013

Received in revised form

15 June 2014

Accepted 18 June 2014

Available online 28 June 2014

Keywords:

Pension plans

Socially responsible business strategies

Cleaner production

Financial performance

Multi-index models

Panel data

ABSTRACT

Assets under management involved in socially responsible investing almost trebled from 2007 to 2011 in Europe, led by pension funds. Such growth has encouraged the implementation of socially responsible activities by companies, which have improved their cleaner production methods in order to reduce greenhouse gas emissions, total water used, energy consumption and waste generated, among others. Integrating environmental, social and governance policies for cleaner production into the investment strategy of pension plans could increase their cost deriving from the screening process and/or increase the benefits, because socially responsible companies in which pension funds invest might achieve a better financial performance than traditional companies, which could in turn affect pension plans' financial performance. For this reason, the aim of this paper is two-fold: firstly, to examine the financial performance of Spanish pension plans compared to market benchmarks taking into account the category to which they belong, and the socially responsible business strategy implemented by the manager; and secondly, to analyze whether differences in financial performance exist between solidarity pension plans, ethical pension plans and traditional pension plans. To do this, we have a sample of 651 individual system pension plans. Using these sample data, we implement the robust random effects panel data methodology. The results show that ethical pension plans, which invest in companies that improve their cleaner production methods, achieve a similar financial performance to conventional pension plans, while solidarity pension plans significantly outperform conventional pension plans.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

In recent years, individual investors, media, non-governmental organizations (NGOs) and governments have focused on the impact of financial institutions' investment on the environment and society (Eurosif, 2012; Goy and Schwarzer, 2013; OECD, 2007). This has encouraged pension and mutual fund managers to adopt social responsibility management strategies based on (1) donating part of the revenues to charity and/or doing community work (responsive social responsibility strategy), which improves their reputation and therefore the financial performance, as found by Smith and Higgins (2000), Brammer and Millington (2008) and Margolis et al. (2007), and/or (2) integrating social and environmental initiatives into their core management strategy (strategic social responsibility strategy) which enables them to create a

competitive advantage while satisfying the demands of their stakeholders, thereby also improving their financial performance, as shown by Callan and Thomas (2009).

The latter investment strategy, implemented by ethical pension plans, consists of adopting negative screening methods and/or positive screening methods, with managers able to combine both screening methods, as mentioned by Goy and Schwarzer (2013) and O'Rourke (2003).

The negative screening methods consist of excluding stocks of companies that belong to a sector characterized by unsatisfactory behaviors or whose practices are not aligned with specific norms, such as the United Nations Principles for Responsible Investment (UN-PRI). These principles, launched by UNEP Finance Initiative and the UN Global Compact, provide a unifying framework that is internationally recognized and accepted by 1249 signatories around the world – whose assets under management reached USD 34 trillion at the end of April 2013 (UN-PRI Global Compact, 2013) – including financial entities that manage ethical pension plans in Spain. The adoption of these principles requires that signatories ask companies in which they invest to adopt and support a set of core values in the areas of human rights, labor standards, the

* The author is grateful to the journal's Editorial Board (Prof. Vincent Blok and Prof. Donald Huisingh) and several anonymous referees for their helpful comments.

* Tel.: +34 935814425.

E-mail addresses: CarmenPilar.Marti@uab.cat, CarmenPilar.Marti@gmail.com.

environment and anti-corruption, and promoting more efficient use of human and natural resources, which improves their operating results (UN-PRI Global Compact, 2013).

On the other hand, positive screening methods consist of selecting, within a given investment universe, stocks of companies that perform best against a set of social, environmental and governance criteria. Among positive screening methods, the most popular is the “Best in Class” (Goy and Schwarzer, 2013), which involves ranking companies according to environmental, social and governance factors relative to industry peers and selecting the firms that score highly on these factors, both individually and as a whole (Brown and Stone, 2007; Goy and Schwarzer, 2013; O'Rourke, 2003). Therefore, managers, as well as taking into account social and governance issues, assess and reward firms that (1) integrate environmental issues in their strategy taking into account the role of the executive in environmental work, environmental policy and environmental programs implemented (such as eco-efficiency programs minimizing unwanted social and environmental consequences), among others; (2) develop sustainability-advantage products that can be recycled; (3) use production systems that reduce water used, toxic emissions and energy consumption, adopting renewable energy; (4) have environmental certifications (for example ISO 14001), using environmental audits and (5) report on the environmental impact of their business activities, by using eco-labels, etc. (O'Rourke, 2003; Said et al., 2013). For this reason, Ortas et al. (2013) and O'Rourke (2003) state that the above-mentioned positive screening method recognizes cleaner production processes and innovations, which is important for capturing investment in cleaner production.

The use of cleaner production processes and innovation by companies could allow them to gain in productivity, due to (1) operational efficiencies resulting in cost savings, (2) the reduction of the cost of attracting top talent to the company and (3) the improvement of the margin coming from offering sustainability-advantaged products to customers, while at the same time reducing their exposure to risks, which gives companies a competitive advantage and improves their financial performance (Gallardo-Vázquez and Sanchez-Hernandez, 2014; O'Rourke, 2003). The higher financial performance of firms that adopt corporate social responsibility strategies for cleaner production could affect the financial performance achieved by mutual and pension fund managers who make their investment decisions based on sustainability (Barnett and Solomon, 2006; Freeman, 1984; Hill et al., 2007; Hillman and Keim, 2001; Humphrey and Lee, 2011; Kempf and Osthoff, 2007; Lee et al., 2010; Wahba, 2008). From the stakeholder theory perspective, ethical fund managers characterized by integrating environmental, human rights, social and/or stakeholder issues into their investment strategies could obtain a higher performance than conventional and solidarity mutual and pension fund managers (Ferruz et al., 2010; Gil-Bazo et al., 2010; Statman, 2000).

However fund managers who limit their universe of investment to firms that pass an ethical screening, might find themselves unable to adequately diversify the portfolios of ethical funds (Barnett and Solomon, 2006; Bauer et al., 2006; Cortez et al., 2009), losing investment opportunities while increasing information costs due to screening (Aslaksen and Synnestrødt, 2003). This could produce a lower risk-adjusted return from modern portfolio theory (Markowitz, 1952) as found by Jones et al. (2008). Adopting the postulates of portfolio theory based on building a diversified portfolio that maximizes return while minimizing risk, charity and solidarity fund managers offer the possibility of donating part of the revenues to charity or social projects by the investors and/or financial group promoting the fund (Signori, 2009). This could increase the costs of mutual and pension

funds, reducing the risk-adjusted return with respect to conventional mutual funds.

Taking the above into account, the main aim of this paper is to determine which business strategy—traditional business strategy implemented in conventional funds, responsive social responsibility strategy adopted in solidarity funds or strategic social responsibility strategy used by ethical funds—enables pension fund managers to obtain a better risk-adjusted financial performance. Said pension fund industry has received less attention from researchers than the mutual fund industry probably because it is difficult to obtain reliable data. Consequently, this study gains importance.

This paper is organized as follows. The next section reviews the literature background of SRI and develops the hypotheses. After that, section three describes the research method. Section four reveals the results obtained and the final section draws some conclusions and discusses a future research agenda.

2. Literature review

The asset under management in socially responsible investing has increased from 2665.4 billion Euros at the end of 2007–6763.4 billion Euros at the end of 2011 in Europe according to the European Sustainable Investment Forum (Eurosif, 2012). The increasing popularity of socially responsible investing has attracted the interest of academics and practitioners to determine the effects of ethical screening on the financial performance of mutual funds and pension plans, typically finding that on a risk-adjusted basis, ethical funds do not underperform compared to conventional funds and their market benchmarks.

Thus, Mallin et al. (1995), using the single factor Jensen alpha model,¹ find ethical trusts underperform on the US market, obtaining an insignificantly higher performance than their matched conventional pairs, as appears in Statman (2000). This result is consistent with that obtained by Gregory et al. (1997) analyzing the UK ethical unit trusts market, and Capelle-Blancard and Monjon (2012) for the French equity and balanced socially responsible funds market. However, these findings should be interpreted with caution as the Jensen performance measure does not account for risk associated with small cap growth stocks (Bauer et al., 2005, 2007; Luther and Matatko, 1994) which could comprise a larger part of ethical equity and balanced portfolios (Cortez et al., 2012; Jones et al., 2008; Luther and Matatko, 1994). Consequently, the estimation of Jensen's alpha could be biased (Gregory et al., 1997).

To overcome this problem of omitted benchmarks, Luther and Matatko (1994) include two benchmarks, the broad market index and the index for companies with a low market capitalization, concluding that it is more appropriate to evaluate UK fund performance using a multi-index model than a single-index model, although the results confirm that there are no significant differences between ethical and conventional funds, as stated in Gregory et al. (1997) and Kreander et al. (2005). Similar findings show Cummings (2000) for the Australian market using a model with three common market benchmarks and Benson et al. (2006) for the US ethical mutual funds market using a model with different industry benchmarks representing the potential industry composition of the investment portfolio.

¹ The Jensen's Alpha is calculated as follows: $\alpha_m = (R_{mt} - R_{ft}) - [\beta_b(R_{mt} - R_{ft}) + \epsilon_{mt}]$, where α_m represents the added value of mutual funds' active management with respect to the benchmark. $R_{mt} - R_{ft}$ represents the excess return of the mutual fund m at moment t over the risk-free asset. β_b represents the systematic risk. ϵ_{mt} is the random error term.

