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Environmental, Social, and Governance initiatives important for the economic performance of food and beverage companies in developed and emerging countries

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Abstract

This study analyzes the impact of environmental, social, and governance (ESG) initiatives on the financial and economic performance of food and beverage companies operating in developed and emerging markets. The research seeks to clarify the role of ESG practices in corporate profitability and market valuation, addressing the gap in empirical studies that link firm-level ESG indicators to performance metrics. A panel data regression analysis was conducted on 159 companies from 30 countries between 2017 and 2021, using Bloomberg ESG scores and financial indicators. Results indicate that social and governance practices have a positive influence on financial performance, while environmental initiatives exhibit a negative impact. The study highlights the need for cautious evaluation of environmental investments due to their potential adverse financial effects. The research contributes to the ongoing ESG discourse by providing insights for businesses, policymakers, and investors regarding sustainable corporate practices. Future studies should explore sector-specific ESG impacts and broader datasets to refine these findings.

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Introduction

Environmental, social, and governance (ESG) practices refer to company strategies and actions aimed at minimizing environmental harm, promoting social responsibility, and ensuring ethical and transparent governance (Martins, 2022). In recent years, ESG has become central to corporate strategy due to growing regulatory requirements, evolving investor expectations, and heightened societal awareness (Naffa & Fain, 2020; Raghunandan & Rajgopal, 2022). However, the relationship between ESG practices and corporate financial performance remains contested (Chouaibi *et al*., 2022; Friede *et al*., 2015; Lu *et al*., 2026; Zhao *et al*., 2018). This research aims to clarify this relationship by examining the food and beverage sector – a global, high-impact industry – through the lens of ESG practices and financial outcomes.

Prior studies point to the growing adoption of ESG frameworks, but their effectiveness, especially regarding financial returns, is still debated (Aich *et al*., 2021; Chen *et al*., 2025; Zhang & Xiong, 2024). Talan & Sharma (2019) identify gaps in assessing ESG as a determinant of investment value, while (Costantini *et al*., 2017) and Zhong *et al.* (2022) call for more empirical research using firm-level data. Much of the existing literature relies on proxies like sustainability reports or index memberships, which may not reflect actual ESG engagement (Broadstock *et al*., 2021; Yao *et al*., 2023). This study builds on these discussions by applying a structured, quantitative analysis at the firm level, contributing new insights into the ESG performance debate.

The food and beverage industry was selected due to its significant environmental footprint, complex supply chains, and high exposure to social and governance scrutiny (Lanzalonga *et al*., 2025; Nirino *et al*., 2019). As a global industry with strong local roots, it operates across national and regional boundaries, making it a relevant context to assess ESG impacts at multiple scales – local (e.g., sourcing and labor practices), national (e.g., regulatory compliance), and global (e.g., climate goals and investor pressure) (Partalidou *et al*., 2020). Moreover, shifting consumer demands and supply chain disruptions have pushed ESG to the forefront of sectoral strategy (Khanchel & Lassoued, 2022).

Emerging markets such as Brazil, China, and India are increasingly important suppliers to developed economies and are expected to shape the global ESG landscape (Barson *et al*., 2024; Dayanandan *et al*., 2024; Martins, 2022). Firms in these markets often face different regulatory and institutional pressures compared to their counterparts in developed economies, which may influence their ESG (Lanzalonga *et al*., 2025; Martins, 2022; Yao *et al*., 2023). In this study, "Global companies" are

defined as firms that operate across multiple national jurisdictions, with international supply chains, investor bases, or product markets. Understanding ESG in these settings enables a more nuanced view of how context influences motivation and outcomes.

Regulatory environments vary considerably between countries, influencing both ESG disclosure standards and enforcement (Chouaibi *et al*., 2022; Gega *et al*., 2025). While developed markets may impose stricter ESG reporting requirements, emerging markets often operate under looser or fragmented frameworks (Barson *et al*., 2024). This divergence affects how ESG is implemented and perceived by stakeholders, adding another layer of complexity to assessing its financial impact (Chen *et al*., 2025; Dayanandan *et al*., 2024). Exploring these differences is critical to informing both corporate strategy and policy design.

This study examines whether ESG investments contribute to financial and economic success or if external factors, such as regulation, market maturity, or institutional quality, are more decisive. It focuses on two core hypotheses:

(H1) ESG practices positively influence food and beverage companies' financial and economic performance.

(H2) The impact of ESG practices differs between companies in developed and emerging markets.

The study analyzes panel data from 159 companies across 30 countries using firm-level ESG indicators to test these hypotheses. The results aim to inform corporate decision-making, guide investor strategy, and support policymaking in emerging and developed contexts.

1. Background

This work was constructed to identify the scientific foundations that underpin ESG and to develop empirical studies on the subject. In doing so, the Scopus platform was utilized, focusing on the time interval from 2017 to July 2022, but not limited to this period, considering classic references and other databases whose relationship closely aligned with the scope and purpose of this research.

Based on the literature, the ESG classification refers to a more objective approach for measuring a company's sustainable performance, distinguishing true differences between samples (Friede *et al*., 2015; Xu *et al*., 2021; Zhang & Xiong, 2024).

The challenges in implementing and increasing interest in ESG practices by companies worldwide are related to the lack of standardized metrics for companies to base their reports and practices (Dayanandan *et al*., 2024; Naffa & Fain, 2020). The lack of standardization in terms of disclosure was

also highlighted by Lanzalonga *et al.* (2025), Lopes Santos *et al.* (2019) and Ismail *et al.* (2019), representing a difficulty in obtaining data from companies' sustainability reports.

