The impact of environmental, social and governance policies on companies' financial and economic performance: A comprehensive approach and new empirical evidence

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Abstract: *In the last decade, the use of integrated reports (IR) comprising information on non-financial indicators from the environment, social, and governance (ESG) category has increased in time. Companies are now focusing not only on financial reporting but are notably including non-financial issues in their public reports. In doing so, they seek to align activities with the expectations of their stakeholders and the society in which they operate, as well as with various regulations, which are increasingly relevant worldwide. This study examines the impact of ESG reporting on company performance. Our research involved analyzing financial and non-financial data from 2,400 companies extracted from the Refinitiv Eikon database. Two methods of quantitative analysis were applied, namely multiple linear regression models processed by the robust regression method and structural equation modelling. Main findings entail that ESG indicators had strong and medium effects on company performance, but these effects varied across different dimensions, requiring a tailored approach to embed ESG factors in corporate strategy to enhance overall performance. Our paper provides a new perspective on the current and the potential impact of ESG reporting, based on systematic theoretical and empirical analyse , with multiple implications for business administration and management.*

Keywords: *ESG indicators, performance, corporate governance, environment, econometric modelling.*

JEL Classification: *G34, L25, M14, Q56.*

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Introduction

Environmental, social and governance (ESG) credentials have become a global trend nowadays and are increasingly important for companies due to spreading awareness of their responsibility for sustainable growth and their multi-dimensional impact on society (Kaakeh & Gokmenoglu, 2022). Sustainable development in all fields of activity is ever more demanded to become a compulsory requirement at the global level (Chien, 2023) and companies are increasingly using sustainability strategies and this has led to notable shifts in business models and management practices (Chang & Lee, 2022). Firms are implementing optimal strategies focused on maximizing stakeholder value while also achieving the company's financial goals (Al Amosh et al., 2022). The practical implementation of this new paradigm is reflected in the increasing efforts companies are making to properly assess their commitment to sustainability and global long-term development goals (Chang & Lee, 2022).

Firms are keener to publish information on their environmental, social and corporate governance principles engagement and use ESG as a means to share information on business sustainability with their stakeholders (Chang & Lee, 2022). Among the directions of this approach is a focus on indicators to measure results related to an organization's involvement in addressing environmental and social issues or implementing policies with an impact on corporate governance. These indicators are grouped in the so-called ESG (environment – social – governance) categories that integrate the results of companies' environmental, social and governance activities (Veenstra & Ellemers, 2020).

ESG indicators have become relevant for both companies and investment fund managers or shareholders (Orsato et al., 2015). Investors are increasingly considering environmental, social, and governance issues when selecting their portfolios. This information allows them to steer towards investments that can be socially and environmentally beneficial (Orsato et al., 2015). It is recommended for companies aiming to implement integrated reporting (IR) using the IIRC Framework to use company-specific determinants to encourage IR adoption (Tiron-Tudor et al., 2022). The criteria used by financial and management professionals to differentiate between various potential investments include environmental, social and corporate governance indicators.

All these are arguments for firms to consider non-monetary objectives in their activities. On the other hand, finding a balance between increasing financial performance and the complex and high expectations of different stakeholders is a challenge for business managers. They must prioritize long-term and short-term objectives and sometimes forego maximizing short-term financial performance to meet urgent corporate social and environmental objectives. This balance is often achieved when the costs of minimizing the negative environmental and social impacts of company operations do not lead to compromising corporate financial performance (Busch et al., 2011). Therefore, an increasingly relevant subject and research theme is the analysis of the links between environmental, social responsibility and corporate governance policies and organizational performance reported by companies.

Numerous studies have examined the link between ESG practices and corporate financial performance, but most of them focus on a single ESG dimension (Barnett & Salmon, 2012; Han et al., 2016; Kaakeh & Gokmenoglu, 2022; Mu et al., 2022; Wu & Li, 2023). The integrated analysis of all three dimensions is considered quite difficult to address, as ESG topics are very broad and comprehensive. In this complex framework, the current research aims to fill in the gap and address this challenge by analyzing the interplay between the ESG dimensions and companies' financial and economic performance in a new comprehensive approach. We address a general objective to assess whether ESG policy performance leads to increased economic and financial performances and to analyze the three pillars of sustainability, the so-called "triple bottom line of sustainability" (Elkington, 1997; Kouaib et al., 2020), namely that environmental performance (planet), social performance (people) and the performance of corporate governance policies lead to an increase in the economic and financial performance of companies (profit).

Our methodological endeavour is based on two advanced econometric procedures: i) multiple linear regression models processed by the robust regression method with Huber; and ii) biweight iterations and structural equation modelling (SEM). We have compiled a complex dataset covering 2,400 companies from different industries, whose results for 2016–2020 (financial and non-financial) are

included in the Refinitiv Eikon database, covering numerous ESG indicators along with indicators that reflect the financial performance of companies. This paper provides new insights that can help to identify the essential mechanisms by which ESG actions can enhance firms' financial and economic performance for each ESG dimension and pillar of sustainability. Furthermore, it outlines the strategies that companies need to design, adopt, and implement to achieve this goal. Therefore, the research study provides a new and comprehensive perspective on the relationship between ESG and firm performance. It enhances the existing literature by examining the interlinkages between specific ESG dimensions and company financial outcomes.

Through a new modelling approach based on applying two advanced econometric techniques, we bring accurate and robust results that provide a clearer picture of the role of corporate social and environmental objectives and ESG actions in shaping company activities and financial performance, with positive spillover effects on society at large. Our research stands out from previous studies due to the unique research framework we have designed. After reviewing the existing relevant literature, we have adopted a comprehensive approach that involves conducting empirical analysis using methods that are configured for separate ESG dimensions and pillars of sustainability. We use robust regression models to test the relationship between different variables and integrated SEM models to test multiple relationships simultaneously.

The paper is divided into several sections. The first section provides an introduction that explains the topic's relevance and the approach's novelty. The next section presents a critical review and bibliometric analysis of the scientific literature in the field. The paper then describes the data and indicators used in the empirical analysis, along with the methodological groundings. The final sections of the paper present the results obtained, complemented by discussion and concluding remarks.

1. Theoretical background

The number of companies using sustainability strategies and publishing information on environmental, social and corporate governance issues is growing, leading to fundamental changes in business models and management practices (Chang & Lee, 2022). The literature highlights both conventional shareholder-oriented management theories (Abdullah & Tursoy, 2023; Friedman, 1970) aimed at improving financial performance and maximizing shareholder benefits and stakeholder-oriented management theories (Freeman & McVea, 2001; Zhang et al., 2022), the latter focusing on maximizing the social value associated with environmental, social and governance (ESG) concepts. These coordinates have also been entailed by Elkington (1997), who proposed the triple-bottom line (TBL) comprising people, the planet and profit to address the issue of sustainability. Various authors further extended these concepts to the economy, the environment and society (Tseng et al., 2020). Issues related to sustainability and the ESG dimensions of a company's business are an intensely debated and controversial topic in the literature, with many studies that have analyzed the link between ESG practices and companies' financial performance.

However, most studies focus on a single ESG dimension (Barnett & Salmon, 2012; Han et al., 2016; Kaakeh & Gokmenoglu, 2022; Wu & Li, 2023), and their overall analysis is quite difficult to address, as ESG topics are very broad and comprehensive. Xie et al. (2019), in the analysis of the impact of ESG dimensions on company performance, found that the most positively impacting link with corporate efficiency is the one with governance disclosure, respectively social and environmental disclosure. The same study showed that a moderate level of ESG disclosure is positively associated with corporate efficiency. Finding a balance between increasing financial performance and the complex and high expectations of different stakeholders can be a challenge for business organizations. They have to prioritize and forego maximizing short-term financial performance to meet corporate social and environmental objectives. According to some studies, the fundamental goals of a business organization are to minimize the negative impacts of business on the environment and society through efficient corporate governance mechanisms without compromising corporate financial performance (Busch et al., 2011).