In addition to small cap bias, ethical funds could have a different exposure to growth-oriented companies than conventional funds, as stated by Bauer et al. (2005), Cortez et al. (2012), Ferruz et al. (2010) and Gregory et al. (1997). To control the fund investment style, Cortez et al. (2012) propose using multifactor models. Thus, Bauer et al. (2005) employing the Carhart (1997) 4-factor model, find that the differences between the financial performance of German, UK and US ethical funds and their matched sample of conventional funds are statistically insignificant for the 1990–2001 period, being unable to outperform the ethical index. This is consistent with Kempf and Osthoff (2008). On the contrary, Jones et al. (2008) show that Australian ethical mutual funds significantly underperform their benchmark market while Gil-Bazo et al. (2010) find that US ethical mutual funds obtain a better performance than conventional funds for the 1997–2005 period. This last finding is driven by ethical mutual funds managed by companies specialized in socially responsible investing which significantly outperform their conventional counterparts, while ethical mutual funds managed by companies not specialized in socially responsible investing underperform US conventional funds.

However, these results could be biased, so the above-mentioned authors assume that the portfolio risk associated with economic variables is fixed for the entire performance period when it is well-known that managers trade on publicly available information (Bauer et al., 2006). Given that the risk premiums associated with economic variables could be potentially relevant in evaluating fund performance (Elton et al., 1995; Ferson and Schadt, 1996), Renneboog et al. (2008) analyze the effect of using multi-factor unconditional and conditional models on the differences between ethical and conditional funds, finding that none of the conditional alphas of socially responsible funds around the world are statistically significant as regards those of counterpart funds, while in almost all countries unconditional alphas of socially responsible funds are lower than those of conventional funds. For this reason, Bauer et al. (2005) have adopted conditional multi-factor models to compare risk-adjusted return between ethical and conventional funds in German, UK, and US markets, finding that any risk-adjusted return differential between socially responsible funds and their conventional counterparts is statistically insignificant, confirming previous outcomes. Similar results were obtained by Bauer et al. (2006), Humphrey and Lee (2011), Bauer et al. (2007), Gregory and Whittaker (2007) and Ferruz et al. (2010) for the Australian, Canadian and UK markets, respectively.

The above-mentioned authors have demonstrated that conditional multifactor models provide explanatory power for evaluating equity funds performance. However, Derwall and Koedijk (2009) analyze US fixed income and balanced funds, using what they consider to be a conditional multi-index model that includes a set of benchmarks which capture the entire spectrum of investment exposures a fund might have for assessing the financial performance. Their results show that there are no significant differences between the risk-adjusted return of socially responsible bond funds and conventional funds while socially responsible balanced funds outperform their matched conventional balanced funds. These differential alphas are not statistically significant when they are controlled by fund-specific attributes such as expenses, fund size and turnover.

Other authors, Bauer et al. (2005), Kreander et al. (2005), Benson et al. (2006), Jones et al. (2008), Kempf and Osthoff (2008), Gil-Bazo et al. (2010), Humphrey and Lee (2011) and Capelle-Blancard and Monjon (2012) have also analyzed the effect of fund-specific attributes on the financial performance of the fund. Thus, managers who obtain a better performance could charge higher management fees or expense ratio (Kempf and Osthoff, 2008; Kreander et al., 2005), being higher for socially responsible funds than

conventional funds (Benson et al., 2006), which could be due to higher search information costs associated with ethical screening requirements applied in socially responsible funds (Jones et al., 2008). These higher costs could affect the differences between the financial performance of conventional and ethical funds.

Fund management expenses may spread across a greater asset base because of the existence of economies of scale in management funds (Barnett and Solomon, 2006; Gregory et al., 1997), which would cause large funds to outperform small funds, as shown by Jones et al. (2008) and Capelle-Blancard and Monjon (2012) in the ethical fund market. However, the European ethical funds market is still at an early stage of development compared with European conventional markets (Bauer et al., 2006). This would explain the statistically significant differences between the average ethical fund's assets under management and the average conventional fund size found by Kempf and Osthoff (2008). These differences could mean that conventional funds can enjoy greater economies of scale than ethical funds, enabling them to outperform the latter.

The cost structures could also differ depending on the fund's age, as pointed out by Barnett and Solomon (2006), due to the experience and learning effect that benefit older funds from picking stocks and bonds and managing their portfolios, enabling them to charge lower fees (Gregory et al., 1997; Malhotra and McLeod, 1997). In keeping with this, Jones et al. (2008) find that older ethical funds outperform younger ethical funds. However, the average age of conventional funds is significantly higher than that of ethical funds (Kempf and Osthoff, 2008), which could affect the differences between ethical financial performance and the performance of conventional funds. These commented differences in financial performance could change over time, decreasing as the ethical funds market matures, due to a lower and steeper learning curve slope (Balasubramanian and Lieberman, 2010). Likewise, Bauer et al. (2006) point out that during the period from 1992 to 1996 domestic ethical funds underperform their conventional funds while from 1996 to 2003 ethical funds reach the financial performance of their conventional peers. Similar results were obtained by Bauer et al. (2005) for the German and US ethical fund markets.

This result confirms modern portfolio theory (Markowitz, 1952) and stakeholder theory (Freeman, 1984). In the earlier phase of development, ethical fund managers are unable to obtain a similar or better risk-adjusted return than those of conventional funds and solidarity funds, probably because their universe of investment is limited by screening, thereby decreasing the probability of building a well-diversified portfolio and increasing search and information costs (Bauer et al., 2006). This could increase the cost of ethical funds, decreasing their financial performance, in line with the postulates of modern portfolio theory. According to this theory, solidarity funds may underperform conventional funds due to the increase in costs derived from donations to social projects and/or charity.

In the later phase of development, the ethical fund manager may be able to improve financial performance as regards that obtained by conventional fund managers due to the growth of their universe of investment. Therefore, more companies wish to benefit from the advantage of adopting socially responsible activities in their core business strategy, enabling them to better diversify their portfolios. Furthermore, the firms selected in ethical portfolios, which initially implemented socially responsible business strategies, obtain a better financial performance than traditional firms in the long term (Hill et al., 2007) due to their positive stakeholder relationship. This would allow ethical funds to outperform conventional funds in the later phase of development in accordance with stakeholder theory.

Given that the Spanish ethical pension funds market is in an early phase of development, receiving less attention from

researchers than mutual funds or traditional investment probably as a result of the lack of reliable data, we evaluate the performance of individual systems' pension plans depending on business strategy, as pointed out by Porter and Kramer (2006). We differentiate between ethical pension plans which integrate ethical screening in their investment strategy (strategic social responsibility strategy), solidarity pension plans aimed at maximizing the return and minimizing the risk, donating part of their return to social projects and/or charity (responsive social responsibility strategy) and traditional pension plans in which case the managers try to maximize risk-adjusted return (traditional investment strategy).

Therefore, we propose:

H1. Ethical pension funds underperform conventional pension funds.

H2. Solidarity pension funds underperform conventional pension funds.

H3. Solidarity pension funds outperform ethical pension plans.

3. Research method

3.1. Sample and data collection

Our primary data sources are (1) the Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO), which provides monthly information on the characteristics of various individual² pension plans such as volume of asset, number of participants, pension plan category and monthly liquidation values, (2) Morningstar and United Nations, which announce the presence of a solidarity and social investment policy, and (3) the Directorate-General of Insurance and Pension Funds (DGSFP), which provides quarterly information on management and custodial fees, the names of management and custodial companies, and the date on which the plans were created, covering the period December 31, 2007 to February 28, 2013. After excluding those pension plans lacking more than two consecutive data, we have information on 552 conventional pension plans and 99 socially responsible pension plans (34 solidarity pension plans and 65 ethical pension plans), enabling us to overcome the inherent problem of survivorship bias involved in matched pairs samples used by Gregory et al. (1997), Kreander et al. (2005), Gil-Bazo et al. (2010) and Derwall and Kowdijk (2009), as mentioned by Gregory and Whittaker (2007).

We also obtain supplementary data from Financial International Analysts (AFI), Financial Times Stock Exchange (FTSE), Spanish Stock Exchanges and Markets (BME) and Morgan Stanley Capital International (MSCI), which provide us with a set of benchmark indexes, and from the National Institute of Statistics (INE), which gives us data on the Spanish inflation rate and economic development (industrial production growth) to evaluate pension plan performance.

3.2. Measures of financial performance

Different authors, Lee et al. (2010) and Benson et al. (2006), point out that the implementation of socially responsible strategies by mutual fund managers could affect the financial performance of mutual funds. Likewise, the adoption of ethical and philanthropic

strategies could influence pension plan financial performance. For this reason, we use the pension plan financial performance as a dependent variable and the pension plan management strategy as an independent variable.

Thus, as a proxy of pension plan financial performance, a modified Jensen's alpha measure is used, obtained using the following multi-index model, including several indexes (Benson et al., 2006; Derwall and Koedijk, 2009), which represent the types of assets in which Spanish plans may invest, and economic information:

$$\begin{aligned} \alpha_p = & (R_{pt} - R_{ft}) - [\beta_{1p}(TBILL_t - R_{ft}) + \beta_{2p}(MTTB_t - R_{ft}) \\ & + \beta_{3p}(LTTB_t - R_{ft}) + \beta_{4p}(GROWTH_t - R_{ft}) \\ & + \beta_{5p}(VALUE_t - R_{ft}) + \beta_{6p}(SMALLCAP_t - R_{ft}) \\ & + \beta_{7p}(WORLD_t - R_{ft}) + \beta_{8p}(IBEX35_t - R_{ft}) \\ & + \beta_{9p}(\text{Inf}_t - \text{Inf}_{t-1}) + \beta_{10p}(\text{IPG}_t - \text{IPG}_{t-1}) + \varepsilon_{pt}] \end{aligned} \quad [1]$$

where α_p represents the added value of pension plans' active management net of expenses with respect to a set of passive portfolios or benchmarks. $R_{pt} - R_{ft}$ represents the excess return between pension plan p at the moment t and the one-day AFI Repos index used as risk-free rate. TBILL is the return of AFI Treasury Bill Index, MTTB denotes the return of AFI Medium term Treasury Bonds Index, LTTB represents the return of AFI Long Term Treasury Debentures Index, GROWTH denotes the return of Spanish MSCI³ growth index, VALUE represents the return of Spanish MSCI value index, SMALLCAP is the return of Spanish MSCI small-cap index, WORLD denotes the return of Spanish MSCI world index, IBEX35 represents the return of the Spanish Stock Market. We employ $\text{Inf}_t - \text{Inf}_{t-1}$ to measure the changes in monthly inflation and $\text{IPG}_t - \text{IPG}_{t-1}$ to measure changes in monthly industrial production growth in a similar way to Derwall and Koedijk (2009) and Cortez et al. (2012). Therefore, the management of portfolio risk and its performance could change with economic conditions (Christopherson et al., 1998). ε is the random error term, which is corrected for autocorrelation and heteroskedasticity using the Newey–West technique.

