Management Decision

Reporting for change: does the adoption of double materiality influence ESG risk management?

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Abstract

Purpose – Drawing on the theoretical distinction between substantive and symbolic sustainability reporting, this study examines whether the adoption of double materiality in sustainability reporting influences ESG risk management.

Design/methodology/approach – Using *t*-tests and OLS regression analyses, this research focuses on European companies listed on the STOXX Europe 600 index, analyzing the relationship between the use of double materiality for the financial year 2022 and ESG risk management. The dataset includes 442 companies.

Findings – The results suggest that the adoption of double materiality for sustainability reporting does not significantly influence the management of ESG risks. Notably, these findings hold true across various robustness checks and additional analyses.

Originality/value – This research contributes to the debate on the organizational implications of sustainability reporting by highlighting that the adoption of double materiality does not influence ESG risk management processes. This could be attributed to symbolic reporting practices, the presence of pre-existing robust ESG risk management frameworks or the early stage of double materiality adoption.

Keywords Double materiality, Sustainability reporting, ESG risks, Risk management

Paper type Research paper

1. Introduction

Similar to financial reporting, materiality is a core principle in sustainability reporting, requiring entities to disclose only the sustainability information relevant to users (Unerman and Zappettini, 2014; Fiandrino *et al*., 2022). However, there is no clear consensus on the precise identity of these users (Barker, 2025). As a result, two distinct approaches to materiality have been codified in sustainability reporting standards (Jørgensen *et al*., 2022). From a first perspective, known as "impact materiality", a sustainability matter is material

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when it represents an organization's, actual or potential, positive or negative, most significant impacts on the economy, environment and people (GRI, 2021). The reported information about these impacts supports the diverse categories of stakeholders (e.g. business partners, civil society organizations, consumers, customers, employees and other workers, governments, local communities, non-governmental organizations, shareholders and other investors, suppliers, trade unions) in making informed assessments and decisions about the organization's impacts and contribution to sustainable development. In contrast, from a second perspective, termed "financial materiality", a sustainability matter is material if it generates risks and opportunities that affect or could reasonably be expected to affect the entity's prospect, influencing its development, financial position, financial performance, cash flows, access to finance or cost of capital over the short-, medium- or long-term. From this perspective, information is material if omitting, misstating or obscuring that information could reasonably be expected to influence decisions that primary users of financial reports (i.e. existing and potential investors, lenders and other creditors) make on the basis of those reports (ISSB, 2023).

In the European Union, the Corporate Sustainability Reporting Directive (CSRD) has radically transformed the conceptualization of materiality in sustainability reporting (Beyne and Moratis, 2025). The CSRD that was adopted in December 2022 (European Parliament and Council of the EU, 2022) and requires reporting from financial year 2024, aims to increase corporate transparency and accountability and enable stakeholders to integrate ESG factors into their decision-making. It significantly amends the previous Non-Financial Reporting Directive (Directive 2014/95/EU, NFRD in brief), including: extending the companies in scope, requiring a double materiality analysis, further specifying reporting contents, introducing mandatory sustainability reporting standards (i.e. the European Sustainability Reporting Standards, developed by EFRAG), expanding the reporting requirements for value chain, integrating sustainability information in the management report, mandating assurance and digital tagging of the reported information (Hummel and Jobst, 2024).

As a result, companies within the scope of the CSRD will be required to perform a double materiality assessment. This approach integrates both impact and financial materiality, necessitating the identification, assessment, and disclosure of the most significant social and environmental impacts, as well as sustainability-related risks and opportunities (Baumüller and Sopp, 2022; Correa-Mejía *et al*., 2024; Barker, 2025; Beyne and Moratis, 2025). While the most obvious implications of materiality assessment relate to the reporting process, it is reasonable to expect that adopting one materiality approach over another will help "for a strong organizational sustainability integration" (Beyne and Moratis, 2025, p. 48). In other words, materiality assessment is expected to influence the organizational sustainability behavior (Mio *et al*., 2020). Although prior research has explored how materiality in sustainability reporting affects investor reactions and firms' financial performance (e.g. Khan *et al*., 2016; Consolandi *et al*., 2022) or explored the challenges that may arise during the double materiality assessment process (Dyczkowska and Szalacha, 2025), the existing literature has not yet examined how organizational practices are shaped by adopting a specific materiality approach.

To contribute to this debate, this paper examines whether the adoption of double materiality in sustainability reporting is related to any organizational changes, specifically in the area of ESG risk management. While companies under the NFRD tended to focus primarily on disclosing social and environmental impacts (Pizzi *et al*., 2024), companies under the CSRD must integrate the impact materiality analysis by identifying, assessing and disclosing also sustainability-related risks and opportunities. Consequently, we expect that the application of double materiality for sustainability reporting may influence ESG risk management, the process by which companies address and manage the risks associated with sustainability issues.

Our study is informed by two contrasting theoretical perspectives on sustainability reporting: the substantive and symbolic approaches (Marquis and Qian, 2014; Shabana and

Ravlin, 2016). These perspectives lead us to hypothesize two alternative relationships between the adoption of double materiality for sustainability reporting and ESG risk management. The symbolic perspective suggests that sustainability reporting is often used by companies to project an image of social and environmental responsibility, without necessarily reflecting substantive and meaningful actions. From this view, we hypothesize that using double materiality for sustainability reporting may not be accompanied by substantive improvements in ESG risk management. Conversely, the substantive approach emphasizes that sustainability accounting and reporting drive real organizational changes, suggesting that such reporting reflects concrete actions rather than superficial compliance with societal expectations. This leads us to conjecture that the adoption of double materiality for sustainability reporting could strengthen ESG risk management.

Using a sample of 442 companies listed in the STOXX Europe 600, we find that the adoption of double materiality for sustainability reporting does not influence ESG risk management. The findings are corroborated along a series of robustness checks and additional analyses. Therefore, our findings suggest that adoption of double materiality does not seem to influence ESG risk management practices, due to symbolic reporting practices. This in turn may derive from pre-existing strong ESG risk management frameworks, or the early stage of double materiality application.

The rest of the paper is organized as follows: Section 2 provides the institutional background on sustainability materiality, while Section 3 reviews the relevant literature. In Section 4, the hypotheses are developed based on the theoretical framework of substantive and symbolic sustainability reporting. Section 5 outlines the methodology, followed by Section 6, which analyzes the findings. Finally, Section 7 concludes with a discussion of the contributions and implications.

2. Background

Historically, materiality has been primarily associated with financial reporting, but it has increasingly taken on a central role in sustainability reporting as well (Unerman and Zappettini, 2014; Puroila and Mäkelä, 2019). In the context of sustainability reporting, applying a materiality filter involves identifying, assessing, and prioritizing the most relevant social, environmental, governance, and economic sustainability information for disclosure (Jørgensen *et al*., 2022, p. 344). Given the broad and diverse nature of sustainability information, the issue of information overload in sustainability reporting is even more pronounced than in financial reporting (Unerman and Zappettini, 2014, p. 175; Baumüller and Schaffhauser-Linzatti, 2018).

To support companies in conducting materiality analyses, major sustainability reporting standards and frameworks provide clear definitions of materiality and detailed guidance for the materiality assessment process (Jørgensen *et al*., 2022; Clark, 2021).

While the Global Reporting Initiative (GRI) Standards remain the most widely adopted sustainability reporting standards globally (KPMG, 2024), the landscape of sustainability reporting has undergone significant changes in recent years. In June 2021, the International Integrated Reporting Council (IIRC) and the Sustainability Accounting Standards Board (SASB) announced their merger to form the Value Reporting Foundation (VRF). Subsequently, on November 3, 2021, at COP26 in Glasgow, the Trustees of the IFRS Foundation announced the establishment of the International Sustainability Standards Board (ISSB). The ISSB's mission is to develop standards that will result in a high-quality, comprehensive global baseline of sustainability disclosures focused on the needs of investors and the financial markets, i.e. the IFRS Sustainability Disclosure Standards. By August 2022, the ISSB had integrated the VRF, further consolidating global sustainability efforts. Additionally, in October 2023, the work of the Task Force on Climate-related Financial Disclosures (TCFD) was completed, with its recommendations incorporated into the ISSB Standards. These standards aim to provide a comprehensive global baseline, suitable for

adoption worldwide. In the European Union, the CSRD introduces the European Sustainability Reporting Standards (ESRS), developed by EFRAG. Compliance with these standards is mandatory for companies within the CSRD's scope.

