

# Pension plans' sustainable identity as a catalyst for environmental and social investing

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## ABSTRACT

Regulators and financial investors require environmental and related social issues to be increasingly integrated into pension plans' investment decisions. This paper aims to verify the role that internal pressures play in the boosting of pension schemes' financial portfolios with respect to a more sustainable orientation. This study specifically aims at verifying whether certain of the sustainability-oriented governance practices that pension plans adopted (their sustainable identity), could act as enablers of their ESG investment strategies. We analyze a highly representative sample of Italian pension plans comprising a confidential dataset collected via questionnaires submitted in 2022 and 2023.

This study's main results highlight sustainable identity's relevance as a driver of pension plans' environmental and social choices when applied to financial portfolios. Specifically, establishing an ESG committee on the board, or assigning specific responsibilities concerning ESG issues to board members, correlates significantly with the sustainability of pension plans' investment choices. Likewise, when incorporating ESG criteria into investment decisions, the proportion of the investment portfolios selected on the basis of the ESG criteria and the kind of sustainability strategies applied to the financial assets, demonstrate a positive association with other ESG-related governance structures. The latter include the presence of incentive systems grounded in ESG objectives, establishing an external body with specialized ESG expertise (e.g., an ethics committee), or creating a sustainability function (e.g., a sustainability manager reporting directly to the board).

## 1. Introduction

Supplementary pension plans increasingly participate in the topical practice of environmental and social investing. Nevertheless, according to a Thinking Ahead Institute and Pensions & Investments report, although most of the industry's offer promotes environmental or social characteristics, the shift to pension plans with a strong environmental, social and governance (ESG) focus and an investment objective aimed at generating a positive real-world impact is only at an embryonic stage (TAI and PI, 2022). To date, there is a lack of pension funds aimed at achieving specific sustainability objectives (According to the European Sustainable Finance Disclosure Regulation, Article 9 funds came into force in 2021). In this context, it is important to ascertain which factors could accelerate complementary pension schemes' sustainability agenda and need to be focused on in order to protect investors against greenwashing.

Pension plans' features make them particularly suitable for

implementing sustainable and responsible investing (SRI). The fiduciary mandate to ensure contributors' satisfaction in the long term recommends integrating ESG factors into managerial choices pertaining to financial portfolios (Johnson and de Graaf, 2009; OECD, 2017). SRI has actually demonstrated the capacity to benefit investments' risk-adjusted performances in the medium-long term (Albuquerque et al., 2019; Capelli et al., 2021, 2023; Cheema-Fox et al., 2021; Harjoto et al., 2021; He et al., 2022; Wong and Zhang, 2022). In this field, the United Nations' Principles for Responsible Investment (PRI) demonstrates that financial factors included in traditional financial risk parameters (e.g., the Value at Risk (VaR) for predicting the risk of a financial asset showing a loss) cannot be fully explained by ex-post volatility, which is also useful for integrating ESG factors, particularly in the long term (PRI, 2016). The long horizon of pension plans' investment approach makes them particularly suitable to investors in respect of integrating ESG factors into fiduciary duty. Indeed, the sustainability notion implies that it fosters a level of equity within generations (Ratner, 2004; Van

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Marrewijk, 2003). Since fiduciary duty requires trustees to manage funds in the beneficiaries' best interests, not integrating ESG factors into securities' selection and management could therefore be a breach of fiduciary obligations (Langbein, 2005; Richardson, 2007). Conversely, sustainability's integration into investment analysis and decision-making processes could demonstrate, as fiduciary duty assumes, adopting a specific focus on intergenerational equity and applying a long-term approach to investing (Martin, 2009; Woods and Urwin, 2010; Hawley et al., 2011).

In this context, and particularly in Europe, industry regulations incentivize environmental and social investment strategies' adoption as well as integrating risks, (IORPs Directive No. 2016/2341<sup>1</sup>, European Regulation No. 2019/2088, European Regulation No. 2020/852). However, pension plans implementing sophisticated ESG solutions still coexist in the marketplace with other plans that apply a limited and simplified ESG strategy or even without integrating ESG issues in the investment process.

Could pension plans' internal governance practices play a role in such unevenness? Specifically, could sustainability-oriented governance structures encourage environmental and social issues' actual and advanced integration within investment strategies?

Building on the literature that highlights sustainable identity's importance for determining a financial institution's actual level of sustainability (Biggeri et al., 2024; Pizzetti et al., 2021; Rezende de Carvalho Ferreira et al., 2016), we hypothesize that sustainability-oriented governance structures/practices (which can define a financial institution's identity) act as enablers of sustainable financial choices in pension plans.

Our theoretical framework, shown in Fig. 1, assumes that sustainable identity is measured by taking governance structures/practices within and outside the Board of Directors (BoD) into consideration. On the other hand, investment choices' sustainability could be measured by taking three variables into consideration: the inclusion of ESG criteria into pension plans' investment decisions, the number of adopted environmental and social investment strategies, and the environmental and social investment policy's coverage ratio to that of the total assets under management.

We test our hypotheses on the Italian market by analyzing a sample of 95 pension plans, representing 80 % of supplementary pension schemes in Italy's Assets Under Management (AUM). European countries are subjected to the same regulations as institutions are in terms of occupational retirement provision. It is, however, crucial to carry out a country-specific study in this field, since specific characteristics related to the mandatory pension system and national financial and demographic features vary widely across countries. The latter could therefore influence the market for supplementary pension plans considerably. Within the European Union, the Italian case is of particular relevance for the following reasons. Traditionally, Italian families' complementary pension schemes were not widespread, especially in the past, because public and other mandatory pensions played a predominant role. According to Eurostat statistics, as a share of Italy's GDP, the weight of pension expenditure is equal to approximately 4 %, which is the second highest in Europe and only exceeded by Greece. Italy, with Germany, the Netherlands, and Slovenia, all face the largest aging pressure on spending, which is causing powerful tensions in the public pension system and a tightening of eligibility conditions. According to the last OECD Report on Pensions, Italy is one of the countries whose longevity has improved the most (OECD, 2023). Currently, of all the OECD countries, Italy has the highest median age after Japan, and by

<sup>1</sup> Directive (EU) 2016/2341 of the European Parliament and of the Council of 14 December 2016 on the activities and supervision of institutions for occupational retirement provision (IORPs).

