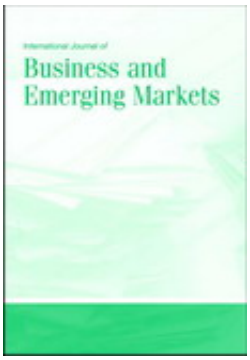

International Journal of Business and Emerging Markets

ISSN online: 1753-6227 - ISSN print: 1753-6219
https://www.inderscience.com/ijbem

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DOI: 10.1504/IJBEM.2028.10066588

Article History:

Received:	01 February 2024
Last revised:	15 April 2024
Accepted:	15 April 2024
Published online:	06 August 2025

The impact of sustainability disclosure on financial statement value relevance: evidence from Europe

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Abstract: The contemporary business environment, where environmental sustainability and corporate social responsibility are at the heart of modern businesses, calls for empirical investigations into how organisations capitalise on their sustainable performance. Despite the proliferation of sustainability metrics, there is a gap in when it comes to understanding their influence on the

financial statement value relevance, which is what this paper seeks to examine. By using multiple regression analyses on panel data, this study investigates how sustainability disclosure and performance affects the value relevance of financial statements in European stock exchanges for a period of ten consecutive fiscal years. The results indicate that companies voluntarily disclosing sustainability performance demonstrate higher value relevance compared to those that do not disclose such information. Further, the study reveals that superior sustainability performance also leads to greater value relevance than for companies reporting lower sustainability scores. Therefore, this paper highlights the importance of sustainability disclosure and performance on creating financial statement value relevance.

Keywords: environmental, social and governance; ESG; value relevance; financial reporting; strategic management.

Reference to this paper should be made as follows: Christofi, K., Kythreotis, A., Chourides, P., Soltani, M. and Di, Z. (2025) 'The impact of sustainability disclosure on financial statement value relevance: evidence from Europe', *Int. J. Business and Emerging Markets*, Vol. 17, No. 5, pp.1–22.

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1 Introduction

Sustainability reporting has been a growing trend among companies worldwide. Organisations have recognised the importance of disclosing their environmental, social, and governance (ESG) performance to stakeholders, including shareholders, investors, customers, employees, and the public. As a result, companies are voluntarily publishing sustainability reports and integrating ESG information into their annual reports. This trend is the result of a combination of factors, including stakeholder expectations, regulatory requirements, customer demand, investor pressure, and the recognition of the long-term value of sustainable business practices. This phenomenon derives from the considerable progress made in standards and regulations regarding sustainability reporting. In November 2022, the European Commission adopted the 'Corporate Sustainability Reporting Directive' (CSRD). Discussions in 2021 led to the development of the European Sustainability Reporting Standard (ESRS) by the European Financial Reporting Advisory Group (EFRAG). In addition, International Financial Reporting Standards (IFRS) established the International Sustainability Standards Board (ISSB), to develop IFRS sustainability standards (IFRS-S1 and IFRS-S2). Most recently, on 31 July 2023, a significant milestone was reached with the commission's approval of the European Sustainability Reporting Standards (ESRS). This innovative framework will form a mandate for all companies impacted by the Corporate Sustainability Reporting Directive (CSRD), marking crucial advancement towards fostering a sustainable EU economy. To harmonise EU and global standards, and minimise redundant reporting for companies, extensive consultations were had with key stakeholders, including the ISSB and the Global Reporting Initiative (GRI). Embracing adaptability, the implementation of reporting requirements will roll out gradually, accounting for the varied needs and capabilities of each company. This phased approach aims to smoothen the transition, encouraging businesses to progressively align with sustainability goals. Overall, this groundbreaking move towards adopting ESRS signals a path of harmonisation and advancement, promoting transparency, and enabling the pursuit of a sustainable future for the European Union.

At the same time, the increasing dialogue surrounding integrated reporting has redirected attention towards presenting corporate performance in a more comprehensive manner, encompassing both financial aspects and ESG performance. By adopting integrated reporting, corporations engage in a systemic approach that takes into consideration financial and non-financial information. Specifically, integrated reporting offers a holistic view of a company's performance. Benefits include improved

stakeholder communication and enhanced decision-making. In addition, this approach fosters better risk management, regulatory compliance, and competitive advantage. By highlighting sustainability and responsible practices, companies adopting integrated reporting build trust and credibility, gaining a strategic edge in the evolving business landscape. Finally, it promotes the adoption of a long-term perspective, and encourages organisations to consider the broader societal and environmental impacts of their operations, aligning business objectives with sustainable development goals. As a result, the topic of sustainability performance disclosure has been gaining momentum in the academic community of business, finance, and strategic management.

