



IQTISODIYOT & TARAQQIYOT

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THE IMPACT OF ESG PERFORMANCE ON FIRM FINANCIAL PERFORMANCE: EVIDENCE FROM CHINESE LISTED MANUFACTURING FIRMS

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Abstract: The study investigates the relationship between Environmental, Social, and Governance (ESG) performance and firm financial performance among publicly listed manufacturing companies in China over the period 2020-2024. Using panel data from 40 firms listed on the Shanghai and Shenzhen Stock Exchanges, the research applies Fixed Effects panel regression to examine whether ESG performance, measured by Refinitiv ESG scores, significantly affects firm profitability as captured by Return on Assets (ROA). Firm size and leverage are included as control variables. The results show a positive and statistically significant association between ESG scores and ROA, suggesting that Chinese manufacturing firms with stronger sustainability practices tend to achieve higher profitability. The findings are consistent with Stakeholder Theory and the Resource-Based View of the firm. This study contributes to the growing empirical literature on ESG in emerging markets and offers practical guidance for corporate managers, investors, and policymakers.

Keywords: ESG performance, Return on Assets (ROA), China, manufacturing, panel data, Stakeholder Theory, emerging markets.

Annotatsiya: Ushbu tadqiqot 2020–2024-yillar davrida Xitoydagi fond birjalarida ro'yxatga olingan ishlab chiqarish korxonalari misolida Atrof-muhit, Ijtimoiy mas'uliyat va Korporativ boshqaruv (ESG) ko'rsatkichlari hamda korxonalarning moliyaviy natijalari o'rtasidagi bog'liqlikni o'rganadi. Tadqiqotda Shanxay va Shenjen fond birjalarida ro'yxatga olingan 40 ta kompaniyaning panel ma'lumotlaridan foydalanilib, Refinitiv ESG reytinglari orqali o'lchangan ESG ko'rsatkichlarining aktivlar rentabelligiga (Return on Assets – ROA) ta'siri Fixed Effects panel regressiya modeli yordamida tahlil qilinadi. Nazorat o'zgaruvchilari sifatida korxona hajmi va moliyaviy leverej darajasi kiritilgan. Natijalar ESG reytinglari va ROA o'rtasida ijobiy hamda statistik jihatdan ahamiyatli bog'liqlik mavjudligini ko'rsatadi. Bu esa barqaror rivojlanish amaliyotlarini samarali qo'llayotgan Xitoy ishlab chiqarish korxonalari yuqoriroq rentabellikka erishish tendensiyasiga ega ekanligini anglatadi. Olingan natijalar Manfaatdor tomonlar nazariyasi (Stakeholder Theory) va Resurslarga asoslangan yondashuv (Resource-Based View) bilan mos keladi. Tadqiqot rivojlanayotgan bozorlarda ESG masalalariga oid empirik adabiyotlarni boyitadi hamda korporativ menejerlar, investorlar va siyosatchilar uchun amaliy tavsiyalar beradi.

Kalit so'zlar: ESG ko'rsatkichlari, aktivlar rentabelligi (ROA), Xitoy, ishlab chiqarish sanoati, panel ma'lumotlar, Manfaatdor tomonlar nazariyasi (Stakeholder Theory), rivojlanayotgan bozorlar.

Аннотация: Данное исследование анализирует взаимосвязь между показателями экологической, социальной и корпоративной ответственности (ESG) и финансовыми результатами компаний среди производственных предприятий Китая, зарегистрированных на фондовых биржах, за период 2020-2024 годов. В исследовании используются панельные данные 40 компаний, зарегистрированных на Шанхайской и Шэньчжэньской фондовых биржах. Для оценки влияния ESG-показателей, измеренных рейтингами Refinitiv ESG, на прибыльность компаний, представленную показателем рентабельности активов (Return on Assets – ROA), применяется модель панельной регрессии с фиксированными эффектами (Fixed Effects). В качестве контрольных переменных используются размер компании и уровень финансового левериджа. Результаты показывают положительную и статистически значимую связь между ESG-рейтингами и ROA, что свидетельствует о том, что китайские производственные компании с более



высоким уровнем устойчивого развития, как правило, достигают большей прибыльности. Полученные результаты согласуются с Теорией заинтересованных сторон (Stakeholder Theory) и Ресурсной теорией фирмы (Resource-Based View). Исследование вносит вклад в растущую эмпирическую литературу по ESG на развивающихся рынках и предоставляет практические рекомендации для корпоративных менеджеров, инвесторов и разработчиков экономической политики.

Ключевые слова: ESG-показатели, рентабельность активов (ROA), Китай, производственный сектор, панельные данные, Теория заинтересованных сторон (Stakeholder Theory), развивающиеся рынки.