Since these frameworks and standards are based on differing interpretations of the purpose and target audience of sustainability reporting, they propose varying notions of materiality. These notions can be grouped into three primary categories: impact materiality (e.g. GRI Standards), financial materiality (e.g. VRF and ISSB Standards), and double materiality (e.g. ESRS).

Impact and financial materiality represent foundational approaches that underpin the more recent concept of double materiality (Reimsbach *et al*., 2020; Jørgensen *et al*., 2022). Impact materiality follows an "inside-out" perspective, where sustainability topics are considered material if they reflect significant impacts (i.e. externalities) that the reporting organization has on the economy, environment, and/or society. In contrast, financial materiality adopts an "outside-in" perspective, identifying sustainability topics as material if they generate, or are expected to generate, significant financial effects on the reporting organization. Double materiality integrates these two approaches, addressing both the organization's externalities and the financial implications of sustainability topics on the organization itself.

This approach is incorporated into EU regulation on mandatory sustainability reporting, initially under the NFRD, where double materiality is specifically mentioned in the *Guidelines on non-financial reporting: Supplement on reporting climate-related information* published by the European Commission in 2019 (Raith, 2023), and more explicitly in the CSRD (La Torre *et al*., 2020; Baumüller and Sopp, 2022).

From the perspective of double materiality, a sustainability topic is considered material if it is significant from either the impact perspective, the financial perspective, or both. This approach necessitates an evaluation from both "outside-in" and "inside-out" perspectives. The *de jure* harmonization initiated by the European Commission through the NFRD has driven the widespread adoption of the GRI Standards as the *de facto* reporting framework among EU companies within the NFRD's scope (Pizzi *et al*., 2024). As a result, these companies, accustomed to the impact materiality approach emphasized by the GRI Standards, will face significant challenges when adopting double materiality, particularly in integrating and addressing the financial perspective.

3. Literature review and research question

Given its importance to the sustainability reporting process, it is not surprisingly that the principle of materiality has drawn significant academic attention. As highlighted by Fiandrino *et al*. (2022), this interest has expanded across various areas of research, summarized in Table 1.

Despite the growing academic interest, significant research gaps remain. First, existing research has not yet addressed how adopting a specific materiality approach influences organizational practices. Indeed, research on the consequences of applying materiality in sustainability reporting has predominantly focused on its value relevance, exploring investors' reactions and its effects on financial performance. Khan *et al*. (2016) found that top-performing companies on ESG material issues outperform those focusing on immaterial ones, based on a study of over 2,000 U.S. firms. Similarly, Consolandi *et al*. (2022) find that markets reward companies operating in industries with high ESG materiality concentration. Schiehll and Kolahgar (2021) reveal the value relevance of disclosing financially material aspects. Carvajal and Nadeem (2023) demonstrate a stronger relationship between firm performance and financially material sustainability information compared to overall sustainability disclosure.

Second, as a relatively recent topic, few studies have explored double materiality in sustainability reporting. Correa-Mejía *et al*. (2024) show that 76 European companies listed on the Dow Jones Sustainability Index for 2022 voluntarily reported applying double materiality

Table 1. Sustainability materiality research (Fiandrino *et al*., 2022)

Academic themes	Main topics
Definitions of materiality	Landscape of international reporting standards and application of definitions by companies
Pressures over materiality analysis	Concerns related to sustainability reporting processes that may impede the proper construction of a sustainability materiality analysis
Materiality determinants and indicators	Determinants of sustainability materiality
Issues that are material for companies and stakeholders	Sustainability issues that are more material for companies and for certain categories of stakeholders
The evaluation of materiality in sustainability information	Assessment of disclosure of the materiality process in the preparation of sustainability reports or integrated reports
Models of materiality assessment	Development of materiality assessment models
Impact of material information and value relevance of materiality	Investigation of the impacts of material information and the value relevance of materiality – that is, when material information impacts the stock price
Materiality in sustainability assurance	Materiality determination and assessment process within sustainability

Source(s): Authors' own work

in their sustainability reports. However, their findings reveal that 33% of the sample are classified as "committed adopters," as they identify both impact materiality and financial materiality in their reports. In contrast, the remaining 67% are categorized as "label adopters", as they fail to identify either impact or financial materiality in their reports, contrary to the guidelines set by EFRAG. Dragomir *et al*. (2024) provide ex-ante empirical evidence on how large Romanian companies conduct materiality assessments and disclose the necessary elements. They found that most companies reported information on their impact materiality assessment process, while fewer provided details on financial materiality. These companies utilized a sophisticated mix of institutional arrangements to prepare for the full implementation of the CSRD. Pizzi *et al*. (2023) report that only 2.68% of 2,046 listed U.S. companies observed from 2017 to 2020 integrated the GRI and SASB Standards – a proxy for double materiality – with the integration predominantly guided by the GRI framework. Lu *et al*. (2024) investigates the valuation and real effects of mandatory disclosure of GHG emission costs from the double materiality perspective. In their model, the persistence and the productivity ratio directly capture the aspects of financial materiality, whereas the social cost parameter directly captures those of impact materiality. Their findings reveal that the mandatory disclosure of the long-term costs of GHG emissions affects capital market valuations and corporate investment decisions relative to a non-disclosure regime. Suhardjo *et al*. (2024) examine how two Indonesian palm plantation companies disclose information related to double materiality, highlighting contrasting approaches in both structure and content of the information disclosed.

To bridge the gap in the academic debate on the organizational implications of applying double materiality in sustainability reporting, this article explores the following research question: Does adopting double materiality in sustainability reporting influence ESG risk management?

This question is particularly relevant in assessing whether the EU's mandate on double materiality can effectively facilitate the transition toward a more sustainable economy – aligned with the objectives of the 2030 Agenda, the European Green Deal, and the Paris Agreement. Achieving this alignment requires that sustainability reporting drives tangible changes in corporate behavior and enhances the ability to manage ESG risks. Companies that effectively monitor and manage ESG risks tend to be more resilient, better equipped to navigate sustainability challenges, and more likely to seize related opportunities.

Furthermore, examining this issue provides valuable insights into the key factors that contribute to effective ESG risk management, helping to identify the mechanisms and practices that enable companies to anticipate, address, and mitigate these risks. While ESG risks and their disclosure in corporate reports have been widely addressed in the academic literature on risk management and reporting (e.g. De Silva Lokuwaduge and De Silva, 2020; Leopizzi *et al*., 2020; Asante-Appiah and Lambert, 2023; Karwowski and Raulinajtys-Grzybek, 2021), limited attention has been given to understanding the specific factors that drive ESG risk management and disclosure practices within companies. Factors observed to influence risk disclosure in corporate reporting include the guidelines used to prepare the report (Fijałkowska and Hadro, 2022), managerial incentives for legitimacy or the desire to shift responsibility (Merkl-Davies *et al*., 2011), and investors' concerns about the allocation of their resources (Sheraz and Nasir, 2021).