2050 it is expected to be the highest after Japan and Korea (United Nations, 2020). The old-age to working-age ratio<sup>2</sup> is accelerating, which has led to a rigorous reform of the pension system, thereby boosting the demand for complementary forms of pension. This is also due to the high percentage of the population currently receiving a minimum public pension (around 30 %, similar to Belgium and Spain) (OECD, 2023). The pension industry in Italy is therefore relatively young, but expanding rapidly in a context in which investors increasingly demand sustainable investment portfolios (Becker et al., 2022; Bolton and Kacperczyk, 2021; Hartzmark and Sussman, 2019).

In this study, we carry out an in-depth analysis of the confidential data provided via a questionnaire that a large sample of Italian pension schemes developed. The research team collaborated on periodical research focused on pension plans' sustainable investments, which the Italian Forum for the Sustainable Finance promoted (in Italian: Forum per la Finanza Sostenibile - FFS).

This study has relevant policy and managerial implications. First, our main findings provide important evidence for regulators, who have long been committed to steering institutional investment choices toward sustainability. In this context, regulation could be either product-focused or more oriented toward the financial institution (entity-focused). The study's main results highlight sustainable identity's importance as a driver of sustainability choices when applied to financial products. Based on our results, entity-focused regulation could therefore generate a direct and significant effect on the actual financial portfolios that pension plans offer the end investors. When the regulator intends to boost products' offering characterized by a more sophisticated portfolio and a higher coverage in terms of ESG screening and management, these actions might favor the adoption of ESG-oriented governance structures/practices to introduce ESG-related responsibilities within the board or to establish ESG committees.

The managerial implications are also evident, given that the board of directors' role and that of other top management structures might influence a strategic change in pension plans' portfolios toward a stronger orientation in respect of ESG issues.

The paper is structured as follows: Section 2 reviews the existing literature and defines the hypotheses that are subsequently tested. Section 5 presents the analyzed sample's characteristics, the data's source, and the methods used in the analysis. Section 6 presents the main results, while Section 5 discusses the main findings and presents the study's implications. Lastly, Section 6 presents the study's limitations and conclusions.

## 2. Literature review and hypotheses

This paper contributes to the still limited literature on pension plans' sustainability (Egli et al., 2022; Boermans and Galema, 2019; Rempel and Gupta, 2020; Alda, 2021). Using several research perspectives, it aims to focus on sustainability-related governance structures' (sustainable identity's) role in shaping ESG investment choices that complementary pension plans applied (Clary, 2009; Walsh, 2010).

In this context, governance, which legal requirements frame, is defined as the "oversight, accountability, transparency, and decision-making norms underpinning the operations and investments of a pension plan" (Monk, 2009). Further, pension plans' governance literature has focused on how they could best meet their obligations to the beneficiaries (Ambachtsheer, 2007; Clark, 2008; Clark and Urwin, 2010); however, little research has focused on corporate governance practices related to environmental and social issues (Sethi, 2005; Woods and Urwin, 2010).

This paper is part of the literature that studies governing bodies' (i.e., board of directors and other top management bodies') role in shaping

<sup>2</sup> Number of people older than 65 years per 100 people of working age (20–64 years old).

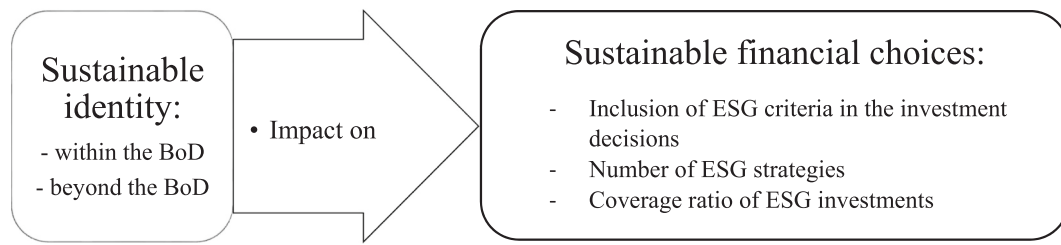


Fig. 1. The theoretical framework.

financial institutions' strategic choices (Di Antonio, 2021). It specifically analyzes governing bodies' involvement in the management function, i. e., adopting a sustainable approach to select and manage financial portfolios.

Supervisory regulation regarding governance structures' duties and powers specifies that corporate strategies' definition of sustainable finance's objectives, and of ESG factors' integration into the investment processes should also be specifically considered (Domínguez-Gómez, 2016; IORP Directive, 2016). In this context, this study aims to verify the extent to which governance structures/practices do not merely define a strategic orientation for asset managers, but could also affect the sustainability of investment strategies applied to financial portfolios.

This strand of literature investigates the opportunities for corporate governance bodies to become more actively involved in strategic and managerial choices, and the effect of doing so, particularly within a highly turbulent and competitive environment. With specific reference to the board of directors' role, some authors have defined this as a mere "rubber stamp" (Herman, 1981; Hendrey and Kiel, 2004), others as a body controlled by the top management (Pfeffer, 1972), while still others regard it as an authoritative entity involved in a firm's actual strategic direction (Finkelstein and Hambrick, 1996). When the board's role of is more virtuous, its involvement could take several forms: taking strategic decisions directly; shaping strategic decisions through formal and informal dialogues with the top management; shaping the strategy's content, context, and conduct by designing the planning process to influence the management behavior (McNulty and Pettigrew, 1999). In these cases, the board and other governance structures' actual strategic involvement could, also in terms of ESG perspectives' integration into management practices, be referred to as leading strategic orientation by differentiating it at a more passive attitude, known as the lagging of strategic orientation (Golden and Zajac, 2001; Judge and Talaulicar, 2017; Hendrey et al., 2010).

Some factors could condition the intensity of the board and other top governance bodies' involvement in formulating strategy. The literature shows that corporate bodies' strategic involvement is higher if the ethical aspects are more relevant (Weitzner and Peridis, 2011). Integrating an ESG perspective into pension fund governance could, therefore, be a driving factor of the board of directors' increased involvement in formulating ESG investment strategies (Piermattei and Schwizer, 2021). In this context, progressive orientation toward sustainability is regarded as top governance bodies' opportunity to assume responsibility for guiding a strategic transition within a financial institution (Di Antonio, 2021).