Different authors, Kreander et al. (2005), Benson et al. (2006), Derwall and Koedijk (2009), Lee et al. (2010) and Capelle-Blancard and Monjon (2012), use the same benchmarks to evaluate the performance of conventional and ethical mutual funds. However, this could provide a Jensen's alpha biased for ethical mutual or pension funds, so the investment "style" of conventional benchmarks could be different to the investment "style" of socially responsible mutual funds or pension plans (Bauer et al., 2005; Statman, 2000). For this reason, we propose the following model to evaluate the performance of ethical Spanish pension plans:

$$\begin{aligned} \alpha_p = & (R_{pt} - R_{ft}) - [\beta_{1p}(TBILL_t - R_{ft}) + \beta_{2p}(MTTB_t - R_{ft}) \\ & + \beta_{3p}(LTTB_t - R_{ft}) + \beta_{4p}(FTSE4IBEX35_t - R_{ft}) \\ & + \beta_{5p}(FTSE4GLOBAL_t - R_{ft}) + \beta_{6p}(\text{Inf}_t - \text{Inf}_{t-1}) \\ & + \beta_{7p}(\text{IPG}_t - \text{IPG}_{t-1}) + \varepsilon_{pt}] \end{aligned} \quad [2]$$

² Individual pension plans are promoted by financial companies and open to any participant. They are managed in a similar way to mutual funds, and accumulate a volume of assets under management and number of participants that are much higher than occupational pension plans, promoted by firms and only open to their employees.

³ MSCI Company has style indexes adapted to the Spanish market. Including these could provide robust estimators (Bauer et al., 2007). On the contrary, the FTSE Company does not have them.

where α_i represents the added value of pension plans' active management net of expenses with respect to a set of passive portfolios or benchmarks. $R_{pt}-R_{ft}$ represents the excess return between pension plan p at the moment t and the one-day AFI Repos index used as risk-free rate. TBILL is the return of AFI Treasury Bill Index, MTTB denotes the return of AFI Medium term Treasury Bonds Index, LTTB represents the return of AFI Long Term Treasury Debentures Index, FTSE4IBEX35 is the return of FTSE4GOOD IBEX Index, which includes all companies in the Ibex35 and FTSE Spain All-Cap—enabling us to overcome the small size bias in socially responsible funds mentioned by Luther and Matatko (1994), Gregory et al. (1997), Cummings (2000) and Cortez et al. (2012)—that meet the FTSE4GOOD environmental, social and stakeholder, human rights, supply chain labor standards and countering bribery criteria. FTSE4GLOBAL represents the return of FTSE4Good Global Benchmark Index,⁴ which includes all companies in the FTSE All World Developed Index that meet the above-mentioned corporate responsibility criteria. We employ $\ln I_{t}-\ln I_{t-1}$ to measure the changes in monthly inflation and $\ln IPG_{t}-\ln IPG_{t-1}$ to measure changes in monthly industrial production growth. ε is the random error term, which is corrected for autocorrelation and heteroskedasticity using the Newey–West technique. Both models [1] and [2] are estimated using net and raw returns of annual management and custodial fees, respectively.

3.3. Measures of social activities

According to Porter and Kramer (2006), pension plan managers could involve their management activity in society by (1) mitigating generic social problems (responsive social responsibility), for example by making donations to non-governmental organizations and/or (2) integrating socially responsible issues within their core business strategy (strategic social responsibility), for example investing in firms' stocks taking into account, as well as their risk-return relation derived from modern portfolio theory (Markowitz, 1952), their socially responsible behavior derived from stakeholders theory (Freeman, 1984; Freeman and Gilbert, 1988). Said socially responsible behavior is based on the firms' compliance with positive (inclusion) and/or negative (exclusion) environmental, social and ethical criteria established in the code of ethical values by the Ethical Committee and published in the pension plan's prospectus. Inclusion screening consists of investing in companies that integrate social and environmental criteria in their activity (fostering socially responsible behavior among suppliers, customers and society, obtaining ISO 14001, UNE 165001, OHSAS 18001 certifications, producing renewable energy, human rights, among others) while criteria for exclusion usually consist of not investing in firms that make and/or finance material for military use (cluster bombs, anti-personnel mines, etc.) and/or tobacco and/or alcohol and/or nuclear power (Aslaksen and Synnestvedt, 2003). Most Spanish socially responsible investment and pension funds combine both criteria according to the Spanish Association of Investment and Pension Funds (INVERCO).

The implementation of responsive social responsibility strategy or strategic social responsibility strategy could influence the financial performance of Spanish pension plans (Porter and Kramer, 2006). For this reason, we include two dummy variables: RSR (Responsive Social Responsibility strategy) and SSR

(Strategic Social Responsibility strategy). The first dummy variable (RSR) takes the value of 1 if the pension plan's manager invests the asset of pension plans in firms' stocks considering their risk-return binomial, giving a part of the management fee to social projects or non-governmental organizations and 0 if not. The second dummy variable (SSR) has the value of 1 if the pension plan's manager invests the asset of pension plans in firms' stocks taking into account positive and/or negative screenings and 0 if it is otherwise.

3.4. Control variables

Previous literature demonstrates that other factors such as fees, size, age and portfolio composition could influence the financial performance of collective investment institutions. For this reason, we include MFEE, CFEE, LASSET, LASSETMC, LINV, LINVMC, LAGE, STFI, LTFI, MFI, EQ, ME as control variables. Different authors such as Kreander et al. (2005) demonstrate that fees paid by mutual funds and pension plans influence their performance, and so we introduce MFEE and CFEE variables in our model, which represent the management fee and custodial fee paid to management and custodial companies for their service, respectively. To manage ethical pension and mutual funds the managers increase the screening in selecting stocks. This may lead to higher information costs (Aslaksen and Synnestvedt, 2003) and would explain why these funds are more expensive than mutual funds with similar characteristics, as mentioned by Bauer et al. (2005).

The fee paid by pension plans or mutual funds could vary depending on the volume of assets managed by the management company due to the existence of scale and scope economies (Martí et al., 2009), which could affect the financial performance of the collective investment institutions. To control the size effect, we introduce the LASSET, LASSETMC, LINV, LINVMC variables. Thus, the LASSET variable represents the natural logarithm of the asset pension plan, the LASSETMG variable is calculated as the natural logarithm of total assets managed by each management company, the LINV variable is measured as the natural logarithm of mean investment per participant of each pension plan and LINVMC represents the natural logarithm of the number of mean investments per participant of each management company.

Those pension plans commercialized in the market for longer could accumulate a higher volume of assets and participants and have more experience in the market than those plans created more recently. This could influence their performance. To control the effect of experience and learning on pension plans (Barnett and Solomon, 2006; Bauer et al., 2005; Cummings, 2000), we introduce the LAGE variable in our model which is measured as the natural logarithm of the number of years passed from the date of inception. We also introduce dummy variables STFI, LTFI, MFI, EQ, ME in the model, which represent the investment style of the pension plan (Wermers, 2000). Thus, the STFI variable takes the value of 1 if the pension plan portfolio is composed of treasury bills, bonds and debentures, with their average duration being less than two years, and 0 if not. The LTFI variable takes the value of 1 if the portfolio consists of fixed income securities, with their average duration being higher than two years, and 0 if not. The MFI variable takes the value of 1 if the portfolio is made up of less than 30 per cent equities, and 0 if not. The EQ variable has the value of 1 if the portfolio consists of more than 75 per cent assets in equities, and 0 if not. The ME variable takes the value of 1 if between 30 per cent and 75 per cent of the portfolio is invested in equities (ME), and 0 if it is otherwise.

Tables 1–3 show a summary of the statistics for the variables used in this study. Table 4 provides the variance inflation factor (VIF) and time series averages of the cross-sectional correlations

⁴ MSCI World SRI only covers large market capitalization, which could generate biased estimators as stated by Bauer et al. (2005, 2006), so ethical funds are used to invest in smaller stocks. For this reason we use the FTSE4Good Global Benchmark Index, as it is one of the most used sustainability indexes according to Chegut et al. (2011).

between the above-mentioned plan's characteristics, showing that there are no multicollinearity problems (Sharma and James, 1981).

3.5. Modelling the effect of CSP on CFP

To analyze the effect of different social responsibility strategies on the financial performance of pension plans we adopt a bootstrap-based non-parametric ANOVA method where the dependent variable is the risk-adjusted return variable and the factor is business strategy variable. This ANOVA test allows us to examine the mean differences between three different groups of pension plans (pension plans that adopt traditional strategies, pension plans that implement responsive social responsibility strategies and pension plans that adopt strategic social responsibility strategies) for risk-adjusted financial performance in each investment style.