Simultaneously, companies need value-relevant financial statements because they serve as a way of communicating relevant and reliable financial information to investors, stakeholders, and other decision makers. Value relevance refers to the degree to which information affects the valuation of a company by investors and other stakeholders. Overall, value-relevant financial statements are essential for companies, as they contribute to investor decision making, market efficiency, stakeholder trust, regulatory compliance, and attracting capital. Therefore, we can assume that sustainability reporting is interrelated with the degree of value relevance. Companies that report ESG information are expected to have higher value-relevant financial statements because of enhanced transparency, improved risk assessment, focus on long-term value creation, investor demand for ESG information, and stakeholder engagement. Additionally, by providing comprehensive information on their ESG performance, companies can better communicate their sustainability efforts, risks, and opportunities, thereby increasing the relevance of their financial statements for investors and other stakeholders.

Nevertheless, literature currently lacks empirical investigations that directly explore the impacts of sustainability discourse on the value relevance of corporations' financial statements. This paper therefore, aims to bridge this gap in the literature by examining the relationship between sustainability reporting and the value relevance of financial statements. Focusing on corporations listed on European stock exchanges, it investigates whether companies that report ESG information exhibit a higher degree of value relevance. Additionally, it explores whether ESG performance is correlated with the level of value relevance. By addressing these questions, this study seeks to provide valuable insights into the link between ESG reporting and the usefulness of financial information for investors and stakeholders. Therefore, the significance of this study is that, in an era where mandatory sustainability disclosure is imminent, companies that present superior results in all pillars of sustainability enjoy greater value relevance in their financial papers. Hence, this paper suggests that executives should approach corporate social responsibility and sustainability as an integral part of their strategy. This paper is separated into five key sections. Firstly, we explore the theoretical basis of value relevance and sustainability. Following that, we describe our research strategy, dataset, and measurement methods. Then we analyse the results and compare them with existing literature on the subject. Lastly, we discuss the practical implications of our findings and suggest future research directions in this area.

2 Literature review

2.1 Financial statements and IFRS

Financial statements, along with their accompanying notes, offer a plethora of valuable data concerning a company's financial status, operational effectiveness, management approaches, and strategies, as well as acting as an indication into prospective performance (Fraser and Ormiston, 2016). While the purpose of financial statements is to present information that helps users make economic decisions about an entity's financial position and performance, the accounting information presented in financial statements must meet strict requirements to present a 'true and fair view' of the entity. This information must be of high quality and meet the needs of users, so they can make rational decisions. To achieve this, the European Parliament adopted International Accounting Standards (IAS) in March 2002 (effective in 2005) for all listed companies. According to the financial reporting framework, the primary goal of financial reporting is to provide high-quality information about economic entities, primarily of a financial nature, that is beneficial for making economic decisions (Whittington, 2008).

Following this direction, the conceptual framework, and the qualitative characteristics of financial reporting quality were created. These characteristics are categorised into fundamental and enhancing. The fundamental ones, namely relevance and faithful representation/reliability, hold paramount importance, as they shape the content of financial reporting. On the other hand, the enhancing characteristics of understandability, comparability, verifiability, and timeliness merely complement the fundamental characteristics, providing additional valuable information to users.

2.2 Value relevance of financial statements

Research on the value relevance of accounting information is often conducted by examining the relationship between the information in financial statements and/or the information outside financial statements, referred to as accounting information, such as stock prices or returns. There is a substantial body of literature concerning the relevance of financial statements, with the initial researchers into this subject being Ball and Brown, in 1968. They conducted a study examining the relationship between performance and accounting profit. Since then, many researchers have built upon this foundation. For instance, in 2007, Hung and Subramanyam conducted a study on 80 German companies, comparing financial statements prepared under IAS/IFRS with those of companies following German standards. They discovered that there were no changes in the relevance of earnings or book value of equity. However, adjustments made to balance sheet data due to the adoption of IAS were found to be relevant. In contrast, Bartov et al. in 2005, as well as Jermakowicz et al. in 2007, found that companies voluntarily adopting IAS experienced an increase in earnings relevance. Barth et al. in 2008, expanded the scope by studying a larger sample of 319 companies from | 21 countries, finding that firms adopting IAS demonstrated a higher degree of relevance. Horton and Serafeim, in 2007, explored the relevance of financial statements in the UK, France, Italy, and Spain using accounting adjustments from reconciliation statements. They discovered that adjustments to earnings increased relevance in the UK, France, and Italy, but not in Spain. Kythreotis and Constantinou, in 2016, using the conceptual

framework's definitions of relevance and reliability, observed an increase in relevance following the adoption of IFRS, but no change in reliability. Hans et al., in 2015, investigated the effect of IFRS adoption and found that it was associated with a decrease in earnings management and an increase in relevance. Sherlita, in 2019, found that the increased relevance of accounting information influenced investment-related decisions, although insufficient transparency in developing countries hindered the relationship between reliability and investment decisions. In 2021, Kraft et al. studied the effect of mandatory IFRS acceptance on Credit Default Swaps forecasting models and discovered that, while IFRS adoption improved accounting quality and benefited equity investors, no clear evidence of similar benefits for debt investors was found. Lastly, Kythreotis and Soltani, in 2023, demonstrated that semi-annual financial statements exhibited greater relevance compared to annual statements.

