EVALUATING THE INTERPLAY BETWEEN ESG PRACTICES AND CORPORATE FINANCIAL PERFORMANCE IN AMERICA: THE INDUSTRIAL SECTOR

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Abstract
A comprehensive strategy that incorporates social responsibility, environmental stewardship, and economic viability is needed to achieve sustainability in the industrial sector, a sector that is responsible for almost a quarter of all carbon emissions worldwide. Nowadays, business strategy, risk management, and long-term value creation are deemed to be critically dependent on sustainability factors. The present paper targets to examine the relationship between ESG (Environmental, Social, and Governance) and CFP (Corporate Financial Performance) for 100 American-listed companies that operate in the Industrial sector from 2018 to 2022. The data used in this study is collected from Thomson Reuters and analyzed using STATA Software. The research reveals a strong association between CFP and ESG as a combined score. When an in-depth analysis is performed regarding the sustainability pillars with separate consideration, a positive relationship was shown between the social and environmental pillar and the financial performance, whereas a weaker link could be determined regarding the governance pillar. As such, American companies need to carefully review ESG investments to avoid bad financial outcomes and gain long-term performance.

Keywords: ESG performance, financial performance, total revenue, industrial sector

JEL Classification: G30, M14, Q50

Introduction

The increasing focus on environmental, social, and governance (ESG) policies has led to a significant shift in the financial and investment sector in recent years. The complex link between financial performance and ESG performance has been re-examined in light of this change. However, amid the expanding findings, a paradox is emerging as conflicting data emerge on the nature of this relationship. While financial performance

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is an unequivocal indicator of a company's efficiency and profitability, ESG performance is a more nuanced assessment of a company's position.

Undoubtedly, there has been a paradigm shift on the global stage, with investors, clients, and governments placing greater emphasis on sustainability indicators. This is also supported by the finding that entities supporting sustainability programs frequently attract both investors and clients. In addition, sustainability measures pay off in the long run by improving links with stakeholders and creating more effective communication channels. Also, the long-term viability of any firm is largely determined by ESG disclosure and transparency, for which CEOs are rewarded more (Rath and Deo, 2023). Research has also indicated that implementing ESG practices can effectively reduce risk and produce long-term returns for investors by improving a company's financial performance, which can differ within and across nations. Environmental balance and shared socio-cultural balance should be maintained by business entities. Various governments and regulatory bodies around the world have put in place legal frameworks and guidelines to ensure sustainable environmental conservation.

This research paper adds to the literature by including sustainability-sensitive industries, with a focus on manufacturing companies. This analysis aims to clarify the financial implications of ESG actions in this sector, as there is a plethora of studies that have found varying results, from negative to positive or insignificant. The fundamental aim of the research is to analyze the impact of ESG initiatives and the performance of firms in the industrial sector on financial performance. To meet the proposed objectives, the Thomson Reuters platform is used to collect ESG performance scores of American-listed industrial sector companies as well as financial data represented by total revenue.

The structure of the paper is as follows: the first part reviews the literature, highlighting the most important studies with conclusive results. The second section explains the methodology, data used, and specific results. Limitations and ramifications of this paper, and directions for future studies are addressed in the conclusion section.

1. Review of the scientific literature

In sectors such as the industrial sector, whose operations have a significant impact on the environment, the growing concern about ESG issues becomes particularly critical. Undoubtedly, ESG policies implemented by companies increase operating costs and, at the same time, improving the ESG performance of companies in sensitive sectors is linked to lower expected returns in the medium term (Rojo-Suárez, Alonso-Conde and Gonzalez-Ruiz, 2023). Although these issues may negatively influence the perception of sustainable policy adoption, Bruna et al. (2022) analyze the relationship between financial performance and ESG performance of 350 European companies over the period 2014-2019 and highlight the positive and significant impact. It is also important to note the complexity of this relationship: up to a certain level of ESG performance, it is negatively correlated with financial performance, beyond this point, continued efforts are rewarded with a partial payback in financial performance. In most cases, according to the literature, the relationship between the two performances under analysis results in a positive impact, however, conflicting results depend on the sector under analysis and/or the component score of sustainable performance that is taken into account.