Other contextual factors, both internal and external, could contribute to explaining the board's level of effectiveness and other top governance bodies' strategic involvement. For example, establishing internal committees, assigning specific delegated responsibilities to individual board members, or even tying a compensation structure to specific strategic goals, might be important to enable conditions for the top governance bodies' high level of strategic involvement in their effectiveness (Zahara, 1990). This might apply even more to the sustainability area, given the board of directors' role in shaping potential excessive short-termism in managerial decisions (Reeves et al., 2018). Specific governance structures/practices could therefore be particularly

relevant regarding influencing the ESG strategies that financial institutions implemented, including the lengthening of financial managers' planning horizons and the broadening of the Chief Risk Officer's view of risks (Di Antonio, 2021; Gray, 2009; Koedijk and Slager, 2009). Specifically, pension plans need to adequately define the trustees and their agents' final purpose regarding managing funds on behalf of beneficiaries. In this context, pension plans need to produce strong investment beliefs that fit their environmental and social investing goals (Clark and Urwin, 2008; Woods and Urwin, 2010).

According to the literature, making finance sustainable and addressing the above critical issues, require financial institutions to be boosted in order to allow them to act more drastically and effectively, by also engaging the stakeholders and by involving the board and other top governance bodies strategically. Choices regarding investment portfolios' sustainability could be articulated better and cover a larger portion of Assets Under Management if financial institutions had a coherent and sustainable identity (Pizzetti et al., 2021; Rezende de Carvalho Ferreira et al., 2016). Actual choices in terms of financial portfolios could be related to financial intermediaries' core values, purposes, and what is regarded as its "organizational DNA," whose sustainable identity is a relevant part (Biggeri et al., 2024; Jackson, 2016).

The same Supervisory Authorities have recommended that intermediaries should communicate adequately, not only about the details of their ESG risks' impact, their financial products' characteristics, and their ESG initiatives' integration into their strategic and organizational models. In this way, supervisors and regulators could aim to reduce the risk of greenwashing phenomena, which could undermine trust in the financial system. All of these phenomena could also generate significant "reputational damage" for pension plans if their investors were to associate the entity with adverse environmental effects, or were to identify the financial institution's conduct as only sensitive to sustainability issues.

We therefore contribute to the topic's literature by suggesting new measures to determine the ESG identity and by integrating other models suggested for the financial sector (Drago et al., 2024; Bellucci et al., 2023). In particular, we aim to measure the upstream practices and processes that ensure complementary pension plans are consistent with their products, and verify the importance of "being sustainable" other than merely meaning "selling sustainable products."

The study aims to verify whether sustainability-related governance structures/practices' presence is positively correlated with environmental and social investment policies' effective implementation. Specifically, we derive the following hypotheses:

**Hp. 1)** sustainability-related governance structures/practices' adoption contributes to ESG criteria's inclusion into pension plans' investment decisions;

**Hp. 2)** sustainability-related governance structures/practices' adoption contributes to determining the number of environmental and social investment strategies that pension plans adopt;

**Hp. 3)** sustainability-related governance structures/practices' adoption contributes to determining the environmental and social investment policy's coverage ratio in relation to the total assets under pension plans' management.

### 3. Data collection and method

#### 3.1. Sample

We derived the data for the study from various information sources. The most important source of information was confidential data collected when we collaborated with the Italian Forum for the Sustainable Finance (in Italian, Forum per la Finanza Sostenibile - FFS). The FFS conducts an annual survey of Italian pension schemes' sustainable investment policies; this paper's authors collaborated on the 2022 and 2023 editions. The research aims to monitor the inclusion of ESG criteria in the main Italian pension plans' investment choices. We used confidential and exclusive data related to 95 pension plans in this study. The data included, among others, information about the ESG criteria's inclusion in investment decisions, the board's role, the SRI policy's coverage rate, and SRI strategies.

The analysis focuses on a sample of pension forms. Specifically, the sample comprises 95 pension plans (see Table 1), including<sup>3</sup>:

- 16 *Open Pension Funds* (OPFs) - pension funds that banks, insurance companies, asset management companies and investment companies promote. They support both occupational and personal pension plans. They are not a legal personality; nonetheless, their assets need to be separated from those of the financial company managing them;
- 32 *Contractual Pension Funds* (CPFs) - pension funds established through collective bargaining agreements between employer associations and trade unions, usually negotiated at the industry level, or sometimes with reference to specific geographical areas. CPFs only support occupational pension plans and have a legal personality (i.e., there is legal separation between the pension fund and the sponsors);
- 16 *Pre-existing Pension Funds* (PrePF) - pension funds already existing before Legislative Decree no. 124 of 1993 entered into force;
- 16 (*professional*) *Social Welfare Funds* (SWFs) - social security institutions referred to in Legislative Decrees 509/1994 and 103/1996. They were established as an association or foundation, and aim to provide mostly basic pensions, and welfare benefits for various categories of self-employed persons, and, in some cases, for employees, their family members, and those who survive them.
- 15 *Individual Pension Plans* (IPPs) - individual pension plans implemented by life insurance contracts established after Legislative Decree no. 252 of 2005 came into force. They are subject to the same rules regarding members' rights, and the portability and transparency regarding the plans that apply to new pension funds. Offered by insurance companies, they only support personal pension plans. They do not have a legal personality; nonetheless, their assets have to be separated from those of the insurance company sponsoring them. They may either be with-profit (traditional policies) or unit-linked policies.

The pension plans included in the sample manage approximately Eur

**Table 1**  
The sample.

Pension plans' type	Obs	%	% cum.
Open Pension Funds (OPFs)	16	16.84	16.84
Contractual Pension Funds (CPFs)	32	33.68	50.53
Pre-existing Pension Funds (PrePFs)	16	16.84	67.37
Social Welfare Fund (SWFs)	16	16.84	84.21
Individual Pension Plans (IPPs)	15	15.79	100.00
Total	95	100.00	

<sup>3</sup> The Italian supervisory authority on pension plans (COVIP) is the source of the definitions proposed below.