2.3 Sustainability, sustainability reporting and ESG investment philosophy

2.3.1 Sustainability

In broad terms, sustainability refers to the use of resources in a manner that fulfils the requirements of current generations, while ensuring that the needs of future generations are not compromised. This then ensures a balance between economic development, environmental protection, and social well-being. Sustainability is an important trend discussed and debated for decades, both in practice and in academic literature. The term ESG refers to environmental, social, and corporate governance issues that can affect a company's ability to create long-term value and take responsibility. Recently, considerable progress was made in terms of standards and regulations. A notable milestone was reached on 31 July 2023, when the European Sustainability Reporting Standards (ESRS) received approval from the Commission. This pioneering framework will be obligatory for all companies affected by the Corporate Sustainability Reporting Directive (CSRD), representing a vital step towards nurturing a sustainable EU economy. Hence, the principles of sustainable development are now global better practices. Many studies have investigated the effects of sustainability performance disclosure and outlined several benefits that derive from it (Al-Dhamari et al., 2022; Danso et al., 2020; Esposito De Falco et al., 2021; Padilla-Lozano and Collazzo, 2022; Wu et al., 2022). Specifically, sustainability performance is associated with greater customer loyalty (Abbasi et al., 2023), the performance of intangible assets (Padilla-Lozano and Collazzo, 2022), governance effectiveness (Bitar, 2022; Mhanna, 2020), innovation (Liang, 2010) and increased market value (Adzis et al., 2022; Christofi et al., 2024). Hence, sustainability disclose opens corporations up to new strategic horizons (Muñoz-Torres et al., 2019).

2.3.2 Sustainability reporting

Sustainability reporting is an important communication tool for demonstrating transparency and effective corporate governance, and is specifically targeted at stakeholders (Amran et al., 2014). It also plays a key role in the innovative strategies implemented by organisations. Sustainability reporting reflects the readiness of companies to shift away from their own internal 'footprint' to an initial consideration of the environmental, social and economic dimensions of their core activities (climate change risks and opportunities, microcredit, project finance, sustainable asset

management) (Kolk, 2005). The 2014 study by Andrikopoulos et al. on social responsibility reporting by financial institutions shows that larger companies with higher leverage are more likely to disclose detailed information about their CSR practices. For this reason, institutions with higher leverage and institutions that pose significant (financial) risk to their stakeholders are more likely to face (and meet) increased demand for information about their policy behaviour. Additionally, research by Arnold et al., in 2012, on the integration of sustainability reports into financial reports found that earnings forecasts are more accurate when sustainability reports are disclosed. More recently, the growing discussion on integrated reporting has shifted the focus of reporting to a more holistic presentation of corporate performance in terms of financial and ESG performance (Eccles and Krzus, 2012), as an integrated report leads to a simultaneous assessment of both types of information. Finally, Smith, in 2014 through his study on strategy, sustainability, and innovative financial reporting, underscores the compelling integration of sustainability assessment into strategic planning goals, standards, and reporting frameworks.

2.3.3 ESG investment philosophy

When selecting investment programs and funds, stakeholders evaluate financial parameters of a company's credibility, such as profitability, market share, and sales. An ESG investment philosophy provides a new way to invest and develop, through the addition of ESG criteria. Investments that follow the ESG philosophy are oriented in three directions:

1 respect for the environment including sustainable development, climate change, carbon emissions, energy efficiency, waste management, etc.

2 social responsibility including human and labour rights, occupational health, safety, etc.

3 good corporate governance including business ethics, transparency, anti-corruption, etc.

Considering all these aspects, companies adopt corporate social responsibility (CSR) activities because they are willing to contribute to the development and welfare of the local community on several levels (Khan et al., 2012).

2.4 Hypotheses development

In the domain of accounting, value relevance primarily focuses on financial information, yet sustainability reporting offers additional non-financial data that can significantly impact value assessments. As mentioned above, in recent years, there has been a growing acknowledgment of the significance of ESG factors in evaluating a company's long-term value and risk profile. Consequently, sustainability reporting contributes to enhancing the overall value relevance of financial statements by providing stakeholders with a more holistic comprehension of a company's performance, risks, and opportunities. It enables investors and stakeholders to gauge a company's financial performance within the broader context of its environmental and social impacts, thereby exerting long-term implications on its value. Moreover, sustainability reporting plays a pivotal role in fostering improved transparency, accountability, and informed decision making within

organisations. By reporting on ESG factors, companies can show their commitment to responsible and sustainable practices, while positively influencing their reputation, access to capital, and relationships with stakeholders. Considering the above, two primary hypotheses can be formulated.

Hypothesis 1 Companies voluntarily issuing ESG reports exhibit higher levels of value relevance.