To grasp a comprehensive updated view of the research guidelines, concepts and directions that fall under this topical subject in current literature, we first performed a bibliometric analysis, followed by a systematic

review. A sample of 412 scientific articles published in relevant journals during 2021–2023 and indexed by Scopus was extracted and processed in VOSviewer, targeting the key concepts of sustainability, ESG and financial performance (Fig. 1).

Fig. 1 entails that ESG, sustainability and environmental performance, corporate social responsibility (CSR) credentials, corporate governance and firm performance are at the core of similar studies published recently on this important subject. In this way and in line with the general objective of current research, we have further structured the systematic literature review in three main directions: environment and performance, CSR and performance, respectively corporate governance and performance.

1.1 Environment and performance

The interplay between the environment (viewed from an environmental perspective) in which business organizations operate and their financial performance is also disputed in literature, with diverging results from various studies over time. According to the neoclassical theory, improved environmental performance leads to increased costs. The idea stems from the fact that by reducing pollution and improving the environment, one can achieve a marginal decrease in net benefits. Porter (1991), however, argues that compliance with environmental regulations can benefit all implicated parties. Thus, both social welfare and private benefits of companies are on an upward trend. In the same paradigm suggested by Ambec et al. (2013) it can be considered that pollution is equated

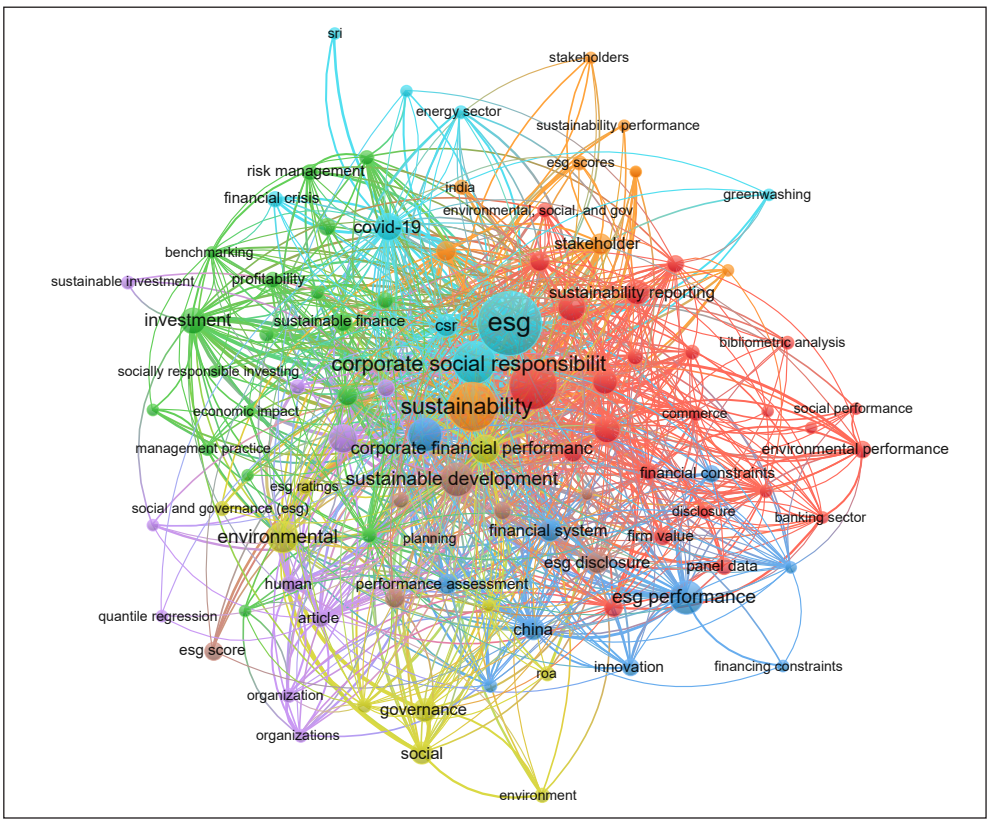

Fig. 1: **Co-occurrence and links between terms/keywords approached in relevant recent literature on sustainability/ESG and firm performance**

Source: own (in VOSviewer, using Scopus indexed scientific articles)

to a waste of resources, a reduction of which can lead to an improvement in the resources use efficiency. In other words, we can state that innovation is a catalyst for the sustainable activities of business organizations.

Lankoski (2000) and Wagner et al. (2001) have presented a third line of thought that challenges the two conventional views regarding the relationship between economic and environmental performance. They propose that the relationship between these two variables is an inverted U-shaped curve (∩), which means that there is a positive correlation between environmental and financial performance until the point where the economic benefits of environmental performance are maximized. At that point, the relationship between the two variables starts to decline.

Empirical results in scientific literature addressing the environmental (E) component follow the same divergent trend, with both views that environmental performance contributes positively to increased financial performance (Chang & Lee, 2022; Ifada et al., 2021; Konar & Cohen, 2001) and views that argue the opposite (Cordeiro & Sarkis, 1997; Lu & Taylor, 2018; Stanwick & Stanwick, 1998), as well as authors lacking a clear conclusion on this link (Cohen et al., 1997; Earnhart & Lízal, 2007a,b; Wagner, 2005). However, Wagner et al. (2001) note that the previously reviewed literature generally indicates a moderately positive relationship between two types of performance, namely environmental and financial. Kaakeh and Gokmenoglu (2022) also suggest a positive relationship, but with weak empirical evidence that environmental performance increases companies' financial performance. On the other hand, Cordeiro and Sarkis (1997) state that previous empirical proof generally reveals a negative short-term relationship between these indicators, while the long-term impact appears to be more promising.

To uncover the underlying factors influencing the variation in empirical findings regarding the relationship between environmental performance and financial performance, Horváthová (2010) conducts a meta-analysis of 64 results from 37 empirical studies. The results of this study are in line with the views of Hart and Ahuja (1996) or Konar and Cohen (2001), suggesting the importance of considering significant time intervals to show a positive effect of environmental performance on financial performance. In the same direction, Chen and Ma (2021) stated that the impact of green investment in improving firms' long-term performance can be strengthened by environmental performance. We can thus conclude that it takes a sufficiently long time for compliance with regulations from an environmental perspective and social initiatives addressing this dimension to materialize in financial performance.

Considering the above arguments, the research hypothesis (*H1*) is configured:

H1: *Environmental performance leads to an increase in the economic and financial performance of companies.*

1.2 Corporate social responsibility (CSR) and performance

Although the perception of corporate social responsibility seems to be as old as the business itself (Ferramosca & Verona, 2019), CSR was conceptually formalized by Bowen (1953), his proposed definition of the concept being the obligations of business people to pursue those policies, make those decisions, or follow those courses of action which are desirable in terms of the aims and values of our society (Bowen, 1953). Porter and Kramer (2002) argue that economic and social objectives have long been seen as distinct and often competing but this represents a false dichotomy and an increasingly obsolete perspective. Many authors argue for the need to take a strategic view of CSR, highlighting criticisms of the characteristics of the traditional approach to CSR and arguing for its consideration as a core of a firm's strategy (Maury, 2022; McBarnet et al., 2009; Perez-Batres et al., 2012; Werther & Chandler, 2011). In that way, CSR can be viewed as a part of the business strategy that can improve financial and market performance (Berber et al., 2022).

The links between corporate social performance and financial performance are still far from being clarified in literature (Ullman, 1985) and contradictory evidence expressing the relationship between them is noted, both in intensity and sign (Lahouel et al., 2021; Waddock & Graves 1997). Results from empirical work indicate an ambiguous relationship between them (Ho et al., 2021; Jacobs et al., 2016; Javed et al., 2017). One fundamental reason for the uncertainty about this relationship is the problem of measuring social performance, which is a multi-dimensional construction that

refers to a wide variety of topics. Their aggregation into a single form of measurement may suffer from inconsistency or lack of accuracy (Waddock & Graves, 1997; Wang et al., 2015).