247,410 million, which is equivalent to about 80 % of the total assets that the Italian pension sector managed in 2022.

Table 2 describes the sample used for the study's main characteristics in terms of ESG criteria's integration into the investment policy. To establish the latter, we divided the sample into two sub-samples, using the dummy variable ESG\_INVEST, which we based on the response that the sample provided to a specific question included in the FFS questionnaire (*Do you include ESG criteria in your investment decisions?*). The first sub-sample (sample A), for which the ESG\_INVEST variable is 0, considers pension forms that do not invest sustainably, while second sub-sample (sample B), for which the ESG\_INVEST variable is 1, includes all pension forms that consider ESG criteria in their investment choices.

The data show that about 80 % of the sample comprises pension plans that already integrate ESG criteria into their investment policy, while the remaining 20 % does not. Specifically, 15 OPFs, 22 CPFs, 12 PrePFs, 15 SWFs, and 12 IPPs already consider ESG factors in their investment choices. Consequently, the categories that mostly include ESG factors in their investments are: the CPFs, OPFs, and SWFs. Finally, pension plans that are currently integrating ESG criteria into their investment policy manage about Eur 200 billion.

#### 3.2. Methodology

In this study, we use different dependent variables. To answer the research question (*could sustainability-oriented governance structures/practices encourage the assumption of more advanced and sophisticated environmental and social management investment strategies?*), we use three different variables related to the ESG investment policy: (1) a dichotomous variable indicating whether the pension form includes ESG criteria in its investment decisions (ESG\_INVEST), (2) a discrete increasing variable about the sustainable investment policy coverage ratio to that of the total assets under management (ESG\_RATE\_COV), and (3) a discrete variable constructed as an indicator derived from the sum of the adopted sustainable strategies (ESG\_STRATEGY) (Marti and Puertas, 2020).

All the analyses in this research involve primary independent variables characterizing pension schemes' sustainable governance decisions. We specifically examined three aspects of sustainable identity: (1) the ESG responsibilities adopted within the board of directors (ESG\_BOARD), (2) the ESG responsibilities that other governance entities outside the board (ESG\_SYSTEM) adopted, and (3) the top management compensation policy linked to the ESG goals (ESG\_REM) (Ye and Fang, 2021).

Approximately 25 % of the sample (in absolute terms, 24 plans) identified specific responsibilities related to the ESG within the board of directors. This was primarily achieved by establishing an internal committee (18 plans) and through dedicated delegation (4 plans). About 6 % of the sample (in absolute terms, 6 plans) plans to assign specific responsibilities for ESG matters, although they do not currently do so.

**Table 2**

The integration of ESG criteria by specific types of pension plans (in 2023).

Pension plans denomination	ESG_INVEST*					
	1		0		Total	
	Obs.	%	Obs.	%	Obs.	%
OPFs	15	15,79	1	1,05	16	16,84
CPFs	22	23,16	10	10,53	32	33,68
PrePFs	12	12,63	4	4,21	16	16,84
SWFs	15	15,79	1	1,05	16	16,84
IPPs	12	12,63	3	3,16	15	15,79
Total	76	80,00	19	20,00	95	100,00

Note: The table shows the choices regarding integrating ESG factors into the investment policies of the pension plans considered in the sample. For our classification, we use the dummy variable INVEST: 1 = if the pension form includes ESG criteria in its investment decisions, 0 = if not included.

Meanwhile, 27 % (in absolute terms, 26 plans) identified reference figures for ESG aspects outside the board of directors. However, a significant portion of the sample, constituting 41 % (in absolute terms, 39 plans), has not, either within or beyond the board, assigned specific responsibilities for sustainability. Among these, 24 plans engage in environmental and social investments (comprising 4 OPFs, 8 CPFs, 3 PrePFs, 8 SWFs, and 1 IPP). Consequently, no approach to SRI is as yet fully integrated into the governance. Of the 26 pension plans claiming to have established specific ESG measures external to the board, almost half (42 %, or 11 plans in absolute terms) rely on external advisors, and 38 % (10 plans in absolute terms) rely on the finance function, that, in 4 cases, collaborates with other areas. The risk management function is responsible for sustainability issues in 2 plans, while 2 respondents established a specific function reporting to the investment management and, in one case, to both the investment committee and the board of directors. Finally, another plan assigns ESG responsibilities to an ad hoc committee.

Finally, in all the analyses, we also introduced two control variables, namely the total Assets Under Management (AUM) and the number of members enrolled in the pension schemes (Ms), for possible confounding effects. In addition, we introduce a third dummy variable (D\_FUND), which is not as dimensional as the previous ones, to the set of control variables, but which describes the type of pension plans considered (pension funds or other types of pension plans).

Table 3 shows the dependent, independent, and control variables used in the regression models' subsequent estimations. In addition to the variable's name and a brief description, the table shows the data's source (specifically the type of question in the FFS survey used to create the variable). The first group of variables describes the pension plans' investment policy, focusing specifically on the ESG criteria's integration. The second group of variables describes the corporate governance practices related to sustainability. It specifically considers whether there are specific ESG responsibilities within the board of directors and/or beyond them, as well as compensation policies that include environmental and social aspects.

Table 4 shows the resulting descriptive statistics (the mean, standard deviation, minimum, and maximum) of each variable used in the study. Table A1 in the Appendix shows the correlation analysis between them. The correlation between variables should be considered acceptable and not likely to affect subsequent analyses.

Models based on the use of logistic and Tobit regressions are, from a methodological point of view, predominantly adopted to answer the above-mentioned research questions and to study the associations between the variables. The logit model is a non-linear regression model used when the dependent variable is a dichotomous type, i.e., a variable with only 0 and 1 values or, as in our case, could be related to them. In general, the logistic model aims to establish the probability with which an observation could generate one or another value of the dichotomous dependent variable. The Tobit model, also called a censored regression model, is designed to estimate the linear relationships between variables when there is either left- or right-censoring in the dependent variable. We used Tobit regression for the ESG\_REM, ESG\_STRATEGY, and ESG\_RATE\_COV, which are discrete variables, and accepted a limited number of values.