4. Theoretical framework and hypothesis development

The introduction of double materiality presents a unique opportunity to explore the implications of this new principle of sustainability reporting on organizational practices. This is relevant to the ongoing debate about the role of sustainability accounting and reporting in driving organizational changes. As organizations face increasing pressure from stakeholders to demonstrate accountability and transparency, the effectiveness of these practices in improving organizational practices becomes a critical area of inquiry. While various perspectives have been articulated in the literature, several compelling positions have emerged. Larrinaga-Gonzalez and Bebbington (2001) distinguish between "institutional appropriation" and "organizational change," while She and Michelon (2019) and Cho *et al*. (2015) contrast "talk-disclosure" with "action-disclosure" Additionally, other scholars refer to "symbolic" and "substantive" approaches to sustainability reporting (Marquis and Qian, 2014; Shabana and Ravlin, 2016). In summary, when organizations are compelled to conform to new reporting demands – whether from stakeholders or legislation – they may adopt varying disclosure behaviors. The literature has linked these behaviors to two main approaches to corporate legitimacy – substantive and symbolic (Ashforth and Gibbs, 1990; Boiral, 2013; Michelon *et al*., 2015) – which have also been observed in the application of materiality. These perspectives provide two contrasting theoretical frameworks, leaving the relationship between the adoption of double materiality and ESG risk management as an open question.

4.1 Symbolic reporting of double materiality

The symbolic perspective on sustainability reporting suggests that organizations often use these reports to project an image of social and environmental responsibility without necessarily engaging in substantive actions. This approach emphasizes the communicative and reputational functions of sustainability reporting, where the focus is on creating positive perceptions among stakeholders rather than genuinely improving sustainability practices (Talpur *et al*., 2024). By adopting the symbolic perspective, companies can appear compliant with societal expectations and regulatory requirements, potentially gaining competitive advantages or mitigating criticism, even if their actual impact on sustainability remains limited (Cho *et al*., 2015; Hahn and Lülfs, 2014; Boiral, 2013).

For instance, Boiral (2013) critically examines the authenticity of high-level GRI reports, suggesting that many serve more as simulacra than genuine reflections of sustainability performance. Although not exclusively about sustainability reporting, Meyer and Rowan's (1977) foundational work on institutional theory explains how organizations adopt formal structures to gain legitimacy, which is central to understanding the symbolic perspective. Cho *et al*. (2015) discuss the concept of organized hypocrite and how companies use sustainability reports to create an organizational façade.

Additionally, impression management techniques are frequently employed in sustainability reporting to shape stakeholder perceptions. Impression management refers to

corporate attempts to shape the impressions of relevant publics through the provision of social and environmental disclosures (Neu *et al*., 1998). Impression management unpacks "the notion of organizational legitimacy" (Neu *et al*., 1998, p. 278) and considers different disclosure responses of corporations in different circumstances to achieve and maintain legitimacy. These techniques may include selective disclosure, positive framing of information, and strategic omission of negative aspects, further reinforcing the symbolic rather than substantive nature of these reports. This process often involves "decoupling", where there is a disconnect between the symbolic commitments presented in sustainability reports and the actual practices of the organization, allowing firms to maintain legitimacy without making significant changes to their operation (Bromley and Powell, 2012).

Bromley and Powell (2012) discuss how organizations often adopt formal structures and policies to appear legitimate and conform to external expectations, while their actual practices remain unchanged or loosely connected to these policies. The authors analyze the reasons behind decoupling, such as the need to manage conflicting demands and maintain flexibility. Criado-Jiménez *et al*. (2008) studied the effect of the 2002 ICAC resolution on environmental information provided in financial statements. Relying on Oliver's (1991) framework, they found that firms followed a concealment strategy through impression management techniques to influence the perception of financial statements' users and make them perceive they were complying while failing to do so. Di Tullio *et al*. (2020) investigate how firms disclose the presentation and content of business model (BM) information in corporate reports to manage their legitimacy in response to European Directive 2014/95. They found that half of the sample strategically chose to comply with the European Union (EU) Directive regarding BM information through the use of non-accounting language, figures, and diagrams. Other firms did not disclose any substantive information but managed the impression of compliance with the regulation, while the remainder of the sample dismissed the regulation altogether.

Furthermore, literature has shown that also the application of materiality in sustainability reporting can integrate symbolic elements. Indeed, firms may misuse the materiality assessment process for greenwashing or window dressing purposes – for example, by limiting the scope of non-financial reporting, excluding negative information, or ignoring stakeholder expectations that conflict with corporate strategy (Oll *et al*., 2025). Empirical studies reveal instances of managerial capture (Farooq *et al*., 2021), symbolic legitimacy (Correa-Mejía *et al*., 2024; Ruiz-Lozano *et al*., 2022), and the strategic misuse of materiality analysis (Beske *et al*., 2020, p. 162). Ferrero-Ferrero *et al*. (2021) found that companies with stronger environmental performance might use materiality analysis to exaggerate positive outcomes or greenwash. Materiality disclosures, as image-enhancing tools, raise "concerns regarding weak accountability and a deviation from the standards' objective of improving information quality" (Fiandrino *et al*., 2022, p. 16). Correa-Mejía *et al*. (2024) indicate that many companies claiming to use double materiality in sustainability reporting are "label adopters" since they do not disclose financial and impact materiality according to the definitions set out by the CSRD and ESRS.

Therefore, based on the symbolic approach to sustainability reporting, we hypothesize that companies may adopt double materiality primarily as a form of symbolic compliance with regulations and external pressures, without making substantive changes to their internal management practices. Consequently, we establish the following null hypothesis:

H0. The adoption of double materiality for sustainability reporting is not related to ESG risk management.

4.2 Substantive reporting of double materiality

The substantive approach emphasizes that sustainability reporting reflects actual organizational actions and tangible outcomes rather than mere symbolic disclosures (Shabana and Ravlin, 2016; Rodrigue *et al*., 2013).

Building on Laughlin's (1991) model of organizational change – which conceptualizes organizations as composed of three interrelated components: tangible sub-systems (e.g. assets,

people, finances), design archetypes (structures and processes), and interpretive schemes (core values and beliefs) - Larrinaga-Gonzalez and Bebbington (2001) argue that sustainability reporting can drive efforts to reduce unsustainability. The few studies that have explicitly examined the mechanisms employed in sustainability reporting suggest that these mechanisms reflect first-order change of the reorientation kind, where tangible elements or systems are adjusted while core values remain intact (Adams, 2002; Adams and Frost, 2008; Adams and McNicholas, 2007a, b; Frostenson *et al*., 2012). These studies conclude that sustainability reporting can be a catalyst for change in particular in relation to the design archetypes, i.e. the structures, processes and systems (Stubbs and Higgins, 2014).

Scholars argue that the application of impact or financial materiality is not merely a symbolic task but a substantial one, with both direct and indirect effects on business strategy, as it is closely linked to financial dynamics and corporate governance mechanisms (Pizzi *et al*., 2023). The process of conducting a double materiality analysis can significantly impact organizational and risk management practices within companies in several ways. A first mechanism is the broader risk identification. Indeed, double materiality requires organizations to assess both the risks that sustainability issues pose to their financial performance (financial materiality) and the impacts they have on the environment, society, and governance (impact materiality). As a result, organizations are compelled to identify a broader set of risks that could affect both their bottom line and their stakeholders. This dual perspective expands risk management to include ESG factors alongside traditional financial risks.

Second, double materiality may enhance stakeholder engagement since it requires the consideration of both external and internal stakeholders. Companies are required to engage with a wider range of groups, including not only investors and financial stakeholders but also environmental, social, and community actors. This broader engagement ensures that sustainability risks and opportunities are identified from both the company's perspective and its impact on society and the environment. Torelli *et al*. (2019) found that the implementation of the level of implementation of materiality principle is strongly related to stakeholder engagement, suggesting that implementing a solid and extensive stakeholder engagement process is a necessary condition to reaching a significant degree of application of the principle of materiality. Adams and McNicholas (2007a, b) contend that stakeholder engagement has the potential to be a particularly powerful driver for change, because its purpose is to challenge the company's role in social and environmental sustainability.

