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Exploring ESG impact on corporate profitability: Insights from the industrials sector in Europe and USA

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Abstract. Over the last decades, environmental, social, and governance (ESG) factors become pivotal in organizations' strategy formations and investment decisions. These factors are essential in evaluating business sustainability and its impact on society. Increasing regulatory requirements, investors' expectations, and consumer awareness are driving companies to adopt sustainability principles, but the impact of ESG on companies' financial performance is still a widely debated topic. This article analyses whether disclosure of ESG data affects the profitability of the European and the United States of America (USA) industrial sector companies. By employing a robust linear regression model, the authors aim to

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identify if information disclosure of ESG's pillars (environment, social, and governance) affects companies' profitability, as assessed by EBIT (Earnings before interest and taxes). The analysis covers 2015-2022 data of the 58 USA corporations and the 124 European companies in the industrial sector. The research findings show different results for industrial sector companies in Europe and the USA. Although a positive and statistically significant relationship is observed for both regions when analyzing the environmental ESG pillar, the results of the social and governance pillar relationship with EBIT show opposite results. The article is expected to contribute to understanding how ESG (environmental, social, and governance) data disclosure impacts companies' financial performance in the European and USA industrial sectors. A key contribution to this research is the indication of region-specific effects within the model, suggesting that further investigation of regional differences and their ESG-related policies would be valuable.

Keywords: EBIT, ESG, industrial sector, linear regression, Europe, USA.

JEL Classification: G30, Q56, M14, L60, F50

1. INTRODUCTION

In the current globalized economic and social development context, companies encounter market competition challenges and must meet environmental, social, and governance (ESG) responsibilities. Environmental preservation, social justice, and transparent governance have a distinct significance globally and have become crucial to business operations. It is becoming evident to companies that, in addition to striving to increase profits, they must consider the environmental and societal implications of business operations. Furthermore, there is a growing recognition of the need to incorporate strategies related to climate change, human capital management, and corporate governance policies into business practices (Iazzolino et al., 2023) and due to the growing pressure from stakeholders (Twinamatsiko & Kumar, 2022). The systematic measurement and disclosure of sustainability performance has become crucial for organizational accountability toward sustainable development goals (Agama & Zubairu, 2022).

Disclosure of environmental, social, and governance (ESG) information for companies operating in sectors associated with higher levels of pollution shows accountability and transparency to stakeholders. More transparent companies are more likely to succeed in attracting more investors and increasing financial performance (Chen & Xie, 2022). Von Rosing et al. (2025) emphasize the growing interest of shareholders in ESG information and point out that disclosure of ESG data can contribute to attracting investors. Ferri et al. (2023) support Von Rosing et al. (2025) idea about the relationship between ESG data disclosure and attracting investors and noted that ESG data disclosure to stakeholders helps minimize information asymmetry. Furthermore, Meng-tao et al. (2023) assert that the disclosure of ESG data is related to increasing stock liquidity, and Ali et al. (2025) noted a positive relationship between ESG data disclosure and the company's profitability. Khandelwal et al. (2023) support the idea that disclosure of ESG information is correlated with transparency, which is related to increasing the trust of stakeholders.

Furthermore, Khandelwal et al. (2023) point out that companies must follow governmental regulations regarding ESG. However, Zhou & Nian (2024) state that there is a link between ESG data disclosure and the sustainable development of companies. Khamisu et al. (2024) point out that disclosing ESG data is important for corporate reputation growth and mandatory compliance with established regulations. ESG

factors are becoming increasingly important globally, and changes towards stricter regulations are notable. It should be noted that regulations on ESG data disclosure differ across countries. For example, historically, the USA did not impose strict regulations for companies referring to ESG data disclosure and followed a market-based approach (Bolognesi et al., 2025). Companies could disclose ESG data voluntarily. However, considering climate-related issues, new initiatives emerge related to the obligations of companies to provide environmental, social, and governance-related information (Global Legal Insights, 2025). On the contrary, the European Union is progressively implementing more rigorous standards for companies' performance in the context of environmental, social, and governance (ESG) considerations and the provision of ESG data. Following "The Green Deal" strategy, which announces the EU's ambition to create a resource-efficient, with no greenhouse gas emissions and competitive economy, the European Commission released regulations referring to ESG, for example, the Corporate Sustainability Reporting Directive and other directives (European Commission, 2025). However, Kahn (2024) highlighted that although environmental, social, and governance (ESG) disclosure is widely acknowledged as a critical indicator of corporate sustainability, the standardization of such disclosures remains incomplete. Kahn (2024) noted that various rating agencies employ divergent methodologies to construct ESG performance indices, potentially impeding investors' decision-making processes, as investors lack access to standardized, comparable data to identify ESG-related risks and opportunities effectively. Eskantar et al. (2024) also draw attention to the issue that there is a lack of universally accepted ESG frameworks and practically used ESG indicators. In response, the European Union introduced the EU Taxonomy Regulation. This system helps define which economic activities can be considered environmentally sustainable, making it easier for companies and investors to make informed decisions that align with long-term climate and sustainability goals (Ginevičius, 2023, 2024).

Although ESG information is often treated as nonfinancial, its impact on business performance is becoming increasingly apparent. Incorporating ESG factors into a company's valuation model enhances nonfinancial performance, such as customer satisfaction, market acceptance, lower financing costs, and the societal value delivered to stakeholders. ESG disclosures can affect various financial outcomes, from a company's risk profile and how investors perceive it to the influence on key performance indicators. Consequently, disclosing ESG information has garnered increasing academic interest, particularly concerning its financial implications.

