

# An Empirical Analysis of the Impact of ESG on the Financial Performance of Chinese Manufacturing Firms in the Post-Pandemic Era

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**Abstract.** The mechanism by which ESG performance impacts corporate financial performance has earned significant attention. However, most studies are primarily based on pre-pandemic data, failing to precisely reflect how the operational environment of businesses was impacted by the COVID-19 pandemic. Particularly in China's manufacturing sector, which was severely affected by the pandemic. Therefore, the correlation between ESG metrics and financial outcomes for Chinese manufacturing firms might have shifted. This study employs post-pandemic data from China's manufacturing sector and utilizes a time fixed effects model for analysis. The findings reveal that the social dimension (S) has a negative impact on the financial performance of Chinese manufacturing enterprises, while the governance dimension (G) has a positive effect. Additionally, the environmental dimension (E) shows little to no correlation with financial performance. Furthermore, the overall ESG performance's influence on financial performance varies across different models. By adopting a timelier and industry-specific perspective, this study supplements current studies that examining how ESG factors influence the financial outcomes of Chinese manufacturing companies.

**Keywords:** ESG, Financial performance, Manufacturing, China, Post-Pandemic Era.

## 1. Introduction

With the shifts in societal values and the intensification of global challenges, the role of enterprises has gradually evolved from being merely economic entities to comprehensive subjects of social responsibility. ESG (Environmental, Social, and Governance) factors have gained increasing attention due to this change. As this concept becomes more deeply rooted, an increasing number of institutions and organizations are emphasizing its importance [1,2]. Therefore, the role of ESG in businesses and its underlying mechanisms have become hot topics attracting numerous researchers. Some studies have investigated and proposed potential impacts of ESG, highlighting that good ESG performance can promote stock liquidity, enable companies to overlook earnings management, or enhance investment efficiency [3, 4, 5].

However, for governments and entrepreneurs, the focus of these key drivers of the economy has shifted to understanding how ESG performance influences corporate financial performance. There are many research that have studied how ESG performance change financial performance; however, the conclusions vary significantly depending on the context, environment, and methodologies employed in the studies.

Chen highlights that better ESG evaluations can positively impact a company's financial performance, particularly in high-risk environments [6]. However, Elamer's findings reveal that in certain circumstances, there is a negative correlation between ESG ratings and financial performance. Apart from that, regional differences in business models and operational contexts can influence the outcomes to some extent [7]. Garcia observes that while ESG has a positive effect on firms in developed countries, this relationship is less evident—or even ab-sent—in developing economies [8]. Additionally, according to DasGupta's re-search, the connection between China's social environment ESG ratings and corporate performance remains uncertain [9].

Through observation, it has been found that existing ESG-related studies often adopt a global perspective or focus on multiple countries or specific groups of nations [10]. While further explorations of the relationship between ESG and corporate financial performance in a single country,

particularly China, remain relatively restricted. As the world's second-largest economy, China has distinctive characteristics in policy orientation, regulatory environment, and corporate governance structures. These features result in significant differences in its ESG development path compared to Western countries. Systematically investigating the specific impact on the financial performance of Chinese manufacturing companies is crucial. It contributes to enriching the regional diversity of ESG re-search. Additionally, it has practical significance for enhancing China's sustainable development capabilities and informing investor decision-making.

Although previous studies have conducted research in this field and reached different conclusions regarding various industries and ESG evaluation dimensions [11], their data primarily focuses on general industries rather than manufacturing. However, this industry is a significant growth driver of China's economy [12]. Additionally, most existing studies rely on data up to 2020. Between 2020 and 2021, the COVID-19 pandemic caused severe economic disruptions across the globe, with recovery beginning in 2022 as countries implemented more mature policy measures [13]. Therefore, using post-pandemic data might not accurately reflect the impact of ESG on companies during this period. Besides, government policies and shifts in societal awareness can influence how companies respond to ESG issues [14], making outdated data less reliable for short-term forecasts.