Hypothesis 2 Companies voluntarily issuing ESG reports with ratings equal to or above B+ demonstrate higher levels of value relevance.

3 Sample and methodology

3.1 Sampling procedure

This study applies multiple regression analysis to panel data, focusing on the last nine fiscal years (2014–2022). Data catering was performed using the Refinitiv database to collect financial statements, as well as market-based and sustainability performance data. The dataset includes corporations listed on stock exchanges in the geographical area of Europe, as taxonomised by the Refinitiv database. After the initial extraction, we apply a four step protocol to frame our final sample. First, we include only corporations that follow the International Financial Reporting Standards (IFRS), to ensure a homogenous reporting method across our observations. Second, to avoid time lags to our panel, we include only corporations whose financial year ends on 31 December. Third, following relevant literature (Ahmed et al., 1999), we exclude financial services firms since their accounting standards and accrual generating process vary significantly. Furthermore, we exclude observations with negative book values of equity, as suggested by Collins et al., in 1997 and Brown et al. in 1999. This left us with a sample of 27,916 observations as the final dataset. Table 1 presents the distribution of the firms based on their country of exchange and economic sector. More information about observation distribution can be found in Appendix 1.

3.2 Measurement of relevance

3.2.1 Measuring relevance according to ESG factor – first model

The first model assesses relevance by regressing the future stock price on independent factors such as total assets and total liabilities at time *t* (Francis and Schipper, 1999).

$$P_{it} = \alpha + \beta_1 APS_{it} + \beta_2 LPS_{it} + \beta_3 ESG * APS_{it} + \beta_4 ESG * LPS_{it} + u_{it} \quad (1)$$

P_{it} market share price

APS total assets per share

LPS total liabilities per share

ESG dummy variable equals to 1 for the ESG-firms and 0 for non-ESG firms

u_{it} residuals.

Table 1 Composition of sampled firms based on county of exchange and economic sector

Final dataset distribution based on the firms' country of exchange and economic sector									
Country of exchange	*Communication services*	*Consumer discretionary staples*	*Energy*	*Healthcare*	*Industrial*	*Information technology*	*Material*	*Unities*	*Total*
Austria	0	9	2	1	13	3	6	1	35
Belgium	3	14	3	17	14	8	9	1	69
Bosnia	0	1	0	0	0	0	0	0	1
Bulgaria	2	30	1	6	24	4	7	2	76
Croatia	1	32	2	1	17	2	1	0	56
Cyprus	0	20	0	0	2	2	3	0	27
Czech Republic	0	2	0	0	2	0	0	3	7
Denmark	4	16	2	13	28	12	4	1	80
Estonia	1	4	0	0	4	2	0	2	13
Finland	8	23	1	8	42	22	7	1	112
France	28	64	10	56	66	54	24	7	309
German	22	72	3	34	100	67	17	8	323
Greece	4	35	3	2	22	14	19	2	101
Hungary	4	2	1	2	7	2	0	3	21
Iceland	4	6	0	0	4	0	0	0	14
Ireland	0	4	2	2	4	1	2	0	15
Italy	24	53	6	14	51	33	8	14	203
Latvia	0	2	0	0	2	1	0	0	5
Lithuania	0	11	1	0	2	1	1	3	19

Table 1 Composition of sampled firms based on county of exchange and economic sector (continued)

Final dataset distribution based on the firms' country of exchange and economic sector									
Country of exchange	*Communication services*	*Consumer discretionary staples*	*Energy*	*Healthcare*	*Industrial*	*Information technology*	*Material*	*Unities*	*Total*
Luxemburg	1	1	0	0	0	0	0	0	2
Macedonia	0	0	0	0	0	0	1	0	1
Malta	1	3	1	0	2	2	0	0	9
Netherlands	5	11	1	4	23	14	8	0	66
Norway	7	21	44	16	48	30	12	6	184
Poland	33	55	5	17	71	33	21	12	247
Portugal	8	6	1	1	5	3	5	4	33
Republic of Serbia	0	4	2	0	2	0	2	1	11
Romania	1	12	5	3	12	2	8	1	44
Russia	7	15	16	3	16	1	28	16	102
Slovakia	0	1	0	2	0	0	1	0	4
Slovenia	1	7	0	2	3	1	1	0	15
Spain	6	19	2	11	22	4	10	10	84
Sweden	31	66	9	96	121	77	26	2	428
Switzerland	3	10	0	25	24	10	9	2	83
Ukraine	1	1	2	2	2	0	3	2	13
UK	51	128	78	72	115	78	113	14	649
Total	261	760	203	410	870	483	356	118	3,461

In the first model, the degree of relevance increases in line with the capacity of total assets and total liabilities, to forecast future variations in stock prices. The variable 'ESG' is added to the formula to account for any differences in the level of relevance between financial statements of ESG and non-ESG firms. For ESG firms and non-ESG firms, the dummy variable is given values of '1' and '0' respectively. Anticipating that both ESG and non-ESG firms are relevant, with ESG companies being more so, coefficients 'β_1' and 'β_3' are expected to be positive. Meanwhile, 'β_2' and 'β_4' are anticipated to be negative and statistically significant. Negative coefficients are expected since an increase in liabilities has a negative impact on stock prices.