According to market research conducted by KPMG (2020) A broad sample of food and beverage sector companies reported on sustainability at a rate of 73%. Compared to the mining sector (84%), the food and beverage sector still needs to enhance the statements in its sustainability reports. However, this does not imply that companies in the food and beverage sector are not working to better demonstrate their sustainability results. In 2017, 50% of sector companies reported on carbon reduction goals, compared to 69% in 2020 within the same segment. In the study proposed by Lanzalonga *et al.* (2025), high levels of ESG performance in the food and beverage sector are associated with lower levels of intangible assets in intellectual capital in a global sample of companies.

In 2018, the Chief Executive Officer (CEO), Larry Fink, of investment management firm BlackRock, published a letter to the CEOs of companies that receive investments from the company, urging the invested companies to recognize and quantify the impacts of environmental and social risks and opportunities through public disclosure (BLACKROCK, 2018). In addition, they were encouraged to detail any strategic actions taken or planned in response to evolving environmental and regulatory landscapes (Pawliczek *et al.*, 2021). Larry emphasized the firm's focus on the impacts of its actions on the world and noted that companies failing to meet their obligations to stakeholders would be abandoned (BLACKROCK, 2018).

In the annual letter published by the BlackRock CEO in 2020, Larry Fink reiterated the firm's commitment to generating long-term value for its investors. He says sustainability and deeper connections with stakeholders generate better company returns (BLACKROCK, 2020).

A study conducted by the authors Pawliczek *et al.* (2021), companies exhibited more alignment with the issues highlighted in the letter in the post-letter period, particularly when companies shared political preferences with BlackRock.

Essays by Henisz *et al.* (2019) indicated that an ESG-related proposition can create value for a company through sustainable growth, attracting customers with more sustainable products, gaining better access to resources through government relations, cost reduction by reducing energy and water consumption, increased productivity through greater employee motivation, and talent attraction due to enhanced company credibility in society. These practices contribute to increased customer loyalty, sales, productivity, and company value (Ismail *et al.*, 2019; Naffa & Fain, 2020).

Hence, the importance of these practices for evaluating businesses and making investment decisions is evident, particularly when evaluating long-

term company performance and exposure to risk (Lopes Santos *et al*., 2019; Zhang & Xiong, 2024)

Friede *et al.* (2015) highlighted the development of numerous studies linking ESG factors to corporate financial performance. They collected evidence from over 2,000 publications spanning the period from 1970 to 2015. They concluded that there is a positive correlation between ESG strategies and strong financial performance, with 62.6% of the studies revealing a positive relationship and only 10% a negative one.

Zhang & Xiong (2024) found in their study of a sample of Chinese agricultural and agro-industrial companies that the relationship between ESG practices and financial performance can be U-shaped, indicating that high investment expenses and costs for ESG implementation do not directly translate into financial improvement until a certain threshold is reached.

A study conducted by Peiris & Evans (2010) demonstrated a positive relationship between ESG practices, operational performance, and company market valuation, resulting in higher profit expectations. Thus, the potential for return due to environmental and governance factors has been a key focus, recognizing the material influence of these issues on company performance.

According to Talan & Sharma (2019) investment strategies incorporating ESG criteria constitute the second largest sustainable investment strategy in the world, with the largest being in the United States and continents like Oceania and Asia. Furthermore, they are the fastest-growing sustainable investment strategy globally.

A study conducted by Dunn *et al.* (2018) examined the risk and return implications of including ESG aspects in an investment strategy, where ESG exposures can inform about the risks of individual companies. The researchers empirically demonstrated that stocks with poorer ESG exposures have volatility up to 15% higher than stocks with better ESG exposures. Moreover, the ESG score can contribute to predicting future changes in risk estimates from a traditional risk model.

Nirino *et al.* (2019) Investigated the impact of corporate social responsibility on the financial performance of companies in the food and beverage sector. Their research suggested that future studies should aim to understand how specific corporate strategies can benefit companies, communities, and the natural environment. This highlights the importance of assessing the impact of ESG practices, as key criteria for corporate strategy, on the economic and financial performance of companies in the food and beverage sector.

The difficulty in assessing the impact of ESG on the financial performance of companies in the food sector was also identified Gega *et al.* (2025), they found that investor-owned companies outperform family and cooperative companies in terms of ESG performance, with risk-taking and time

horizon being positively and negatively associated with ESG performance, respectively.

The importance of the performance of companies in the food sector in different countries and the degree of ESG was verified in the study de Chen *et al.* (2025) which showed that international diversification and ESG performance have a positive impact on financial performance metrics at the company level for a sample in Taiwan. However, the effect of extending or international markets was not explored, and the authors indicated the relevance of discussing the impact under different market conditions.

In recent decades, the role of corporate governance has been continually studied by administrators, researchers, and educators (Lu *et al.*, 2026). However, few of these studies have focused on the relationship between corporate governance, financial sustainability, and shareholder value (Sulimany *et al.*, 2021). According to the authors, studies in developed markets suggest that well-governed companies tend to have higher valuations, profits, and dividend distributions to shareholders, as well as lower bankruptcy risks.

The study conducted by Sun & Li (2021) concluded that publicly listed Chinese companies that adopt responsible practices mitigated the negative effects of the COVID-19 pandemic on financial performance. Broadstock *et al.* (2021) created portfolios of Chinese companies with high and low levels of ESG and found that the group of companies with a higher level of ESG has lower financial risk than the portfolio with companies with lower financial risk, indicating that ESG practices can contribute positively to investment decisions in the market.