A third mechanism is the integration of non-financial data. To conduct a double materiality analysis, organizations must gather and analyze both financial and non-financial data, such as environmental impact metrics, social performance indicators, and governance aspects. This requires the integration of a wide variety of data sources into decision-making processes, altering how organizations assess risks and evaluate opportunities. Companies may need to adopt new technologies, systems, and methodologies to handle this complex data. Adams (2002) and Adams and McNicholas (2007a, b) suggest that sustainability reporting can be a catalyst of organizational change through integrating sustainability performance data into strategic planning, decision making, risk management and performance measurement processes and systems.

Furthermore, incorporating both financial and non-financial dimensions of materiality, the double materiality analysis encourages organizations to integrate ESG factors into their decision-making processes. This may prompt changes in internal risk management strategies to account for sustainability issues such as climate change, human rights, and supply chain transparency. For example, companies might adopt risk models that consider ESG performance as part of their overall risk strategy and prioritize sustainability-related risks in strategic planning.

Finally, conducting a double materiality analysis may lead to shifts in organizational culture, as it emphasizes the importance of both financial and non-financial factors. As companies recognize the interconnection between sustainable practices and long-term financial health, it may embed ESG awareness in the entity's culture and enhance corporate governance bodies' awareness for ESG (Eccles and Youmans, 2015). The broader culture of

responsibility and accountability can permeate throughout the organization, making sustainability an integral aspect of its risk management frameworks.

Therefore, based on the substantive approach to sustainability reporting, we hypothesize that the adoption of double materiality in sustainability reporting will enhance ESG risk management. Accordingly, we establish the following alternative hypothesis:

H1. The adoption of double materiality for sustainability reporting is related to ESG risk management

5. Research design

5.1 Sample selection

The primary objective of this study is to assess whether, and to what extent, the adoption of double materiality in sustainability reporting influences ESG risk management. To achieve this goal, we focus on European companies listed on the STOXX Europe 600 stock market index, which comprises the 600 largest publicly traded companies across European countries. Our analysis builds on their most recent available sustainability reports at the date of collection [1], corresponding to those published in 2023 and covering the 2022 financial year. These reports were released after the CSRD enters into force (5 January 2023) but before the first companies will have to apply the new rules for the first time (in the 2024 financial year, for reports published in 2025). This indicates that companies within the sample adopting double materiality in the reporting year are doing so voluntarily, thereby anticipating mandatory compliance. This approach facilitates the investigation of the potential impact on ESG risk management among early adopters of double materiality. Due to missing data, our final sample consists of 442 companies located in 15 countries and spanning 17 industries (see Table 2).

5.2 Methodology

To investigate the relationship between the adoption of double materiality and ESG risk management, we preliminary conducted two independent *t*-tests. First, we analyzed whether there is a significant difference in *ESG_RISK* between companies that adopt double materiality for sustainability reporting and those that do not. Second, we assessed whether there is a significant difference in *ESG_RISK* between Label adopters and Committed adopters (see Table 3 for variables' description).

Then, to examine the relationship between the (early) adoption of double materiality and ESG risk management, we employ an Ordinary Least Squares (OLS) regression also controlling for country and industry fixed effects. Given the potential temporal lag in the impacts of the adoption of double materiality on ESG risk management, we used the dependent variable at the year t+1 (i.e. 2023).

The following equation is specified for estimation:

$$\text{ESG\_RISK}_{i,t+1} = \beta_0 + \beta_1 \text{DM\_ADOPTION}_{i,t} + \beta_k \text{CONTROLS}_{i,t} + \varepsilon_{i,t}$$

In the equation: *ESG_RISK*$_i$ is the dependent variable; *DM_ADOPTION*$_i$ is the independent variable of interest; *CONTROLS*$_i$ is a vector of control variables, and β_k is a vector of parameters, and ε_i represented stochastic errors.

We focus on β_1 to test our hypotheses. If the adoption of double materiality is positively related to ESG risk management, then β_1 will be significantly positive, providing support for H1. Conversely, if β_1 is not significant, it will indicate support for H0.

5.3 Variables definitions

Our dependent variable is ESG risk management (*ESG_RISK*), which measures a company's management of financially relevant ESG risks and opportunities. In our study, this is proxied

Table 2. Sample composition

Panel A. Breakdown of companies by country Country	*N*	%
Austria	5	1.13
Belgium	11	2.49
Bermuda	1	0.23
Denmark	18	4.07
Finland	16	3.62
France	64	14.48
Germany	62	14.03
Italy	19	4.30
Netherlands	27	6.11
Norway	12	2.71
Poland	5	1.13
Portugal	3	0.68
Sweden	55	12.44
Switzerland	43	9.73
UK	101	22.85
Total	442	100

Panel B. Breakdown of companies by industry Industry – NACE	*N*	%
A – Agriculture, forestry and fishing	2	0.45
B – Mining and quarrying	15	3.39
C – Manufacturing	211	47.74
D – Electricity, gas, steam and air conditioning supply	17	3.85
E – Water supply, sewerage, waste management	4	0.90
F – Construction	13	2.94
G – Wholesale and retail	33	7.47
H – Transportation and storage	13	2.94
I – Accommodation and food services	7	1.58
J – Information and communication	41	9.27
K – Financial and insurance	23	5.20
L – Real estate activities	24	5.43
M – Professional, scientific, and technical activities	21	4.75
N – Administrative and support service activities	10	2.26
O – Public administration and defence	3	0.68
Q – Human health and social work	3	0.68
R – Arts, entertainment and recreation	2	0.45
Total	442	100

Source(s): Authors' own work

by the ESG Risk Rating provided by Morningstar Sustainalytics, one of the major ESG rating agencies (as previously adopted by Cohen, 2023). Sustainalytics' ESG Risk Ratings assess the extent of a company's economic value at risk due to ESG factors by evaluating its exposure to and management of material ESG issues. The total unmanaged risk across these issues is combined into a single score that represents the company's overall ESG risk. Thus, the ESG Risk Ratings scores indicate unmanaged risk, defined as the portion of material ESG risk not managed by the company. The ESG Risk Ratings are categorized into five risk levels: negligible (0–9.99 points), low (10–19.99 points), medium (20–20.99 points), high (30–39.99 points), and severe (40 points and above) (Morningstar Sustainalytics, 2024).

The independent variable in our analysis is the adoption of double materiality (*DM_ADOPTION*). To construct this variable, we consider not only whether double materiality is

Table 3. Variable definitions

Variable name	Definition	Source	Supporting references
$ESG\_RISK_{i,t+1}$	Unmanaged risk for firm *i* at time *t+1*, defined as the portion of material ESG risk not managed by the company. The score ranges from 0 to 100. Lower the score, lower the unmanaged risk	Morningstar Sustainalytics	E.g. Cohen (2023)
$DM\_ADOPTION_{i,t}$	Categorical variable indicating the use of double materiality for sustainability reporting for firm *i* at time *t*: 0 = Non-adopters (no use of double materiality); 1 = Label adopters (declares use, no disclosure of analyses); 2 = Committed adopters (declares use and discloses impact and financial materiality assessments)	Manual collection	Adaptation from Correa-Mejía *et al*. (2024)
$SIZE_{i,t}$	Logarithm of total sales for firm *i* at time *t*	Orbis	E.g. Beasley *et al*. (2021)
$MTB_{i,t}$	Ratio of market value of equity to book value of equity for firm *i* at time *t*	Orbis	E.g. Liebenberg and Hoyt (2003)
$ROE_{i,t}$	Return on Equity for firm *i* at time *t*	Orbis	E.g. Ding *et al*. (2024), Florio and Leoni (2017)
$LEVERAGE_{i,t}$	Financial leverage for firm *i* at time *t* calculated as: [(Short Term Loans and Overdrafts + Long Term Liabilities)/ Shareholders' Funds)]*100	Orbis	E.g. Liebenberg and Hoyt (2003), Baxter *et al*. (2013), Beasley *et al*. (2021)
$BETA_{i,t}$	Beta for firm *i* at time *t*, obtained by the relationship between two statistics: the covariance of the returns of the stock and the returns of an index; and the variance of the returns of the index	Orbis	E.g. Baxter *et al*. (2013), Beasley *et al*. (2021)
$ESG\_DISCLOSURE_{i,t}$	Proprietary Bloomberg ESG disclosure score firm *i* at time *t*. The score ranges from 0 (for those without ESG disclosure) to 100 (for those that disclose every data point collected by Bloomberg)	Bloomberg	Martiny *et al*. (2024)
$COUNTRY_{i,t}$	Headquarter's country for firm *i* at time *t*	Orbis	
$INDUSTRY_{i,t}$	NACE code for firm *i* at time *t*	Orbis	
$FINANCIAL_{i,t}$	A dummy variable equal to "1" if firm *i* at time *t* belongs to financial industry, "0" otherwise	Orbis	
$ENV\_SENSITIVE_{i,t}$	A dummy variable equal to if firm *i* at time *t* belongs to an environmental sensitive industry, "0" otherwise	Orbis	See Brammer and Pavelin (2008) and Reverte (2009)