To answer the research questions and test the hypotheses, we estimated three different models by using one logistic regression and two Tobit regressions. In our case, the three models were designed to examine the relationship between the sustainability governance structures that several pension plans implemented and the ESG investment policies adopted in respect of the various implemented investment lines. These further estimations are based on the following equations:

- (1)  $ESG\_INVEST_i = \beta_0 + \beta_1 AUM + \beta_2 Ms. + \beta_3 D\_FUND + \beta_4 ESG\_BOARD + \beta_5 ESG\_SYSTEM + \beta_6 ESG\_REM + u_i$
- (2)  $ESG\_RATE\_COV_i = \beta_0 + \beta_1 AUM + \beta_2 Ms. + \beta_3 D\_FUND + \beta_4 ESG\_BOARD + \beta_5 ESG\_SYSTEM + \beta_6 ESG\_REM + u_i$

**Table 3**  
The summary of the variables.

Variables	Description and source
<b>Investment Policies – DEPENDENT variables</b>	
ESG_INVEST <i>ESG Investment</i>	Dummy variable: 1 = if the pension form includes ESG criteria in investment decisions, 0 = if not included Source: questionnaire Question: Do you include ESG criteria in your investment decisions?
ESG_RATE_COV <i>ESG Coverage Ratio</i>	Discrete increasing variable: 0 = zero coverage rate, 1 = 0–25 %, 2 = 25–50 %, 3 = 50–75 %, 4 = 75–100 % Source: questionnaire Question: What is sustainable investment policy coverage ratio to total assets under management?
ESG_STRATEGY <i>ESG Strategy</i>	Discrete variable constructed as an indicator derived from the summation of sustainable strategies adopted: 1 point for each strategy adopted (exclusions, international conventions, best in class, thematic investments, engagement, impact investing) - max 6 points per asset class. Source: questionnaire Question: With reference to Equity, Corporate Bond and Government Securities, what ESG strategies do you adopt?
<b>Corporate Social Identity – INDEPENDENT variables</b>	
ESG_BOARD <i>Specific ESG-related responsibilities within the board</i>	Dummy variable: 1 = if within the board there are specific ESG-related responsibilities, 0 = otherwise Source: questionnaire Question: Are there specific ESG-related responsibilities within the board?
ESG_SYSTEM <i>Other systems for ESG issues</i>	Dummy variable: 1 = if there are other systems in place to oversee ESG issues, 0 = otherwise Source: questionnaire Question: Are other systems in place to oversee ESG issues?
ESG_REM <i>ESG Remuneration</i>	Discrete increasing variable: 1 = no, 2 = no, but it is programmed, 3 = yes, qualitative indicators, 4 = yes, quantitative indicators, 5 = yes, qualitative and quantitative indicators Source: questionnaire Question: Within your remuneration policy, do you use sustainability indicators to assess the achievement of ESG goals?
<b>Control variables</b>	
AUM <i>Asset Under Management</i>	Assets under management in million of euro Proprietary Dataset
Ms <i>Members</i>	Number of people enrolled in the pension plan Proprietary Dataset
D_FUND <i>Type of pension plans</i>	Dummy variable: 1 = if the pension plan is a pension fund, 0 = otherwise Proprietary Dataset

**Table 4**  
The sample's descriptive statistics.

Variable	Obs	Mean	Std. Dev	Min	Max
ESG_BOARD	95	0.2631579	0.4426835	0	1
ESG_SYSTEM	95	0.28422105	0.4534304	0	1
ESG_REM	95	1.852632	1.32864	0	5
ESG_INVEST	95	0.8	0.402122	0	1
ESG_RATE_COV	95	2.589474	1.647014	0	4
ESG_STRATEGY	95	5.589474	4.677913	0	16
AUM	95	2572.924	4136.493	12.12903	27,673
Ms	95	96,554.78	163,598.1	833	1,183,091
D_FUND	95	0.6736842	0.4713517	0	1

Note: The table shows the descriptive statistics (obs, mean, standard deviation, minimum, and maximum) of each variable used in the study.

$$(3) \text{ ESG\_STRATEGY}_i = \beta_0 + \beta_1 \text{ AUM} + \beta_2 \text{ Ms.} + \beta_3 \text{ D\_FUND} + \beta_4 \text{ ESG\_BOARD} + \beta_5 \text{ ESG\_SYSTEM} + \beta_6 \text{ ESG\_REM} + u_i$$

#### 4. Empirical results

Initially, the existing data provided us with an opportunity to categorize the examined pension plans, thereby offering a means to more accurately outline Italian pension schemes' current situation concerning their sustainability.

The results actually allowed us to divide the respondents' sample into four categories that summarize corporate governance choices and sustainable investment policies. In order to do so, we used a matrix that outlines the sample's position on the two trajectories analyzed in the paper: (1) the choices of adopting ESG responsibilities in respect of the corporate governance, and (2) the investment policies adopted in respect of the ESG as illustrated in Fig. 2.

The indicator shown on the y-axis summarizes the choices of adopting ESG-specific responsibilities in respect of the corporate governance. Specifically, a score of 0 was assigned to each of the three analyzed essential governance guidelines (the ESG responsibilities internal to the board, as well as the other ESG system external to the board, and the ESG remuneration policies) if the pension scheme stated that it had not introduced such guidelines, while 1 was assigned if the respondent stated that the introduction of the ESG governance responsibilities was planned and in the process of being introduced, and 2 was assigned if the ESG governance responsibilities had been introduced. The indicator thus measures the ESG governance structures' intensity and is assigned values between 0 and 6. Environmental and social investment policies applied to equity, bond, and government bond portfolios are represented on the x-axis on a scale from 0 to 18, depending on the number of strategies that the manager applied when selecting securities to be included in the investment portfolios (maximum 6 strategies per asset type). Finally, the size of the bubbles represents the environmental and social investment policy's coverage rate, and each analyzed investment line (which can take the values 0, 25 %, 50 %, 75 %, or 100 %).