Naeem and Çankaya (2022) support the idea that ESG performance has a positive and significant impact on the profitability of 192 companies in the energy sector over a period from 2008 to 2019 using panel regression. In measuring financial performance, the authors considered return on assets and return on equity. A recent paper (Yiheng et al., 2024) highlights the idea that companies increase their efforts to improve environmental, social, and governance performance as it has a beneficial impact on public image and perception, which in turn leads to better financial results. Furthermore, a study focusing on 316 companies over 11 years noted the positive and statistically significant impact of ESG score on return on assets, although this may decrease when companies allocate more resources to towards sustainable practices (Veeravel, Sadharma and Kamaiah, 2023). In addition, Ademi and Klungseth (2022) note that the positive correlation found between ESG and financial performance during economic downturns is explained by the less elastic demand of those with superior ESG performance than their industry counterparts during difficult times. Researchers are increasingly showing interest that as firms are required to disclose more information, the disclosure score will become less dependent on the ESG score. For example, Da Fermo et al., (2024) demonstrate that firms that adhere to ESG rules to a greater extent have fewer volatile assets than others and do not face low return penalties, but the actual value of the partial correlation between disclosure and ESG score evolved from 2017 to 2021, declining almost continuously.

Alternatively, a study applied to the East Asian industrial sector estimates that although no relationship is observed between ESG and financial performance as measured by ROA and ROE, this relationship depends on the ESG pillar, with the relationship between environmental and financial performance being the only one showing a convex relationship (El Khoury, Naimi and Iskandar, 2021). However, an analysis of the logistics sector is conducted by Nenavani et al., (2024) and suggests, through their results, a strong link between social score and ROE and between ESG and CFP. The association between total returns and governance is surprisingly unfavorable. Another advantage of companies operating in highly polluting sectors is that they can benefit from good environmental, social, and governance performance by reducing the costs associated with debt financing, Hou and Zhang (2023) find.

It should be noted that when the influence determination does not focus on a sensitive sector but on a variety of companies, the results are slightly different. Doni and Fiameni (2023) suggest, by analysing 148 European companies, that there are positive relationships between social and CFP aspects, while the relationship between environmental aspects is found to be weak. Gutiérrez-Ponce and Wibowo (2023) caution against analysing each score separately concerning CFP to provide a thorough and true picture. The authors' study finds that, in the banking sector, ESG performance has a negative and significant effect on ROA and ROE, but the scores considered separately result in a positive influence when the environmental score is taken into account, with no effect on the social score and even negative influences of the corporate governance score on CFP. Although Europe has imposed clear regulations on sustainable aspects, corporate governance performance is found to have a negative influence in this case.

Interestingly, when the study of the relationship between combined and individual ESG scores on financial performance is conducted on a sample of 59 Malaysian companies, ESG cause a positive influence, but the findings indicate that only social score significantly affects firm performance; environmental and governance scores have negligible effects (Lee, Lau and Yip, 2023). Martynova and Lukina (2023) also highlighted the importance that the geographical region considered determines. Thus, due to discrepancies in the historical and cultural background of ESG issues, the study showed that ESG ratings had different effects on financial performance in Southwest Asia and Southeast Asia. Another example is the level of development of the markets in which the analyzed companies operate. Strekalina et al., (2023) examine the relationship between ESG and financial performance on a sample of 257 emerging market companies and observe a negative impact of ESG score on ROA. The authors attribute the results to factors specific to emerging markets. Various factors may influence the conclusions of the analysis, and among them, the heterogeneous economic structures of equity and assets, as well as the ratio of equity to assets at the firm level need to be highlighted, factors exposed in the research of the authors Siminică et al. (2020), whose contradictory results support the existence of notable differences regarding the relationships between dimensions of sustainable performance and financial performance when measured by ROA or ROE.