However, given that other factors such as size, age and fees could influence the performance of the pension plan, as mentioned by Ambachtsheer et al. (1998), Andonov et al. (2012) and Martí (2012, 2014), we propose the following random effects model, which is similar to that used by Barnett and Solomon (2006), to analyze the relationship between financial performance and pension plan social performance:

$$ALPHA_{pt} = \lambda_0 + \lambda_1 RSR_{pt} + \lambda_2 SSR_{pt} + \tau CV_{pt} + Z_t + F_p + v_{pt} \quad [3]$$

where $ALPHA_{pt}$ are the estimations of the monthly annual-risk-adjusted excess returns according to multi-index models; RSR_{pt} is a dummy variable representing whether or not the pension plan manager adopts a responsive social responsibility strategy; SSR_{pt} is a dummy variable representing whether or not the pension plan manager implements a strategic social responsibility strategy; CV_{pt} is a set of control variables which include the neperian logarithm of number of years since the registration of the pension plan ($LAGE_{pt}$); the neperian logarithm of a plan's asset in Euros in the previous month ($LASSET_{pt-1}$); the neperian logarithm of assets under management in Euros in the previous month ($LASSETMC_{pt-1}$); the neperian logarithm of mean investment per investor of each plan in the previous month ($LINV_{pt-1}$); the neperian logarithm of the mean

investment per investor of each management company in the previous month ($LINVMC_{pt-1}$); the management fee of each pension plan ($MFEE_{pt}$); the custodial fee of each pension plan ($CFEE_{pt}$); $STFI_{pt}$, $LTFI_{pt}$, MFI_{pt} , EQ_{pt} , ME_{pt} are dummy variables representing the pension plans with different investment objectives according to INVERCO criteria, with τ being the 11x1 vector of parameters; Z_t is the monthly dummy variables; F_p denotes the individual pension plan effect; v_p is an idiosyncratic error term. The random effects estimator used is the feasible generalized least squares estimator. We estimate robust standard errors using the investment style as a cluster.

This method allows us in our case to (1) analyze the effect of social responsibility strategies, which vary little across time, on financial performance and (2) control for unobserved heterogeneity as mentioned by Barnett and Solomon (2006) unlike the cross-section method employed by Kreander et al. (2005), Capelle-Blancard and Monjon (2012) and the Fama and MacBeth approach adopted by Gregory et al. (1997) and Derwall and Koedijk (2009).

4. Results

Table 5 provides the results from estimating equations [1] and [2] using the plan's net return based on CAPM. An inspection of this table reveals that for the whole pension plans sample the majority of Spanish pension plans obtain similar results to the market benchmark. Only 37 of the 651 pension plans significantly exceed their market benchmark while 42 of 651 pension plans underperform the benchmark significantly. Taking into account the socially responsible business strategy used by the pension plan we find that 97.30% of pension plans with a significant positive performance belong to the conventional pension plans group while only one solidarity pension plan significantly exceeds the market benchmark.

On the contrary, conventional pension plans significantly underperform market benchmarks in 80.95% of the cases with a significant negative performance, while five ethical plans and three solidarity pension plans obtain worse after-fee risk-adjusted return with respect to the market. The mean is negative in

Table 1 Descriptive statistics for variables of Ethical Plans. AFRAR = after-fee risk-adjusted return; BFRAR = before-fee risk-adjusted return.

Ethical plan		AFRAR	BFRAR	MFEE	CFEE	ASSET	LINV	ASSETMC	LINVMC	AGE
STFI (N=11)	Mean	-0.60	0.60	1.06	0.15	77,765,089.47	24,627.47	4,480,283,408.37	5501.63	12.63
	Median	-0.47	0.56	1.06	0.17	17,186,682.54	14,456.14	4,636,616,761.90	5472.36	11.96
	Standard Deviations	0.64	0.56	0.39	0.08	134,248,049.43	29,056.55	768,741,578.79	226.30	2.87
	Maximum	0.40	1.51	1.68	0.30	444,850,365.08	128,000.00	4,807,410,079.37	5935.24	18.35
	Minimum	-1.86	-0.83	0.40	0.00	105,587.30	5945.57	2,062,983,285.71	4985.87	7.92
LTFI (N=5)	Mean	-0.23	1.18	1.30	0.10	381,340,393.65	10,101.07	4,807,410,079.37	5503.59	16.49
	Median	-0.13	1.34	0.95	0.00	493,285,126.98	7566.00	4,807,410,079.37	5478.39	13.44
	Standard Deviations	0.57	0.28	0.57	0.13	322,501,971.38	5531.46	0.00	229.27	6.52
	Maximum	0.39	1.38	2.00	0.27	817,548,222.22	21,136.36	4,807,410,079.37	5935.24	24.19
	Minimum	-0.91	0.63	0.76	0.00	1,719,920.63	3462.34	4,807,410,079.37	4985.87	8.27
MFI (N=18)	Mean	-0.55	0.87	1.27	0.15	57,941,417.99	8396.16	3,316,909,726.63	4794.85	12.90
	Median	-1.12	0.80	1.54	0.13	3,631,349.21	5238.73	4,636,616,761.90	5357.62	12.49
	Standard Deviations	1.04	0.60	0.62	0.10	131,042,426.07	7431.22	1,827,429,086.58	1016.17	5.70
	Maximum	1.69	2.10	2.00	0.45	460,614,650.79	34,361.11	4,807,410,079.37	5935.24	24.18
	Minimum	-1.59	-0.09	0.09	0.03	77,650.79	1262.02	789,412,682.54	1980.95	5.32
EQ (N=18)	Mean	-1.19	0.53	1.55	0.17	20,647,680.78	7138.29	4,353,869,309.52	5326.83	12.62
	Median	-1.47	0.26	1.88	0.17	4,970,563.49	6164.12	4,807,410,079.37	5472.36	12.83
	Standard Deviations	1.81	1.98	0.55	0.10	33,355,630.08	4064.12	1,138,135,882.37	856.71	2.30
	Maximum	3.75	5.90	2.00	0.50	119,820,253.97	19,946.67	4,807,410,079.37	5935.24	18.35
	Minimum	-4.26	-2.26	0.40	0.00	45,904.76	438.13	412,862,920.63	906.28	7.86
MEQ (N=13)	Mean	-0.70	0.53	1.06	0.18	21,060,967.03	20,174.01	4,504,334,693.53	5504.70	13.14
	Median	-0.94	-0.01	1.00	0.18	1,184,682.54	7516.28	4,636,616,761.90	5484.42	12.38
	Standard Deviations	0.94	0.85	0.56	0.06	46,006,655.26	30,778.96	709,385,430.83	227.77	3.92
	Maximum	0.96	1.71	2.00	0.30	174,563,079.37	167,000.00	4,807,410,079.37	5935.24	20.31
	Minimum	-2.26	-0.36	0.40	0.08	22,634.92	2134.92	2,062,983,285.71	4985.87	6.84

Table 2
Descriptive statistics for variables of Solidarity Plans. AFRAR = after-fee risk-adjusted return; BFRAR = before-fee risk-adjusted return.

Solidarity plan		AFRAR	BFRAR	MFEF	CFEE	ASSET	LINV	ASSETMC	LINVMC	AGE
STFI (N=7)	Mean	0.17	1.42	1.09	0.16	40,001,188.21	6383.60	754,661,560.09	4727.48	10.05
	Median	0.26	1.62	1.04	0.10	10,538,238.10	3947.05	794,097,222.22	3007.43	11.35
	Standard Deviations	0.37	0.46	0.15	0.07	56,725,489.99	4506.63	116,733,084.86	3423.96	2.64
	Maximum	0.64	1.76	1.25	0.25	174,653,238.10	14,842.18	854,885,682.54	10,483.18	13.25
	Minimum	-0.64	0.35	0.89	0.10	5,149,349.21	1882.92	474,272,587.30	1758.67	5.78
LTFI (N=2)	Mean	-0.06	1.79	1.50	0.35	9,699,134.92	14,820.55	474,272,587.30	9619.37	21.36
	Median	0.46	2.23	1.50	0.27	10,951,031.75	15,642.59	278,885,626.98	9597.09	23.30
	Standard Deviations	0.53	0.44	0.00	0.09	7,077,476.19	2306.78	195,386,960.32	388.90	0.85
	Maximum	0.99	2.67	1.50	0.35	18,028,507.94	20,437.50	474,272,587.30	10,483.18	24.15
	Minimum	-0.06	1.79	1.50	0.18	3,873,555.56	10,755.15	83,498,666.67	8842.37	22.44
MFI (N=9)	Mean	-0.89	0.96	1.51	0.34	43,640,109.35	5903.26	727,888,970.02	5587.68	19.66
	Median	-1.06	0.72	1.50	0.25	25,707,555.56	5631.42	794,097,222.22	3594.26	24.13
	Standard Deviations	0.41	0.46	0.17	0.11	49,688,102.04	3433.24	137,076,010.95	3630.29	7.51
	Maximum	-0.29	1.64	1.75	0.50	170,575,682.54	13,665.56	854,885,682.54	10,483.18	24.19
	Minimum	-1.32	0.41	1.23	0.23	4,553,174.60	1637.30	474,272,587.30	1758.67	5.78
EQ (N=6)	Mean	0.23	2.20	1.74	0.24	9,068,674.60	6265.31	684,653,433.86	6763.49	12.33
	Median	-0.26	1.77	1.78	0.24	2,730,126.98	8650.15	785,590,492.06	9226.80	13.55
	Standard Deviations	1.22	1.16	0.11	0.07	10,503,129.26	4044.56	148,883,284.92	3700.75	3.20
	Maximum	2.90	4.75	1.82	0.35	25,642,444.44	11,021.36	794,097,222.22	10,483.18	15.35
	Minimum	-0.58	1.44	1.50	0.10	591,190.48	848.78	474,272,587.30	1758.67	5.78
MEQ (N=10)	Mean	-0.31	1.78	1.84	0.24	13,950,776.19	3921.00	777,513,928.57	4254.66	12.56
	Median	-0.21	1.80	1.82	0.25	7,950,357.14	1619.24	802,335,261.90	3037.37	14.26
	Standard Deviations	0.39	0.40	0.09	0.09	14,334,395.52	3237.89	103,938,470.28	3080.72	3.63
	Maximum	0.19	2.38	1.97	0.46	48,089,365.08	10,050.61	854,885,682.54	10,483.18	15.87
	Minimum	-0.95	1.20	1.73	0.10	486,936.51	1114.22	474,272,587.30	1758.67	5.78

conventional, solidarity and ethical pension plans, with its annualized risk-adjusted return being -0.03% , -0.25% and -0.74% respectively for the period 2008–2013. The bootstrap-based non-parametric ANOVA method ($F = 4.689$; p -value = 0.010) shows that the differences between these three groups are statistically significant, obtaining a significantly higher mean annualized after-fee risk-adjusted return in conventional pension plans than in solidarity and ethical pension plans, which is consistent with modern portfolio theory and stakeholder theory, as shown by Jones et al. (2008) and Bauer et al. (2006) in their analysis of the implementation of socially responsible investment strategies in earlier periods.