Given the average of the values that the variables shown in the two perpendicular straight lines within the graph assume, it is clear that a

large proportion of pension plans present only modest values in both the indicator related to SRI strategies and to the ESG governance indicator. We could define this group as the "potential" group, which still has wide spaces for implementing environmental and social investment policies. Many of these plans have a high rate of sustainable investment coverage, but adopt non-complex SRI strategies (e.g., in most cases only the exclusion strategy is mentioned). These intermediaries have not yet made specific ESG governance choices, but many intend to implement them in the near future.

It should be noted, however, that the upper quadrants of the matrix are reserved for "neophytes" and "holistic" pension plans. The "neophytes" are noteworthy for their satisfactory governance principals (although these may at times only be planned), as well as for the sustainable investments' high coverage rates; nevertheless, they only apply a narrow range of SRI strategies. These pension plans have only recently become aware of the importance of ESG aspects in their investment choices and have, consequently, taken the first steps to adapt accordingly (in terms of both governance and SRI strategies). Articulated SRI strategies' adoption, high sustainable investment coverage rates, and a well-defined and consistent sustainable identity characterize the "holistic" pension plans. This is undoubtedly the most virtuous group, as it has managed to fully reconcile investment strategies with governance choices in the ESG logic.

The last quadrant concerns the group of "operational" pension plans, i.e., pension plans offering products characterized by a broad coverage of sustainable investments and selected by means of an articulated range of SRI strategies. However, specific corporate governance sustainability responsibilities do not match these plans' product policies.

Again, for descriptive purposes and before estimating the regression models, we analyzed the two sub-samples described in the previous section in detail. This refers to sub-sample A, for which the ESG\_INVEST variable is equal to 0, and refers to pension forms that do not invest sustainably, as well as sub-sample B, for which the ESG\_INVEST variable is equal to 1 and comprises all pension forms that consider ESG criteria in their investment choices. Specifically, we tested whether or not the two samples differ in terms of corporate governance choices by testing such a possible difference by means of an equality of means *t*-test. Table 5 presents the results of the *t*-test performed on the variables

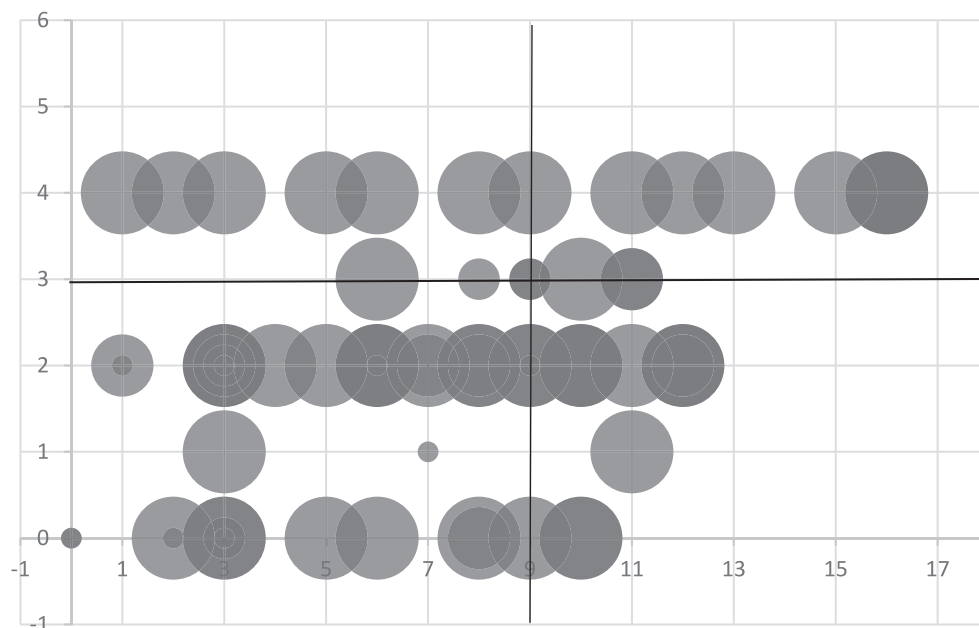


Fig. 2. ESG governance/ESG investment policy matrix.

Note: The figure summarizes the pension plans in the sample's corporate governance choices and sustainable investment policies. The indicator shown on the y-axis summarizes the choices of adopting ESG-specific responsibilities in respect of the corporate governance. Sustainable investment policies applied to equity, bond, and government bond portfolios are represented on the x-axis. The size of the bubbles represents the sustainable investment policy's coverage rate.

**Table 5**  
T-test on the ESG investing variable.

Variable	Sub-sample A (ESG_INVEST = 0)	Sub-sample B (ESG_INVEST = 1)
ESG_BOARD	0.1052632 **	0.3026316 **
ESG_SYSTEM	0.1052632 **	0.3289474 **
ESG_REM	1.526316	1.934211

Note: The table shows the results of the t-test performed on the variables describing the *Corporate Social Identity* (i.e. ESG\_BOARD, ESG\_SYSTEM, ESG\_REM).

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

describing sustainable identity (i.e. ESG\_BOARD, ESG\_SYSTEM, ESG\_REM). One, two, or three asterisks represent the coefficients' significance, i.e., rejection of the hypothesis of the coefficients' equality, with a probability level of 10, 5, and 1 %, respectively. As the table shows, the difference in the averages is significant in respect of the variables ESG\_BOARD and ESG\_SYSTEM. Consequently, it was possible to determine that the two sub-samples differ regarding 2 of the 3 the observed corporate governance's aspects.

After identifying a significant difference between the two sub-samples (in at least two out of the three variables), we started testing the hypothesis that specific sustainability-linked governance practices/structures' implementation might encourage a more extensive adoption of environmental and social investment policies.

Table 6 shows the model estimates' results. Consistent with the previous test of the averages' significance, the results' analysis shows that some governance variables are significant in respect of explaining pension plans' environmental and social investment choices.

Specifically, the choices that pension schemes make regarding investment lines' sustainability appear to be significantly correlated with specific ESG responsibilities' presence within the Board in the form of establishing a committee or giving specific delegation regarding sustainability issues to some board members.