While interest and research on whether ESG disclosures and implementing ESG principles in companies impact their performance is growing, the results are mixed and contrasting. Researchers have explored the impact of the disclosure of ESG data on stock market returns (e.g., Naseer et al., 2024), stock liquidity (Cao et al., 2024), firm market value (Dorothy & Endri, 2024; Conca et al., 2021; Yu et al., 2018; Al Amosh & Khatib, 2024), investment efficiency (Ellili, 2022), and green innovation (Wang & Wang, 2025). Moreover, most of the research is concentrated on the financial sector (Gholami et al., 2022; Al-Jalahma et al., 2020; Buallay, 2019; Loew et al., 2024), the energy sector (Parashar et al., 2024; Naseer, 2024; Anwer et al., 2023), and there is scarce research on the impact of ESG integration on companies' performance in other sectors.

This article examines whether a relationship exists between companies' performance and the disclosure of information on separate ESG pillars. The article is structured in six sections. The first section sets out the theoretical background. Section 2 reviews studies focusing on European and American regions in the theoretical context. Section 3 applies regression analysis to test the model using data from European and the USA industrial sector companies; Sections 4 and 5 present results and discussions. Finally, the paper ends with the conclusions section.

2. LITERATURE REVIEW

2.1. Theoretical background of ESG and financial performance

The term "ESG" was first mentioned in 2004 in the report "Who Cares Wins," a United Nations initiative inviting financial institutions to develop guidelines and recommendations on integrating environmental, social, and corporate governance issues into investment decisions (Knoepfel et al., 2009). However, the discussion of environmental concerns and business responsibilities to mitigate environmental impact began in the 1960s and 1970s. (Loew et al., 2024). The relationship between environmental responsibility and financial performance has been extensively researched. The debate was notably sparked by Milton Friedman, who, since 1970, has argued that environmental and social investments are not essential costs for businesses, a perspective encapsulated in his shareholder theory. Concepts such as corporate social responsibility, sustainability, shared value, and ESG are utilized in the business sector to address social and environmental responsibilities. ESG, in particular, has become a standard tool in capital markets, where socially conscious investors assess the future financial performance of organizations based on their conduct. ESG considerations can complement traditional financial analysis, as companies with strong ESG performance are often expected to outperform their competitors in the long run.

The concept of ESG serves as a comprehensive framework for managing the risks and rewards associated with competitive advantage, shaped by key principles such as Environment, Health and Safety, Sustainability, and Corporate Social Responsibility. The evolution of ESG has been driven by the need to mitigate investor risk, ensure corporate transparency with society, and comply with increasingly stringent regulations that address global challenges such as climate change. Fundamentally, ESG aims to help investors identify potential risks and opportunities. ESG is structured around three core pillars: environmental (which assesses the impact on the natural environment), social (which reflects the relationships between various stakeholders), and governance (which reveals the management structures and practices of companies). The key areas of the environmental, social, and governance pillars are presented in Table 1.

Table 1

Key areas of ESG pillars, named by Bloomberg (2024)

| Environmental | Social | Governance |
|---|--|--|
| <ul style="list-style-type: none"> – Preserve the environment and conserve natural resources; – Sulfur dioxide concentration; – Concentration of nitrogen oxides; – Selected priority pollutants; – Excessive nutrients; – Electricity consumption; – Fossil fuel consumption; – Solid waste management; – Hazardous waste management; – Change in land use/land cover; – Wastewater and waste; – Percentage of new suppliers that were screened using environmental criteria | <ul style="list-style-type: none"> – Build social equity, support employee well-being, and promote fair trade; – Gender equality and diversity; – Work-life balance; – Respect for human rights; – Health insurance; – Average commute time; – List of stakeholders and relationship with them (Customers, Employees, Owners and investors, and Society); – Average hours of training per year | <ul style="list-style-type: none"> – Maximize long-term profitability and promote sustainable growth; – Profit and sales; – Ethical business relationship; – Transparent reporting of earnings and taxes; – Income rise per worker; – Sustainable products and services; – Transportation |

Analysis of the performance between ESG and financial performance is grounded by the following theories: the stakeholder theory (Freeman, 1984), the resource-based view (Penrose, 1959), agency (Jensen & Meckling, 1976); neo-institutional (Meyer & Rowan, 1977) and DiMaggio & Powell (1983) and legitimacy (Dowling & Pfeffer, 1975); signaling theory (Spence, 1973); shared value (Porter & Kramer, 2011) and some others. The institutional framework supporting sustainable development requires a balance between environmental, economic and social values, with institutions serving as key factors rather than mere conditions for development processes (Staniek, 2023).

The most heated debate between the followers of shareholder and stakeholder theories has been conducted in many studies, from discussing business responsibilities to society to relationships between CSR (corporate social responsibility) and financial performance. Nowadays, the ESG concept represents modern companies' conscience. Friedman (1970) argued that a company's primary responsibility lies with its shareholders and that investments in ethical standards incur additional costs that can help companies in economically disadvantaged situations reduce their market value. Few studies support this view without showing a positive correlation between profits or share prices and social or sustainable actions. In contrast, Freeman's (1984) stakeholder theory grounded arguments that only satisfied stakeholders can lead to companies' successful performance and, as a consequence, that financial markets are likely to reward companies for their ESG efforts. Research increasingly supports this stakeholder-centric approach, indicating that sustainability has become an important global strategy for modern organizations. If stakeholders are disappointed in the companies' activities, it can negatively impact financial results (Clarkson, 1995; Barman, 2018). Resource-based theory arguments encourage companies to invest in environmental and social performance as mandatory elements for which modern society may reward them. Such directions of managing resources can increase the value of a brand while at the same time strengthening its competitive advantage (Branco & Rodrigues, 2006; Bui et al., 2020).