3.2.2 Measuring relevance according to ESG disclosure – second model

With the second model, relevance is detected through the relationship between the market price and independent factors, such as the book value of equity and earnings per share (Barth et al., 2008; Francis and Schipper, 1999; Kythreotis and Constantinou, 2016).

$$P_{it} = \alpha + \beta_1 EQPS_{it} + \beta_2 EAPS_{it} + \beta_3 ESG * EQPS_{it} + \beta_4 ESG * EAPS_{it} + u_{it} \quad (2)$$

P_{it} market share price.

EQPS book value of equity per share.

EAPS earnings per share.

ESG dummy variable equals to 1 for the ESG-firms and 0 for non-ESG firms.

u_{it} residuals.

Through this model, we can determine whether accounting earnings and book value of equity are able to predict future stock prices for both businesses that adhere to ESG parameters (ESG firms) and those that do not (non-ESG firms). Like the first model, a dummy variable called 'ESG' is used in the equation to evaluate the level of relevance between financial statements of ESG-firms and non-ESG firms. For the ESG-firms and the non-ESG firms, the dummy variable is given values of '1' and '0', respectively. The coefficients 'β_1,' 'β_2', 'β_3', and 'β_4' are expected to be statistically significant and positive, showing that financial statements of both ESG and non-ESG firms are relevant, but that those of ESG firms are more so.

3.2.3 Measuring relevance according to ESG rating – first model

We employ a similar methodology as in regression (1) to assess the value relevance of balance sheet items, while considering their ESG rating grade. As mentioned earlier, the degree of relevance increases alongside the ability of total assets and total liabilities, to predict future changes in stock prices. The variable 'dum2' is used to account for the variation in relevance between high and low ESG rating companies. Like equation 1, positive and statistically significant coefficients are expected for 'β_1' and 'β_3', while negative and statistically significant coefficients are expected for 'β_2' and 'β_4'.

$$P_{it} = \alpha + \beta_1 APS_{it} + \beta_2 LPS_{it} + \beta_3 SESG * APS_{it} + \beta_4 SESG * LPS_{it} + u_{it} \quad (3)$$

P_{it} market share price at time t + 6 month

APS total assets per share

LPS total liabilities per share

SESG dummy variable equals to 1 for the ESG-firms with rating equal or above B+ and 0 for ESG-firms with rating B or lower

u_{it} residuals.

3.2.4 Measuring relevance according to ESG rating – second model

Using the same approach as in regression (2), we measure the relevance of financial statements of companies taking into consideration their ESG rating.

$$P_{it} = \alpha + \beta_1 EQPS_{it} + \beta_2 EAPS_{it} + \beta_3 SESG * EQPS_{it} + \beta_4 SESG * EAPS_{it} + u_{it} \quad (4)$$

P_{it} market share price.

EQPS book value of equity per share.

EAPS earnings per share.

SESG dummy variable equals to 1 for the ESG-firms with rating equal or above B+ and 0 for ESG-firms with rating B or lower

u_{it} residuals.

Through equation (4), we can determine whether accounting earnings and book value of equity can predict future stock prices for businesses rated with an ESG rating of B+ or above, and those rated with a grade of B or lower. A dummy variable called 'dum2' is used to evaluate the level of relevance between financial statements with an ESG rating of B+ (or above) and B (or below). For the first group of companies, the dummy variable has a value of '1', while for the second, it is '0'. The coefficients 'β_1', 'β_2', 'β_3' and 'β_4' are expected to be statistically significant and positive, indicating that:

a the financial statements of both subsamples are relevant

b that the value relevance of the first subsample is higher.

Finally, all regressions account for year and industry-fixed effects. Robust standard errors were used to avoid any heteroscedasticity threats, and the regressions for the balance sheet information were performed with the natural logarithm as a robustness test, which can be found in Appendix 2.

4 Results

4.1 Descriptive statistics

Table 2 provides an overview of the distribution and central tendencies of the variables within the dataset, offering insights into the financial performance represented in the data. The table contains descriptive statistics for a dataset with 27,916 observations. 'Price' exhibits a minimum price of €0.01, a maximum of €4,633.35, and an average (mean) price of €188.84. The ratio of 'total assets per share' (APS) ranges from 0.01 to

13,191.89, with a mean value of 40.26. Respectively, 'total liabilities per share' (LPS) displays a ratio ranging from 0.004 to 12,226.8. Furthermore, 'equity per share' (EQPS) shows values ranging from 0.001 to 3,340.03, with an average value of 15.66. Finally, 'earnings per share' (EAPS) indicates a minimum value of 124.60, a maximum of 254, and a mean value of 12.1. Therefore, the descriptive statistics ensure all the observations in the dataset represent active corporations, since book and share-price values are greater than 0.