Source(s): Authors' own work

applied for sustainability reporting but also the level of its application, following Correa-Mejía *et al*. (2024). The, *DM_ADOPTION* is a categorical variable, that we manually coded as follows: "0" indicates that a company does not use double materiality for sustainability reporting (i.e. Non-adopters); "1" indicates that the company declares the use of double materiality for sustainability reporting but has not disclosed the impact and financial materiality analyses (i.e. Label adopters); and "2" indicates that the company not only declares the use of double materiality but also provides disclosures on how impact and financial materiality have been assessed (i.e. Committed adopters).

To address endogeneity concerns, the research design includes control variables. We rely on prior literature that investigated firm characteristics that influence risk management and/or ESG performance (Liebenberg and Hoyt, 2003; Baxter *et al*., 2013; Beasley *et al*., 2021; Khan, 2022; Martiny *et al*., 2024). Based on prior research results, we assume these can be extended to the ESG risk management. According to the above studies: firm *SIZE* is operationalized as the natural logarithm of total assets; market to book ratio (*MTB*) represents growth opportunities; profitability is measured as return on equity *ROE; LEVERAGE* is the ratio of long-term debt to total equity; financial systematic risk is BETA; and, *ESG_DISCLOSURE* is the quality of sustainability disclosure measured using Bloomberg's proprietary ESG disclosure scores.

We also control for country and industry, as classified by NACE, also distinguishing financial and non-financial companies, and companies belonging to environmental sensitive industry [2]. Table 3 defines the variables included in our analyses.

6. Findings

6.1 Descriptive statistics

Our preliminary analysis indicates that the majority of the sample companies (79%) did not adopt double materiality in their sustainability reports for the financial year 2022. Early adopters represent 21% of the sample, of which 66% are "label adopters" and 34% are "committed adopters". Table 4 presents the adoption of double materiality by country. Italy has the highest proportion of committed adopters (42%), followed by Norway at 25%. Table 5 provides a breakdown of double materiality adoption by industry. The industry with the highest percentage of committed adopters is "Electricity, gas, steam, and air conditioning supply" (24%), followed by "Financial and Insurance" (17%).

Table 6 presents the descriptive statistics for the variables. The mean *ESG_RISK* for the overall sample is 19.25, indicating that, on average, the sampled companies have a low level of exposure to ESG risks. The average *ROE* is 13.51%, while financial leverage stands at 86.50%, suggesting a high level of financial risk. The mean *BETA* is below 1, implying that sampled companies are generally less volatile than the market. Regarding *ESG_DISCLOSURE*, the average score is 56.98, with a maximum of 81.41.

Table 4. Double materiality application by country

Country	Total (*n*.)	Non-adopters (%)	Label adopters (%)	Committed adopters (%)
Austria	5	80%	20%	0%
Belgium	11	73%	18%	9%
Bermuda	1	100%	0%	0%
Denmark	18	67%	22%	11%
Finland	16	88%	6%	6%
France	64	88%	11%	2%
Germany	62	73%	19%	8%
Italy	19	53%	5%	42%
Netherlands	27	67%	19%	15%
Norway	12	42%	33%	25%
Poland	5	80%	20%	0%
Portugal	3	67%	33%	0%
Sweden	55	80%	16%	4%
Switzerland	43	73%	23%	5%
UK	101	94%	3%	3%
Total	442	79%	14%	7%

Source(s): Authors' own work

Table 5. Double materiality application by industry

Industry – Nace	Total (*n*)	Non-adopters (%)	Label adopters (%)	Committed adopters (%)
A – Agriculture, forestry and fishing	2	50%	50%	0%
B – Mining and quarrying	15	67%	20%	13%
C – Manufacturing	211	79%	14%	7%
D – Electricity, gas, steam and air conditioning supply	17	65%	12%	24%
E – Water supply, sewerage, waste management	4	100%	0%	0%
F – Construction	13	77%	23%	0%
G – Wholesales and retail	33	94%	6%	0%
H – Transportation and storage	13	77%	15%	8%
I – Accommodation and food services	7	100%	0%	0%
J – Information and communication	41	80%	10%	10%
K – Financial and insurance	23	61%	22%	17%
L – Real estate activities	24	75%	21%	4%
M – Professional, scientific, and technical activities	21	91%	9%	0%
N – Administrative and support service activities	10	70%	20%	10%
O – Public administration and defence	3	67%	33%	0%
Q – Human health and social work	3	100%	0%	0%
R – Arts, entertainment and recreation	2	100%	0%	0%
Total	442	79%	14%	7%

Source(s): Authors' own work

Table 6. Descriptive statistics

Variable	Obs.	Mean	Std. dev.	Min.	Max
ESG_RISK	442	19.2517	6.3272	6.0300	39.8200
DM_ADOPTION	442	0.2782	0.5847	0.0000	2.0000
SIZE	442	22.4462	1.6597	12.7929	26.6024
MTB	442	0.0016	0.0076	3.03e−07	0.1000
ROE	442	13.5078	12.4916	−14.7960	38.7970
LEVERAGE	442	86.5036	51.4514	23.9410	185.2740
BETA	442	0.9418	0.3989	−0.0545	2.2695
ESG_DISCLOSURE	442	56.9859	10.6624	15.2902	81.4103
FINANCIAL	442	0.0520	0.2224	0.0000	1.0000
ENV_SENSITIVE	442	0.1448	0.3523	0.0000	1.0000

Source(s): Authors' own work

Table 7 presents the Pearson correlations for the full sample. Importantly, the main independent variable (*DM_ADOPTION*) shows no correlation with *ESG_RISK*. This lack of correlation suggests that the level of commitment to double materiality may not have a direct linear relationship with ESG risk management. Moreover, the results indicate that there are few significant correlations between the control variables and the dependent variable. However, multicollinearity is not a concern, as the mean Variance Inflation Factor (VIF) is 1.12, well below the threshold that would indicate multicollinearity.

6.2 Univariate findings

To gain preliminary insights into the impact of double materiality on ESG risk management, we examine the mean *ESG_RISK* based on companies' level of adoption of double materiality. The results, presented in Table 8, show that although all categories fall within the "low risk"

Table 7. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ESG_RISK (1)	1.000									
DM_ADOPTION (2)	0.0119	1.000								
SIZE (3)	*0.2489**	0.0632	1.000							
MTB (4)	0.0093	−0.0612	−0.0920	1.000						
ROE (5)	0.0680	0.0394	0.0880	*0.1702**	1.000					
LEVERAGE (6)	0.0022	*0.1205**	*0.2631**	*−0.1047**	−0.0386	1.000				
BETA (7)	*−0.1235**	*−0.1085**	*−0.1323**	0.0323	−0.0848	*−0.1895**	1.000			
ESG_DISCLOSURE (8)	0.0383	*0.1215**	*0.5111**	*−0.1528**	0.0130	*0.1622**	−0.0273	1.000		
COUNTRY (9)	0.0410	0.0278	*−0.1320**	−0.0308	0.0031	−0.0148	*0.1852**	−0.0763	1.000	
INDUSTRY (10)	*−0.3168**	−0.0224	*−0.2921**	0.0141	*−0.1011**	*0.0992**	−0.0387	*−0.3461**	0.0216	1.000

Note(s): **p*-value <0.05
Source(s): Authors' own work

Table 8. ESG risk means by double materiality adoption

DM_ADOPTION	Obs	ESG_risk Mean	Std.dev.	Min	Max
Non-adopters	350	19.1743	6.2607	6.03	36.56
Label adopters	61	19.8239	7.0743	7.56	39.82
Committed adopters	31	19.0007	5.6218	9.57	32.99

Source(s): Authors' own work

range, committed adopters have the lowest average *ESG_RISK* score (18.84), followed by non-adopters (19.16) and label adopters (19.82). There is variability across the three groups, with standard deviations ranging from 5.62 for committed adopters to 7.07 for label adopters.