Regarding the two-way analysis of the relationship between the two performances, Qureshi et al. (2021) find that financial performance measured by ROA and ROE on a sample of American firms shows no correlation for ROA and a positive combination of ESG-CFP and CFP-ESG relationships for ROE, but Siminică et al. (2019) observe a positive correlation between ESG performance with both ROA and ROE in an analysis focused on the European Economic Area. Due to different legislative constraints, stakeholder pressure, and awareness of ESG risks, ESG practices vary widely across the globe in general. These differences between EU and non-EU countries are particularly notable when considering the analysis of any ESG effect (Cantero-Saiz, Polizzi, and Scannella, 2024). Jung and Yoo (2023) emphasize the conditioning of results on the influence of sustainability by arguing that the impact of ESG performance on companies' financial performance is less pronounced in markets with a larger number of competitors while arguing for a linear and positive relationship between the two.

The literature focused on the subject under analysis provides the necessary foundation for creating the hypothesis of this research paper regarding companies in the industrial sector, namely:

Hypothesis H_1: There is a direct link between ESG performance and financial performance for companies operating in the industrial sector.

Since the author set out to analyse in detail the sustainability issues that influence financial performance, the main hypothesis leads to several supporting assumptions, such as:

- Hypothesis $H_{1.1}$: The environmental score has a positive and significant effect on the financial performance of companies operating in the industrial sector.
- Hypothesis $H_{1.2}$: Social score has a positive and significant effect on the financial performance of companies operating in the industrial sector.

- Hypothesis $H_{1.3}$: Corporate governance score has a positive and significant effect on the financial performance of companies operating in the industrial sector.

2. Research methodology

To substantiate the existence of the relationship between ESG performance and financial performance, data from a sample of 100 industrial sector companies listed on Thomson Reuters America over the period 2018-2022 are used. The Reuters database was searched to extract the 2,500 observations relevant to the analysis. As the researched relationship has led to different results in the literature concerning the pillars composing ESG performance, for relevant results, the analysis is extended by considering the relationship between financial performance and each component score of ESG performance: environmental score, social score and corporate governance score. ESG scores were used primarily because there is a high degree of originality and reliability, as the data used to calculate them comes directly from companies and is calculated based on component scores, ensuring transparency and taking into account the specificity of each industry. Scores range from 0%, which represents poor ESG performance or the company has provided very little information about its ESG performance in its public disclosures, to 100%, representing outstanding sustainable performance. Financial performance is represented by the total revenue of the companies in the sample, representing the total amount of money a company earns from the sale of goods or services. It provides information on a company's ability to make money from its main line of business, and the corresponding unit of measure is the US dollar. The description of the variables used in the analysis is shown in Table No. 1:

Table no. 1 Variable description

Variable name	Symbol variable	Type of variable	Significance
Total revenue	Trev	Dependent	Total revenue from business activity
ESG score	ESG	Independent	measures a company's ESG performance based on verifiable data reported in the public domain.
Environmental score	EnvP	Independent	measures the company's environmental performance based on verifiable data reported in the public domain.
Social score	SocP	Independent	measures a company's social performance based on verifiable data reported in the public domain.
Governance score	GovP	independent	measures corporate governance performance based on verifiable data reported in the public domain.

Source: own processing

The ESG scores and financial performance data of the industry sector companies in the selected sample are presented in Table No. 2 summarizing the descriptive statistics. In particular, the third and fourth columns display the means and standard deviations of the financial and sustainable returns of these companies. The Max and Min columns display the highest and lowest combined ESG score for each company in terms of ESG performance, which is also valid for total revenues calculated over the whole period. The standard deviation ranges from 15.377 to 21.277 and indicates a high degree of data dispersion, i.e. the combined and individual ESG scores vary considerably within the sample.