Table 2 Descriptive statistics

	Descriptive statistics				*Correlation coefficients*				
	N	*Min*	*Max*	*Mean*	*Price*	*APS*	*LPS*	*EQPS*	*EAPS*
Price	27,916	.01	4,633.35	188.84	1				
APS	27,916	.01	13,191.89	40.26	.401**	1			
LPS	27,916	.0004	12,226.82	24.59	–.304**	.972**	1		
EQPS	27,916	.0001	3,340.03	15.66	.541**	.783**	.615**	1	
EAPS	27,916	–124.60	254.92	12.1	.571**	.409**	.302**	.574**	1

Note: **Correlation is significant at the 0.01 level (2-tailed).

Furthermore, Table 2 shows correlations among the financial metrics, suggesting interdependencies within the dataset. Specifically, 'APS', 'LPS', and 'EQPS' exhibit positive correlations with each other, indicating potential relationships among total assets, total liabilities, and equity per share. Additionally, 'EAPS' demonstrates a positive correlation with 'equity per share' (EQPS), suggesting a potential connection between earnings per share and equity per share. The correlation coefficient between 'share price' (Price) and 'APS' is positive and significant at the 0.01 level (2-tailed), with a coefficient of 0.401. This indicates a moderately positive correlation between stock prices and total assets per share. Furthermore, the correlation between share price and 'LPS' is negative and significant at the 0.01 level (2-tailed), with a coefficient of –0.304. This suggests a moderate negative correlation between these variables. Moreover, the correlation coefficient between 'Price' and 'EQPS' is positive and highly significant at the 0.01 level (2-tailed), with a coefficient of 0.541. This implies a strong positive correlation between stock prices and equity per share. Additionally, the correlation between 'Price' and 'EAPS' is also positive and highly significant at the 0.01 level (2-tailed), with a coefficient of 0.571. This indicates a strong positive correlation between stock prices and earnings per share. Finally, correlations among the financial metrics themselves suggest interdependencies within the dataset. Specifically, 'APS', 'LPS', and 'EQPS' show positive correlations with each other, reflecting potential relationships among total assets, total liabilities, and equity per share. Additionally, 'EAPS' demonstrates a positive correlation with 'EQPS', indicating a potential connection between earnings per share and equity per share.

4.2 Empirical results

As a first step, we examine the balance sheet-oriented equation by including the variables of assets ('APS') and liabilities ('LPS'), to ensure the construct validity of the upcoming models. As Table 3 illustrates, the explanatory power of the model is 29.4%. Assets

present as positive and statistically significant (0.865; $p < 0.01$), while liabilities present as negative and statistically significant (–.891; $p < 0.01$). This result is in line with previous scholars and our initial assumptions, proving the construct validity of our equation. Secondly, to examine the effect of corporate social responsibility on financial statement value relevance, we include two more variables in the assets model 'ESG*APS' and 'ESG*LPS', which represent the multiplication of the assets and liabilities respectively for corporations voluntarily engaged in CSR disclosure.

Table 3 Regression results based on balance sheet information

Variable	*1*	*2*	*3*
Constant	12.980***	13.278***	16.411***
	(.603)	(.593)	(.024)
APS	.865***	.661***	1.137***
	(.010)	(.012)	(.024)
LPS	–.891***	–.673***	–1.212***
	(.012)	(.014)	(.032)
ESG*APS		.553***	
		(.021)	
ESG*LPS		–.604***	
		(.027)	
SESG*APS			3.066***
			(.202)
SESG*LPS			–3.072***
			(.289)
R^2	0.294	.318	.382
Observations	27,915	27,915	8,450

Notes: 1 Robust standard errors in parenthesis.
2 * denotes that the regression coefficient is significant at the *10% (0.1); ** at the 5% (0.05); *** at the 1% (0.01).
3 APS is the ratio of the book value of assets divided by the number of common shares outstanding. LPS is the ratio of the book value of liabilities divided by the number of common shares outstanding. ESG is a dummy variable where companies that publish an ESG grade are given a 1, and those that don't a 0. SESG is a dummy variable that captures ESG superiority. A 1 is assigned to companies that score B+ in ESG, with a 0 given to all others. All regressions account for year and industry-fixed effects.

As presented in Table 3, column 2, the explanatory power of the model increases to 31.8% by adding those two variables. Both assets and liabilities keep their statistical significance ($p < 0.01$) and present positive and negative coefficients respectively (.661; –.673). The multiplication variable of assets shows positive and statistically significant results (.553; $p < 0.01$), while the multiplication variable of liabilities presents negative and statistically significant results (–.604; $p < 0.01$). Hence, under the prism of the theoretical framework of balance sheet equation, 'Hypothesis 1' is supported. In other words, firms that use CSR disclose and report their ESG performance enjoys greater value relevance on their financial statements, compared to those that do not.