In the EU, the strictness of regulations impacts companies' investment in ESG, and such reactions are proven by institutional theory. Strong institutional impact forces companies' transformation into a more sustainable way of operating (Chan & Ananthram, 2020).

Signaling theory also aligns with the arguments that ESG disclosure is the perfect instrument to attract investors, partners, and customers. The government pillar of ESG helps companies to decrease the risk of misunderstanding between managers and shareholders.

2.2. ESG and financial performance in studies focusing on the European and the USA regions

Empirical studies analyzing ESG and financial indicators provide various results, with some indicating a lack of consistent correlation between these factors. The research on this subject can be categorized into three significant groups based on the type of data used. One group analyses the main movements in market shares (e.g., stock returns and prices) and their relation to ESG (Bifulco et al., 2023; Bolton & Kacperczyk, 2021). Another group investigates the relationship between financial indicators (ROE, EBIT, and others) and ESG data (Candio, 2024; Koundouri et al., 2022). The third group integrates both types of information (Agoraki et al., 2023; Alfalih, 2022; Kim & Li, 2021; Alareeni & Hamdan, 2020). Many articles analyze data divided by regions (Europe, USA, and Asia); some concentrate on variations of a particular country or industry. However, there are scarce articles defining industrial particularities (Egorova & Petrov-Nerling, 2023; Hyusein & Cek, 2024).

Empirical studies on the relationship between financial performance and ESG produce mixed results, some indicating a lack of consistent correlation between these factors.

For example, Yoo & Managi (2021) explored the impact of various ESG scores on financial performance indicators (ROA, gross profits, total market value, liabilities, and assets) using a fixed-effect model on data from Bloomberg ESG scores (indicating disclosure levels) and MSCI ESG scores (reflecting ESG implementation and performance) over the period 2007 to 2019. Their findings suggest that ESG disclosure is more important for profitability, while ESG action is more crucial for market valuation (Tobin's Q). However, the study does not definitively indicate whether the disclosure of information or action is more significant. For instance, Saygili et al. (2022) utilized the Hausman-Taylor model to analyze the relationship between financial performance indicators - Return on Assets (ROA) and Tobin's Q - and ESG practices, focusing on environmental disclosure scores and 20 independent ESG indicators. Their study, which analyzed Turkish publicly traded companies from 2007 to 2017, found that environmental disclosures negatively impact financial performance, likely due to the lack of regulation and mandatory sustainability reporting in Turkish financial markets.

In contrast, social and governance indices positively correlate with financial performance, with governance having a more substantial influence. Mohammad & Wasiuzzaman (2020) analyzed 3,966 Bursa Malaysia-listed companies from 2012 to 2017 and found that increased ESG transparency is associated with a 4% improvement in firm performance. This study combined accounting and market data, demonstrating that greater ESG disclosure positively impacts corporate performance. Feng et al. (2021) proposed a relationship between ESG ratings and a future stock price crash risk. Their regression analysis on Chinese firms found a statistically and economically significant negative correlation, supporting the agency theory explanations.

Our analysis concentrated on the literature systematization based on two regions – Europe and the USA- highlighting specifics of the industrial sector and analyzing the relationship between ESG and financial performance.

The relation between ESG and financial performance in Europe

The relationship between ESG factors and financial performance has been the subject of extensive research, yielding equivocal results in Europe. This issue poses a significant challenge for companies assessing their investment effectiveness and sustainability. Agoraki et al. (2023) performed regression analysis for European companies, excluding financial and utility sectors, for 2007–2021, stressing the impact of the crisis (COVID-19). The authors documented that higher ESG reputational risk for this sample leads to worse financial performance. The crisis period might impact the lower attitude to managing ESG risk, leading to more cautious decisions and lower investment. Candio (2024) used ordinary least squares regression to test European companies' performance for 2012–2022. An extensive regression framework was used to test the relationship between ESG, profitability, and market share indicators. The conflicting findings that higher ESG scores were related to lower financial performance, except for the relationship between the governance score and EBIT, led the authors to suggest expanding the investigation (Candio, 2024). Koundouri et al. (2022) used fifty European companies (EURO STOXX 50 Index) covering a wide range of sectors, namely Automobiles, Consumer Products, Energy, Financial Services, Manufacturing (Personal Care, Drug and Grocery Stores, Real Estate, Retail and Telecommunications were excluded) for the analysis. Performed correlation analysis among indicators, which showed that firms with better ESG scores demonstrated better ROA and ROE results. There was no fixed, clear correlation between ESG and profit margin. Sandberg et al. (2022) analyzed European companies' food industry from 2017 to 2020. The authors documented that higher positive ESG scores were correlated with better ROA and ROE results. Rossi & Harjoto (2020) conducted a regression analysis on 156 Italian listed companies over 18 years (2001-2018) using various corporate performance metrics, including annual total shareholder return, Stern

Stewart's economic value added, and Tobin's Q, alongside nonfinancial indicators and data from the Standard Ethics Rating. Their study concluded that improved nonfinancial disclosures, particularly ESG, enhance firm value and reduce risk, aligning with stakeholder-agency theory by minimizing residual loss.

The analysis of the relation between ESG and financial performance in Europe shows that ESG aspects generally positively impact companies' financial performance (Table 2).