These initial findings suggest that there are minimum differences in ESG risk management among the three levels of adoption of double materiality for sustainability reporting. To determine whether these observed variations in ESG risk across different levels of adoption are statistically meaningful, we conducted two *t*-tests on the *ESG_RISK* means. First, Table 9 presents the results of a *t*-test comparing the *ESG_RISK* means between double materiality adopters and non-adopters, regardless of their level of commitment. The results indicate that there is no statistically significant difference in ESG risk management between the two groups. Second, Table 10 shows the results of a *t*-test comparing label adopters with committed adopters of double materiality. Again, the results indicate no significant difference in the mean *ESG_RISK* scores between these two groups.

6.3 Main model findings

Table 11 presents the results of the main regression model. The analysis reveals that company size has a positive and statistically significant effect on *ESG_RISK* (*p*-value <0.01), indicating that larger companies tend to face greater unmanaged ESG risks. Additionally, both *BETA* and *ESG_DISCLOSURE* negatively influence *ESG_RISK*, with *p*-values <0.01. This suggests that companies with higher systematic risk and better ESG disclosures tend to manage their ESG risks more effectively. However, the application of double materiality (*DM_ADOPTION*) is not statistically significantly related to ESG risk management, meaning that adopting double materiality does not directly influence how companies manage their ESG risks. These results suggest that while larger companies face higher ESG risks, firms with better ESG disclosure and higher systematic risk manage those risks more effectively. The lack of a significant effect from double materiality application hints that the adopters may be engaging in symbolic reporting, focusing on appearance rather than substantive risk management improvements.

Tables 9. *T*-tests on ESG risk means between double materiality adopters and non-adopters

Group	Obs	Mean	Std. err.	Std.dev.	[95% conf	Interval]
Non-adopters	350	19.1743	0.3347	6.2607	18.5161	19.8324
Adopters	92	19.5465	0.6882	6.6007	18.1796	20.9135
Combined	442	19.2517	0.3010	6.3272	18.6603	19.8432
Diff.		−0.3723	0.7419		−1.8304	1.0859
Diff = mean(0) – mean (1)					$t = -0.5018$	
H0: diff = 0					Degrees of freedom = 440	
Ha: diff < 0			Ha: diff! = 0		Ha: diff > 0	
Pr($T < t$) = 0.3080			Pr(|T| > |t|) = 0.6161		Pr ($T > t$) = 0.6920	

Source(s): Authors' own work

Tables 10. *T*-tests on ESG risk means by double materiality label adopters and committed adopters

Group	Obs	Mean	Std. err.	Std.dev.	[95% conf	Interval]
Label adopters	61	19.8239	0.9058	7.0743	18.0121	21.6357
Committed adopters	31	19.0007	1.0097	5.6218	16.9385	21.0628
Combined	92	19.5465	0.6882	6.6007	18.1800	20.9135
Diff.		0.8233	1.4614		−2.0801	3.7267
Diff = mean(0) – mean (1)					$t = 0.5634$	
H0: diff = 0					Degrees of freedom = 90	
Ha: diff < 0			Ha: diff! = 0		Ha: diff > 0	
$Pr(T < t) = 0.7127$			$Pr(\|T\| > \|t\|) = 0.5746$		$Pr(T > t) = 0.2873$	

Source(s): Authors' own work

Table 11. Main model results

	(1) ESG_RISK
DM_ADOPTION	−0.303
	(0.5367)
SIZE	0.802***
	(0.0002)
ROE	−0.017
	(0.4578)
MTB	1.968
	(0.9574)
LEVERAGE	0.004
	(0.5327)
BETA	−2.856***
	(0.0002)
ESG_DISCLOSURE	−0.119***
	(0.0004)
Constant	23.744***
	(0.0038)
N_obs	442
df_res	404
N_X	37
R2	0.32
AdjR2	0.26
RMSE	5.437
F_test	5.2
COUNTRY_FE	YES
INDUSTRY_FE	YES

Note(s): *p*-values in parentheses: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Source(s): Authors' own work

6.4 Robustness checks

To corroborate our main results – that the adoption of double materiality for sustainability reporting does not significantly impact the management of ESG risks–we conducted two robustness analyses.

As a first robustness check, we relaxed the assumption that potential organizational changes in ESG risk management, due to the adoption of double materiality, may occur with a temporal lag. Table 12 – panel (1) presents the results of a regression analysis using *ESG_RISK* at time t (2022). The previous findings are confirmed, particularly that the relationship between *ESG_RISK* and *DM_ADOPTION* remains statistically insignificant.

Table 12. Robustness checks: (1) relaxing time lag assumption and (2) reverse analysis

	(1) ESG_ RISK		(2) DM_ ADOPTION	(3) DM_ ADOPTION
DM_ADOPTION	0.002	ESG_RISK	0.003	0.024
	(0.9965)		(0.8035)	(0.4234)
SIZE	0.707***	SIZE	−0.013	−0.007
	(0.0023)		(0.8399)	(0.9072)
ROE	−0.012	MTB	−17.514	−17.992
	(0.6185)		(0.3068)	(0.3195)
MTB	7.147	ROE	0.005	0.005
	(0.8552)		(0.5073)	(0.50330)
LEVERAGE	0.000	LEVERAGE	0.001	0.001
	(0.9479)		(0.4408)	(0.4039)
BETA	−2.803***	BETA	−0.179	0.282
	(0.0005)		(0.3893)	(0.6577)
ESG_DISCLOSURE	−0.143***	ESG_DISCLOSURE	0.020**	0.020**
	(0.0001)		(0.0364)	(0.0357)
Constant	13.543*	ESG_RISK*BETA		−0.023
	(0.0661)			(0.4447)
N_obs	440	N_obs	427	427
df_res	402	LR χ^2(37)	80.79	81.38
N_X	37	Prob > χ^2	0.0000	0.0001
R2	0.33	Pseudo R2	0.1445	0.1455
AdjR2	0.27	Log likelihood	−239.1861	−238.8924
RMSE	5.779	COUNTRY_FE	Yes	Yes
F_test	5.3	INDUSTRY_FE	Yes	Yes
COUNTRY_FE	Yes			
INDUSTRY_FE	Yes			

Note(s): *p*-values in parentheses: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Source(s): Authors' own work

Additionally, as part of further robustness analysis, we conducted a reverse analysis, hypothesizing that the level of commitment to double materiality may be influenced by prior ESG risk ratings (see Table 12 – panel (2)). For this, we adjusted the time frame of the variables. The dependent variable, *DM_ADOPTION*, is fixed at year t (2022), while the independent variable, *ESG_RISK*, and all control variables are based on t-1 (2021). Our key finding — that there is no significant relationship between ESG risk management and double materiality adoption — is confirmed. Furthermore, none of the control variables show a significant relationship with *DM_ADOPTION*. Moreover, building on the findings of Cohen (2023), which demonstrate that the traditional systematic risk factor "Beta" is not influenced by all ESG risk factors, we incorporated the interaction term between *ESG_ RISK* and *BETA* into the reverse model analysis (see Table 12 – panel (3)). The results provide strong support for prior findings, as this interaction term is also not statistically significant.