In column 3, we investigate the effects of ESG superiority on the value relevance of financial statements. This involved the addition of two variables, 'SESG*APS' and 'SESG*LPS', that capture the multiplication value of assets and liabilities. By adding

those variables, the explanatory power of the model rises slightly to 38.2%. As Table 3 indicates, assets and liabilities remain robust, presenting as positive and negative respectively, and statistically significant ($p < 0.01$). The new multiplication variables also indicate that assets present positive and statistically significant results (3.066; $p < 0.01$), while liabilities once again indicate negative and statistically significant coefficients (–3.072; $p<0.01$). In other words, corporations with superior ESG scores present higher value relevance on their financial statements. Hence, under the lens of balance sheet equation, Hypothesis 2 is also supported.

To ensure the replicability of our results, we also examine the impact of CSR disclosure on financial statement value relevance under the prism of the earnings-based equation as presented in Table 4.

Table 4 Regression results based on earnings

Variable	*1*	*2*	*3*
Constant	11.802*** (.559)	10.815*** (.532)	12.097*** (1.356)
EQPS	.489*** (.009)	.383*** (.011)	.631*** (.018)
EAPS	5.384*** (.079)	3.798*** (.092)	8.170*** (.191)
ESG*EQPS		.243*** (.017)	
ESG*EAPS		5.737*** (.160)	
SESG*EQPS			1.339*** (.153)
SESG*EAPS			4.601*** (4.601)
R^2	.393	.453	.504
Observations	27,915	27,915	8,450

Notes: 1 Robust standard errors in parenthesis.

2 * denotes that the regression coefficient is significant at the *10% (0.1); ** at the 5% (0.05); *** at the 1% (0.01).

3 EQPS is the ratio of the book value of equity divided by the number of common shares outstanding. EAPS is the ratio of the earnings divided by the number of common shares outstanding. ESG is a dummy variable where companies that publish an ESG grade are given a 1, and those that do not a 0. SESG is a dummy variable that captures ESG superiority. A1 is assigned to companies that score B+ in ESG, with a 0 given to all others.

4 All regressions account for year and industry-fixed effects.

Like the balance sheet model, as a first step we include only the value of equity ('EQPS') and earnings ('EAPS'). As presented in Table 4, both variables present positive and statistically significant results ($p < 0.01$), while the explanatory power of the regression reaches 39.3%. The results ensure the robustness of the earnings-based models as explained by Barth et al. (2008). Thereafter, the two multiplication variables that reflect CSR disclose, 'ESG*EQPS' and 'ESG*EAPS', were added to examine their effect on the earnings model. As presented in regression two, both CSR disclosure multiplication

variables present positive and statistically significant coefficients ($p < 0.01$). Hence, the results show that corporations engaged in CSR disclosure through ESG reporting present higher value relevance compared with those that do not. This strongly supports Hypothesis 1. Finally, in column 3, the two multiplication variables that represent 'ESG' superiority under the lens of the earnings-based model, 'SESG*EQPS' and 'SESG*EAPS', were added. As presented in Table 3, the explanatory power of the model rises to around 51%. The results indicate that equity and earnings keep their significance, while also highlighting that both multiplication variables present positive and statistically significant results (1.339; 4.607, $p < 0.01$). This strongly supports Hypothesis 2, as both value relevance applied methods reveal the positive impacts of ESG superiority and value relevance.

5 Conclusions

The purpose of this paper is to examine the effect of sustainability disclosure and performance on the value relevance of financial statements. Through the use of ESG, we conducted an empirical investigation on corporations listed on European stock exchanges. Our results show that corporations that voluntarily disclosing their sustainability performance outcomes experience greater value relevance in their financial statements compared to those that do not. Furthermore, corporations with superior ESG performance show greater value relevance compared to corporations which present low ESG scores. Therefore, this paper makes both theoretical and managerial contributions. Firstly, it contributes to strategic management, by emphasising the significance of corporate social responsibility and sustainability as integral components of the contemporary competitive landscape. Previous studies have found that corporate sustainability with a focus on ESG helps corporations enhance their strategic sensitivity (Christofi et al., 2023), develop customer loyalty (Abbasi et al., 2023), and increase their market value (Al-Dhamari et al., 2022). In addition to those, this paper also highlights that superior ESG performance delivers greater value relevance for financial statements.

5.1 Managerial implications

This paper also makes managerial contributions. The results indicate that voluntary disclosure gives companies an advantage. This paper contributes to the practitioner's community by highlighting the positive impact of ESG to the value relevance of financial statements. Hence, it contributes to the managerial debate by arguing that companies should invest in sustainable development, incorporate practices contributing to social welfare, and simultaneously publish their performance in relation to ESG. Companies should approach ESG criteria as an integral part of their corporate strategy and establish mechanisms that enhance their ESG scores. This approach will increase the relevance of their financial statements, consequently boosting their market share prices.