There is evidence that CSR activities, and in particular environmental activities, can be an important source of innovation that creates additional revenue so that appropriate CSR strategies can be positively correlated with long-term corporate financial performance, being a factor in creating the competitive advantage (Ambec et al., 2013; Bocquet et al., 2017). However, despite a newly formed positive link, it remains unclear whether financially performing business organizations are more resourceful when it comes to money spent on CSR programs (Ransariya & Bhayani, 2015; Rivera et al., 2017) or whether better performance across different dimensions of corporate social performance itself leads to better financial outcomes (Edmans et al., 2017).

Those who argue for a negative relationship between social and financial performance believe that business organizations with high levels of social involvement face a competitive disadvantage (Aupperle et al., 1985) because they incur costs that could be avoided or should be supported by other stakeholders.

The two approaches outlined above are included, together with a societal approach by Van Marrewijk (2003), in an analysis leading to the identification of three perspectives on the social role of companies: i) The classical view (shareholder focus), stating that company social responsibility is represented by the action of increasing the profits (Friedman, 1970); ii) The stakeholder focus – considering that organizations should take into account the diversity of stakeholder interests (Freeman, 1984); and iii) The societal approach, with five pillars – governance, employees, community, environment, and customers, which is based on organizations taking responsibility towards the society they are part of (Liute & DeGiacommo, 2022).

Other authors (McWilliams & Siegel, 2001; Resmi et al., 2018) argue that there is a neutral relationship between social performance and financial performance of companies because firms that do not invest in CSR programs will have lower costs and benefits, while companies that do will have higher costs and customers willing to pay higher prices. There are also empirical results in the literature that support the idea that no relationship, be it positive or negative, is present in the social and financial performance of companies. Proponents of this position (Ullman, 1985) point out that there are so many intervening variables that there is no reason to argue for the idea of a relationship, except possibly by chance. Comparatively, measurement problems can shield a potential link between these indicators (Maury, 2022).

Several benefits of voluntary reporting of CSR information have been identified in relevant literature: lower corporate risk (Orlitzky & Benjamin, 2001; Orlitzky et al., 2003), lower cost of equity (Dhaliwal et al., 2011; Plumlee et al., 2015), lower cost of debt (Bauer & Hann, 2010; Goss & Roberts, 2011), higher credit ratings (Bauer & Hann, 2010), increased performance from a stock market perspective in times of financial crisis (Lins et al., 2017), optimistic analyst perceptions (Ioannou & Serafein, 2010) or improving general reputation (Barauskaite & Streimikiene, 2021).

Along these lines, it could be hypothesized that (*H2*):

H2: *Social performance leads to the increased economic and financial performance of companies.*

1.3 Corporate governance and performance

The emergence and further development of the concept of corporate governance have been associated with companies' constant attempts to improve their business in an increasingly dynamic competitive environment. The concept of corporate governance has received multiple meanings over time, being associated with management, accounting or auditing. It has often been used to describe actions taken to guide, direct and govern companies towards achieving business objectives.

The existence of a link between corporate governance and company performance has been addressed in a multitude of studies, with different findings, mainly attributable to differences in the theoretical basis of the research and the variables considered to assess corporate governance. Drobetz et al. (2004) highlighted the positive link between corporate governance and market performance, expressed by Tobin's Q ratio, results later confirmed by other studies (Strenger, 2017). Using the same performance evaluation indicator, Kiel and Nicholson (2003) found a positive relationship between the proportion of directors

elected from within the company (as an indicator of good governance practices) and the performance of companies listed on the Australian stock exchange in 1996. Dahya et al. (2008) demonstrated a positive correlation between the proportion of independent directors and Tobin's Q ratio using a sample of companies with a shareholding of at least 10% of voting rights in 22 countries, with the link being stronger for countries with low shareholder protection.

Similarly, Lefort and Urzua (2008) found a positive link between the percentage of independent directors and the same Tobin's Q ratio in a study of Chilean companies. Other studies have identified a positive link between the percentage of non-executive directors and company performance, expressed in terms of stock market returns and return on assets (O'Connel & Cramer, 2010; study of Irish companies) or between the percentage of non-executive directors and the Tobin's Q ratio (Jackling & Johl, 2009; study of Indian companies). Klapper and Love (2004) and Durnev and Kim (2005) have analyzed government ratings provided by Credit Lyonnais Securities Asia analysts for listed companies in 25 countries. The results of both studies suggest that corporate governance positively impacts company performance and value. The studies also found that this relationship is stronger in countries with less stringent investor protection standards. Benvenuto et al. (2021) conducted a study in the Romanian and Italian banking systems and identified a significant and positive, lasting influence of the IGC (corporate governance index) on financial performance expressed as profitability in both countries. Bawazir et al. (2021), through a study conducted on a sample of non-financial companies, concluded that the presence of women on the board of directors, audit committee size, financial leverage and firm size are positively correlated with company performance expressed by ROE. On the other hand, the study found a negative correlation between audit committee size, leverage, and ROA. Additionally, the study showed no mediating effect of financial leverage on the relationship between corporate governance and firm performance.

According to Ahmad-Zaluki and Wan-Hussin (2010), effective corporate governance is associated with a higher quality of financial information disclosed by companies in their periodic reports. However, the size, profitability, and industry sector-specific to each company may influence the level of reporting (Rao et al., 2012). In addition, voluntary disclosure related to corporate governance by adhering to new reporting requirements is positively associated with improved governance practices at the company level (Silveira et al., 2010).

Some studies have found no correlation or even negative links between the variables indicating corporate governance and variables that reflect the company's performance. For instance, a study by Ciftci et al. (2019) found that the increase in cross-ownership did not affect market performance when measured using Tobin's Q ratio.

In this framework, the third working hypothesis (*H3*) considered is:

H3: *The performance of corporate governance policies leads to an increase in the economic and financial performance of companies.*

2. Research methodology

The main focus of this research is to evaluate the impact of ESG reporting on company performance. To this end, the performance of ESG policies reported by companies and their correlation with indicators reflecting the economic and financial performance of companies were analyzed. To achieve this objective, two statistical approaches were employed, namely robust regression models and structural equation-based models. These methods were used to enhance the statistical significance of the results obtained in the econometric analysis. The research was conducted using a sample of 2,400 companies from various geographic areas (Europe, North America, Australia, Asia and South Africa) and sectors (classified according to Global Industries Classification Standards – GICS: Energy, Materials, Industrials, Healthcare, Financials, Information Technology, Real Estate, Communication Services, Utilities, Consumer Discretionary, Consumer Staples), with data covering the period 2016–2020, collected from the Refinitiv Eikon database. All selected companies are classified based on total assets in medium and large-sized types (minimum USD 10 million according to Internal Revenue Service – IRS; Liberto, 2023).

In order to assess the performance of the analyzed companies, five specific economic and financial performance indicators (proxies) were used: return on assets (ROA), return on equity (ROE), earnings before interest, taxes, depreciation and amortization (EBITDA), total revenues (TREVENUE) and enterprise

value (ENTVAL), and 12 independent variables reflecting ESG policies and indicators. Both dependent and independent variables were chosen by integrating previous studies which analyzed the relationship between either environmental (Kaakeh & Gokmenoglu, 2022; Wu & Li, 2023), social (Barnett & Salmon, 2012; Han et al., 2016) or governance criteria (Kara et al., 2015; Kyere & Ausloos, 2021) and financial performance. Tab. 1 captures a detailed description of all 12 variables used in the econometric modelling endeavour.