The impact of the COVID-19 pandemic also affected the ESG performance of companies in different countries, as identified in the study by Al Amosh & Khatib (2023), also highlighting differences in ESG results between emerging and developed countries, but with varying effects on the environmental and social dimensions. The authors showed that emerging countries performed better in the environmental aspect, while developed countries performed better in the social area.

Based on the existing studies, a gap in the literature remains to be explored regarding the impact of ESG practices on the economic and financial performance of companies in the food and beverage sector. Overall, these studies do not consider regional and national effects where companies are located, failing to analyze important variables such as legal differences and consumer expectations (Manrique & Martí-Ballester, 2017). Moreover, few studies have jointly evaluated the effects of ESG practices on economic and financial company performance (Dayanandan *et al.*, 2024; Friede *et al.*, 2015; Madison & Schiehll, 2021; Park & Jang, 2021; Yoon *et al.*, 2018; Zhang & Xiong, 2024; Zhao *et al.*, 2018).

2. Materials and methods

This investigation constitutes an empirical study encompassing ESG practices within globally listed food and beverage companies. This choice is based on the need for company-level information that is both dependable and audited. The identification of companies was achieved through data accessed from the Bloomberg terminal, resulting in a sample size of 157 companies.

The temporal scope of this study spans from 2017 to 2021, ensuring that it includes current and relevant data while allowing for a five-year analysis period to yield more reliable results. This period also covers events both before and after the onset of the COVID-19 pandemic, along with the publication of the letter by BlackRock's CEO, Larry Fink, in 2018 (BLACKROCK, 2018).

As a preparatory step, financial, economic, and ESG indicators, as well as control variables, were collected for each company using available data, as mapped in the Bloomberg terminal. The objective was to gather data for a comparative analysis of companies with different ESG practices.

The analytical method employed was panel data regression using the Gretl software. This method was selected because it facilitates the evaluation of ESG variables across all 159 companies identified in the Bloomberg database from 2017 to 2021. Similar techniques have been employed in prior studies (Chelawat & Trivedi, 2016; Ismail *et al.*, 2019; Lopes Santos *et al.*, 2019). This approach allowed for the control of unobservable individual heterogeneity (firm effect) and the endogeneity of explanatory variables.

It should be noted that 167 companies were identified in the initial survey, with eight companies excluded due to a lack of information on economic performance and/or negative net equity that could lead to losses, which would impact the analysis.

The study initially involved an extensive range of 74 variables, encompassing independent ESG, dependent, and control variables. However, some companies do not provide data for all analyzed variables as corporate practices evolve.

Due to limited data availability, a selection process was undertaken, focusing on variables with higher frequency of information to ensure greater representativeness and a higher number of valid observations. Guided by Bloomberg's criteria, benchmark variables were identified using the "ESG Metrics Calculation Methodology" from MSCI and Standard & Poor's reports (MSCI, 2023)This yielded a selection of 27 variables with available data for 159 companies based in 30 different countries across America, Europe, and Asia. Table 1 shows the distribution of companies by continent, sectors, and characteristics related to size.

Table 1 - Aggregated sample information. (Asset values in US$ million)

Continent	Food					Beverage				
	N%	Average Asset	Minor Asset	Biggest Asset	Average Emplo-yee	N%	Average Asset	Minor Asset	Biggest Asset	Average Emplo-yee
America	25	13,073	156	93,394	2,205	22	18,877	226	94,354	56,885
Ásia	–	–	–	–	–	22	12,683	1,398	40,145	22,413
Europa	19	13,099	354	134,084	35,452	12	34,200	640	217,627	39.942

Source: Authors' compilation.

The sample appears to comprise large corporations, as indicated by the average number of employees and size of assets. The company with the lowest valuation had assets valued at $354 million. Despite being large companies, a high dispersion in company sizes is evident, and the food sector in Asia is represented in the consulted database.

2.1. *Construction of the empirical model*

To verify the hypotheses and achieve the objective of this study, the regression model with panel (pooled) data defined in Equation 1 was used, given its ability to aggregate cross-sectional data with time, at the company level, which allows working with the extension of the database and, equally, analyzing the results respecting the individual characteristics of the companies within the period:

$$Y_{it} = \alpha_i + b_1 Environmental_{it} + b_2 Social_{it} + b_3 Governance_{it} + b_4 Size_{it} + b_5 Control_{it} + b_6 COVID_{it} + u_{it} \quad (01)$$

Where:

Y: dependent variables (P/E, P/BV, dividend yield, ROA, ROE, and adjusted EBITDA Margin).

Environmental: average performance, at the company level, in selected environmental indicators.

Social: Average performance, at the company level, in selected social indicators.

Governance: Average performance, at the company level, in governance indicators.

Size: Company size, measured by the natural logarithm of total assets.

Control: dummy variable to control for emerging or developed countries, individual companies.
COVID: dummy variable to control the years with COVID-19 pandemic.
t: each year within the analyzed period (2017-2021).
α: model constant; e b: partial coefficients of each independent variable in the model.

To construct the independent variables related to ESG initiatives, it was necessary to examine the results of each company individually and standardize them. Since the research aimed to verify best practices, priority was given to standardization following a ranking.