Similarly, assuming that the investment choices are all based on ESG criteria, the percentage of the investment portfolio selected according to

**Table 6**  
Models' estimates.

Variables	Logit ESG_INVEST	Tobit ESG_RATE_COV	Tobit ESG_RATE_COV
AUM	-0.0000921 (0.0000878)	7.85e-06 (0.0000422)	0.0001584 (0.0001114)
Ms	4.61e-06 (4.33e-06)	3.11e-07 (1.05e-06)	6.38e-07 (2.77e-06)
D_FUND	-0.9052111 (0.6779359)	0.3130308 (0.3487611)	0.4754249 (0.9198398)
ESG_BOARD	1.896364 * (0.9998322)	1.116612 ** (0.459285)	3.40547 *** (1.211341)
ESG_SYSTEM	2.034567 ** (0.8246693)	0.9016862 ** (0.3687434)	1.908964 ** (0.9725422)
ESG_REM	-0.150603 (0.3251141)	0.2114766 (0.1504715)	1.057867 *** (0.396861)
_cons	1.374444 (0.8037229)	1.386432 *** (0.4453251)	1.401392 (1.174523)
	Number of obs = 95	Number of obs = 95	Number of obs = 95
	LR chi2(6) = 14.30	LR chi2(6) = 17.68	LR chi2(6) = 31.76
	Prob > chi2 = 0.0265	Prob > chi2 = 0.0071	Prob > chi2 = 0.0000
	Pseudo R2 = 0.1504	Pseudo R2 = 0.0487	Pseudo R2 = 0.0565

Notes: The table shows the model estimates' results. We estimated three different models to investigate how the sustainability governance structures that different pension plans implemented relate to the ESG investment policies adopted across the various investment portfolios. The dependent variables are: ESG\_INVEST, ESG\_RATE\_COV and ESG\_STRATEGY.

Standard errors in parentheses.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

such ESG criteria, and the number of sustainability strategies adopted, all have a positive relationship with other ESG-related governance structures. The latter include incentive systems for governing bodies based on ESG objectives; establishing a body with specific ESG expertise outside the board, such as an ethics committee; or establishing a sustainability function, such as a sustainability manager who reports directly to the board.

On the other hand, the analysis shows that the sustainability indicators' use in the remuneration policy to assess whether the ESG objectives have been achieved, does not show a statistically significant relationship with the adopted ESG policies in terms of the investments.

#### 4.1. Robustness check

A potentially critical aspect of our analysis is governance forms' likely endogeneity. In other words, governance forms might not causally explain investment choices' sustainability, but a third variable does cause both. Consequently, in an effort to solve this endogeneity problem, we re-estimated all the regressions by lagging all the independent variables used for the analyses at t-1. Our analysis justifies using a one-year lag on independent variables for several reasons. First, it helps address potential endogeneity issues by introducing a temporal gap between the cause (the independent variable) and the effect (the dependent variable), thereby reducing the likelihood of simultaneous influence. Second, the lag enables a more realistic portrayal of the causal relationship between the variables, because many real-world economic processes involve time delays before a change's full impact becomes apparent.

The regressions' new estimation is possible because we observed the sample in two different years (2022 and 2023).

Table 7 shows the previous models' results when re-estimated with the independent variables in respect of the previous period. The results shown in the tables are partially confirmed, thereby largely ensuring the analyses' robustness and the relationships' significance. Specifically, the strongest confirmed relationship is the ESG\_BOARD variable, which remains significant in all the three estimated regressions.

**Table 7**  
Models' estimates – robustness checks.

Variables	Logit ESG_INVEST	Tobit ESG_RATE_COV	Tobit ESG_RATE_COV
AUM <sub>t-1</sub>	-0.0001588 (0.0001081)	-0.0000204 (0.0000489)	0.0000662 (0.0001292)
Ms <sub>t-1</sub>	7.34e-06 (5.73e-06)	8.50e-07 (1.23e-06)	2.14e-06 (3.24e-06)
D_FUND	-0.7775007 (0.6,632,846)	0.2628699 (0.3607138)	0.3445683 (0.9525561)
ESG_BOARD <sub>t-1</sub>	1.655862 * (0.8721351)	0.883123 ** (0.4142031)	3.172378 *** (1.093808)
ESG_SYSTEM <sub>t-1</sub>	1.002603 (0.6630646)	0.352219 (0.3639508)	0.4960707 (0.9,611,043)
ESG_REM <sub>t-1</sub>	-0.1641084 (0.2702341)	0.1362559 (0.1481077)	0.8957828 ** (0.391116)
_cons	1.50791 (0.7691698)	1.806744 *** (0.4452545)	2.460414 (1.175807)
	Number of obs = 95	Number of obs = 95	Number of obs = 95
	LR chi2(6) = 10.09	LR chi2(6) = 9.10	LR chi2(6) = 22.94
	Prob > chi2 = 0.1207	Prob > chi2 = 0.1679	Prob > chi2 = 0.0008
	Pseudo R2 = 0.1062	Pseudo R2 = 0.0250	Pseudo R2 = 0.0408

Notes: The table shows the model estimates' results. We estimated all the regressions by lagging all the independent variables used for the analyses (AUM, Ms., ESG\_BOARD, ESG\_SYSTEM, ESG\_REM) at t-1. D\_FUND was the only not lagged variable.

Standard errors in parentheses.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## 5. Discussion

This study has presented the effects that sustainability-oriented governance choices have on the actual investment strategies that pension plans adopt. This could allow regulators and contributors to verify the effectiveness of governance measures favoring certain managerial choices in terms of environmental and social investing.

On a highly representative sample of Italian pension plans, we test the relationship between governance choices linked to sustainability as well as environmental and social investment policies' adoption by integrating confidential data that we collected via a questionnaire submitted in collaboration with the FFS. Consequently, we test the effectiveness of a pension plan's governance if this is oriented toward sustainability (sustainable identity) in order to enable sustainable investment choices.

Analyses reveal that certain governance variables play a significant role in elucidating pension plans' sustainability decisions in terms of investments. Specifically, pension schemes' choices regarding investment portfolios' sustainability show a significant correlation with specific ESG responsibilities' presence within a board. This becomes evident when establishing a committee or assigning specific responsibilities concerning sustainability issues to board members. Likewise, incorporating ESG criteria into investment decisions, into the proportion of the selected investment portfolio based on the ESG criteria, and into sustainability strategies' adoption, demonstrate a positive and significant association with other ESG-related governance structures. These structures include incentive systems for governing bodies grounded in ESG objectives, establishing an external body with specialized ESG expertise (such as an ethics committee), and creating a sustainability function (such as a sustainability manager who reports directly to the board).