Tab. 1: Variables used in the empirical analysis – Part 1

ID/acronym	Variable	Description/definition
ROA	Return on assets (actual)	Measures a company's operating efficiency regardless of its financial structure (in particular, without regard to the degree of leverage a company uses) and is calculated by dividing a company's net income prior to financing costs by total assets
ROE	Return on equity (actual)	Represents a profitability ratio calculated by dividing a company's net income by total equity of common shares
EBITDA	Earnings before interest, taxes, depreciation, amortization	Represents company's net income before income tax expense and interest expenses are deducted for the fiscal year plus the same period's depreciation, amortization of acquisition costs, and amortization of intangibles
TREVENUE	Total revenues	Represents revenue from all of a company's operating activities after deducting any sales adjustments and their equivalents
ENTVAL	Enterprise value	Represents the sum of market capitalization, total debt, preferred stock and minority interest minus cash and short-term investments for the most recent fiscal period; market capitalization is calculated by multiplying current total shares outstanding by latest close price
RESPOL	Resource reduction policy	Captures the extent to which the company has a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain
CO2EQT	Total CO2 equivalent emissions	Represents total carbon dioxide (CO2) and CO2 equivalent emissions in tonnes; the following gases are relevant: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCS), perfluorinated compound (PFCS), sulfur hexafluoride (SF6), nitrogen trifluoride (NF3)
ENVPS	Environmental product score	Captures the extent to which the company reports on at least one product line or service that is designed to have positive effects on the environment or which is environmentally labelled and marketed; in focus are the products and services that have positive environmental effects, or marketed as which solve environment problems
DIVOPPS	Diversity and opportunity objectives score	Captures the extent to which the company sets targets or objectives to be achieved on diversity and equal opportunity; sets any objective/target to increase or promote diversity in the workplace within a time frame; includes information on the promotion of women, minorities, disabled employees, or employment from any age, ethnicity, race, nationality, and religion

Tab. 1: Variables used in the empirical analysis – Part 2

ID/acronym	Variable	Description/definition
HRIGHTSS	Human rights score	Human rights category score measures a company's effectiveness towards respecting the fundamental human rights conventions
POLBES	Business ethics score	Captures the extent to which the company describes in the code of conduct that it strives to maintain the highest level of general business ethics, along with information on respecting general business ethics or integrity and information from the code of conduct section
POLFT	Fair trade policy	Captures the extent to which the company: has a policy on fair trade; develops processes in place by which it strives to develop or market fair trade or other products based on minimum working conditions and human rights principles; gathers information to be on the final product; includes if the company develops or markets products based on SA 8000 (the global standard for decent working condition); impacted products are food (such as coffee/cocoa beans, chocolate, tea, herbs & spices, fruits & vegetables, oil, juices, wine, cereals, and sugar), footwear, clothing and cotton and precious stones such as diamond (conflict-free)
BSIZE	Board size (number of members)	Represents the total number of board members at the end of the fiscal year
BCFS	Bribery, corruption and fraud controversy score	Captures the extent to which the company is under the spotlight of the media because of a controversy linked to bribery and corruption, political contributions, improper lobbying, money laundering, parallel imports or any tax fraud
GOLDP	Golden parachute policy	Captures the extent to which the company has a golden parachute or other restrictive clauses related to changes of control (compensation plan for accelerated pay-out); considers if a large or special severance package given to top executives for their loss of office following a change in control of the company; includes accelerated vesting of share-based compensation without any conditions attached awarded to executives due to loss of office following a takeover; considers when there is a change in control clause in the employment agreement of any of the executives, in the form of severance benefits
CSRSTRS	CSR strategy score	Reflects a company's practices to communicate that it integrates the economic (financial), social and environmental dimensions into its day-to-day decision making processes
OECDMNCG	OECD guidelines for multinational companies	Captures the extent to which the company claims to follow the OECD Guidelines for Multinational Enterprises; general information on OECD is not considered such as OECD guidelines for chemical testing

Source: own (based on Refinitiv Eikon (2022) data and definitions)

Detailed statistics of all indicators employed in the empirical analysis are presented in Tab. 2.

The methodological rationale is constructed along the general assumption of this research that ESG policy performance leads to an increase in the economic and financial performance of companies. The working hypotheses are tested by applying robust regression models

Tab. 2: Descriptive statistics

	N	Mean	SD	Min	Max
ROA	8,871	0.05498	0.05995	–1.15	0.53
ROE	9,863	0.13136	0.44694	–15.53	10.35
EBITDA	11,909	1.64e+09	4.18e+09	–1.45e+10	8.18e+10
TREVENUE	11,965	1.01e+10	2.25e+10	–9.09e+09	4.25e+11
ENTVAL	11,500	18.38522	43.53669	–129.40	1209.87
RESPOL	8,061	0.85262	0.35450	0.00	1.00
CO2EQT	5,391	5,560,030	1.99e+07	253.70	3.78e+08
ENVPS	7,969	39.81570	37.27616	0.00	98.85
DIVOPPS	7,864	23.97778	40.50116	0.00	98.53
HRIGHTSS	8,061	35.98810	34.22938	0.00	99.14
POLBES	8,061	46.74917	24.52577	0.00	89.26
POLFT	8,062	0.02047	0.14160	0.00	1.00
BSIZE	7,967	11.00251	3.32226	1.00	31.00
BCFS	7,974	53.97166	19.16557	0.00	63.17
GOLDP	4,746	0.67003	0.47025	0.00	1.00
CSRSTRS	7,974	45.85497	32.97978	0.00	99.88
OECDMNCG	7,975	0.07699	0.26659	0.00	1.00
***N* total**	11,996				

Source: own

(RREG) with Huber and biweight iterations and structural equation modelling (SEM).

The robust regression models (RREG) are designed for each research hypothesis as in Equations (1–3).

H1: Environmental performance leads to an increase in the economic and financial performance of companies.

$$ROA_{it}/ROE_{it}/EBITDA_{it}/TREVENUE_{it}/EntVAL_{it} = \\ = \beta_0 + \beta_1 RESRPOL_{it} + \beta_2 CO2EQT_{it} + \\ + \beta_3 ENVPS_{it} + \varepsilon_{it} \quad (1)$$

where: *ROA* – return on assets (actual); *ROE* – return on equity (actual); *EBITDA* – earnings before interest, taxes, depreciation, amortization; *TREVENUE* – total revenues; *EntVAL* – enterprise value; *RESRPOL* – resource reduction policy; *CO2EQT* – total CO2 equivalent emissions; *ENVPS* – environmental product score.

H2: Social performance leads to the increased economic and financial performance of companies.

$$ROA_{it}/ROE_{it}/EBITDA_{it}/TREVENUE_{it}/EntVAL_{it} = \\ = \beta_0 + \beta_1 DIVOPPS_{it} + \beta_2 HRIGHTSS_{it} + \\ + \beta_3 POLBES_{it} + \beta_4 POLFT_{it} + \varepsilon_{it} \quad (2)$$

where: *DIVOPPS* – diversity and opportunity objectives score; *HRIGHTSS* – human rights score; *POLBES* – business ethics score; *POLFT* – fair trade policy.

H3: The performance of corporate governance policies leads to an increase in the economic and financial performance of companies.

$$ROA_{it}/ROE_{it}/EBITDA_{it}/TREVENUE_{it}/EntVAL_{it} = \\ = \beta_0 + \beta_1 BSIZE_{it} + \beta_2 BCFS_{it} + \beta_3 GOLDP_{it} + \\ + \beta_4 CSRSTR_{it} + \beta_5 OECDMNCG_{it} + \varepsilon_{it} \quad (3)$$

where: *BSIZE* – board size (number of members); *BCFS* – bribery, corruption and fraud

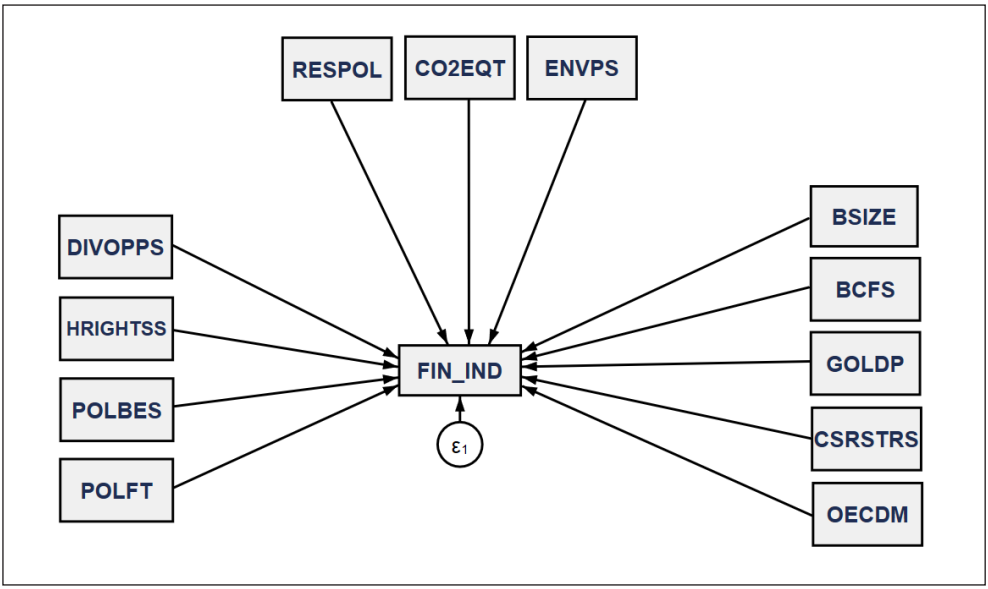

Fig. 2: **General configuration of the structural equation model**

Source: own

controversy score; *GOLDP* – golden parachute policy; *CSRSTR* – CSR strategy score; *OECDMNCG* – OECD guidelines for multinational companies.