ESG variables, scores ranging from 1 to 10, were assigned based on percentiles within each of the 19 variables. This approach was taken to mitigate the effects of outliers. The criteria and independent variables subjected to each of these criteria are detailed in Charts 1, 2, 3, and 4, respectively:

Chart 1 - Applied Scores for Independent ESG Variables When HIGHER Value = Better

Percentiles	**Scores**
HIGHER value found	10
>= 0,95 (among the top 5%)	9
>= 0,80 (between 5.1% - 20% highest)	8
>= 0,70 (between 20,1% - 30% highest)	7
>= 0,60 (between 30,1% - 40% highest)	6
>= 0,50 (between 40,1% - 50% highest)	5
>= 0,40 (between 50,1% - 60% highest)	4
>= 0,30 (between 60,1% - 70% highest)	3
>= 0,05 (between 70,1% - 95% highest)	2
< 0,05 (among the bottom 5%)	1
No valid observations (empty cells)	0

Source: Authors' compilation.

The ESG independent variables, which were assigned scores based on the criteria outlined in Chart 1, are presented in Chart 2:

Chart 2 - Independent ESG Variables: When HIGHER Value = Better

Independent Variable (ESG)	Representation
ENVIRONMENTAL	
RENEW_ENERGY	Percentage of renewable energy consumed
ENERGY_USAGE	Total renewable energy consumption
RECYCLING	Percentage of waste recycled
SOCIAL	
EMPLOYEE_COST	Average total cost per employee
WOMEN_TOTAL	Percentage of female employees
WOMEN_MANAGEMENT	Percentage of female employees in managerial positions
WOMEN_EXECUTIVES	Percentage of female executives
SOCIAL_ACTIONS	Total resources invested in the community
GOVERNANCE	
IND_BOARD	Percentage of independent directors on the board
NON_EXEC_BOARD	Percentage of non-executive directors on the board
BOARD_ENGAGEMENT	Frequency of board members' participation in meetings
WOMEN_BOARD	Percentage of female directors on the board
ESG_SCORE	Score achieved in ESG initiatives disclosure

Source: Authors' compilation.

Chart 3 - Applied Scores for Independent ESG Variables When LOWER Value = Better

Percentiles	Scores
LOWER value found	10
<= 0,05 (among the bottom 5%)	9
<= 0,30 (between 5,1% - 30% lowest)	8
<= 0,40 (between 30,1% - 40% lowest)	7
<= 0,50 (between 40,1% - 50% lowest)	6
<= 0,60 (between 50,1% - 60% lowest)	5
<= 0,70 (between 60,1% - 70% lowest)	4
<= 0,80 (between 70,1% - 80% lowest)	3
<= 0,95 (between 80,1% - 95% lowest)	2
> 0,95 (between 4.9% - highest)	1
No valid observations (empty cells)	0

Source: Authors' compilation.

The ESG independent variables that were assigned scores based on the criteria elucidated in Chart 3 are presented in Chart 4:

Chart 4 - Independent ESG Variables: When LOWER Value = Better

Independent Variable (ESG)	**Representation**
ENVIRONMENTAL	
GHG	Total greenhouse gases emitted per sale
WASTE_GEN	Total waste generated
WATER_USAGE	Total water consumed per sale
SOCIAL	
TSWA	Percentage of total time spent on work accidents
TURNOVER	Total number of employees leaving
UNION_EMPLOYEES	Percentage of unionized employees

Source: Authors' compilation.

Based on this, the E, S, and G indicators (given by the average scores of the respective dimensions' independent variables) were derived, and subsequently, the Overall ESG Average (average of the E, S, and G indicator scores) for analysis. Some variables were not identified in the literature scan; however, they were selected for this study because they address sensitive topics that could potentially have financial or economic impacts on organizations.

Next, in Charts 5, 6, and 7, the independent variables selected to constitute the analyzed Environmental (E), Social (S), and Governance (G) indices are presented, along with their calculation methods and studies in which they have been utilized. These variables serve the purpose of explaining the financial-economic impact:

Chart 5 - Bloomberg Independent Variables Selected for Environmental (E) Index

ESG Initiatives	Calculation Method	Utilized by Authors
GHG	Emitted GHG (MT) ÷ total sales (millions)	Lopes Santos *et al.* (2019); Aich *et al.* (2021); Madison & Schiehll (2021)
RENEW_ENERGY	Renewable energy usage ÷ Total energy	Sharma *et al.* (2020)
WASTE_GEN	Total waste generated (000s metric tons)	Sharma *et al.* (2020)
RECYCLING	Total recycled waste ÷ total waste generated	Lokuwaduge & de Silva (2020)
WATER_USAGE	Total water usage (m3) ÷ total sales (thousand)	Park & Jang (2021)

Source: Authors' compilation, based on data obtained via Bloomberg.

Chart 6 - Bloomberg Independent Variables Selected for Social (S) Index

ESG Initiatives	Calculation Method	Utilized by Authors
TSWA	Time spent on work accidents ÷ total time spent on business activities	Lokuwaduge & de Silva (2020)
TURNOVER	Total employees left	Lokuwaduge & de Silva (2020)
EMPLOYEE_COST	Total employee costs ÷ total company employees	J. Zheng *et al.* (2022)
UNION_EMPLOYEES	Total unionized employees ÷ total company employees	Research proposition
WOMEN_TOTAL	Total female employees ÷ total company employees	Sharma *et al.* (2020)
WOMEN_MANAGEMENT	Total female managers ÷ total company managers	Sharma *et al.* (2020)
WOMEN_EXECUTIVES	Total female executives ÷ total executives	Sharma *et al.* (2020)
SOCIAL_ACTIONS	Total community spending (millions of euros)	Park & Jang (2021)

Source: Authors' compilation, based on data obtained via Bloomberg.