Table no. 2 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Trev	500	12091.981	17650.578	1032.238	101127
ESG	500	58.534	15.377	8.126	90.672
SocP	500	59.301	17.24	11.389	94.736
GovP	500	60.436	19.065	2.471	95.304
EnvP	500	55.448	21.277	0	94.616

Source: own processing

To determine the relationship between the two performances, we initiated a correlation analysis between the selected variables. Moreover, when integrating time series and cross-sectional data to analyze effects, the most appropriate models to use are panel data. The existence of heterogeneity is unlikely in cross-sectional units due to clustered data series, and time series data frequently exhibit autocorrelation problems. Therefore, panel data models extend the degrees of freedom while taking into account the problems with time series and cross-section data. Dynamic changes of cross-sectional units over time are studied using panel models. There are two types of panel data models: with random effects and with fixed effects.

3. Results and discussions

By calculating the Pearson correlation coefficient between the variables studied, the correlation analysis is substantiated. Based on the assumption that the data are normally distributed, the Pearson correlation coefficient is calculated in Stata software (Table No. 3) for ESG and financial performance.

Table no. 3 Correlation Coefficient of Financial and Sustainability Variables

Variables	(1)	(2)	(3)	(4)	(5)
(1) Trev	1.000				
(2) ESG	0.377***	1.000			
(3) SocP	0.319***	0.861***	1.000		
(4) GovP	0.202***	0.671***	0.360***	1.000	
(5) EnvP	0.375***	0.841***	0.654***	0.316***	1.000
*** $p<0.01$, ** $p<0.05$, * $p<0.1$					

Source: own processing

The Pearson correlation coefficient between ESG performance and total revenue -Trev shows positive but relatively low values (<0.5) at the p<0.01 level, reflecting the existence of a weakly positive and statistically significant relationship. These results are also valid considering the environmental -EnvP, social -SocP and corporate governance -GovP scores, determining the weakest relationship. Considering the values presented in the correlation matrix, the strongest links (above 0.6) are relevant between ESG and its three pillars (EnvP, SocP, and GovP), indicating that they will not be included together in a single regression and two separate models will be formed in order not to influence the results of the analysis.

The type of association between the dependent variable and the independent variables was initially estimated using linear regression analysis. Linear regression models for the chosen sample are designed using Stata statistical software. To address the multicollinearity problem, the variance inflation factor is calculated and for both models, the result that multicollinearity is not a problem is accepted (Table No. 4).

Table no. 4 Multicollinearity testing

Model I	VIF	1/VIF	Model II	VIF	1/VIF
ESG	1	1	SocP	1.832	.546
Mean VIF	1	.	EnvP	1.771	.565
			GovP	1.164	.859
			Mean VIF	1.589	.

Source: own processing

Table no. 5 Regression models test results

Test	Model I	Model II
Hausman specification test	chi-square test value 66.683 P-value 0	chi-square test value 36.592 P-value 0
Wooldridge test for autocorrelation in panel data	F(1, 99) = 125.521 Prob > F = 0.0000	F(1, 99) = 131.488 Prob > F = 0.0000
Modified Wald test for groupwise heteroskedasticity in fixed effect regression model	chi2 (100) = 19540.67 Prob>chi2 = 0.0000	chi2 (100) = 39615.37 Prob>chi2 = 0.0000

Source: own processing

The dependent variable represented by total income has much larger values than the values of the independent variables, and for the regression to conclude coefficients that are easier to interpret, the author resorted to transforming the values of the dependent variable by logarithm. To compare the two types of regressions, fixed and random effects, the Hausman test is applied and according to the results, both panel data models used to study the ESG-CFP and E, S, G - CFP relationship apply fixed effects regression. Heteroscedasticity was also detected by the Modified Wald test (all p-values = 0). To detect the presence of autocorrelation in the data, the Wooldridge test was used (p = 0), where both models constructed concluded the presence of autocorrelation (Table No. 5).