The study has noteworthy policy and managerial implications. First, our primary findings offer regulators who have been actively working to guide institutional investment decisions toward sustainability, crucial insights. In this context, regulatory measures could either be product-focused or more directed toward the financial institution (which is an entity-focused one). This study's key results underscore sustainable identity's significance as a catalyst for financial products' sustainability choices. Based on our findings, entity-focused regulation could have a direct and substantial impact on pension plans' investment choices. When policymakers aim to encourage complementary pension plans characterized by a higher degree of sustainability, they could promote the adoption of ESG-oriented governance structures/practices by introducing specific ESG-related responsibilities within the board or by establishing ESG committees.

Based on the results obtained from the conducted survey, many pension plans have in recent years moved toward the area of green or social investing, although they have often limited this approach to specific investment lines and have not applied ESG factors' holistic integration into their internal procedures and practices, not into their overall strategic orientation. Further effort might be needed if regulators aim to make finance fully sustainable. Based on our results, it is essential to stimulate institutional investors (including pension plan investors) to go beyond a purely product approach to sustainability. Indeed, according to our main findings, a pension plan's consistent sustainable identity could facilitate ESG factors' integration into the investment choices, could ensure that sustainability strategies are better applied to the investment portfolios, and could encourage a wider coverage of Assets Under Management chosen specifically for their sustainability criteria.

The managerial implications are equally evident, given the influential role that the board of directors and the other top management structures could play in steering the strategic shift in pension plans' portfolios toward a more focused orientation on environmental and social issues. The board of directors plays a crucial role in guiding an organization's strategic direction and overseeing its operations. This governance mechanism helps manage relationships with various

stakeholders by reducing costs and encouraging actions that align with creating value (Jensen and Meckling, 1976; Fama and Jensen, 1983). Based on agency theory, the board is tasked with overseeing management activities and supporting the development and implementation of organizational strategies. Recently, organizations have increasingly integrated ESG considerations into their strategic plans, emphasizing sustainability and expanding the board's responsibilities (e.g., Baselga-Pascual et al., 2018). This shift is also influenced by recent regulations, such as the IORPII directive for pension plans. The relevance of governance in guiding the strategic supervision of the whole organization has increased over the years, also due to pressures from authorities. It is therefore evident the need for a board of directors to promote its effectiveness and ability to grasp the opportunities in terms of profitability deriving from the market, enhancing the stakeholders' expectations and ensuring sound and prudent management, also considering the ESG factors related to their investment decisions.

## 6. Conclusion

As institutional investors, pension plans should integrate sustainable development goals into their investment decisions (Alda, 2021; Egli et al., 2022; Boermans and Galema, 2019). Internal and external factors, including regulatory factors, push them toward the environment and social-oriented investment portfolios' design. However, the industry's features are currently extremely varied: the inclusion of simple ESG criteria in a limited portion of environment and social-oriented investments' portfolios characterizes several plans, while others include more holistic approaches to sustainability, which also apply to governance models (namely, their sustainable identity).

This study's main findings emphasize sustainable identity's significance as a catalyst for the environmental and social choices in the financial products that pension plans offer. Specifically, forming an ESG committee within a board or assigning distinct responsibilities related to environmental, social, and governance issues to board members are significantly linked to the sustainability of pension plans' investment portfolios. Similarly, integrating ESG criteria into investment decisions, into the portion of the investment portfolio based on ESG criteria, and adopting sustainability strategies show a positive correlation with other ESG-related governance structures. These include having incentive systems based on ESG goals, establishing an external body with specialized ESG expertise (e.g., an ethics committee), or creating a sustainability role (e.g., a sustainability manager who reports directly to the board)."

The study has a number of limitations, however, which could offer future research insights into the sustainable finance area as applied to pension plans. First of all, since supra-national regulation governs Italian pension plans, the analyses' results could be replicated and verified in other contexts characterized by the same regulatory framework. This study only focuses on Italian pension plans; by taking a future perspective, a similar study could replicate the analysis but focus on other European countries while using the same regulatory framework, thereby verifying whether environmental and social conditions could have an effect on the main results.

Additionally, given the authors' participation in a biennial survey and the subsequent data that became available, the study focuses on just two years; future research could cover a larger time frame to verify whether specific time windows lead to differences. Finally, a final consideration in our analysis refers to governance forms' possible endogeneity. In other words, there is a chance that governance forms might not causally elucidate investment choices' sustainability; instead, a third variable might influence both. Future research could therefore focus on instrumental variables' use, which the current data does not allow.



## CRedit authorship contribution statement

**Elisa Bocchialini:** Methodology, Data curation, Formal analysis, Validation, Writing – original draft, Writing – review & editing. **Paola Ferretti:** Conceptualization, Validation, Formal analysis, Data curation, Writing – original draft, Writing – review & editing. **Federica Ielasi:** Conceptualization, Formal analysis, Validation, Writing – original draft, Writing – review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial

## Appendix A. Appendix

**Table A1**

Analysis of correlation between variables.

	AUM	Ms	D_FUND	ESG_BOARD	ESG_SYSTEM	ESG_REM	ESG_INVEST	ESG_RATE_COV	ESG_STRATEGY
AUM	1.0000								
Ms	0.4053	1.0000							
D_FUND	-0.1948	-0.0665	1.0000						
ESG_BOARD	-0.0527	0.0706	-0.1449	1.0000					
ESG_SYSTEM	0.0332	0.0453	0.0901	-0.3766	1.0000				
ESG_REM	0.0712	0.1358	-0.2645	0.5912	-0.1770	1.0000			
ESG_INVEST	0.0252	0.0853	-0.1235	0.1793	0.1984	0.1235	1.0000		
ESG_RATE_COV	-0.0049	0.0886	0.0175	0.2957	0.1152	0.2832	0.7903	1.0000	
ESG_STRATEGY	0.1075	0.1478	-0.0903	0.4175	0.0205	0.4386	0.6006	0.6793	1.0000

## Data availability

Data will be made available on request.

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