Chart 7 - Bloomberg Independent Variables Selected for Governance (G) Index

ESG Initiatives	**Calculation Method**	**Utilized by Authors**
IND_BOARD	Total independent directors ÷ total directors	(Iatridis, 2013); Ismail *et al.* (2019); Forte *et al.* (2021); Tleubayev *et al.* (2021); Gangi *et al.* (2020); Villiers & Dimes (2021)
NON_EXEC_BOARD	Total non-executive directors ÷ total directors	(Iatridis, 2013); Ismail *et al.* (2019); Forte *et al.* (2021); Tleubayev *et al.* (2021); Gangi *et al.* (2020); Villiers & Dimes (2021)
BOARD_ENGAGEMENT	Average (frequency of board member participation)	Sharma *et al.* (2020); Zhao *et al.* (2018)
WOMEN_BOARD	Total female board members ÷ total board members	Forte *et al.* (2021); Tleubayev *et al.* (2021); Shakil (2021)
ESG_SCORE	Score obtained in the ESG initiative disclosure	Iatridis (2013)

Source: Authors' compilation, based on data obtained via Bloomberg.

The Overall ESG Average indicator was derived from calculating the average of the E, S, and G indicators for each company and year within the study period (2017-2021).

Next, in Charts 8 and 9, the control variables and the dependent variables (financial and economic) used in this study are presented:

Chart 8 - Control Variables

Control Variables	Calculation Method	Utilized by Authors
SIZE	Log of total company assets (ln assets)	Shakil (2021)
CONTROL	Dummy variable = 1 if the company is headquartered in a developed country, and zero if in an emerging country	Manrique & Martí-Ballester (2017); Lopes Santos *et al*. (2019); Martins (2022); Al Amosh & Khatib (2023)
COVID-19	Dummy variable = 1 if pandemic year (2020 and 2021), and zero for others years (2017, 2018 and 2019)	Broadstock *et al*. (2021); Al Amosh & Khatib (2023)

Source: Authors' compilation, based on data obtained via Bloomberg

Chart 9 - Dependent Variables (Financial and Economic Scope)

Dependent Variables	Calculation Method	Utilized by Authors
ROE	(Net Income ÷ Shareholders' Equity) x 100	Alshehhi *et al*. (2018); Nirino *et al*. (2019); J. Zheng *et al*. (2022)
ROI	(Net Revenue - Invested Capital) ÷ Invested Capital x 100	Yoon *et al*. (2018)
ADJUSTED EBITDA MARGIN	EBITDA ÷ Company Revenue during the period	Alshehhi *et al*. (2018)
P/E	Current Stock Price ÷ Earnings Per Share	Alshehhi *et al*. (2018)
P/BV	Current Stock Price ÷ Book Value Per Share	Shakil (2021)
DY	(Total Dividends Paid in the Last 12 Months ÷ Current Stock Price) x 100	Shakil (2021)

Source: Authors' compilation, based on data obtained via Bloomberg.

The variables ROE, ROI, and adjusted EBITDA margin were meticulously chosen for their ability to reflect distinct aspects of financial performance: return to shareholders, return on invested capital, and level of cash generation, respectively. These variables, widely acknowledged in the literature (Alshehhi *et al*., 2018; Dayanandan *et al*., 2024; Lopes Santos *et al*., 2019) are instrumental in gauging a company's ability to manage its business, with or without ESG initiatives. It is important to note that these indicators are influenced by local accounting practices and reporting decisions, which is a limitation of multinational studies.

3. Results

In this chapter, we present and discuss the research findings based on the analyses conducted, highlighting the relevant descriptive statistics of the sample. Descriptive statistics encompass key metrics such as mean, median, standard deviation, minimum, and maximum for the selected variables.

Due to the lack of standardization information in the original dataset, we adopted the standardization methods outlined in Charts 1, 2, 3, and 4. Subsequently, to facilitate the incorporation of variables into the empirical model, the descriptive results are provided in Table 2.

Table 2

Variable	Mean	Median	SD	Min	Max	Kurtosis	P 5%	P 95%	
Environmental	1.52	0.00	1.92	0.00	7.00	0.84	0.0	5.17	
Social	1.74	1.67	1.39	0.00	6.00	0.68	0.0	4.53	
Governance	3.12	3.40	2.48	0.00	9.40	0.06	0.0	7.00	
Overall ESG Average	2.13	1.97	1.69	0.00	6.79	0.30	0.0	4.99	
Size	8.42	8.33	1.56	3.22	12.41	–0.28	5.75	10.93	
Control	0.73	1.00	0.44	0.00	1.00	–1.07	0.0	1.00	
COVID-19	0.40	0.00	0.49		0.00	1.00	–1.83	0.0	1.00
ROE	0.14	0.11	0.25	–1.74	2.40	16.10	8.57	90.19	
ROI	0.08	0.07	0.17	–3.63	0.67	4.04	0.69	15.11	
Adj EBITDA Margin	13.96	14.34	9.27	–63.42	41.56	2.39	0.01	0.05	
P/E	49.77	23.08	260.18	1.28	5,064	1.88	–0.08	0.44	
P/BV	4.37	2.55	5.69	0.25	57.96	–14.57	–0.04	0.24	
DY	0.02	0.02	0.02	0.00	0.15	–2.03	2.89	25.52	

Source: Developed by the authors using Gretl software, based on data obtained via Bloomberg.

Note 1: Descriptive statistics, using observations 1:1 - 159:5 (missing values ignored). 2. SD - Standard Deviation. 3. P5% - Percentile 5%. 4. P95% - Percentile 95% 6. The variables individually do not have a normal distribution.