However, given that Wermers (2000) shows that asset allocation to equity could vary in the portfolios, impacting the funds' risk-adjusted return, we compare conventional, solidarity and ethical pension plans across their investment objectives classified according to the Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO) criteria. With regard to pension plans integrated in short-term fixed income (STFI) and long term fixed income (LTFI) categories, we observe that solidarity pension plans outperform ethical and conventional pension plans, reaching a mean after-fees risk-adjusted return, expressed as an annualized percentage, of 0.17% (STFI) and -0.06 (LTFI) while ethical pension plans obtain a mean risk-adjusted return of -0.60

Table 3
Descriptive statistics for variables of traditional pension plans. AFRAR = after-fee risk-adjusted return; BFRAR = before-fee risk-adjusted return.

Conventional plan		AFRAR	BFRAR	MFEF	CFEE	ASSET	LINV	ASSETMC	LINVMC	AGE
STFI (N=79)	Mean	-0.10	1.22	1.13	0.18	76,052,305.00	10,757.10	940,457,052.24	6192.42	12.70
	Median	0.06	1.36	1.10	0.13	27,082,269.84	7950.77	635,478,222.22	5624.21	11.37
	Standard Deviations	0.90	0.87	0.40	0.12	122,668,185.50	10,200.76	1,146,209,070.18	3603.41	4.40
	Maximum	1.84	3.09	2.00	0.50	657,492,142.86	110,142.86	4,807,410,079.37	28,680.45	24.18
	Minimum	-3.38	-1.60	0.20	0.03	61,000.00	1018.52	12,978,650.79	906.28	5.34
LTFI (N=42)	Mean	-0.45	1.16	1.42	0.19	68,886,910.81	8813.64	1,002,282,691.61	7338.23	15.63
	Median	-0.27	1.30	1.40	0.12	17,372,404.76	6809.15	451,953,000.00	5771.50	14.81
	Standard Deviations	1.43	1.34	0.40	0.15	116,490,203.64	9071.13	1,134,389,873.72	6214.11	6.02
	Maximum	2.15	4.13	2.00	0.50	536,048,714.29	74,500.00	3,202,831,317.46	35,840.24	24.19
	Minimum	-4.23	-1.94	0.60	0.00	22,904.76	110.25	1,627,587.30	906.28	5.48
MFI (N=187)	Mean	-0.38	1.38	1.53	0.22	55,840,705.63	10,218.56	936,087,130.38	6612.40	17.17
	Median	-0.36	1.60	1.60	0.16	11,721,158.73	6959.79	551,156,682.54	5549.64	16.32
	Standard Deviations	1.31	1.22	0.46	0.15	139,109,105.68	10,128.26	962,009,113.34	4606.25	5.81
	Maximum	2.32	4.06	2.00	0.50	1,093,737,507.94	108,294.12	3,202,831,317.46	38,849.44	24.23
	Minimum	-6.56	-4.26	0.10	0.00	6063.49	0.00	82,523.81	906.28	5.39
EQ (N=129)	Mean	0.64	2.58	1.72	0.22	25,427,017.47	7038.54	1,260,345,519.87	7310.05	11.56
	Median	0.37	2.40	1.90	0.18	11,399,095.24	5448.68	854,885,682.54	5976.51	12.24
	Standard Deviations	2.53	2.53	0.40	0.15	39,270,907.93	8641.96	1,256,504,164.88	5970.44	3.37
	Maximum	13.18	15.07	2.00	0.50	208,126,111.11	521,444.44	4,326,068,063.49	38,849.44	24.13
	Minimum	-6.02	-4.62	0.10	0.00	16,238.10	225.81	11,801,904.76	906.28	5.28
MEQ (N=115)	Mean	-0.03	1.78	1.60	0.21	26,826,976.67	9578.22	826,882,046.51	7248.51	13.65
	Median	-0.16	1.73	1.82	0.15	11,734,571.43	5441.25	501,750,031.75	5432.72	14.38
	Standard Deviations	2.25	2.15	0.49	0.15	36,617,588.97	13,553.09	946,184,854.08	6788.63	4.01
	Maximum	10.65	12.06	2.00	0.50	171,594,396.83	608,916.67	4,326,068,063.49	53,601.69	24.21
	Minimum	-8.52	-7.17	0.10	0.00	2825.40	250.00	3,191,841.27	906.28	5.48

Table 4
Correlation matrix for regression variables.

	VIF	STFI	LTFI	MFI	EQ	MEQ	LAGE	SSR	RSR	LASSET _{t-1}	LINV _{t-1}	LASSETMC _{t-1}	LINVMC _{t-1}	MFEE
LTFI	1.46	-0.1194												
MFI	2.55	-0.2928	-0.1996											
EQ	2.52	-0.2319	-0.1581	-0.3879										
MEQ	2.22	-0.2170	-0.1480	-0.3630	-0.2875									
LAGE	1.22	-0.1160	0.0669	0.2723	-0.2165	-0.0305								
SSR	1.36	0.0030	-0.0041	-0.0556	0.0663	-0.0048	-0.0956							
RSR	1.02	0.0153	0.0263	-0.0219	-0.0181	0.0136	0.0569	-0.0565						
LASSET _{t-1}	1.25	0.1477	0.0688	-0.0261	-0.0653	-0.0754	0.2280	-0.0698	0.0286					
LINV _{t-1}	1.52	0.1412	-0.0020	0.0583	-0.1414	-0.0419	0.0653	0.0715	-0.0638	0.0022				
LASSETMC _{t-1}	1.45	0.0200	-0.0405	-0.0450	0.1013	-0.0447	0.0020	0.4384	-0.0657	0.1382	-0.0350			
LINVMC _{t-1}	1.58	-0.0372	0.0259	-0.0174	0.0372	-0.0028	0.0486	-0.0486	-0.0577	0.0640	0.4960	-0.2719		
MFEE	1.37	-0.3100	-0.0513	0.0188	0.2119	0.0617	0.1216	-0.2064	0.0360	0.1505	-0.3091	-0.0168	-0.1381	
CFEE	1.14	-0.0871	-0.0318	0.0540	0.0300	0.0032	0.1405	-0.1621	0.0973	0.2016	-0.1374	0.0078	-0.1355	0.1504

(STFI) and -0.23 (LTFI) and that of conventional pension plans is -0.10 (STFI) and -0.45 (LTFI). The differences between these three groups in each mentioned category are not statistically significant as the results of the F-test show, and their annualized risk-adjusted return, in general, is close to zero in 77.32% of the cases in the short-term fixed income category and 87.76% of the plans belong to the long-term fixed income category.

When the managers introduce stocks in the pension plan portfolios we find that conventional pension plans outperform ethical and solidarity pension plans, with the differences between these groups only being statistically significant in the equity category, as the results of the F-test show. Thus, in the mixed fixed income plan category the mean financial performance is negative in three groups, with their value oscillating between -0.38 for conventional plans and -0.89 for solidarity pension plans. Only four conventional pension plans significantly exceed their market benchmark while 9 of the 178 conventional pension plans and 3 of the 9 solidarity pension plans obtain a significantly worse financial performance than those of passive management. None of the ethical pension plans significantly outperform or underperform the market in this category.

In the equity plan category, we find that conventional pension plans significantly outperform solidarity and ethical pension plans, with their mean annualized risk-adjusted return oscillating between 0.64% for conventional pension plans and -1.20 for ethical pension plans. The results indicate that 17 of the 76 conventional pension plans, whose performance is positive, significantly exceed

the market benchmark while 2 of the 53 conventional pension plans, whose performance is negative, perform significantly worse than the market benchmarks. We also find that 16.67% of the solidarity pension plans obtain a significantly negative performance. Again, all ethical pension plans reach a financial performance of close to zero. Results for the mixed equity plan category reveal that 4.35% of the conventional pension plans exceed the market benchmark while 8.70% of the mentioned group underperforms the market benchmark significantly. In this category, all ethical and solidarity pension plans meet the market benchmark.

In general the results reveal that 87.87% of pension plan alphas in our sample are very close to zero on average, as in passive portfolios (Cremers et al., 2012), which could also be due to the costs of active management not being offset by the profits associated with the investment. To verify this we estimate models [1] and [2] based on CAPM using the pension plan's raw return, reporting the results in Table 6 which show that 36.71% (220 conventional plans, 14 solidarity plans and 5 ethical plans) of the pension plans exceed the market benchmark. However, these significant benefits of implementing an active strategy do not offset their cost in 84.52% (184 conventional plans, 13 solidarity plans and 5 ethical plans) of these plans. The pension plans, whose before-fee risk-adjusted return is very close to zero, represent 62.06% of the cases, while only 8 conventional pension plans underperform the market benchmark significantly. After paying fees the number of pension plans with significant and negative financial performance increases to forty-two pension plans (34 conventional plans, 3 solidarity

Table 5
After-fee risk-adjusted return of Spanish Pension Plans.