The general configuration of the structural equation model is presented in Fig. 2.

Both advanced econometric modelling procedures provide robust estimates and allow to capture direct, indirect and total linkages between considered variables in a comprehensive approach. Hence, robust regression models firstly calculate Cook's distance and start the iteration process based on two types of iterations, Huber and biweight, to drop the outliers in the sample, thus avoiding spurious regression. Further, structural equation models allow to test multiple relations simultaneously, the coefficients associated with the SEM models being estimated through the maximum likelihood (MLE) procedure with missing values.

3. Results and discussion

Tabs. 3–5 show the results of our robust regression models and present a series of reliable estimates that we obtained from the empirical analysis. We used Equations (1–3) to apply the robust regression (RREG) and assess the effect of environmental (Tab. 1), social (Tab. 2) and governance (Tab. 3) ESG factors on companies' financial performance.

The main results show that there is a significant positive correlation between resource reduction policies (RESPOL) and return on equity (ROE), as well as earnings before interest, taxes, depreciation, and amortization (EBITDA). This can be explained by the fact that resource reduction policies can lead to a decrease in company costs. There is also a positive correlation between resource reduction policies (RESPOL) and total revenues (TREVENUE), entailing that resource reduction policies can increase the volume of sales revenue due to lower costs, allowing companies to deliver products at lower prices while still making a profit (volume increase compensates for price decrease).

On the other hand, there is a negative correlation between the increase in total CO2 emissions and ROA (economic performance), ROE (financial performance) and ENTVAL. The increase in the CO2 equivalent emissions total indicator (CO2EQT) causes a negative

Tab. 3: Robust regression results on the environmental indicators linked with economic and financial performance (*H1*)

	ROA	ROE	EBITDA	TREVENUE	ENTVAL
RESPOL	0.64100	1.80600*	0.55100**	0.48600**	0.21600
	(0.34800)	(0.67900)	(0.09570)	(0.08650)	(0.55100)
CO2EQT	−2.46e−08**	−3.01e−08**	2.15e−08**	1.93e−08**	−1.45e−08*
	(2.96e−09)	(6.14e−09)	(8.12e−10)	(7.44e−10)	(4.66e−09)
ENVPS	−0.00581**	−0.00418	0.00479**	0.00691**	0.00332
	(0.00164)	(0.00333)	(0.00046)	(0.00042)	(0.00267)
_cons	4.61800**	10.22000**	19.99000**	21.79000**	11.64000**
	(0.34300)	(0.66600)	(0.09410)	(0.08490)	(0.54200)
N	4,821	5,062	5,245	5,313	5,139
R^2	0.01700	0.00600	0.14400	0.16400	0.00200

Note: Standard errors in parentheses; *$p < 0.01$; **$p < 0.001$.

Source: own

influence (small, however) on economic and financial performance (ROA, ROE). On the one hand, this influence may be driven by carbon footprint penalties. In the case of the correlation with ENTVAL, one explanation is that for the markets as a whole, investors react to environmental issues, even if the intensity of the reaction is low. In the case of the correlation of this indicator with TREVENUE, one explanation lies in the fact that revenues may be associated with a higher volume of activity (production), which would lead to a higher volume of CO2 emissions. The correlation between total CO2 equivalent emissions and EBITDA is positive. One explanation could be that EBITDA does not reflect global tax benefits/penalties related to polluting activities, which would lead to this direct positive link between the two indicators. The same results were obtained by Chen and Ma (2021), who have outlined that the firm's financial outcomes have notably improved after constant investment in energy conservation and emission reduction for several years.

In the case of the link between ENVPS and ROA there is a negative relationship (negative estimated coefficient, statistically significant at the 0.1% threshold). These results are opposite to those of Ifada et al. (2021), who showed that investing in environmentally quality products proves a strong commitment by companies to achieve environmental performance that further induces a significant positive effect on firms' financial performance. A possible explanation of our estimations is that products and production lines included in ENVPS may require additional investments (increase in total assets), leading to a reduction in ROA, at least in the short and medium term. Companies reporting this product or process certification related to the environment generally have higher investments or operational expenses related to these certifications, which, on the one hand, justifies their public visibility (with the desire/intent to gain a green notoriety on the market), and on the other hand, leads to lower ROA. Regarding the link between this indicator and EBITDA, i.e., TREVENUE, there is a significant positive correlation, explained by the potential increase in sales (and thus revenues) due to the marketing of certified products with various green labels. Along the same lines, Chen and Ma (2021) also substantiated that environmental performance and green investment would significantly improve firms' long term performance.

In the case of the DIVOPPS indicator (Tab. 4), there is a negative influence on ROA, ROE and ENTVAL. One explanation is related to equal opportunity policies that do not directly translate into effects such as improved economic and financial performance, reflecting a rather neutral perception of various stakeholders (especially investors, customers or suppliers), being perceived positively only by stakeholders

Tab. 4: Robust regression results on social indicators linked with economic and financial performance (*H2*)

	ROA	ROE	EBITDA	TREVENUE	ENTVAL
DIVOPPS	−0.00582**	−0.02230**	0.00352**	0.00489**	−0.01990**
	(0.00130)	(0.00264)	(0.00036)	(0.00032)	(0.00221)
HRIGHTSS	−0.00183	0.01740**	0.00927**	0.00804**	0.00297
	(0.00164)	(0.00329)	(0.00044)	(0.00039)	(0.00273)
POLBES	0.00926**	0.03050**	−0.00049	−0.00294**	−0.00195
	(0.00216)	(0.00438)	(0.00057)	(0.00051)	(0.00355)
POLFT	1.30800**	3.57500**	−0.00744	0.46200**	2.99100**
	(0.34900)	(0.70900)	(0.09520)	(0.08540)	(0.58200)
_cons	4.80600**	10.62000**	20.23000**	22.19000**	13.02000**
	(0.11400)	(0.23200)	(0.03020)	(0.02700)	(0.18700)
N	6,819	681	7,731	7,861	7,581
R^2	0.00800	0.01900	0.09600	0.11900	0.01400

Note: Standard errors in parentheses;*$p < 0.01$; **$p < 0.001$.

Source: own

in the civic spectrum. In addition, operational costs may increase even through the provision/implementation of equal opportunities policies (e.g., increased integration costs for employees and board members from different cultural backgrounds). Revenues may increase in this situation, but it does not compensate for increased costs. In the case of the link between this indicator and EBITDA, i.e., total revenues (TREVENUE), there is a positive correlation. One explanation is linked to the open organizational culture that is created by the diversity of a company's employees and which also creates diversity in terms of sold products/services, which can also lead to an increase in revenues. The same results were also obtained by Bawazir et al. (2021) which found that board diversity is positively correlated with company performance expressed by ROE.