5.2 Limitations and further research

Like all empirical investigations, this paper has its limitations. Firstly, it only considers publicly listed corporations, and as a result, the findings may not be applicable to private companies. Secondly, the sample includes only companies listed on European stock

exchanges, mainly from developed and high-income countries. Therefore, different implementations and results may arise in developing countries. Future empirical investigations should focus on examining ESG scores on the value relevance of financial statements in emerging economies. Additionally, empirical examinations should also consider small and medium enterprises, as well as private corporations and partnerships, considering their idiosyncratic criteria for sustainability reporting.

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Appendix 1

Final composition of observations

Final dataset distribution based on country of exchange and economic sector										
Country of exchange	*Communication services*	*Consumer discretionary and staples*	*Consumer staples*	*Energy*	*Healthcare*	*Industrial*	*Information technology*	*Material*	*Utilities*	*Total*
Austria	9	38	36	18	3	119	20	54	9	306
Belgium	36	28	95	27	114	111	63	69	9	552
Bosnia	0	0	9	0	0	0	0	0	0	9
Bulgaria	26	134	121	9	61	233	33	63	3	683
Croatia	9	172	97	18	3	141	11	9	0	460
Cyprus	9	116	54	9	3	13	16	45	0	265
Czech Republic	0	0	17	0	0	12	0	0	27	56
Denmark	36	87	52	13	94	224	53	42	7	608
Estonia	9	18	25	0	0	51	4	0	11	118
Finland	66	123	62	9	57	316	176	63	9	881
France	216	369	209	68	399	560	472	211	61	2,565
German	198	449	93	20	290	839	568	152	68	2,677
Greece	27	210	104	36	19	206	131	152	42	927
Hungary	28	0	14	9	18	54	18	0	27	168
Iceland	18	16	28	0	0	37	0	0	0	99
Ireland	0	13	18	15	13	34	5	15	6	119
Italy	210	313	108	52	94	382	215	59	114	1,547
Latvia	0	0	15	0	9	17	9	0	9	59
Lithuania	9	49	45	9	0	15	9	9	30	175

Final composition of observations (continued)

Final dataset distribution based on country of exchange and economic sector										
Country of exchange	*Communication services*	*Consumer discretionary and staples*	*Consumer Staples*	*Energy*	*healthcare*	*Industrial*	*Information technology*	*Material*	*Utilities*	*Total*
Luxemburg	9	0	27	0	0	0	0	0	7	43
Macedonia	0	0	0	0	0	0	0	9	0	9
Malta	9	18	7	9	0	18	13	0	0	74
Netherlands	33	48	63	18	38	167	111	65	0	543
Norway	49	65	100	338	131	337	186	73	35	1,314
Poland	264	332	150	42	142	667	279	240	114	2,230
Portugal	65	36	17	9	5	41	26	45	29	273
Republic of Serbia	0	18	27	18	0	26	0	18	5	112
Romania	5	84	32	72	34	100	18	81	27	453
Russia	47	35	72	119	32	118	9	233	158	823
Slovakia	0	9	0	0	13	0	0	9	0	31
Slovenia	9	50	9	0	18	27	5	9	0	127
Spain	43	108	49	18	105	173	37	93	83	709
Sweden	211	391	90	74	728	938	554	201	10	3,197
Switzerland	26	69	20	0	165	199	89	80	18	666
Ukraine	1	8	0	10	17	18	0	40	26	120
UK	361	667	299	569	491	982	575	831	143	4,918
Total	2,038	4,073	2,164	1,608	3,096	7,175	3,705	2,970	1,087	27,916

Appendix 2

Regression results based on natural logarithm for robustness

Variable	*1*	*2*	*3*
Constant	355.503*** (5.860)	348.258*** (5.888)	353.136*** (5.873)
APS	525.290*** (15.663)	518.971*** (16.309)	527.891*** (15.736)
LPS	–187.383*** (13.852)	–192.291*** (14.861)	–193.167*** (13.986)
ESG*APS		223.494*** (41.079)	
ESG*LPS		–216.037*** (42.435)	
SESG*APS			215.548** (134.315)
SESG*LPS			–206.601* (137.245)
R2	.134	.139	.135
Observations	27,915	27,915	8,450

Notes: 1 Robust standard errors in parenthesis.
2 * denotes that the regression coefficient is significant at the *10% (0.1); ** at the 5% (0.05); *** at the 1% (0.01).
3 APS is the ratio of the natural logarithm (LN) of book value of assets divided by the number of common shares outstanding. LPS is the ratio of the book value of natural logarithm (LN) of liabilities divided by the number of common shares outstanding. ESG is a dummy variable where companies that publish an ESG grade are given a 1, and those that do not a 0. SESG is a dummy variable that captures ESG superiority. A 1 is assigned to companies that score B+ in ESG, with a 0 given to all others.
4 All regressions account for year and industry-fixed effects.