Table 2

The relation between ESG and financial performance in Europe

| Results | Period | Indicators | Data, methods | Databases | Author (year) |
|--|-----------|--|--|---|-------------------------|
| Fixed causal negative relationship between ESG reputational risk and financial performance | 2007–2021 | ESG (RepRisk Index), ROA, ROE | European 1816 listed firms; regression analysis | Risk, Global Business Intelligence Database | Agoraki et al. (2023) |
| Higher ESG scores are linked to lower financial performance | 2012–2022 | ROA, ROE, EBITM | Top 600 companies listed; regression, ordinary least squares | STOXX Europe 600, Refinitiv Eikon platform | Candio (2024) |
| Higher ESG results led to better ROA, ROE, and non-significant results with profit | July 2021 | ESG, ROA, ROE, profit margin | Top 50 companies from STOXX Europe; correlation among indicators | EURO STOXX 50 Index, Yahoo Finance | Koundouri et al. (2022) |
| Food industry analysis, slight positive impact of ESG on ROA and ROE | 2017–2020 | ESG, ROA, ROE | 83 companies; ordinary least squares regression analysis | CSRHub ESG rating | Sandberg et al. (2022) |
| Improved ESG disclosures, enhanced firm value, and reduced risk | 2001–2018 | TSR (Total Shareholder Return), VA (value added) | 56 Italian listed companies; regression analysis | Standard Ethics Rating. | Rossi & Harjoto (2020) |

Source: own compilation

In the EU, where sustainability regulations have become stricter, the tendencies are positive, but there are no absolute confirmations in all cases that ESG has increased financial performance.

The relation between ESG and financial performance in the USA

The USA region differs from Europe in its approach to sustainability. The EU has stricter regulations, requiring companies to disclose ESG-related data, whereas the USA relies more on voluntary guidelines,

though regulatory changes are emerging. Hence, USA businesses try to attract investors and be rewarded by consumers by investing in ESG. Alareeni & Hamdan (2020) examined the relationship between financial performance (ROA, ROE, and Tobin's Q) and ESG indicators in USA S&P 500-listed companies from 2009 to 2018. The results showed that environmental performance and ESG disclosure positively affect market performance, while they are negatively correlated with ROA and ROE. Corporate governance disclosure is positively correlated with ROA and Tobin's Q but negatively correlated with ROE. Conversely, Bolton and Kacperczyk (2021) analyzed the relationship between USA companies' carbon emissions and market information from 2005 to 2017. Their analysis revealed a positive association between higher emissions and stock returns, suggesting that firms with more significant emissions exhibit higher stock returns. This finding underscores a pessimistic tendency among firms with higher emissions, which is characterized by the expectation of higher returns. Egorova & Petrov-Nerling (2023) performed regression analysis (ESG and financial performance) of companies using data from Thomson Reuters Eikon. Their analysis concentrated on seven sectors. The main conclusion of Egorova & Petrov-Nerling (2023) is that ESG rating had a negative impact on the financial performance of brown industries (Oil & Gas and Mining), and as a consequence, these companies have no motivation to invest in reducing ESG risk. Yildiz et al. (2024) used the fixed effects method to analyze 32 European, USA, and Asian airline companies in 2018–2023. Using separate ESG score indicators and financial performance indicators (Return on Sale, Current Ratio, Asset Turnover, Total Assets, Total Debt), the authors concluded that ESG scores did not significantly impact chosen financial indicators in the airline industry. Kim & Li (2021) performed four regression models using Return on Assets as a dependent factor and ESG as an independent variable using company data from all industries from S&P Capital IQ - Compustat database from 1991 to 2013. The general fixed tendencies were that total ESG ratings positively impact firms' profitability. By testing the impact of different ESG aspects, Kim & Li (2021) proved that the governance score was the most significant element influencing ROA. Ademi and Klungseth (2022), testing ESG scores fluctuation on the financial performance of USA companies, employed five models with the following dependable factors: return-on-sales, return-on-assets, return-on-capital-employed, operating income, sales, and growth rate. Data were collected from 150 USA firms from 2017 to 2020. Ademi & Klungseth (2022) concluded that high ESG scores positively impacted companies' financial results. Hyusein & Cek (2024) examined the relationship between ESG and financial performance using ROA in the energy and renewable energy industries, seeking to compare differences between green and more brown performance in the USA from 2013 to 2023. The panel data model was tested using the LSEG Asset 4 Database. Hyusein & Cek (2024) had not fixed the difference – general ESG scores positively impacted ROA in both industries. A separate analysis of Environmental, Social, and Governance (ESG) aspects showed that only the social pillar positively impacted ROA. Alfalih (2022), using a dynamic panel data model with the System Generalized Method of Moments, investigated ESG pillars' impact on financial performance across SP-500 non-financial companies (Bloomberg and Thomson Reuters) in the USA from 2010 to 2019. Their study found that social and governance pillars positively impacted ROA. The environmental aspect showed significance only for the stock market analysis of Tobin's Q, as Hyusein & Cek (2024). In trying to catch the data difference between the manufacturing and services industries, Hyusein & Cek (2024) segregated them. Social and governance data showed positive and statistically significant linear effects on ROA in the manufacturing industry. This industry data revealed that the higher disclosure of ESG leads to higher financial performance, and this industry had higher governance disclosure scores.

The analysis of the USA market shows very similar tendencies to those of the European region. ESG aspects generally positively impact companies' financial performance, but the confirmation level depends on the nature of the analysis, covering different data sets and techniques (Table 3).