Class	Strategy	Number of plans					F	Maximum	Minimum	Mean	Median	Standard deviation
		Total	Positive performance	p-value <0.10	Negative performance	p-value <0.10						
STFI (N=97)	Conventional	79	44	10	35	7	2.190	1.8444	-3.3804	-0.0962	0.0588	0.8940
	Solidarity	7	6	0	1	0		0.6432	-0.6408	0.1736	0.2616	0.3744
	Ethical	11	2	0	9	5		0.4008	-1.8612	-0.6035	-0.4680	0.6427
LTFI (N=49)	Conventional	42	18	0	24	6	0.122	2.1468	-4.2336	-0.4480	-0.2694	1.4287
	Solidarity	2	0	0	2	0		-0.0623	-0.0660	-0.0641	-0.0641	0.0019
	Ethical	5	2	0	3	0		0.3912	-0.9096	-0.2297	-0.1296	0.5683
MFI (N=214)	Conventional	187	73	4	114	9	0.816	2.3232	-6.5604	-0.3763	-0.3600	1.3080
	Solidarity	9	0	0	9	3		-0.2880	-1.3224	-0.8907	-1.0584	0.4085
	Ethical	18	5	0	13	0		1.6884	-1.5888	-0.5492	-1.1232	1.0427
EQ (N=153)	Conventional	129	76	17	53	2	4.486**	13.1808	-6.0216	0.6427	0.3672	2.5323
	Solidarity	6	2	1	4	0		2.8968	-0.5784	0.2284	-0.2568	1.2160
	Ethical	18	3	0	15	0		3.7476	-4.2636	-1.1945	-1.4658	1.8074
ME (N=138)	Conventional	115	56	5	59	10	0.651	10.6488	-8.5176	-0.0283	-0.1584	2.2497
	Solidarity	10	3	0	7	0		0.1932	-0.9540	-0.3056	-0.2126	0.3872
	Ethical	13	4	0	9	0		0.9612	-2.2608	-0.7040	-0.9360	0.9409

***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Table 6
Before-fee risk-adjusted return of Spanish Pension Plans.

Class	Strategy	Number of plans					F	Maximum	Minimum	Mean	Median	Standard deviation
		Total	Positive performance	p-value <0.10	Negative performance	p-value <0.10						
STFI (N=97)	Conventional	79	73	52	6	0	3.029*	3.0864	-1.5960	1.2184	1.3572	0.8695
	Solidarity	7	7	6	0	0		1.7556	0.3516	1.4208	1.6236	0.4587
	Ethical	11	10	4	1	0		1.5060	-0.8280	0.6024	0.5628	0.5598
LTFI (N=49)	Conventional	42	33	14	9	0	0.226	4.1292	-1.9416	1.1596	1.2990	1.3427
	Solidarity	2	2	2	0	0		1.7880	1.7844	1.7862	1.7862	0.0018
	Ethical	5	5	0	0	0		1.3824	0.6300	1.1767	1.3416	0.2842
MFI (N=214)	Conventional	187	173	75	14	4	2.042	4.0644	-4.2624	1.3791	1.5972	1.2159
	Solidarity	9	9	1	0	0		1.6404	0.4128	0.9561	0.7236	0.4613
	Ethical	18	17	1	1	0		2.1012	-0.0947	0.8683	0.7980	0.5972
EQ (N=153)	Conventional	129	112	41	17	0	5.518***	15.0648	-4.6212	2.5774	2.3964	2.5290
	Solidarity	6	6	1	0	0		4.7472	1.4448	2.2010	1.7664	1.1577
	Ethical	18	10	0	8	0		5.8980	-2.2644	0.5273	0.2562	1.9797
ME (N=138)	Conventional	115	102	38	13	4	2.292	12.0624	-7.1748	1.7824	1.7304	2.1451
	Solidarity	10	10	4	0	0		2.3784	1.2036	1.7825	1.7982	0.4024
	Ethical	13	6	0	7	0		1.7100	-0.3600	0.5345	-0.0128	0.8478

***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

plans and 5 ethical plans). To enhance this, regulators could reduce the maximum percentage of management fees applied to the value of plan assets and introduce a new fee applied to the value of financial performance obtained. This measure could (1) motivate managers to implement an active strategy for managing their portfolios and (2) reduce abusive management fees.

Analyzing according to pension plan categories, we observe that solidarity pension plans obtain significantly higher mean before-fee risk-adjusted returns than conventional and ethical pension plans in the short-term fixed income (STFI) category, as the results of the F-test show. This result, together with the result obtained in Table 5, could indicate that ethical, conventional and solidarity pension plans charge significantly different fees, on average. As in Table 5, we also find significant differences between conventional, solidarity and ethical plans in the equity (EQ) category, observing no statistically significant differences between the above-mentioned groups for the remaining categories.

However other factors could influence the relationship between pension plan social performance and pension plan financial performance as mentioned by Derwall and Koedijk (2009), Kreander et al. (2005), Capelle-Blancard and Monjon (2012) and Gregory et al. (1997). For this reason, we control by plan-specific attributes in equation (3) introducing well-documented plan characteristics in our model augmented by two dummy variables that identify whether the plan implements a strategic socially responsible investment strategy (SSR) or a responsive social responsibility strategy (RSR). As a dependent variable we use an after-fee risk adjusted return in model 1 and before-fee risk-adjusted return in model 2.

The robust random effects panel regression results are reported in Table 7, showing that ethical pension plans' coefficients (SSR) are positive but statistically insignificant; therefore, there is no significant difference between the financial performance of ethical and conventional plans, as stated in Derwall and Koedijk (2009); Kreander et al. (2005); Gregory et al. (1997). This lack of a significant advantage for implanting a strategic socially responsible investment strategy could be due to the recent development of socially responsible investment in Spain as pointed out by Cummings (2000); Bauer et al. (2005, 2006). On the contrary, the coefficient on the solidarity plans' dummy variable (RSR) is statistically significant, indicating that solidarity plans significantly outperform their counterparts (ethical and conventional plans), which contradicts arguments of modern portfolio theory (Markowitz, 1952).

However, from the perspective of stakeholder theory, these results are consistent with Porter and Kramer (2006) who state that firms that integrate social initiatives into their core strategies outperform in the long-term those implementing traditional business strategies, while firms that make philanthropic contributions to local charities, non-governmental organizations and social projects disconnected from the companies' strategies, improve their reputation in the short-term—which could explain the popularity of solidarity pension plans in Spain (Signori, 2009)—but do not strengthen their long-term competitiveness, providing minimal value to society and no strategic benefits for firms.

Higher management fees, charged by the plans, are significantly associated with a higher before-fee risk-adjusted return, *ceteris paribus*, which indicates that better managers receive higher fees. However, higher management fees paid by the plans are not significantly associated with a higher after-fee risk-adjusted return, *ceteris paribus*. This could be due to the fact that managers who outperform their peers take the excess profits from their management compared to those obtained by peer managers on average, themselves in the form of management fees earned. This might

Table 7
Regression estimates.

Variables	After-fee risk-adjusted return (model 1)		Before-fee risk-adjusted return (model 2)	
	Random effects coef.	Standard errors	Random effects coef.	Standard errors
SSR	0.4984	0.4873	0.4984	0.4873
RSR	2.3002**	1.1107	2.3002**	1.1107
MFEE	0.4711	0.3321	1.4711***	0.3321
CFEE	2.0393	2.2692	3.0393	2.2692
LASSET _{t-1}	0.0273	0.0252	0.0273	0.0252
LASSETMC _{t-1}	-0.1426	0.1559	-0.1426	0.1559
LINV _{t-1}	0.6711**	0.2806	0.6711**	0.2806
LINVMC _{t-1}	0.7416*	0.3799	0.7416*	0.3799
LAGE	-0.2723	0.2097	-0.2723	0.2097
LTFI	0.1920	0.1369	0.1920	0.1369
MFI	0.0707	0.1609	0.0707	0.1609
EQ	2.6148***	0.2881	2.6148***	0.2881
MEQ	1.6635***	0.2113	1.6635***	0.2113
Constant	-13.4875	2.5942	-13.4875	2.5942
Monthly dummies	Yes		Yes	
R-squared	0.2069		0.2093	

***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

produce similar after-fee financial performance among managers on average, *ceteris paribus*. This result supports our portfolio evaluation findings reported in Table 5 and Table 6, but is not consistent with Kreander et al. (2005) who find a significant and positive relationship between fee and after-fee financial performance for Sweden and UK mutual funds and Derwall and Koedijk (2009) who show that the mentioned relationship is statistically significant and negative for US mutual funds. This could indicate that the Spanish pension plans market is less competitive than other European and US mutual fund markets.

The size measured as the investment per participant ($LINV_{t-1}$) is significantly related to risk-adjusted financial performance. Thus, those plans with a small number of participants appointed who own large wealth, outperform those plans with a great number of participants appointed who own small wealth. This could be due to the fact that (1) the former are managed by more skilled managers so wealthier investors might be more sensitive to financial performance, and/or (2) the latter support higher operating costs such as costs of information to investors, accounting, registration and transfer agent fees. The $LINVMC$ variable is also related with risk-adjusted financial performance which could be due to management companies that administrate large assets belonging to a small number of participants incurring lower operating costs than management companies that administrate small assets belonging to a great number of participants.

As mentioned by Wermers (2000), we find that portfolios composed of a large number of stocks (equity pension plans) significantly outperform pension plans whose portfolios are composed of bonds. Other variables, such as $LAGE$, $LASSET$ and $LASSETMC$ are not statistically significant, as stated in Kreander et al. (2005) and Derwall and Koedijk (2009), which may indicate the lack of scale economies and learning effect probably due to the recent development of the Spanish pension plan market and its small trading volume.

5. Conclusions and future research agenda

This paper provides new evidence on the relationship between financial performance and socially responsible business strategy defined by Porter and Kramer (2006) for the Spanish individualized pension plans market which presents a recent development of socially responsible investment. Using a multi-index model we compare before-fee risk-adjusted return and after-fee risk-adjusted return between conventional plans—which implement a traditional investment strategy—ethical plans—which apply ethical screens in their investment, assessing cleaner production activities and innovation adopted by companies in which they could invest—and solidarity plans—which donate part of their revenues to charity.