Upon observing the descriptive statistics of the variables utilized in the model presented in Table 2, it is evident that the scores, ranging from 1 to 10, yielded low results. The averages for the environmental and social variables were notably low, 1.52 and 1.74, respectively. A huge portion of this observation can be attributed to the lack of available information. The governance indicator exhibited an average of 3.12, signifying a higher score than the averages of the environmental and social indicators. This underscores the role of the governance indicator in bolstering the Overall ESG Average. The correlation matrix between the variables can be seen in the appendix.

These outcomes suggest that companies prioritize disclosing and presenting information expected by the financial market, possibly more than genuinely emphasizing social and environmental variables. This may also reflect the practicality of companies adopting sound governance practices rather than embarking on structural changes, such as integrating facilities for improved use of renewable energy.

The financial performance variables – ROE, ROI, and Adjusted EBITDA Margin – exhibited dispersed minimum and maximum values compared to their means. This outcome could be linked to the diverse array of companies within the sample, whose heterogeneity is further evident in the results presented by the control variables. Notably, these control variables offer insights into the company's characteristics in terms of size and country of origin (developed or emerging), which may influence its financial outcomes.

The examined companies demonstrate positive expectations for future economic performance growth. This is indicated by the positive average P/E ratio of 49.77, the average market price exceeding four times the book value, and the fact that these companies in the food and beverage sector, on average, offer a DY of 2.24% to their shareholders.

In the subsequent Table 3, the number of sample companies analyzed located in developed and emerging countries globally, as well as by continent, is presented:

Table 3 - Number of Sample Companies Analyzed Located in Developed and Emerging Countries

Variable	Developed	Emerging
Global	117	42
America	55	17
Europe	49	3
Asia	13	22

Source: Developed by the authors using Gretl software, based on data obtained via Bloomberg.

Based on Table 3, approximately 70% of the companies comprising the sample for this study are in developed countries, while around 30% are in emerging countries. Notably, among companies in developed countries, 94% are from Europe, 76% are from the Americas, and only 37% are from Asia. Companies of Asian origin primarily dominate the emerging country category.

Tables 4 and 5 present the empirical results from regression analyses conducted using the Gretl software. These analyses employed financial indicators (ROE, ROI, and Adjusted EBITDA Margin) and economic indicators (P/E, P/BV, and DY). The model employed aimed to understand the relationship between ESG initiatives and companies' financial and economic performance. The study period spanned from 2017 to 2021, encompassing market dynamics and shifts in organizations' market value in response to the disclosure of these practices.

Table 4 - Empirical Results Exploring Financial Performance of ESG Variables

Dependent Variable	**ROE**	**ROI**	**Adjusted EBITDA Margin**
	Coefficient	**Coefficient**	**Coefficient**
Constant	–0.011	0.051 ***	–2.957 ***
Environmental	–0.006 ***	–0.004 ***	1.061 ***
Social	0.012 ***	0.003 ***	–0.970 ***
Governance	0.002 **	0.004 ***	0.308 **
SIZE	0.013 ***	0.003 ***	1.663 ***
CONTROL	0.006	–0.019 ***	2.443 ***
COVID-19	–0.007 *	–0.007 ***	0.473
Statistics based on weighted data:			
R-squared	0.16	0.16	0.60
Adjusted R-squared	0.16	0.15	0.59
F	21,85	20.63	8720
P-value (F)	1.68e-23	3.02e-22	7.56e-66
Schwarz Criterion	1,872.69	1,945,15	1,022.08
Akaike Criterion	1,841.16	1,914.29	991.12
Cross-sectional companies	148	149	76
Observations	668	678	348

Source: Developed by the authors using Gretl software, based on data obtained via Bloomberg.

Note 1: Weighted Least Squares method, using weights based on unit error variances.
Note 2: *** > 99% significance; ** > 95% significance; * > 90% significance.

Table 5 - Empirical Results Exploring Economic Performance of ESG Variables

Dependent Variable	P/E	P/BV	DY
	Coefficient	Coefficient	Coefficient
Constant	3.875***	4.914***	0.001***
Environmental	–0.035***	–0.176***	–4.479
Social	0.016	0.355***	–0.001**
Governance	0.0183**	0.135*	0.000***
SIZE	–0.087***	–0.339***	0.000***
CONTROL	0.044.	0.903***	–0.000
COVID-19	0.039	0.2576***	0.001**
Statistics based on weighted data:			
R-squared	0.19	0.33	0.06
Adjusted R-squared	0.18	0.33	0.05
F	20.84	46.90	5.89
P-value (F)	5.56e-22	2.07e-46	5.66e-06
Schwarz Criterion	1,561.06	1,477.22	1,521.42
Akaike Criterion	1,531.06	1,446.98	1,491.27
Cross-sectional companies	123	125	122
Observations	537	556	549

Source: Developed by the authors using Gretl software, based on data obtained via Bloomberg.

Note 1: Weighted Least Squares method, using weights based on unit error variances.
Note 2: *** > 99% significance; ** > 95% significance; * > 90% significance.

As indicated in Tables 4 and 5, the goodness of fit of the regression models was assessed using the R-squared statistic, which yielded adequate fits for all models. The F-statistic, employed to test the model's overall significance, led to the rejection of the null hypothesis of misspecification ($p < 0.05$). All independent variables used in the model were statistically significant in explaining the dependent variable.

The regression model with panel data, incorporating weighted heteroscedasticity, addresses a problem identified when exploring panel models using fixed or random effects: heteroscedasticity. This limitation is common in studies with financial-economic data from companies, due to the amplitude, as verified in the results of Table 2. However, the exclusion or 'normalization' of 'abnormal' data must be done with caution, since results considered statistically 'abnormal' from companies can express very different strategies and operations of the sector, as expressed by the resource-

based theory (Chuang & Lin, 2017). Thus, only companies whose market conditions (negative equity and lack of economic performance information) were excluded from the sample. Furthermore, using different financial and economic indicators enables the evaluation of the persistence of the coefficients' results across the various models.