Table 3

The relation between ESG and financial performance in the USA

| Results | Period | Indicators | Data, methods | Databases | Author (year) |
|--|--------------|---|---|-------------------------------------|---------------------------------|
| ESG disclosure is negatively correlated with ROA and ROE | 2009 – 2018 | ESG, ROA, ROE | S&P 500-listed companies; regression analysis | S&P | Alareeni & Hamdan (2020) |
| ESG rating had a negative impact on the financial performance of brown industries (Oil & Gas and Mining) | 2002 – 2021 | ESG and financial performance | 270 global companies across selected industries; regression analysis | Thomson Reuters Eikon | Egorova & Petrov-Nerling (2023) |
| ESG rating had a negative impact on the financial performance of brown industries | 2018– 2023 | Return on Sale, Current Ratio, Asset Turnover, Total Assets, Total Debt | 32 airline companies in Europe, the USA, and the Asia regions; fixed effects method | Refinitiv EIKON Data Stream | Yildiz et al. (2024) |
| ESG ratings positively impact firms' profitability | 1991 – 2013 | Return on Assets as a dependable factor and ESG | Companies data of all industries from the S&P Capital IQ - Compustat database; four regression models | S&P Capital IQ - Compustat database | Kim & Li (2021) |
| ESG scores positively impacted companies' financial results | 2017 to 2020 | Return on sales, Return on Assets, Return on capital employed, operating income, sales, and growth rate | USA 150 firms; five regression models | S&P 500 | Ademi & Klungseth (2022) |
| In both industries, general ESG scores positively impacted ROA | 2013 to 2023 | ESG and financial performance using ROA | USA companies in energy and renewable energy industries; panel data model | LSEG Asset 4 Database | Hyusein & Cek (2024) |
| Social and governance pillars positively impacted ROA | 2010 to 2019 | ESG; ROA | SP-500 non-financial companies from USA; dynamic panel data model | Bloomberg and Thomson Reuters | Alfalih (2022) |

Source: own compilation

Based on the literature analysis, there is limited direct analysis specifically targeting the industrials industry in the chosen regions and worldwide. Egorova & Petrov-Nerling (2023) highlighted the negative link between profitability and ESG scores in brown industries, and such results decreased motivation to

expand investment in ESG. The same results were proved in airlines (Yildiz et al., 2024) and energy industries (Hyusein & Cek, 2024). The positive link between profitability and ESG scores in the manufacturing industry was documented by Hyusein & Cek (2024). Such literature analysis influences the decision to perform analysis exclusively within the industrial sector. The disaggregation of ESG scores can further demonstrate reality.

3. METHODOLOGY

This study used Bloomberg's proprietary ESG ratings dataset to provide comparable data for analysis. Bloomberg's ESG scores provide a data-driven measure of a company's environmental, social, and governance dimensions, allowing investors to quickly assess performance on a range of important issues such as climate change, health and safety, and corporate governance policies (BESGSCO Index). This study focuses on 182 Industrials sector companies from Europe and the USA, covering EBIT and ESG data from 2016 to 2022; 2020 was excluded from the analysis as this COVID year of COVID demonstrated very unstable results related to the crisis. The research area covers the data line of companies' EBIT and ESG panel data. In the context of Bloomberg's industry classification, industrials refers to a sector encompassing companies producing goods or services for industrial and commercial use. These companies typically include those involved in manufacturing, construction, transportation, aerospace, defense, and other infrastructure-related activities. The industrial sector is crucial in supporting global infrastructure and economic development. Such industries are a core component of most financial markets and are closely monitored by investors for their economic sensitivity and growth potential.

The research methodology is constructed in two steps to get research results (Table 4).

Table 4

Research methodology

| Step | Purpose | Output | Comment |
|-------------------------------------|--|---|--|
| 1. Analysis of panel data | Collect data from the Bloomberg (2024) database and normalize data values. | The data was grouped for further analysis at the European and the USA levels. | ESG scores were analyzed at the European and USA levels. |
| 2. Formation of Robust linear model | To identify ESG impact on EBIT. | To get regression results and evaluate the size of the impact. | Analyse ESG impact by regions. |

Source: own compilation

The above methodology allows for the formation of a robust linear model and forecasts for predicted EBIT development.

This paper's empirical evaluation and validation aimed to analyze the impact of separate aspects of ESG data on EBIT. The empirical study is based on regression analysis. The software EViews was selected as the instrument of analysis. In some estimations, data was recalculated to eliminate potential data discrepancies by adjusting the actual data to sector differences. For example, $E_{sector} = E_{actual} / E_{average_sector}$, where E_{sector} is an environmental indicator adjusted by sector average. An additional advantage is obtained by making this adjustment: it is easy to distinguish between sector leaders ($E_{sector} > 1$) and laggards ($E_{sector} < 1$). Some data adjustment steps were performed:

- 2020 was excluded
- Empty fields were filled with adjacent data

- Normalization was performed.

Steps of performing the robust linear regression method:

- Construction of equations using the method and identification of probabilities that meet requirements.
- Remove outliers and revise probability changes after outlier removal.
- Validation of equations.

A general theoretical equation for estimating the considered economic relationship is given below.

$$EBIT_t = \alpha + \beta_1 E_t + \beta_2 S_t + \beta_3 G_t + \varepsilon_t \quad (1)$$

where $EBIT_t$ is a dependent factor in time t ;

E_t is an environmental score for countries at time t ;

S_t is a social score for countries at time t ;

G_t is a governance score for countries at time t ;

β_i denotes the regression coefficients;

ε_t is an error term.

The characteristics of the fitted model validated the model:

- R^2 and adjusted R^2 .
- p values.