While previous researchers have limited their attention to (1) analyzing mutual funds whose managers implement strategic socially responsible strategies in their management (Benson et al., 2008; Bollen, 2007; Renneboog et al., 2008) and (2) examining one category of mutual funds, mainly the equity category, adopting a Carhart (1997) multifactor asset-pricing model, our study focuses on analyzing and comparing Spanish pension plans whose managers implement strategic socially responsible strategies (which contribute to the adoption of cleaner production processes by firms) and responsive socially responsible strategies in their management, implementing a multi-index model which includes a set of indexes that represent all types of assets in which the plan may invest. This enables us to examine the management of different pension plan categories according to INVERCO criteria.

The results obtained indicate that ethical pension plans do not underperform traditional pension plans in terms of risk-adjusted

returns. This could be due to the fact that some companies, whose stocks are traded in stock markets, have made cleaner production investments, which allows them to improve their cleaner production processes, making production methods more technically feasible and cost-effective and, consequently, to reach similar financial performance in the medium-term to those companies that implement traditional business strategies, the former companies being expected to outperform traditional ones in the long term in congruence with Porter and Kramer (2006). Therefore, companies could have an incentive to implement cleaner production methods because (1) good environmental performance might be positively correlated with good business management as commented by Cabello-Eras et al. (2013); Ortas et al. (2013) and Zeng et al. (2010) due to the savings in costs associated with cleaner production and the reduction of risk (O'Rourke, 2003) and (2) they are valued more highly by stakeholders who aim to promote cleaner production (Zeng et al., 2010). On the other hand, this result does not support the view voiced (Aslaksen and Synnestvedt, 2003; Barnett and Solomon, 2006; Bauer et al., 2006; Cortez et al., 2009) by modern portfolio theory about negative financial consequences from investing in socially responsible companies due to increased information costs and the difficulty of adequately diversifying the portfolios of ethical pension plans. Thus, investors can add ethical screens to their Spanish pension plan investment choice without compromising their risk-adjusted financial performance.

Furthermore, the results obtained also indicate that solidarity pension plans outperform ethical and traditional pension plans, which could be due to (1) accumulating a smaller volume of assets than other types of pension plans, allowing managers to take advantage of investment opportunities in financial markets (Annaert et al., 2003; Indro et al., 1999), (2) being able to attract top managers and/or (3) philanthropic contributions to local charities, non-governmental organizations and social projects being made by management companies and not deducted directly from solidarity pension plans' assets. Under these conditions, this strategy does not provide strategic benefits for management companies in the long-term, being only sustainable when the pension plan receives money inflows that increase the management fee earned, which allows them to compensate for the donations made, and during the period analyzed in this paper solidarity pension plans accumulated a smaller volume of assets than their counterparts. Therefore, the adoption of this responsive social responsibility strategy does not strengthen firms' competitiveness in the long-term, providing minimal value to society and no strategic benefits for firms, which is congruent with Porter and Kramer (2006).

Given that (1) pension plans are long-term investors because they accumulate the contributions made by participants until they retire, which requires the implementation of long-term management strategies (O'Neill, 2008) and (2) the integration of environmental, social and governance factors in the core of business strategy plays its greatest role in the firms' long-term financial performance (Porter and Kramer, 2006), governments should encourage pension fund managers to implement strategic social responsibility strategies for cleaner production when building their portfolios, which would not compromise the participants' wealth and could contribute to reducing environmental damage produced by companies (Agudo-Valiente et al., 2012).

Thus, pension fund regulatory authorities in the United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Norway, Spain and Sweden have promoted laws requiring trustees of occupational pension plans (those promoted by companies) to report their policy on socially responsible investment (Inderst et al., 2012; OECD, 2007). However, in Spain this regulation should be extended to individual pension plans (those promoted by financial companies and

open to any participant) because their volume of accumulated assets is almost double that of occupational pension plans and the number of participants triple those of occupational pension plans. Thus, in Spain, individual pension plans could play a greater role than occupational pension plans in encouraging firms to adopt cleaner production methods and contribute to sustainable development.

Finally, there is one limitation to our study. We do not know which types of social screens have implemented ethical pension plans, or their intensity, which could vary between them because of ethical managers who have different beliefs about which ethical screens are necessary to hold an ethical portfolio. This could affect the financial performance of ethical pension plans.