As shown in Table 4, the environmental indicator had a negative impact on profitability variables (ROE and ROI) and a positive effect on the Adjusted EBITDA Margin, with a 99% significance level. These findings align with Manrique & Martí-Ballester (2017), suggesting that companies often undertake measures to minimize environmental impacts, investing significantly in clean technologies and sustainable processes. Such investments lead to higher operational costs but yield gains for the company. Similarly, Nirino *et al.* (2019). Observed that environmental outcomes have insignificant or non-positive effects on financial performance, depending on various financial performance measures.

However, these results differ from the findings of Henisz *et al.* (2019), indicating cost reductions resulting from environmental practices, such as decreased energy and water consumption. Partalidou *et al.* (2020) Demonstrated that higher environmental performance has a positive impact on financial performance. In addition, Shakil (2021) ESG initiatives enable companies to reduce operational costs and enhance profitability.

The negative impact of environmental initiatives on financial performance for the investigated sector suggests that the market may not yet fully price or value these practices. Given the negative impact on profitability, investors may place less value on these initiatives. Conversely, positive impacts were observed for social and governance initiatives, indicating that investors appreciate and assign value to these practices, resulting in positive effects on companies' market valuations.

Regarding the social indicator, an opposite effect is observed compared to the impact caused by the environmental indicator, leading to a positive influence on ROE and ROI, while negatively affecting the Adjusted EBITDA Margin. These outcomes align with the findings of Yoon *et al.* (2018) asserting that effects related to the social dimension can enhance long-term profitability for companies. This alignment is also evident in the studies by Nirino *et al.* (2019) and F. Zheng *et al.* (2023), who provided evidence of the positive impact of social initiatives on the financial performance of firms.

The governance indicator had a positive impact on all financial variables (ROE, ROI, and Adjusted EBITDA Margin). These results align with the existing literature. According to Lopes Santos *et al.* (2019) robust corporate governance practices enhance stakeholder confidence, reduce risk, improve decision-making effectiveness, reduce costs, and enhance company

profitability. These findings reinforce the governance indicator's highest average among the scores in Table 2.

The results are consistent with Sulimany *et al.* (2021) this suggests that well-governed companies tend to have higher valuations, profits, and dividend distributions to shareholders, along with lower bankruptcy risks. Gangi *et al.* (2020) also, confirm that good governance practices, such as effective board involvement, drive corporate social and environmental responsibility. This becomes a positive predictor of higher profitability and lower corporate debt costs.

Company size was not significant for ROE and exhibited a positive impact on Adjusted EBITDA Margin. This could be attributed to economies of scale inherent in larger companies, allowing them to produce goods or services at a lower cost per unit than smaller firms, which reflects positively on profitability (Buitendag *et al.*, 2017). However, the results indicated a negative impact on ROI, suggesting that companies located in developed countries may take longer to realize returns on their investments.

The results support those of Iatridis (2013), indicating a positive relationship between certain company attributes, such as portly size, and the quality of environmental disclosure. Similarly, Buitendag *et al.* (2017) the quality of integrated reporting is influenced by industry type and other factors, including company size.

The control variable exhibited a positive impact on Adjusted EBITDA Margin, suggesting that companies located in developed countries tend to outperform operationally. However, this variable was insignificant for ROE and hurt ROI. The negative and significant impact on the ROI of companies established in developed countries signals the difficulty companies based in these regions face in transforming investments into positive financial results, especially if the temporal effect and risks involved are not moderated, as indicated in the study of Gega *et al.* (2025) for the food sector in Europe.

From the outcomes presented in Table 5, a negative impact of environmental initiatives on firms' economic performance is observed, suggesting that the market has yet to fully incorporate or assign value to these environmentally conscious practices. Given the adverse effect on profitability, these initiatives receive limited recognition from investors. Conversely, positive effects are discernible for both social and governance initiatives, indicating investor appreciation and valuation of these practices, which results in a favorable impact on market pricing of companies.

These findings are based on the conclusions drawn by Forte *et al.* (2021), who demonstrated that the proportion of independent directors on the Board positively influences the disclosure of environmental and social information. However, there is a divergence concerning the representation of women on the Board, which was not significant in the researchers' study.

Nevertheless, these findings do not entirely align with those of Aich *et al.* (2021), who suggest that good governance, human rights, employee relations, and corporate policy contribute to achieving investment impact through environmental means. Additionally, partial disparity exists in comparison to the results by Park & Jang (2021), who identified evidence indicating that institutional investors place greater importance on environmental and governance than on social factors.

Regarding firm size, the results indicate a positive impact on Dividend Yield (DY); in contrast, a negative influence is noted on P/E and P/BV ratios. As highlighted by Buitendag *et al.* (2017) larger companies can capitalize on economies of scale, producing goods or services at a lower unit cost than smaller enterprises. This leads to increased profitability and, consequently, higher dividend distributions to shareholders.

The impact of the effects of the COVID-19 pandemic on the profitability of companies is confirmed in the negative and significant coefficients for ROE and ROI. These results can be explained by the increase in investments in the working capital of companies, increased costs and reduced revenues (Liu *et al.*, 2024).