Table no. 6 Regression analysis results

	Model I	**Model II**
	lnTrev	lnTrev
ESG	0.0352*** (0.00430)	-
SocP	-	0.00690*** (0.00159)
GovP	-	0.00377* (0.00159)
EnvP	-	0.0219*** (0.00224)
_cons	6.714*** (0.270)	6.926*** (0.254)
N	500	500
R^2	0.283	0.324

* p < 0.05, ** p < 0.01, *** p < 0.001

Source: own processing using Stata

The estimated results of the two models are reported in Table No. 6. The results of the regression analysis, in the case of Model I, show that ESG has a positive effect on Trev (p-values of 0.000 < 1%; and coefficients of 0.0352). The R^2 coefficient of determination for financial performance was 0.283, indicating that a moderate amount of variation was explained by the predictive structure in the model. For every one-unit increase in ESG performance, total revenue increases by a factor of approximately 1.036 or 3.6%, confirming hypothesis H_1 that there is a direct link between ESG performance and financial performance for companies operating in the industrial sector. Model II explains the variation in financial performance by each component score of

ESG performance, and the R^2 coefficient of determination for total revenue is higher than in the original model (0.324), but the level is again moderate. The three scores also have a positive effect on financial performance (p-values of 0.000; 0.017; 0.000 < 5% and coefficients of 0.00690; 0.00377; 0.00377). The regression results for Model II explain that for every one-unit increase in the component scores, total revenue increases by a factor of approximately 1.007 or 0.7% (social score), 1.004 or 0.4% (corporate governance score) and 1.022 or 2.2% (environmental score). Considering hypotheses $H_{1.1}$, $H_{1.2}$, and $H_{1.3}$ which assume the existence of a positive and significant effect on the financial performance of companies operating in the industrial sector, they are partially confirmed, the effects are not significant and the weakest influence on financial performance in this case is the corporate governance score. The regression models calculated for each analysis are as follows:

Model I: $lnTrev_{it} = 6.714 + 1.036*ESG_{it} + \varepsilon_{it}$ (1)

where:

$lnTrev_{it}$ – natural logarithm of total revenues of a company i in year

ESG_{it} - ESG performance of company i in year t

ε_{it} – error term

Model II: $lnTrev_{it}=6.926+1.007*SocP_{it}+1.004*GovP_{it}+1.022*EnvP_{it}+\varepsilon_{it}$ (2)

where:

$lnTrev_{it}$ – natural logarithm of total revenues of company i in year t

$SocP_{it}$ - social performance of company i in year t

$GovP_{it}$ - corporate governance performance of company i in year t

$EnvP_{it}$ - environmental performance of company i in year t

ε_{it} – error term

Conclusions

In many respects, it is difficult to establish a clear direct relationship between ESG performance and financial performance. Most often, short-term swings prevent ESG initiatives from reaching their full potential, while this association is observed in the longer term. Different sectors face different opportunities and challenges in terms of ESG concerns, as well as variations in the effect of ESG performance on financial success between companies and sectors.

Understanding the complex relationship between financial performance and ESG practices can help companies adopt strategies that not only improve profitability but also align with challenging societal and environmental goals as corporate sustainability becomes increasingly important. This study has provided insight into how companies can use ESG thinking to achieve both financial success and societal impact by taking a close look at the complex dynamics.

Regression and correlation models yielded clear results on the influence of ESG performance on financial performance, only partially validating the proposed hypotheses. Considering the effect of the industrial sector on the environment, the results regarding the effect of environmental performance were the most expected, and the positive but insignificant relationship of corporate governance performance may be primarily due to early regulatory initiatives in America.

The limitations of the study focus on the variables considered, as it is possible that not all relevant factors were considered, and to get a complete picture, future studies may choose to include other factors that are related to financial performance and ESG performance indicators. Also, the sample size analysed can be expanded to solidify the results by selecting a broad geographical area. Longitudinal research could be used to investigate long-term effects.

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