References

- Agudo-Valiente, J.M., Garcés-Ayerbe, C., Salvador-Figueras, M., 2012. Social responsibility practices and evaluation of corporate social performance. *J. Clean. Prod.* 35, 25–38. <http://dx.doi.org/10.1016/j.jclepro.2012.05.002>.
- Ambachtsheer, K.P., Capelle, R., Scheibelhut, T., 1998. Improving pension fund performance. *Financ. Anal. J.* 54, 15–21.
- Andonov, A., Bauer, R.M., Cremers, K.J., 2012. Can large pension funds beat the market?. In: Paper presented at the Annual Meeting of the European Finance Association, Copenhagen, Denmark.
- Annaert, J., Van den Broeck, J., Vander Vennet, R., 2003. Determinants of mutual fund underperformance: a Bayesian stochastic frontier approach. *Eur. J. Oper. Res.* 151, 617–632. [http://dx.doi.org/10.1016/S0377-2217\(02\)00603-3](http://dx.doi.org/10.1016/S0377-2217(02)00603-3).
- Aslaksen, I., Synnestvedt, T., 2003. Ethical investment and the incentives for corporate environmental protection and social responsibility. *Corp. Soc. Resp. Env. Ma* 10, 212–223.
- Balasubramanian, N., Lieberman, M.B., 2010. Industry learning environments and the heterogeneity of firm performance. *Strateg. Manage. J.* 31, 390–412. <http://dx.doi.org/10.1002/smj.816>.
- Barnett, M.L., Salomon, R.M., 2006. Beyond dichotomy: the curvilinear relationship between social responsibility and financial performance. *Strateg. Manage. J.* 27, 1101–1122. <http://dx.doi.org/10.1002/smj.557>.
- Bauer, R., Koedijk, K., Otten, R., 2005. International evidence on ethical mutual fund performance and investment style. *J. Bank. Financ.* 29, 1751–1767. <http://dx.doi.org/10.1016/j.jbankfin.2004.06.035>.
- Bauer, R., Otten, R., Rad, A.T., 2006. Ethical investing in Australia: Is there a financial penalty? *Pac-Basin. Financ. J.* 14, 33–48.
- Bauer, R., Derwall, J., Otten, R., 2007. The ethical mutual fund performance debate: new evidence from Canada. *J. Bus. Ethics* 70, 111–124. <http://dx.doi.org/10.1007/s10551-006-9099-0>.
- Bengtsson, E., 2008. Socially responsible investing in Scandinavia – a comparative analysis. *Sustain Dev.* 16, 155–168. <http://dx.doi.org/10.1002/sd.360>.
- Benson, K.L., Brailsford, T.J., Humphrey, J.E., 2006. Do socially responsible fund managers really invest differently? *J. Bus. Ethics* 65, 337–357. <http://dx.doi.org/10.1007/s10551-006-0003-8>.
- Bollen, N.P.B., 2007. Mutual fund attributes and investor behavior. *J. Financ. Quant. Anal.* 42, 683–708.
- Brammer, S., Millington, A., 2008. Does it pay to be different? an analysis of the relationship between corporate social and financial performance. *Strateg. Manage. J.* 29, 1325–1343. <http://dx.doi.org/10.1002/smj.714>.
- Brown, G., Stone, L., 2007. Cleaner production in New Zealand: taking stock. *J. Clean. Prod.* 15, 716–728. <http://dx.doi.org/10.1016/j.jclepro.2006.06.025>.
- Cabello Eras, J.J., Sagastume Gutiérrez, A., Hernández Capote, D., Hens, L., Vandecasteele, C., 2013. Improving the environmental performance of an earthwork project using cleaner production strategies. *J. Clean. Prod.* 47, 368–376. <http://dx.doi.org/10.1016/j.jclepro.2012.11.026>.
- Callan, S.J., Thomas, J.M., 2009. Corporate financial performance and corporate social performance: an update and reinvestigation. *Corp. Soc. Resp. Env. Ma* 16, 61–78. <http://dx.doi.org/10.1002/csr.182>.
- Capelle-Blancard, G., Monjon, S., 2012. The performance of socially responsible funds: does the screening process matter? *Eur. Financ. Manag.* 20. <http://dx.doi.org/10.1111/j.1468-036X.2012.00643.x>.
- Carhart, M., 1997. On persistence in mutual fund performance. *J. Financ.* 52, 57–82. <http://dx.doi.org/10.2307/2329556>.
- Chegut, A., Schenk, H., Scholtens, B., 2011. Assessing SRI fund performance research: best practices in empirical analysis. *Sustain Dev.* 19, 77–94. <http://dx.doi.org/10.1002/sd.509>.
- Christopherson, J.A., Ferson, W.E., Glassman, D.A., 1998. Conditioning manager alphas on information: another look at the persistence of performance. *Rev. Financ. Stud.* 11, 111–142. <http://dx.doi.org/10.1093/rfs/11.1.111>.
- Cortez, M.C., Silva, F., Areal, N., 2009. The performance of European socially responsible funds. *J. Bus. Ethics* 87, 573–588. <http://dx.doi.org/10.1007/s10551-008-9959-x>.
- Cortez, M.C., Silva, F., Areal, N., 2012. Socially responsible investing in the global market: the performance of us and European funds. *Int. J. Financ. Econ.* 17, 254–271. <http://dx.doi.org/10.1002/ijfe.454>.
- Cremers, M., Petajisto, A., Zitewitz, E., 2012. Should benchmark indices have alpha? Revisiting performance evaluation. *Crit. Financ. Rev.* 2, 1–48.
- Cummings, L.S., 2000. The financial performance of ethical investment trusts: an Australian perspective. *J. Bus. Ethics* 25, 79–92. <http://dx.doi.org/10.1023/A:1006102802904>.
- Derwall, J., Koedijk, K., 2009. Socially responsible fixed-income funds. *J. Bus. Financ. Acc.* 36, 210–229. <http://dx.doi.org/10.1111/j.1468-5957.2008.02119.x>.
- Elton, E.J., Gruber, M.J., Blake, C.R., 1995. Fundamental economic variables, expected returns, and bond fund performance. *J. Financ.* 50, 1229–1256. <http://dx.doi.org/10.2307/2329350>.
- European Sustainable and Responsible Investment Forum –Eurosif, 2012. European SRI Study. Available at: <http://www.eurosif.org/research/eurosif-sri-study-sri-study-2012>.
- Ferruz, L., Muñoz, F., Vargas, M., 2010. Stock picking, market timing and style differences between socially responsible and conventional pension funds: evidence from the United Kingdom. *Bus. Ethics* 19, 408–422. <http://dx.doi.org/10.1111/j.1467-8608.2010.01601.x>.
- Ferson, W., Schadt, R., 1996. Measuring fund strategy and performance in changing economic conditions. *J. Financ.* 51, 425–462. <http://dx.doi.org/10.2307/2329367>.
- Freeman, R.E., 1984. *Strategic Management: a Stakeholder Approach*. Pitman, Boston.
- Freeman, R.E., Gilbert, D.R., 1988. *Corporate Strategy and the Search for Ethics*. Prentice Hall, Englewood Cliffs.
- Gallardo-Vázquez, D., Sanchez-Hernandez, M.I., 2014. Measuring corporate social responsibility for competitive success at a regional level. *J. Clean. Prod.* 72. <http://dx.doi.org/10.1016/j.jclepro.2014.02.051>.
- 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. *J. Bus. Ethics* 94, 243–263. <http://dx.doi.org/10.1007/s10551-009-0260-4>.
- Goy, J., Schwarzer, H., 2013. Socially Responsible Investment, Decent Work and Pension Funds: Concepts and International Experiences. International Labour Organization. Social Security Department. EES Paper 36.
- Gregory, A., Matatko, J., Luther, R., 1997. Ethical unit trust financial performance: small company effects and fund size effects. *J. Bus. Financ. Acc.* 24, 705–725.
- Gregory, A., Whittaker, J., 2007. Performance and performance persistence of 'ethical' unit trusts in the UK. *J. Bus. Financ. Acc.* 34, 1327–1344. <http://dx.doi.org/10.1111/j.1468-5957.2007.02006.x>.
- Hill, R.P., Ainscough, T., Shank, T., Manullang, D., 2007. Corporate social responsibility and socially responsible investing: a global perspective. *J. Bus. Ethics* 70, 165–174. <http://dx.doi.org/10.1007/s10551-006-9103-8>.
- Hillman, A., Keim, G., 2001. Shareholder value, stakeholder management and social issues: what's the bottom line? *Strateg. Manage. J.* 22, 125–139. [http://dx.doi.org/10.1002/1097-0266\(200101\)22:2%3c125::AID-SMJ150%3e3.0.CO;2-H](http://dx.doi.org/10.1002/1097-0266(200101)22:2%3c125::AID-SMJ150%3e3.0.CO;2-H).
- Humphrey, J.E., Lee, D.D., 2011. Australian socially responsible funds: performance, risk and screening intensity. *J. Bus. Ethics* 102, 519–535. <http://dx.doi.org/10.1007/s10551-011-0836-7>.
- Inderst, G., Kaminker, C., Stewart, F., 2012. Defining and Measuring Green Investments: Implications for Institutional Investors' Asset Allocations. OECD Working Papers on Finance, Insurance and Private Pensions, No. 24. OECD Publishing. <http://dx.doi.org/10.1787/5k9312twnn44-en>.
- Indro, D.C., Jiang, C.X., Hu, M.Y., Lee, W.Y., 1999. Mutual fund performance: does fund size matter? *Financ. Anal. J.* 3, 74–87.
- Jones, S., Laan, S., Frost, G., Loftus, J., 2008. The investment performance of socially responsible investment funds in Australia. *J. Bus. Ethics* 80, 181–203. <http://dx.doi.org/10.1007/s10551-007-9412-6>.
- Kempf, A., Osthoff, P., 2007. The effect of socially responsible investing on portfolio performance. *Eur. Financ. Manag.* 13, 908–922.
- Kempf, A., Osthoff, P., 2008. SRI funds: Nomen est Omen. *J. Bus. Financ. Acc.* 35, 1276–1294. <http://dx.doi.org/10.1111/j.1468-5957.2008.02107.x>.
- Kreander, N., Gray, R.H., Power, D.M., Sinclair, C.D., 2005. Evaluating the performance of ethical and non-ethical funds: a matched pair analysis. *J. Bus. Financ. Acc.* 32, 1465–1493. <http://dx.doi.org/10.1111/j.0306-686X.2005.00636.x>.
- Lee, D.D., Humphrey, J.E., Benson, K.L., Ahn, J.Y.K., 2010. Socially responsible investment fund performance: the impact of screening intensity. *Acc. Financ.* 50, 351–370. <http://dx.doi.org/10.1111/j.1467-629X.2009.00336.x>.
- Luther, R.G., Matatko, J., 1994. The performance of ethical unit trusts: choosing an appropriate benchmark. *Br. Acc. Rev.* 26, 77–89.
- Malhotra, D., McLeod, R., 1997. An empirical analysis of mutual fund expenses. *J. Financ. Res.* 20, 175–190.
- Mallin, C.A., Saadouni, B., Briston, R.J., 1995. The financial performance of ethical investment funds. *J. Bus. Financ. Acc.* 22, 483–496.
- Margolis, J.D., Elfenbein, H.A., Walsh, J.P., 2007. Does it Pay to Be Good? A Meta-analysis and Redirection of Research on the Relationship between Corporate Social and Financial Performance. Harvard Business School. Working Paper.
- Markowitz, H.M., 1952. Portfolio selection. *J. Financ.* 7, 77–91.
- Martí, C., Matallín, J., Fernández, M., 2009. Determinants of pension plan fees in Spain. *Appl. Econ.* 41, 2153–2168. <http://dx.doi.org/10.1080/00036840701222462>.
- Martí-Ballester, C.P., 2012. A comparative analysis of the performance of collective investment institutions. *Rev. Econ. Financ.* 2, 43–52.
- Martí-Ballester, C.P., 2014. Determinants of equity pension plan flows. *Estud. Econ.* 41, 125–148.
- OECD, 2007. Recent trends and regulatory implications in socially responsible investment for pension funds. In: Paper prepared for the OECD Working Party on Private Pensions by Oxford Business Knowledge.
- O'Neill, L., 2008. Regulating Pension Fund Disclosure of Environmental, Social and Governance Practices. Shareholder Association for Research & Education (Working Paper).

- O'Rourke, A., 2003. The message and methods of ethical investment. *J. Clean. Prod.* 11, 683–693. [http://dx.doi.org/10.1016/S0959-6526\(02\).http://dx.doi.org/10.1016/S0959-6526\(02\)00105-1](http://dx.doi.org/10.1016/S0959-6526(02).http://dx.doi.org/10.1016/S0959-6526(02)00105-1).
- Ortas, E., Burritt, R.L., Moneva, J.M., 2013. Socially responsible investment and cleaner production in the Asia Pacific: does it pay to be good? *J. Clean. Prod.* 52, 272–280. <http://dx.doi.org/10.1016/j.jclepro.2013.02.024>.
- Porter, M.E., Kramer, M.R., 2006. Strategy and Society: the link between competitive advantage and corporate social responsibility. *Harv. Bus. Rev.* 84, 78–92.
- Renneboog, L., Ter Horst, J., Zhang, C., 2008. The price of ethics and stakeholder governance: the performance of socially responsible mutual funds. *J. Corp. Financ.* 14, 302–332. <http://dx.doi.org/10.1016/j.jcorpfin.2008.03.009>.
- Said, R.M., Sulaiman, M., Ahmad, N.N.N., 2013. Do fund managers perceive environmental information useful? an empirical study from Malaysia. *J. Clean. Prod.* 52, 281–288. <http://dx.doi.org/10.1016/j.jclepro.2013.02.038>.
- Sharma, S., James, W.L., 1981. Latent root regression: an alternate procedure for estimating parameters in the presence of multicollinearity. *J. Mark. Res.* 18, 154–161. <http://dx.doi.org/10.2307/3150950>.
- Signore, S., 2009. Ethical (SRI) funds in Italy: a review. *Bus. Ethics* 18, 145–164. <http://dx.doi.org/10.1111/j.1467-8608.2009.01554.x>.
- Smith, W., Higgins, M., 2000. Cause-related marketing: ethics and the ecstatic. *Bus. Soc.* 39, 304–322.
- Statman, M., 2000. Socially responsible mutual funds. *Financ. Anal. J.* 56, 30–39.
- UN-PRI Global Compact, 2013. The Value Driver Model: a Tool for Communicating the Business Value of Sustainability. <http://www.unglobalcompact.org>.
- Wahba, H., 2008. Exploring the moderating effect of financial performance on the relationship between corporate environmental responsibility and institutional investors: some Egyptian evidence. *Corp. Soc. Resp. Env. Ma* 15, 361–371. <http://dx.doi.org/10.1002/csr.177>.
- Wermers, R., 2000. Mutual fund performance: an empirical decomposition into stock-picking Talent, style, transactions costs, and expenses. *J. Financ.* 55, 1655–1695. <http://dx.doi.org/10.1111/0022-1082.00263>.
- Zeng, S.X., Meng, X.H., Yin, H.T., Tam, C.M., Sun, L., 2010. Impact of cleaner production on business performance. *J. Clean. Prod.* 18, 975–983. <http://dx.doi.org/10.1016/j.jclepro.2010.02.019>.