6.5 Additional analyses

Since our sample consists of companies in the STOXX Europe 600 index, it includes companies listed in the European Union and outside (e.g. the United Kingdom). This distinction is crucial because of differing EU regulatory requirements related to sustainability reporting [3]. This division allows us to investigate whether the proximity to the application of the CSRD (financial 2024 for EU companies versus financial year 2028 for non-EU companies) influences the adoption of double materiality and ESG risk management practices.

Table 13. Additional analysis: *T*-test on double materiality application between EU and non-EU companies

Group	Obs	Mean	Std. err.	Std.dev.	[95% conf	Interval]
Non-EU companies	114	0.1140	0.0299	0.3193	0.0548	0.1733
EU companies	328	0.2409	0.0236	0.4283	0.1943	0.2874
Combined	442	0.2081	0.0193	0.4106	0.1701	0.2461
Diff.		−0.1268	0.0438		−0.2213	−0.0407
Diff = mean(0) – mean (1)					$t = -2.8938$	
H0: diff = 0					Degrees of freedom = 440	
Ha: diff < 0			Ha: diff! = 0		Ha: diff > 0	
$Pr(T < t) = 0.0020$			$Pr(\|T\| > \|t\|) = 0.0040$		$Pr(T > t) = 0.9980$	

Source(s): Authors' own work

First, we conducted a *t*-test to determine if there is a significant difference in double materiality adoption between the two groups. As shown in Table 13, the results indicate a statistically significant difference (*p*-value <0.01), with EU companies exhibiting a higher tendency to adopt double materiality than non-EU companies (24% vs 11%). This finding aligns with expectations, as EU companies are facing more urgent regulatory pressure to adopt double materiality.

Second, we ran another *t*-test to explore whether ESG risk management practices differ between EU and non-EU companies. Although Table 14 shows a lower mean *ESG_RISK* for EU companies, the difference is not statistically significant, suggesting that, despite higher adoption of double materiality in the EU, this does not significantly impact how companies manage ESG risks.

Third, we re-run our main model on the EU and non-EU sub-samples, respectively. Table 15 supports the prior results while suggesting a slight difference between the two groups. In line with the main model, the *ESG_RISK* of EU companies (Column 1) is positively related to *SIZE* (*p*-value <0.05) and negatively related to *BETA* (*p*-value <0.01) and *ESG_DISCLOSURE* (*p*-value <0.05). For non-EU companies (Column 2), *ESG_RISK* is positively related to *SIZE* and *LEVERAGE* (*p*-value <0.05) and negatively related to *ESG_DISCLOSURE* (*p*-value <0.1). Interestingly, for both EU and non-EU firms, *DM_ADOPTION* is not statistically related to *ESG_RISK*. These findings corroborate the evidence that the adoption of double materiality does not significantly influence ESG risk management practices, regardless of whether companies are operating in a mandatory or voluntary sustainability reporting environment.

Table 14. Additional analysis: *T*-tests on ESG risk means between EU and non-EU companies

Group	Obs	Mean	Std. err.	Std.dev.	[95% conf	Interval]
Non-EU companies	114	19.6149	0.6378	6.8098	18.3513	20.8785
EU companies	328	19.1255	0.3400	6.1565	18.4568	19.7943
Combined	442	19.2517	0.3010	6.3272	18.6603	19.8432
Diff.		0.4894	0.6883		−0.8634	1.842
Diff = mean(0) – mean (1)					$t = 0.7110$	
H0: diff = 0					Degrees of freedom = 440	
Ha: diff < 0			Ha: diff! = 0		Ha: diff > 0	
$Pr(T < t) = 0.7613$			$Pr(\|T\| > \|t\|) = 0.4774$		$Pr(T > t) = 0.2387$	

Source(s): Authors' own work

Table 15. Additional analysis: regression analysis comparing (1) EU vs (2) non-EU companies

	(1) ESG_ RISK	(2) ESG_ RISK
DM_ ADOPTION	−0.299	−0.024
	(0.5780)	(0.9841)
SIZE	0.636**	1.268**
	(0.0110)	(0.0100)
ROE	−0.020	−0.028
	(0.4802)	(0.4829)
MTB	−8.513	181.111
	(0.8235)	(0.2600)
LEVERAGE	−0.009	0.024**
	(0.1900)	(0.0350)
BETA	−2.870***	−1.871
	(0.0008)	(0.3118)
ESG_DISCLOSURE	−0.096**	−0.133*
	(0.0112)	(0.0910)
Constant	14.273*	−8.495
	(0.0917)	(0.4060)
N_obs	328	114
df_res	294	91
N_X	33	22
R2	0.30	0.54
AdjR2	0.22	0.43
RMSE	5.449	5.149
F_test	3.7	4.8
COUNTRY_FE	Yes	Yes
INDUSTRY_FE	Yes	Yes

Note(s): *p*-values in parentheses: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Source(s): Authors' own work

This suggests that external reporting requirements may have limited influence on the internal risk management approaches of firms, raising questions about the practical impact of regulatory shifts on organizational behavior.

Finally, we also ran our main model, distinguishing by industry (Table 16). Specifically, we differentiated between financial and non-financial companies, as well as between environmentally sensitive and non-sensitive companies. Due to the limited number of observations in the financial (23 observations) and environmentally sensitive (64 observations) groups, we focus our analysis on the non-financial and non-environmentally sensitive subsamples.

The results for the non-financial subsample largely support our main model: *ESG_RISK* is positively related to *SIZE* (*p*-value <0.01) and negatively related to *BETA* (*p*-value <0.05). Additionally, *LEVERAGE* is found to have a negative relationship with *ESG_RISK* for non-financial companies (*p*-value <0.1), suggesting that both higher financial and systematic risks are related to lower unmanaged ESG risk. The analysis of the non-environmentally sensitive subsample also aligns with our main model. Similar to the non-financial subsample, *ESG_RISK* is positively related to *SIZE* (*p*-value <0.01) and negatively related to *BETA* (*p*-value <0.01) and *LEVERAGE* (*p*-value <0.05).

However, in both subsamples, the adoption of double materiality (*DM_ADOPTION*) is not significantly related to ESG risk management. This reinforces our earlier findings, suggesting that the implementation of double materiality does not seem to drive substantial changes in how firms manage ESG risks, regardless of industry. This may indicate that other

Table 16. Additional analysis: regression analysis by industry

	Financial ESG_ RISK	Non-financial ESG_ RISK	Env_ sensitive ESG_ RISK	Non-env_ sensitive ESG_ RISK
DM_ADOPTION	0.081	−0.304	0.181	−0.320
	(0.9793)	(0.5872)	(0.9256)	(0.5563)
SIZE	0.581	1.235***	2.424***	0.916***
	(0.4474)	(0.0000)	(0.0028)	(0.0001)
ROE	0.032	−0.004	−0.095	0.003
	(0.8227)	(0.8822)	(0.3276)	(0.9161)
MTB	39.420	6.501	−2831.835	18.476
	(0.7814)	(0.8868)	(0.2851)	(0.6309)
LEVERAGE	−0.007	−0.010*	0.013	−0.013**
	(0.8694)	(0.0974)	(0.4757)	(0.0383)
BETA	−4.422	−1.848**	5.079	−2.827***
	(0.4989)	(0.0242)	(0.1032)	(0.0006)
ESG_DISCLOSURE	−0.294	−0.035	0.017	−0.050
	(0.2463)	(0.3272)	(0.9104)	(0.1521)
Constant	23.221	6.526	−20.406	12.293**
	(0.3304)	(0.3841)	(0.1708)	(0.0358)
N_obs	23	419	64	378
df_res	8	397	44	357
N_X	14	21	19	20
R2	0.57	0.15	0.53	0.13
AdjR2	−0.19	0.11	0.32	0.08
RMSE	6.597	5.998	6.561	5.687
F_test	0.7	3.4	2.6	2.6
COUNTRY_FE	Yes	Yes	Yes	Yes
INDUSTRY_FE	Yes	Yes	Yes	Yes

Note(s): *p*-values in parentheses: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Source(s): Authors' own work

factor–such as firm size, financial structure, or market exposure–play a more crucial role in shaping ESG risk management strategies across sectors.