There is a positive correlation between the HRIGHTSS indicator and ROE. One explanation is related to the avoidance of additional costs related to sanctions for labour and human rights violations, which reduces ROE. There is also a positive correlation of this indicator, both in terms of the link with EBITDA and total revenues. These results show the positive reactions of stakeholders (less investors, as no significant links of this indicator with enterprise value were found) to positive actions of companies in the field of fundamental human rights, especially if these actions are also promoted/highlighted in their IR.

There is a positive correlation between the policy business ethics score (POLBES) and ROA, i.e., ROE. Improved economic and financial performance can be a positive outcome of adhering to ethical codes and policies. This is because a standardized and assumed ethical climate at the organizational level can lead to better productivity, especially among employees. Despite the potential benefits, stakeholders' perception of the link between ethics and performance is generally low in intensity. According to a study conducted by Lins et al. in 2017, perceptions of stakeholders and investors play an important role in establishing a trustworthy relationship with a firm. The study analyzed a sample of 1,673 non-financial firms in the US and found that investing in social capital can help build this relationship and have a positive impact on a firm's performance. In this way, Zhang et al. (2022) suggest that the managerial stakeholder approach tends to be more robust in guiding companies towards sustainable development than the ethical stakeholder perspective.

In the case of the total revenues (TREVENUE) indicator, the negative correlation can be explained by the possible perception of green-washing policies at a customer level,

Tab. 5: Robust regression results on corporate governance indicators linked with economic and financial performance (*H3*)

	ROA	ROE	EBITDA	TREVENUE	ENTVAL
BSIZE	−0.27500***	−0.33400***	0.11800***	0.11100***	−0.13400***
	(0.02450)	(0.05560)	(0.00555)	(0.00472)	(0.03740)
BCFS	0.00156	−0.01710*	−0.01510***	−0.01350***	0.00473
	(0.00339)	(0.00798)	(0.00079)	(0.00068)	(0.00531)
GOLDP	0.00705	0.70800*	0.18600***	−0.03890	1.56200***
	(0.15200)	(0.34900)	(0.03470)	(0.02970)	(0.23200)
CSRSTRS	−0.01560***	−0.02660***	0.01290***	0.00986***	−0.01930***
	(0.00224)	(0.00512)	(0.00050)	(0.00043)	(0.00338)
OECDMNCG	0.67500**	0.12400	0.35500***	0.37600***	0.21300
	(0.25300)	(0.59000)	(0.05980)	(0.05110)	(0.39700)
_cons	8.80900***	19.43000***	19.46000***	21.4900***	13.8800***
	(0.36800)	(0.85000)	(0.08390)	(0.07140)	(0.56000)
N	4,067	4,381	4,658	4,737	4,558
R^2	0.05500	0.02200	0.36100	0.37800	0.03100

Note: Standard errors in parentheses; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Source: own

which leads to a reluctance to purchase goods/services.

A positive correlation can be observed between the POLFT indicator and ROE, ROA, TREVENUE and ENTVAL. One possible explanation is that these policies have led to an increase in revenue that surpasses the cost increases. This may be due to the growing public interest in fair-trade processes and products. The study also found that investors are more likely to respond positively to companies that include fair-trade information in their reporting.

The correlation between board size (BSIZE) and ROA, respectively ROE, is negative (Tab. 5). One explanation is the increase in annual operating expenses due to higher salaries and bonuses received by more board members. As regards the relationship between board size (BSIZE) and EBITDA, respectively total revenues (TREVENUE), there is a positive correlation. Larger and more diverse boards may be associated with larger companies having higher business volumes (total revenue; Pirtea et al., 2015). A statistically significant negative correlation is found between board size (BSIZE) and enterprise value (ENTVAL), indicating that investors generally react negatively to a large number of board members.

In the case of the link between BCFS and ROE, EBITDA and TREVENUE, a negative correlation is found. A plausible explanation is related to the public perception, which shifts in a negative direction when a company is associated with such controversies, leading to decreases in revenues and, thus profitability. The relationship between Golden Parachute (GOLDP) and ROE, EBITDA and ENTVAL is positive. Potential safety nets granted to managers may represent guarantees in the view of investors for quality management processes with implications for company performance and market value.

The impact of the CSR strategy score (CSRSTRS) on ROA, respectively ROE, is negative according to our estimations and might suggest that the implementation of CSR programmes can lead to assumed cost increases and, therefore, to reductions in returns. The correlation is positive in the link with EBITDA and total revenues (TREVENUE). One explanation in this regard lies in the fact that EBITDA does not reflect the tax benefits that exist globally with reference to the implementation of CSR programmes. For TREVENUE, the positive impact is associated with favorable stakeholder (especially customer) perceptions, especially if

these actions are also publicly reported. There is a negative impact of CSR strategy score (CSRSTRS) on enterprise value (ENTVAL) (model 5 in Tab. 5, negative estimated coefficient, statistically significant at the 0.1% level). This result is in line with the Friedmanian position that the involvement of companies in social responsibility actions directly affects the share of value-added that would accrue to investors, who act accordingly (Friedman, 1970). In a different approach, other authors (McWilliams & Siegel, 2001; Resmi et al., 2018) argue that there is a neutral relationship between CSR outcomes and the financial performance of companies. OECDMNCG exerts a favorable and notable influence on ROA (model 1 in Tab. 5, positive estimated coefficient, statistically significant at the 0.1% threshold), as compliance with good governance principles can positively influence economic and financial performance and firm profitability. In the case of EBITDA and TREVENUE there is a positive correlation. The efficiency of the whole value chain driven by the application of good governance principles generates effects including on revenues (better management of distribution networks) and costs (better management of supply structure).

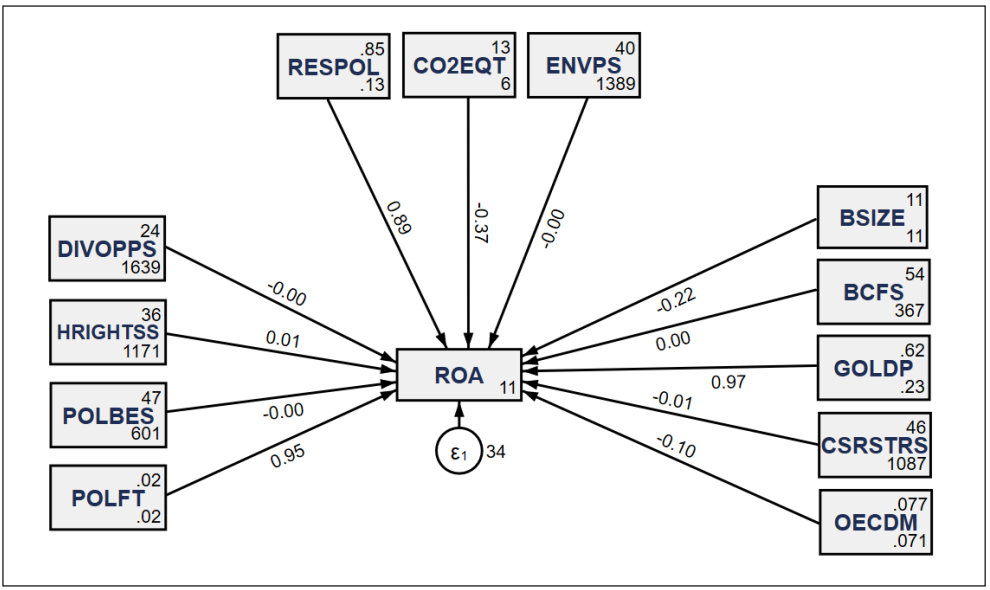

Fig. 3: **Main results of the SEM 1 model (ROA as proxy for company financial performance)**

Source: own

SEM 1 results presented in Fig. 3 entail relatively small effects on ROA induced by HRIGHTSS, CSRSTRS, OECDM, while CO2EQT, BSIZE exert medium effects and POLFT, RESPOL, GOLDP exert large impacts on company financial performance measured by ROA. The notable effects on economic performance (as measured by ROA) induced by the three indicators (one indicator in each category) can be explained by the significant increase in revenues due to fair trade implementation policies, decrease in resource consumption and efficiency of managerial processes due to the existence of golden parachutes. On these lines, Ahmad-Zaluki and Wan-Hussin (2010) have also substantiated that effective corporate governance is associated with higher profitability and improved quality of financial information disclosed by firms.