Based on the above analysis, this study selected data from Chinese A-share manufacturing companies listed from 2022 to 2023. The purpose of this selection was to investigate the accuracy and importance of how different dimensions of the ESG affect the financial performance of Chinese manufacturing enterprises during the post-pandemic era.

## **2. Research Design**

### **2.1. Sample Selection**

The study employs data from all Chinese A-share manufacturing companies listed between 2022 and 2023. This time frame was chosen to minimize the impact of outdated social environments and unforeseen events on short-term projections. To ensure data reliability, the CNRDS database was utilized. It is known for its accuracy and integrates international standards such as ISO 26000 and SASB with China's specific conditions, providing precise and broadly applicable ESG metrics.

Data processing involved the removal of companies designated as ST or \*ST to refine the dataset. The final sample comprises 3,397 publicly listed manufacturing companies across Chinese stock exchanges, forming an unbalanced panel dataset that includes 3,394 annual observations.

### **2.2. Variables**

ROA is an important financial metric that comprehensively reflects a company's overall operational efficiency and performance [15,16]. As such, it has been selected as the dependent variable in this study.

ESG and its various dimensions are likely to influence corporate financial performance [17]. These dimensions encompass environmental, social, and governance-related events. To ensure consistency across variables in terms of scale, this study will utilize ESG rankings expressed as percentile scores for manufacturing companies based on the CNRDS database.

To more accurately assess corporate financial performance, additional control variables have been incorporated into the analysis. These include leverage ratio, fixed asset ratio, intangible asset ratio, current ratio, and the logarithm of total assets. These factors are considered important influences on financial performance and have been included to enhance the accuracy of the study's measurements.

### **2.3. Model Specification**

To examine the impact of ESG and its dimensions on corporate financial performance, Equation (1) has been established in this study. This equation aims to evaluate how ESG factors, including environmental, social, and governance aspects, influence corporate financial outcomes.

$$performance_{i,t} = \beta_0 + \beta_1 ESG_{RANK_{i,t}} + \sum \beta_i Control_{i,t} + \omega_{i,t} \quad (1)$$

Table 1 introduces the variables included in the model. ROA is used as a proxy variable to measure corporate performance. In this study, "i" represents different individual companies, while "t" denotes different years. The control variables include company size (logarithm of total assets), fixed assets ratio, intangible assets ratio, and leverage ratio. These factors are included because they may influence corporate performance, as mentioned in previous studies. The independent variable is the ESG rating percentile, which indicates how many companies a firm outperforms in terms of ESG scores within the same year. Due to the significant results of the F tests and Hausman tests at the 0.01 level, this study employs a fixed effects model for analysis.

**Table 1.** Variables definitions.

Variable	Symbol	Definition
Independent Variable	ROA	Net income/Total Assets
Independent Variable	ESG_RANK	(The number of companies - The company's ESG rank)/The number of companies
control variables	FA	Fixed Assets/Total Assets
	IA	Intangible Assets/Total Assets
	LEV	Total liabilities/Total Assets
	SIZE	Natural logarithm of total assets

### 3. Results Analysis

#### 3.1. Descriptive Statistics

Table 2 depicts the descriptive statistics of the variables included in the model. Notably, the variance of environmental scores among companies is 152.231, indicating significant differences in environmental governance performance across firms. Additionally, with an average and standard deviation of 3.09 and 12.429 respectively for the current ratio, this highlights varying levels of stock liquidity among listed companies.