The results of the research are presented in the next section.

4. EMPIRICAL RESULTS AND DISCUSSION

This study analyzed data from 182 industrial sector companies in Europe and the USA. Comparing separate ESG pillars' scores of the assessed European firms, it has been noticed that all analyzed companies demonstrate higher performance in the governance pillar (average 6.53), than in environmental aspects (average 3.42), and the lowest level in social aspects (average 3.06). The European companies demonstrate higher performance in the governance pillar (average 6.20), than in environmental aspects (average 3.51), and the lowest level in social aspects (average 2.93). The USA companies demonstrate higher performance in the governance pillar (average 7.26), than in social aspects (average 3.34), and the lowest level in environmental aspects (average 3.22). These numbers show that the highest focus is on the governance pillar in both regions, but the USA companies prevail. Talking about other pillars, European companies pay more attention to environmental aspects, and American companies pay more attention to social aspects.

Such numbers of signals about the low transformation to a green economy. A preliminary study was conducted using aggregated data at the sector level.

The model's robustness is ensured using the median absolute deviation (MAD) as the scale estimator. The significant coefficients and small p -values (<0.05) for factors LOG_SOCIAL, LOG_ENVIRONMENTAL, and LOG_GOVERNANCE indicate the reliability of these relationships.

The authors formed two equations: one dedicated to the European case and the other to the USA case.

The equation for the Europe case:

$$\text{LOG_EBIT} = 8.5585 + 0.2236 \times \text{LOG_SOCIAL} + 0.4398 \times \text{LOG_ENVIRONMENTAL} - 1.4630 \times \text{LOG_GOVERNANCE} \quad \dots(2)$$

The robust linear regression analysis results show that the dependent factor is the logarithm of EBIT (LOG_EBIT). The model was estimated using Iteratively Reweighted Least Squares (IRLS) with a Huber-T norm, ensuring robustness against outliers. The regression includes three independent factors: LOG_SOCIAL, LOG_ENVIRONMENTAL, and LOG_GVERNANCE.

The constant term ($\beta_0=8.5585$, $p<0.001$) indicates the baseline value of LOG_EBIT when all independent factors are at zero. Among the independent factors, there are such results:

- LOG_SOCIAL ($\beta=0.2236$, $p=0.010$) has a positive and statistically significant relationship with LOG_EBIT, suggesting that increases in social performance are associated with higher EBIT.
- LOG_ENVIRONMENTAL ($\beta=0.4398$, $p<0.001$) exhibits the strongest positive association with LOG_EBIT, indicating that environmental improvements impact firm profitability most among the factors studied.
- LOG_GVERNANCE ($\beta=-1.4630$, $p<0.001$) shows a negative and statistically significant relationship with LOG_EBIT, implying that governance-related variables (following Annex 1) might adversely affect EBIT in the context of this dataset, but require further revision.

The model results reveal that LOG_ENVIRONMENTAL has the highest positive effect on LOG_EBIT, while LOG_GVERNANCE has a pronounced negative impact. These findings underscore the differential roles of social, environmental, and governance factors in shaping financial performance.

| Robust linear Model Regression Results | | | | | | |
|--|------------------|-------------------|--------|-------|--------|--------|
| Dep. Variable: | LOG_EBIT | No. Observations: | 799 | | | |
| Model: | RLM | Df Residuals: | 795 | | | |
| Method: | IRLS | Df Model: | 3 | | | |
| Norm: | HuberT | | | | | |
| Scale Est.: | mad | | | | | |
| Cov Type: | H1 | | | | | |
| Date: | Tue, 31 Dec 2024 | | | | | |
| Time: | 15:55:24 | | | | | |
| No. Iterations: | 20 | | | | | |
| | coef | std err | z | P> z | [0.025 | 0.975] |
| const | 8.5585 | 0.370 | 23.147 | 0.000 | 7.834 | 9.283 |
| LOG_SOCIAL | 0.2236 | 0.087 | 2.573 | 0.010 | 0.053 | 0.394 |
| LOG_ENVIRONMENTAL | 0.4398 | 0.066 | 6.696 | 0.000 | 0.311 | 0.569 |
| LOG_GVERNANCE | -1.4630 | 0.203 | -7.207 | 0.000 | -1.861 | -1.065 |

Figure 1. Results of the analysis for the Europe case

Source: own calculation

The equation for the USA case:

$$\text{LOG_EBIT} = 0.0207 - 0.2757 \times \text{LOG_SOCIAL} + 0.3887 \times \text{LOG_ENVIRONMENTAL} + 3.7502 \times \text{LOG_GOVERNANCE} \dots \quad (3)$$

The dependent factor in the USA case is the logarithm of EBIT (LOG_EBIT). The regression includes three independent factors: LOG_SOCIAL, LOG_ENVIRONMENTAL, and LOG_GVERNANCE.

The constant term ($\beta_0 = 0.0207$, $p = 0.986$) indicates the baseline level of LOG_EBIT when all independent factors are at zero. However, it is not statistically significant. Among the independent factors, there are such results:

- LOG_SOCIAL ($\beta = -0.2757, p = 0.008$) shows a negative and statistically significant relationship with LOG_EBIT. The 1% increase in the social factor is associated with a 0.2757% decrease in LOG_EBIT, indicating that social performance may impose costs that negatively affect profitability.
- LOG_ENVIRONMENTAL ($\beta = 0.3887, p < 0.001$) exhibits a positive and highly significant association with LOG_EBIT. The 1% increase in the environmental factor leads to a 0.3887% increase in LOG_EBIT, highlighting the beneficial impact of environmental improvements on firm profitability.
- LOG_GOVERNANCE ($\beta = 3.7502, p < 0.001$) suggests a strong positive and statistically significant relationship with LOG_EBIT. The 1% increase in governance factors is associated with a 3.7502% increase in LOG_EBIT, indicating that governance is a substantial driver of financial performance in this dataset.