The second SEM model (Fig. 4) encompasses that the variables DIVOPPS, HRIGHTSS, POLBES, BSIZE, BCFS, CSRSTRS exert small

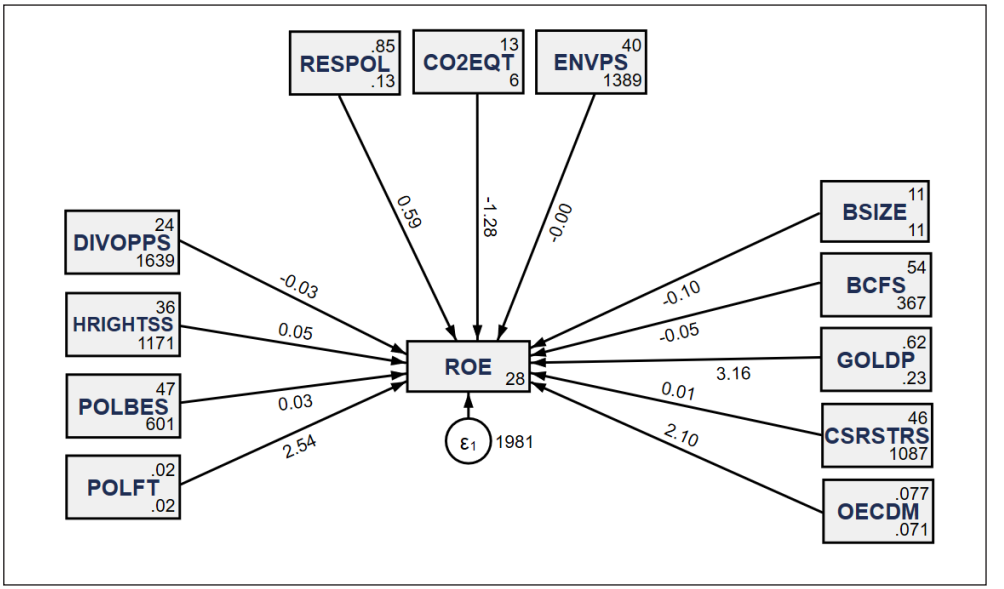

Fig. 4: **Main results of the SEM 2 model (ROE as proxy for company financial performance)**

Source: own

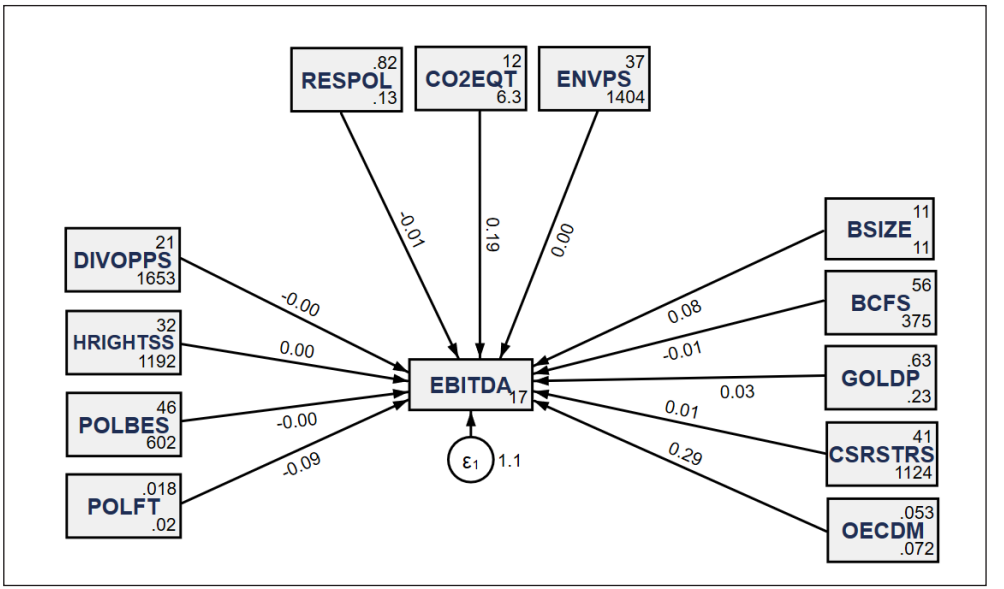

Fig. 5: **Main results of the SEM 3 model (EBITDA as proxy for company financial performance)**

Source: own

effects on ROE, while the variables POLFT, RESPOL, CO2EQT, GOLDP, and OECDM exert large effects on ROE. These results are in line with Bawazir et al. (2021), who also concluded a positive correlation between board characteristics, financial leverage, and company performance expressed by ROE. The large effects on financial performance (as measured by ROE) found for five indicators have similar explanations, providing additional arguments for lower operational costs as a result of reduced carbon emissions and for increased efficiency of managerial processes due to the application of OECD corporate governance principles.

The third SEM model (Fig. 5) entails that the variables POLFT, RESPOL, BSIZE, BCFS, GOLDP, and CSRSTRS exert small effects on EBITDA, while CO2EQT and CSRSTRS have medium effects on EBITDA. None of the indicators analyzed have large effects on EBITDA, as performance measured by gross operating profit is not directly influenced by social, environmental and governance performance.

In Fig. 6 the following variables exert small effects on TREVENUE: RESPOL, BSIZE, BCFS, while POLFT, CO2EQT, GOLDP, and OECDM exert medium effects on TREVENUE. The non-existence of indicators with large effects on total revenue is explained by the fact that performance measured solely by revenue has a stronger multi-dimensional determination (i.e., market conjuncture).

Lastly, the final SEM model (Fig. 7) entails that variables DIVOPPS, HRIGHTSS, ENVPS, BSIZE, BCFS, CSRSTRS exert small effects on ENTVAL, while only OECDM induces medium effects on ENTVAL. The following variables exert large effects on ENTVAL: POLFT, RESPOL, CO2EQT, GOLDP. These indicators influence firm value from the perspective of investors, who are interested in the impact generated by the implementation of environmental, social and governance policies (Pirtea et al., 2015). In this sense, investors sanction entities for non-compliance with social (POLFT) and environmental (RESPOL, CO2EQT) policies respectively and reward those entities that apply corporate governance policies through Golden Parachute policies for managers.

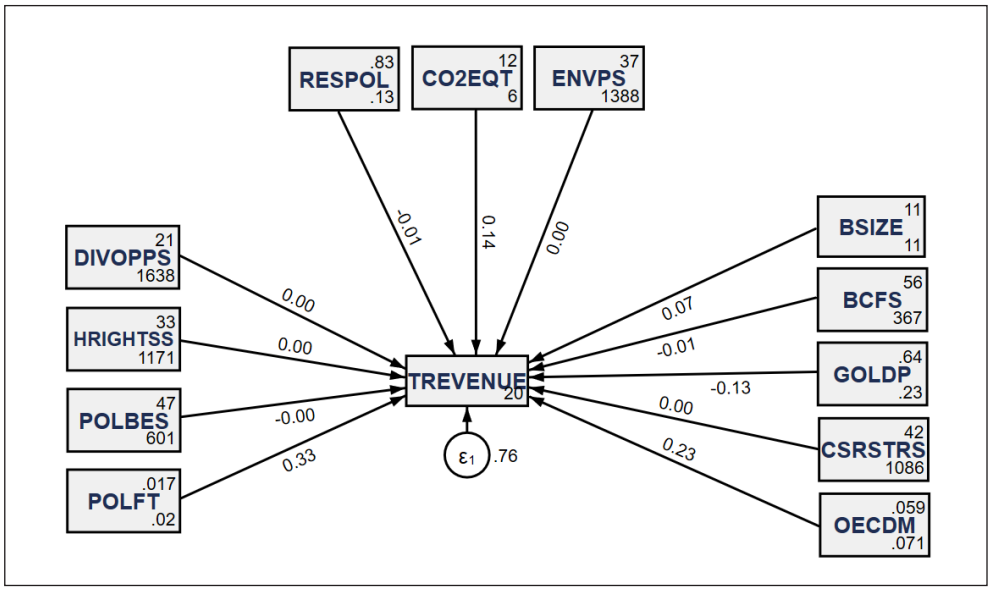

Fig. 6: **Main results of the SEM 4 model (TREVENUE as proxy for company financial performance)**