On the other hand, there is a positive effect on the economic variables P/BV and Dividend yield, which contrasts with previous results on the economic impact (Boumlik *et al.*, 2023). The effect on P/BV may be due to the reduction in financial results, which decreases the value of the company's equity and, consequently, increases the ratio. The positive effect on dividend distribution contrasts with previous studies that found a higher level of profit yield during the pandemic period, but contributes to the discussion of differing results in various contexts (Pettenuzzo *et al.*, 2023). It is possible that for the sector, the distribution of dividends is the result of a strategy by companies to signal to shareholders, with a view to balancing capital losses with financial returns (Gosain *et al.*, 2025).

Concerning the geographic location of firms, the results were not statistically significant for P/E and DY; however, they were important for the economic variable P/BV, with a positive impact. These outcomes partially substantiate the observations made by Martins (2022) affirming that companies in developed countries enjoy superior political-economic conditions for operating in the market, coupled with greater access to advanced technologies.

The findings presented in the panel data regression analyses confirm the impact of ESG indicators on companies' economic and financial performance. Furthermore, the varying impacts of these practices are evident between firms located in developed and emerging countries. Additionally, all proposed independent variables displayed significance in explaining the dependent variables.

As discussed in the preceding section, the social and governance indicators have a significant positive impact on the economic and financial performance of global food and beverage companies. Conversely, the environmental indicator signifies a significant negative impact on these firms' economic and financial performance, thereby partially validating H1.

Regarding H2, distinct effects emanate from ESG practices for certain dependent variables (financial and economic). However, ESG indicators did not exhibit significance for some variables when contextualized within the dichotomy of developed and emerging countries, thus partially confirming H2.

The partial confirmation of H2 may be subject to the sector, given that different emerging countries in the sample: Brazil, China, India, and Mexico, for example, are major food exporters worldwide. Therefore, their companies must present governance levels similar to those in developed countries. This fact was not identified in the study Lopes Santos *et al.* (2019) for example, due to the distinct characteristics of the sectors investigated, this requirement for adequacy, especially for governance in the presentation of results, was identified by Dayanandan *et al.* (2024) in India. Unfortunately, it was impossible to discriminate in the database for detailed information on the companies' internationalization level to include this condition as a discriminant eventually.

4. Conclusions

This research examined the impact of environmental, social, and governance (ESG) initiatives on the financial and economic performance of global companies in the food and beverage sector, using data from 159 companies between 2017 and 2021. The results confirm that the effects of the ESG pillars are distinct. While the social and governance dimensions have a positive and significant impact on indicators such as ROE, ROI, and P/BV, the environmental pillar has demonstrated a negative or insignificant impact, especially on profitability indicators.

These results indicate that, in practice, companies still face difficulties in converting environmental investments into measurable financial returns in the short term. This may be due to both high initial costs and the lack of immediate recognition by the market. On the other hand, practices focused on governance (e.g., board independence, effective member participation) and social responsibility (e.g., diversity, workplace safety) are valued by investors and are associated with creating corporate value.

The analyses also demonstrated that company size positively influences operating margin (adjusted EBITDA), indicating the presence of economies of scale. Larger companies are more efficient in transforming resources

into results, while smaller companies or those in emerging countries face additional challenges related to structure, capital, and transparency. From an applied perspective, the results offer important insights: (i) for managers, when prioritizing social and governance strategies as value levers; (ii) for investors, who should consider the disaggregation of ESG pillars in the analysis of risk and return; (iii) for public policy makers, who can act to promote the standardization of reports and incentives for environmental practices with long-term effects. Theoretically, this study contributes to deepening the understanding of the heterogeneity of ESG effects, partially corroborating the findings of Friede *et al.* (2015), Nirino *et al.* (2019), Lopes Santos *et al.* (2019) and Zhang & Xiong (2024), which suggests a positive relationship between ESG and performance, but with non-linear or homogeneous effects. The disaggregation of ESG pillars and the comparative analysis between companies from developed and emerging countries address gaps identified by Zhong *et al.* (2022) and Aich *et al.* (2021), while also reinforcing the central role of corporate governance in sustaining financial performance.

Limitations include the five-year time window, marked by the exceptional effects of the COVID-19 pandemic, during which we controlled for two years but not the entire period, and the use of self-reported data, which may be subject to disclosure bias. The number of companies between developed and emerging countries is imbalanced, which can influence the results. Future research suggests expanding the sectoral and temporal scope, as well as incorporating institutional and qualitative variables, to refine the understanding of the mechanisms by which ESG practices impact corporate performance. New studies can also advance the assessment of differences between economic subsectors or segments in the food and beverage industry value chain, as well as seek to expand the sample by integrating new databases and exploring data from companies in emerging countries that are not listed on the stock exchange.

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Appendix – Correlations Matrix of Variables

	Environ-mental	**Social**	**Gover-nance**	**Size**	**Control**	**PE**	**P/ Book**	**DY**	**ROE**	**ROI**	**EBITDA Margin**
Environ-mental	1,00	0,60	0,68	0,27	0,24	–0,08	0,20	0,04	0,26	0,13	0,33
Social		1,00	0,64	0,12	0,35	–0,10	0,24	–0,16	0,30	0,20	0,14
Governance			1,00	0,28	0,56	–0,15	0,25	0,13	0,25	0,10	0,36
Size				1,00	–0,03	0,05	0,15	–0,06	0,28	0,09	0,49
Control					1,00	–0,16	0,19	0,10	0,14	0,11	0,19
PE						1,00	–0,04	–0,16	–0,11	–0,03	–0,15
P/Book							1,00	–0,11	0,76	0,41	0,38
DY								1,00	–0,01	–0,26	0,11
ROE									1,00	0,63	0,47
ROI										1,00	0,34
EBITDA Margin											1,00

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