The model reveals that LOG_GOVERNANCE has the highest positive effect on LOG_EBIT, followed by LOG_ENVIRONMENTAL, while LOG_SOCIAL shows a significant negative impact. These findings highlight the differentiated influence of social, environmental, and governance factors on firm financial outcomes.

| Robust linear Model Regression Results | | | | | | |
|--|------------------|-------------------|--------|-------|--------|--------|
| Dep. Variable: | LOG_EBIT | No. Observations: | 373 | | | |
| Model: | RLM | Df Residuals: | 369 | | | |
| Method: | IRLS | Df Model: | 3 | | | |
| Norm: | HuberT | | | | | |
| Scale Est.: | mad | | | | | |
| Cov Type: | H1 | | | | | |
| Date: | Tue, 31 Dec 2024 | | | | | |
| Time: | 13:54:50 | | | | | |
| No. Iterations: | 15 | | | | | |
| | coef | std err | z | P> z | [0.025 | 0.975] |
| const | 0.0207 | 1.167 | 0.018 | 0.986 | -2.267 | 2.309 |
| LOG_SOCIAL | -0.2757 | 0.105 | -2.635 | 0.008 | -0.481 | -0.071 |
| LOG_ENVIRONMENTAL | 0.3887 | 0.061 | 6.412 | 0.000 | 0.270 | 0.507 |
| LOG_GOVERNANCE | 3.7502 | 0.591 | 6.340 | 0.000 | 2.591 | 4.909 |

Figure 2. Results of the analysis for the USA case

Source: own calculation

In Europe, (1) LOG_ENVIRONMENTAL has the highest positive impact on LOG_EBIT, while LOG_GOVERNANCE has a pronounced negative effect. (2) The positive LOG_SOCIAL coefficient indicates that better social performance positively contributes to EBIT. (3) The negative LOG_GOVERNANCE suggests that governance factors might impose costs in the European context.

In the USA case, (1) LOG_GOVERNANCE has the highest positive and significant impact on LOG_EBIT, indicating governance as a substantial driver of financial performance. (2) LOG_ENVIRONMENTAL maintains a strong positive effect, emphasizing the importance of environmental improvements. (3) The negative LOG_SOCIAL coefficient suggests that social performance may incur costs that negatively affect EBIT. Table 5 presents the summary of all independent coefficients.

Table 5

Coefficients and relationships

| Factor | Europe (β , p -value) | USA (β , p -value) | Interpretation Comparison |
|-------------------------|-----------------------------------|-----------------------------------|---|
| LOG_SOCIAL | $\beta = 0.223$, $p = 0.010$ | $\beta = -0.275$, $p = 0.008$ | Positive in Europe and negative in the USA, suggesting regional differences in the financial impact of social factors. |
| LOG_ENVIRONMENTAL | $\beta = 0.439$, $p < 0.001$ | $\beta = 0.388$, $p < 0.001$ | Positive and statistically significant in both regions. Environmental improvements consistently benefit profitability. |
| LOG_GOVERNANCE | $\beta = -1.463$, $p < 0.001$ | $\beta = 3.750$, $p < 0.001$ | Strongly negative in Europe and strongly positive in the USA, reflecting contrasting governance impacts across regions. |
| R ² | 0.314 | 0.2403 | Moderate and credible in the European and the USA cases |
| Adjusted R ² | 0.301 | 0.2342 | Informative in the European and the USA cases |

Source: own calculation

Results show that changes in a company's EBIT might be influenced by separate pillars of the ESG score or its variations.

Discussion

The ESG framework identifies three interconnected pillars of environmental, social, and governance measures. The growing environmental risks, while increasing geopolitical tensions, prompt questions about how ESG scores impact financial performance. If customers, shareholders, and other partners can value companies' efforts and investment.

Much of the previous research focused heavily on the financial and energy sectors, with limited attention to the industrial sector. Few studies disaggregated ESG impact at the sector level, particularly for manufacturing, construction, or aerospace industries. Although there are region-based studies, direct comparative studies between Europe and the USA within the same sector (industrials) were scarce.

One of the most notable results of this study is the clear and consistent positive link between environmental data disclosure and financial performance observed in European and the USA industrial firms. This finding supports earlier studies indicating that companies that adopt environmentally responsible practices experience tangible benefits - such as improved operational efficiency, reduced exposure to environmental risks, and stronger reputations among stakeholders (Ferri et al., 2023; von Rosing et al., 2025; Cormier & Magnan, 2015). In sectors like industrial, where environmental impact is often significant, taking proactive steps to manage these issues not only helps to lower compliance and operational costs but also tends to appeal to a growing base of sustainability-focused investors.

Analyzing the relationship between social data disclosure and the financial performance of industrial sector companies, we can see contrasting results: a positive influence on financial performance in European firms but a negative one in the USA. This contrast is likely rooted in differences in how companies are expected to operate within their respective institutional and cultural contexts. The idea that firms are accountable to shareholders and a wider group of stakeholders is more firmly established in Europe. Social responsibility is often supported - if not required - by regulations, and companies that actively invest in social issues, such as employee well-being or community engagement, may gain long-term trust and credibility. On the other hand, in the United States of America, the emphasis is more on maximizing

shareholder returns; such social investments might be seen as non-essential or too expensive, especially if the financial benefits are not immediately visible.