7. Discussion and conclusion

This paper investigates whether the adoption of double materiality in sustainability reporting influences ESG risks management, offering both theoretical contributions and practical implications.

As a first contribution, our study provides evidence on the early adoption of double materiality among companies listed in the STOXX Europe 600. We find that 79% of the sample companies did not apply double materiality in their sustainability reports for the 2022 financial year, while early adopters account for 21% of the sample. These findings align with prior research on the limited application of double materiality (Correa-Mejía *et al.*, 2024; Dragomir *et al.*, 2024; Pizzi *et al.*, 2023). Additionally, we differentiated between levels of application and found that the majority of European early adopters (66%) have not disclosed both the impact and financial materiality analyses, classifying them as "label adopters". This result corroborates the findings of Correa-Mejía *et al.* (2024) for companies listed in the Dow Jones Sustainability Index. Finally, we observe significant variations in the early application of double materiality across industries and countries. Notably, EU-companies tend to adopt double materiality more frequently than non-EU companies, suggesting the upcoming implementation of the CSRD may be putting EU companies under additional institutional pressures.

As a second contribution, our study expands our understanding of the consequences of adopting double materiality in sustainability reporting, suggesting that its application does not significantly influence ESG risk management performance. While previous research has highlighted the value relevance of the materiality principle and its impact on markets and financial performance (e.g. Khan *et al*., 2016; Consolandi *et al*., 2022), our findings indicate that the adoption of double materiality among early adopters has not significantly influenced the their ESG risk management performance. These findings seem to challenge prior studies suggesting that sustainability reporting acts as a catalyst for organizational changes (Adams, 2002; Adams and Frost, 2008; Adams and McNicholas, 2007a, b; Frostenson *et al*., 2012; Stubbs and Higgins, 2014). In fact, it appears that the adoption of the double materiality approach is not one of the key factors in sustainability reporting that leads to changes in organizational structures, processes, and systems and that influences ESG risks management performance.

These results could be attributed to various factors. The theoretical framework applied in this study suggests that these findings may be explained by a symbolic approach to the use and application of double materiality. Symbolic adoption refers to the idea that organizations sometimes engage in "decoupling" behaviors, where external disclosures and formal practices are implemented to satisfy regulatory or stakeholder pressures, yet are not deeply integrated into internal processes. Companies may have declared the adoption of double materiality as a way to symbolically comply with regulations, presenting an image of adherence without making substantive changes to their ESG risk management practices. In this context, while companies may publicly adopt double materiality to enhance their legitimacy in the eyes of regulators, investors, and the public, their actual ESG risk management practices might remain largely unchanged.

This explanation is consistent with existing research, which suggests that, due to its ambiguous and malleable nature, materiality in sustainability reporting often involves symbolic elements (Fiandrino *et al*., 2022), such as greenwashing or selective reporting (Oll *et al*., 2025). Additionally, there have been reported cases of managerial manipulation (Farooq *et al*., 2021) and the strategic misuse of materiality analysis (Beske *et al*., 2020). Adopting double materiality symbolically can be driven by several factors. Companies may use it to comply with regulatory requirements, balancing external expectations with internal capabilities. By adopting it symbolically, firms can project a progressive image without the costs or operational changes needed for genuine integration. This behavior helps protect their reputation, maintain market competitiveness, and avoid stakeholder scrutiny, while delaying deeper organizational changes. While some companies may be genuinely committed to managing ESG risks, others may focus on reputational benefits. Due to its complexity, fully operationalizing double materiality can be challenging, especially for companies without the internal capabilities to manage comprehensive ESG risk assessments.

However, alternative explanations for having found that the early adoption of double materiality does not influence ESG risk management could be considered. First, firms with well-established risk management frameworks may not see significant changes after adopting double materiality, as their existing practices might already align with its principles. In such cases, adopting double materiality for sustainability reporting may simply formalize what is already embedded in their risk management processes, resulting in limited visible changes in ESG risk management. However, our reverse analysis partially challenges this explanation, revealing that the level of commitment to double materiality is not influenced by prior performance of ESG risk management. Second, as early adopters, companies may need more time to fully integrate double materiality into their organizational processes. The initial adoption phase could involve a period of adjustment and learning, which may delay any noticeable impact on ESG risk management. During this phase, double materiality may lead to increased disclosure but not immediately improve risk management practices. As companies gain experience with double materiality reporting, they may gradually refine their internal processes, potentially leading to more significant impacts over time.

From a practical standpoint, our findings provide valuable insights into the ongoing debate surrounding the mandatory application of double materiality, as proposed by the EU' CSRD.

Our results suggest that, at least among early adopters, the mandatory adoption of double materiality may not immediately drive significant organizational changes or improve ESG risk management capabilities. This raises important questions about whether the mere imposition of reporting standards is sufficient to foster deeper integration of sustainability-related risks into corporate governance, strategy and risk management and, to foster sustainable finance and drive the transition toward a sustainable economy.

Our study is not without limitations, which, in turn, offer avenues for future research. First, the proxy used to measure ESG risk management performance presents certain constraints. While we rely on proxies previously adopted by scholars–specifically, the ESG Risk Rating provided by Morningstar Sustainalytics – they represent third-party assessments and may not fully capture the complexity of how companies manage ESG risks. Future research could explore alternative proxies to validate (or challenge) our findings. Additionally, investigating whether financial analysts rely on different ESG risk ratings and how alternative approaches to double materiality influence their forecasts would be valuable. Responding to the call by Nicolò *et al.* (2024a, b), future studies could also examine the value relevance of sustainability information. Second, our study considers a short timeframe, focusing solely on financial year 2022. Since double materiality in sustainability reporting is still in its early stages, future research should explore whether its impact on ESG risk management becomes more pronounced as regulations evolve and companies have more time to integrate this principle into their strategies. Moreover, our sample is limited to companies listed in the STOXX Europe 600. Building on prior research that links cultural dimensions to sustainability reporting (e.g. Panfilo and Krasodomska, 2022; Nicolò *et al.*, 2024a, b), future studies could expand the scope beyond the EU or further investigate cultural differences within the EU that shape double materiality assessments. As Dyczkowska and Szalacha (2025) highlight, the double materiality assessment process is inherently complex. A deeper investigation into the factors distinguishing symbolic vs substantive adoption could provide critical insights into how organizations respond to sustainability reporting mandates. Thus, qualitative studies could offer a deeper understanding of the internal mechanisms and organizational changes driven by this emerging principle in sustainability reporting.

Notes

1. January and February 2024.
2. Relying on Brammer and Pavelin (2008) and Reverte (2009) we consider the following environmental sensitive industries: "A – Agriculture, forestry and fishing", "B – Mining and quarrying", "D – Electricity, gas, steam", "E – Water supply, sewerage, waste management", "F – Construction", "H-Transportation and storage".
3. Specifically, the CSRD will become mandatory for large companies listed in the EU starting in financial year 2024. In contrast, non-EU companies, which were previously excluded from the NFRD, will be required to comply with the CSRD starting in financial year 2028 - if they meet certain criteria: the following criteria: 1) The non-EU company must generate a net turnover of more than €150 million within the EU over two consecutive years; 2a) The company has a large subsidiary in the EU, or 2b) The company has a branch in the EU that generates a net turnover of more than €40 million. This division allows us to investigate whether the proximity to mandatory regulation (2024 for EU companies versus 2028 for non-EU companies) influences the adoption of double materiality and ESG risk management practices.

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