Source: own

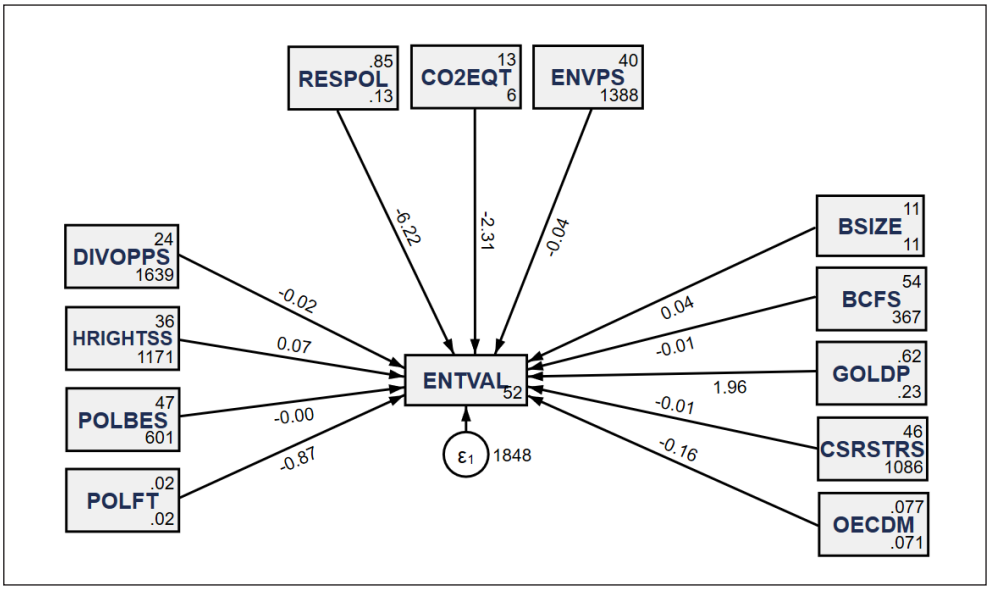

Fig. 7: **Main results of the SEM 5 model (ENTVAL as proxy for company financial performance)**

Source: own

3.1 Hypotheses validation

The results of the robust regression models have entailed that hypothesis *H1* is partially validated by the positive correlation between resource reduction policy (RESPOL) and ROE, EBITDA, respectively total revenues (TREVENUE), as well as between total CO2 equivalent emissions (CO2EQT) and EBITDA, respectively TREVENUE and between ENVPS and EBITDA, respectively TREVENUE.

In the case of hypothesis *H2*, robust regression estimations proved that it is partially validated by the positive correlation between DIVOPPS and EBITDA, respectively TREVENUE, between HRIGHTSS and ROE, EBITDA, respectively TREVENUE, between POLBES and ROE, respectively ROA and between POLFT and ROE, ROA, TREVENUE and ENTVAL.

The third working hypothesis *H3*: "The performance of corporate governance policies leads to an increase in the economic and financial performance of companies" is partially validated by the positive correlation between BSIZE and EBITDA, respectively TREVENUE, as well as between GOLDP and ROE, EBITDA and ENTVAL, between CSRSTRS and EBITDA, respectively TREVENUE and between OECDMCG and ROE, EBITDA, respectively TREVENUE.

Moreover, the results of structural equation models entail strong interdependencies between several key indicators from each considered dimension and the financial performance of companies considered in the analysis.

Therefore, the general hypothesis "ESG policy performance leads to an increase in companies' economic and financial performance" is partially validated.

Our results are in line with the findings of other researchers. For example, Friede et al. (2015) have shown that knowledge on the financial effects of ESG criteria remains fragmented (the issue that assumptions about the financial effects of ESG indicators are only partially valid). They combined the findings of about 2,200 other previous individual studies and concluded that the business case for ESG is empirically very well founded. Moreover, the authors underlined that approximately 90% of the analyzed studies found a nonnegative relationship between ESG and corporate financial performance and that a significant number of these studies report positive findings

with a stable ESG impact over time. Other researchers, like El Khoury et al. (2021), identified U-shaped correlations between ESG indicators and financial performance in research conducted for the banking industry, one of their main recommendations being that the analyses performed by business organizations should determine a turning point that leads to a decrease in the marginal benefits of ESG policies.

Conclusions

This research aimed to identify the influence of ESG credentials on financial performance in a comprehensive framework considering the three pillars of sustainability. Through a new modelling approach, two advanced econometric methods were applied to a newly compiled dataset of companies from various fields to test three research hypotheses, each corresponding to a dimension of the ESG triad. The results obtained from the robust regression models demonstrated that all hypotheses were partially validated, our study confirming fragmentary links between ESG indicators and financial performance.

The main theoretical implications of our findings are given by the integration within a conceptual model of various ESG indicators with multiple economic and financial indicators with robust evidence that can strengthen the knowledge and fill multiple gaps in this field. As regards the practical implications, the findings are relevant for managers as strategic guidelines for considering the impact of transparency: i) of information on the implementation of corporate policies aimed at reducing resource consumption; or ii) of information concerning the true value of sissiosans respectively, on the environmental characteristics of products/services that positively influence both the result of the activity (EBITDA) and its volume.

Our estimations reveal that the effect is transmitted differentially by the three considered indicators (RESPOL, CO2EQT, ENVPS). On one hand, these influences are due to lower costs resulting from lower resource consumption. On the other hand, they are determined by the increase in the volume of activity and sales, both due to the environmental consumption characteristics of products/services and the direct link between CO2 emissions and volume of activity. The most significant result is given by public information about corporate policies regarding resource consumption reductions, and the least significant effect is generated by the information about CO2 emissions.

Managers should also consider the transparency of information on social indicators that induce a cumulative positive influence on the volume of activity and implicitly on the volume of sales (TREVENUE). This further shows a positive reaction of stakeholders (primarily customers) to companies' active policies regarding diversity, defending human rights, the implementation of business ethics, and fair trade principles. As for the other categories of economic and financial indicators, the effects of information on social credentials are varied, revealing specific reactions of different stakeholders (investors could react differently and less positively than customers to ethical and social policies of companies), which are also worth considering in future managerial strategies. Another practical implication could emerge from the evidence brought to attest that the transparency of information regarding corporate governance indicators has predominantly positive effects on the EBITDA result and activity volume indicators (like TREVENUE), demonstrating a positive reaction from various categories of stakeholders (mainly customers and suppliers).

In summary, the ESG effects on profitability indicators (ROA and ROE) as well as on the enterprise value (ENVAL) are diverse. At one end of the spectrum, investors may react negatively to information about a high number of board members or controversies about bribery, corruption or fraud, with a negative effect on company value. On the other hand, allocating resources to CSR policies can lead to reduced profitability, at least in the short term. All the above-stated issues need to be addressed further and embedded in strategic and policy endeavours.

Our research is not without limitations entailed by a relatively reduced availability of data for certain indicators. One possible constraint of this study may reside on the indicators chosen to quantify the ESG domains (three indicators for the environmental domain, four indicators for the social domain, and five indicators for the corporate governance domain), as there is a wide range of indicators throughout literature respectively a multitude of other indicators. However, this limitation constitutes the groundings for future research endeavours that may consider other corporate aspects of the ESG spectrum to fully understand their

impact on company performance. Another limitation occurs because the sample comprised companies from both financial and non-financial sectors, which have many different structural aspects of corporate governance and reporting practices. Thus, future research perspectives may focus on studies of more structurally compatible sectors, such as exclusively financial or non-financial sectors, along with analyses of the sustainability challenges faced by companies in a digital globalized economy during pandemic and post pandemic times.

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