Applying robust linear regression to assess the impact of specific ESG factors on EBIT revealed that ESG data positively affect companies' EBIT performance in Europe and the USA. Overall, the results delivered using disaggregated company-level panel data and estimation models support the beneficial impact of monetary policy on EBIT (Meng-tao et al., 2023; Chen et al., 2023). As regulations become more stringent, companies, especially in developed countries, are increasingly compelled to engage in environmental initiatives.

Preliminary observations indicate that European corporations invest less in environmental aspects, while governance ratings are more stable and higher. These findings align with the work of Veenstra & Ellemers (2020), who observed that environmental data is not disclosed as consistently as governance data.

Regression analysis explores the relationship between environmental, social, and governance data and the EBIT of companies performing in the industrial sector. Our regression analysis shows that:

- social performance are associated with higher EBIT.
- environmental scores impact firm EBIT most among the ESG factors studied.
- governance-related score shows a statistically significant relationship with LOG_EBIT, implying that governance-related factors might adversely affect EBIT, particularly in the USA.

The study targets 182 industrial sector companies in the USA and Europe, highlighting an under-researched sector with significant ESG impact potential. It provides a side-by-side analysis of Europe and the USA using the same methodology, allowing for a clear comparative insight into ESG's regional effects on profitability. The analysis spans 2015–2022, using Bloomberg ESG ratings and financial performance indicators (EBIT), offering a comprehensive temporal perspective. The paper contributes practical knowledge for investors, policymakers, and managers by identifying region-specific strategies where ESG investments are more (or less) likely to improve profitability.

5. CONCLUSION

In this paper, the authors investigate whether there is a relationship between the disclosure of environmental, social, and governance information and companies' performance in Europe and the USA industrial sectors from 2015 to 2023. By employing robust regressions and fixed-effect panel data, the authors aim to identify if disclosure of environmental, social, and governance data impacts companies' profitability, as assessed by EBIT (Earnings before interest and taxes).

The results of this study contribute to the growing body of literature investigating the impact of environmental, social, and governance data disclosure on companies' financial performance.

The findings indicate a clear and consistent positive link between environmental data disclosure and financial performance observed in European and US industrial firms. Companies that adopt environmentally responsible practices experience tangible benefits such as improved operational efficiency, reduced exposure to environmental risks, and stronger reputations among stakeholders.

The relationship between social data disclosure and EBIT shows contrasting results. In European companies, there is a positive influence on financial performance, while in the USA, there is a negative impact. This contrast is likely rooted in differences in how companies are expected to operate within their respective institutional and cultural contexts of the researched regions.

The governance-related factor shows a statistically significant relationship with financial performance in the USA. However, in the European context, governance factors might slightly affect EBIT and impose additional costs. However, further financial performance analysis is required to identify which governance score-affecting variable is Europe's most significant financial performance driver.

Overall, the results delivered using disaggregated company-level panel data and estimation models support the beneficial impact of ESG data disclosure on EBIT. As regulations become more stringent, companies, especially in developed countries, are increasingly compelled to engage in environmental initiatives.

In the future, as ESG data collection and dissemination improve due to regulatory pressure or investor demand, a more comprehensive dataset, including detailed factors and a broader range of companies (including small-cap firms), may be analyzed. By categorizing companies by industry and separately examining ESG leaders and laggards, specific ESG characteristics could be isolated for further analysis.

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ANNEX 1

Table A1

Variables forming ESG scores

| Environmental Disclosure Score | Social Disclosure Score | Governance Disclosure Score |
|--|---|-----------------------------------|
| Direct CO2 Emissions | Number of Employees | Size of the Board |
| Travel Emissions | Employee Turnover % | Indep Directors |
| Total CO2 Emissions | % Women in Workforce | % Indep Directors |
| CO2 Intensity per Energy | % Women in Mgt | % Women on Board |
| CO2 Intensity per Sales | Social Supply Chain Management | CEO Duality |
| Total Energy Consumption | Sustain Sup Guidelines Encomp ESG Area | Board Average Age |
| Electricity Used - MWh | Community Spending | Board Duration (Years) |
| Renewable Energy Use | Employee Training Cost | # Board Meetings |
| Water Consumption | # Awards Received | Audit Committee Meetings |
| Total Waste | Health and Safety Policy | Board Mtg Attendance |
| Waste Recycled | Fair Remuneration Policy | Political Donations |
| Paper Consumption | Training Policy | ESG Linked Compensation for Exec |
| Environmental Fines # | Employee CSR Training | ESG Linked Compensation for Board |
| Environmental Fines \$ | Equal Opportunity Policy | GRI Criteria Compliance |
| Investments in Sustainability | Human Rights Policy | Checked by GRI |
| Energy Efficiency Policy | Business Ethics Policy | |
| Emissions Reduction Initiatives | Anti-Bribery Ethics Policy | |
| Environmental Supply Chain Management | Employee Protection / Whistle Blower Po | |
| Green Building Policy | UN Global Compact Signatory | |
| Waste Reduction Policy | United Nations PRI Signatory | |
| Sustainable Packaging | SRI Assets Under Management | |
| Environmental Quality Management Polic | | |
| Climate Change Opportunities Discussed | | |
| Risks of Climate Change Discussed | | |
| Climate Change Policy | | |
| New Products - Climate Change | | |
| Biodiversity Policy | | |
| Environmental Awards Received | | |
| Verification Type | | |

Source: Bloomberg, 2024