**Table 2.** Descriptive statistics.

	N	Range	Minimum	Maximum	Mean	SD	Variance
ROA	6720	2.403	-1.644	0.759	0.032	0.077	0.006
FA	6720	0.766	0.000	0.766	0.208	0.129	0.017
IA	6715	0.511	0.000	0.511	0.039	0.036	0.001
LR	6720	66.501	0.110	66.611	3.090	3.526	12.429
LEV	6720	1.781	0.016	1.797	0.381	0.196	0.039
SIZE	6720	8.975	18.663	27.638	22.154	1.232	1.518
ESG_RANK	6630	1.000	0.000	1.000	0.531	0.287	0.082
E_RANK	6630	0.998	0.001	1.000	0.596	0.275	0.076
S_RANK	6630	0.999	0.000	0.999	0.473	0.269	0.072
G_RANK	6630	1.000	0.000	1.000	0.410	0.250	0.063
ESG_Score	6630	74.551	1.667	76.219	32.156	12.338	152.231
E_Score	6630	97.564	0.000	97.564	40.667	22.163	491.207
S_Score	6630	81.301	0.277	81.578	23.104	11.195	125.331
G_Score	6630	88.380	2.454	90.835	21.011	9.448	89.258

### 3.2. Correlation Analysis

Table 3 presents the regression results. The coefficient for ESG\_RANK is -0.009. The E\_RANK is not significant. The S\_RANK coefficient is -0.011, while the G\_RANK coefficient is 0.010. This suggests that overall ESG performance has a limited impact on profitability. However, the environmental (E) dimension shows no significant effect, the social (S) dimension has a slight negative impact, and the governance (G) dimension demonstrates a significant positive influence. These findings indicate that improved corporate governance can enhance enterprises' asset return rates.

**Table 3.** Correlation analysis.

	(1) ROA	(2) ROA	(3) ROA	(4) ROA
FA	-0.126*** (0.020)	-0.126*** (0.020)	-0.124*** (0.020)	-0.127*** (0.020)
IA	-0.187*** (0.063)	-0.186*** (0.063)	-0.183*** (0.063)	-0.189*** (0.063)
LEV	-0.371*** (0.015)	-0.372*** (0.015)	-0.371*** (0.015)	-0.375*** (0.015)
SIZE	0.104*** (0.007)	0.104*** (0.007)	0.104*** (0.007)	0.103*** (0.007)
ESG RANK	-0.009* (0.005)			
E RANK		-0.006 (0.004)		
S RANK			-0.011** (0.004)	
G RANK				0.010** (0.005)
cons	-2.077*** (0.150)	-2.076*** (0.150)	-2.081*** (0.150)	-2.076*** (0.150)
N	6619	6619	6619	6619
r <sup>2</sup>	0.226	0.225	0.227	0.226

Standard errors in parentheses

\* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

### 3.3. Robustness Checks

To test the model's robustness, this study adopted two methods: introducing new control variables (specifically, current ratio) and replacing the explanatory variable with an ESG score sourced from the CNRDS database.

**Table 4.** Robustness checks 1.

	(1)	(2)	(3)	(4)
	ROA	ROA	ROA	ROA
FA	-0.130*** (0.020)	-0.130*** (0.020)	-0.128*** (0.020)	-0.131*** (0.020)
IA	-0.194*** (0.063)	-0.193*** (0.063)	-0.190*** (0.063)	-0.196*** (0.063)
LR	-0.001** (0.001)	-0.001** (0.001)	-0.002*** (0.001)	-0.001** (0.001)
LEV	-0.383*** (0.015)	-0.384*** (0.015)	-0.383*** (0.015)	-0.386*** (0.015)
SIZE	0.104*** (0.007)	0.104*** (0.007)	0.104*** (0.007)	0.103*** (0.007)
ESG RANK	-0.009* (0.005)			
E RANK		-0.005 (0.004)		
S RANK			-0.011*** (0.004)	
G RANK				0.010** (0.005)
cons	-2.069*** (0.150)	-2.068*** (0.150)	-2.073*** (0.150)	-2.068*** (0.150)
N	6619.000	6619.000	6619.000	6619.000
r2	0.227	0.227	0.228	0.228

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ 

Table 4 describes the robustness test results for the previous scenario. The core variable ESG\_RANK is significant at the 10% level, indicating that overall ESG performance still exerts a stable negative impact on ROA. Among the dimensions, E\_RANK is not significant, suggesting that environmental dimension performance does not significantly affect ROA. S\_RANK has a coefficient of -0.011 and is significant, indicating that better social dimension performance may lead to lower ROA, possibly due to increased costs from social responsibility activities. G\_RANK has a coefficient of 0.010 and is significant, showing that good corporate governance can enhance ROA. These results highlight differences in how each dimension influences financial performance, with the governance dimension playing a particularly notable role in improving profitability.

**Table 5.** Robustness checks 2.

	(1)	(2)	(3)	(4)
	ROA	ROA	ROA	ROA
FA	-0.127*** (0.020)	-0.126*** (0.020)	-0.125*** (0.020)	-0.127*** (0.020)
IA	-0.187*** (0.063)	-0.186*** (0.063)	-0.185*** (0.063)	-0.189*** (0.063)
LEV	-0.372*** (0.015)	-0.372*** (0.015)	-0.371*** (0.015)	-0.374*** (0.015)
SIZE	0.103*** (0.007)	0.104*** (0.007)	0.103*** (0.007)	0.103*** (0.007)
ESG Score	-0.00010 (0.000)			
E Score		-0.00006 (0.000)		
S Score			-0.00019* (0.000)	
G Score				0.00013* (0.000)
cons	-2.072*** (0.150)	-2.075*** (0.150)	-2.074*** (0.150)	-2.081*** (0.150)
N	6619.000	6619.000	6619.000	6619.000
r <sup>2</sup>	0.225	0.225	0.226	0.226

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 5 describes the robustness test results for the latter scenario. Due to the significant differences in scale, the coefficients of ESG scores and their dimensions were converted to five decimal places for presentation purposes. The core variable, ESG\_Score, had a coefficient of -0.0001, which was not statistically significant, suggesting that when measured using ESG\_Score, its impact on ROA (Return on Assets) was not statistically significant. Examining the dimension-specific indicators, the E\_Score coefficient was -0.00006 and insignificant. The S\_Score had a coefficient of -0.00019, which reached significance at the 10% level, while the G\_Score coefficient was 0.00013 and significant at the 10% level. These findings share similarities with those from ESG\_RANK analysis: the environmental dimension had no significant impact, the social dimension showed a slight negative effect, and the governance dimension demonstrated a positive influence. However, the choice of different ESG measurement metrics can lead to varying results, highlighting the importance of selecting appropriate indicators.

#### 4. Conclusions

This study examined the impact of ESG and its various dimensions on the financial performance of Chinese manufacturing enterprises in the post-pandemic era and arrived at the following conclusions: To some extent, the ESG evaluation system can influence financial performance; however, this impact may disappear with changes in the model, such as incorporating new variables or employing different ESG evaluation methods. Under any circumstances analyzed in this study, the environmental dimension did not significantly affect financial performance, which might be attributed to the specific characteristics of the Chinese manufacturing industry. The social dimension has a significantly negative impact on financial performance. This implies that Chinese manufacturing enterprises engaging more in social service activities experience lower financial performance. Conversely, the governance dimension has a significantly positive impact on financial performance. Enhanced corporate governance levels in manufacturing enterprises can improve operational efficiency and, as a result, enhance financial performance. This study provides insights

into corporate planning, investor behavior, and the overall functioning of capital markets. Organizations or individuals focusing on the financial performance of specific Chinese manufacturing enterprises should particularly pay attention to the S (social) and G (governance) dimensions.

This study has certain limitations. The data used spans a relatively short period, and the explanatory variables rely on the official ESG evaluation system from the database. Consequently, different conclusions may arise when employing alternative ESG rating systems in future studies. It is recommended that future research incorporate multiple ESG frameworks to provide results across various standards. Additionally, this study may not be applicable in situations involving unforeseen, uncontrollable events with significant impacts. For instance, since January 2025, the uncertainty following the U.S. government transition has triggered substantial market volatility, which could distort the relationship between ESG ratings and the financial performance of the entities examined in this study. Future research should consider incorporating such sudden global events into its scope.

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