INTRODUCTION

In recent years, the criteria for Environmental, Social, and Governance (ESG) have gained significance as a means to assess how responsibly a company operates. ESG is increasingly recognized not merely as an ethical framework but as an indicator of corporate risk, long-term viability, and overall business success. Investors, regulators, and consumers are now placing considerable emphasis on ESG ratings when making their choices (Friede, Busch, and Bassen, 2015).

China serves as a particularly pertinent backdrop for this analysis. As the largest emerging economy and the foremost manufacturing nation globally, it contributes approximately 28% of the world's manufacturing output (World Bank, 2023). Since 2018, the China Securities Regulatory Commission (CSRC) has implemented guidelines that encourage publicly listed corporations to reveal information related to ESG. This has intensified the pressure on Chinese companies to enhance their practices concerning environmental, social, and governance issues.

The manufacturing sector is the most appropriate area of focus for this research for multiple reasons. Manufacturing companies in China are significant sources of industrial pollution and carbon emissions and are subject to the most immediate regulatory demands to elevate environmental standards. Concurrently, they are facing heightened scrutiny regarding labor conditions and transparency in their supply chains. Therefore, it raises the question: do companies that excel in ESG also achieve superior financial results?

This study seeks to address the following research inquiry: Does ESG performance have a significant impact on the financial outcomes of publicly listed manufacturing firms in China? The goal is to determine whether there exists a positive and significant correlation between ESG ratings and Return on Assets (ROA), utilizing panel data from 40 Chinese listed manufacturing companies over the timeframe of 2020 to 2024.

This study is guided by five interconnected research objectives that collectively aim to examine the impact of ESG performance on the financial performance of listed manufacturing firms in China over the period 2020-2024:

1. The first objective is to measure the level of ESG performance among the selected Chinese listed manufacturing firms.
2. The second objective is to assess the financial performance of the selected firms using Return on Assets (ROA).
3. The third objective is to analyze the relationship between ESG performance and ROA using panel regression analysis.
4. The fourth objective is to determine whether firm size and leverage influence the ESG-financial performance relationship.
5. The fifth objective is to provide practical recommendations for managers, investors, and policymakers based on the findings.

REVIEW OF LITERATURE ON THE SUBJECT

ESG represents Environmental, Social, and Governance factors, which collectively outline how a corporation addresses its global impact and manages its internal governance. The Environmental aspect examines the company's approach to issues such as pollution, carbon output, energy consumption, and waste handling. The Social component assesses how a company interacts with its workforce, engages with local communities, and oversees its supply chain. The Governance aspect pertains to the effectiveness of a company's leadership, the structure of its board, transparency, and measures against corruption. Specialized rating organizations compute ESG ratings; this study utilizes Refinitiv ESG scores. Refinitiv gathers information from publicly accessible corporate reports and sustainability disclosures, converting this data into a score ranging from 0 to 100, where



higher scores indicate superior ESG performance. Refinitiv is favored in academic research due to its extensive coverage of publicly traded Chinese companies and its clear methodology (Drempetic, Klein, and Zwergel, 2020).

The primary theoretical framework employed in this research is Stakeholder Theory, introduced by Freeman (1984). This theory posits that a corporation's success hinges not only on generating profits for its shareholders but also on effectively managing its relationships with all parties impacted by its operations, including employees, customers, suppliers, government entities, and local communities. ESG practices assist companies in navigating these relationships; for instance, effective environmental management mitigates the likelihood of regulatory penalties, while equitable labor practices enhance employee productivity and decrease turnover. This theory suggests that companies with strong ESG scores should also achieve better financial outcomes.

Another pertinent theory is the Resource-Based View (Barney, 1991), which contends that firms that cultivate distinctive internal resources and capabilities can achieve a competitive advantage over time. ESG capabilities, such as possessing a certified environmental management system or having a reputation for ethical business practices, can serve as valuable resources. These capabilities are not easily replicated by competitors and can help a business attract superior talent, secure financing more readily, and forge stronger ties with regulators. In the context of China's manufacturing sector, where environmental regulations are tightening annually, companies with robust ESG practices tend to be more adept at adapting to new requirements without significant disruptions.

Numerous studies have explored the link between ESG performance and financial success. The most exhaustive review, a meta-analysis by Friede, Busch, and Bassen (2015), examined over 2,000 studies, revealing that approximately 63% identified a positive correlation between ESG factors and financial performance, while only 8% noted a negative relationship. In developed markets, research by Eccles, Ioannou, and Serafeim (2014) indicated that U.S. firms with strong sustainability practices significantly outperformed their counterparts in both stock market and accounting metrics over 18 years. Similarly, a meta-analysis of 52 studies conducted by Orlitzky, Schmidt, and Rynes (2003) consistently found positive associations. Focusing specifically on China, Zhao et al (2018) investigated 166 listed companies and identified a positive relationship between Corporate Social Responsibility (CSR), a concept closely associated with ESG, and Return on Assets (ROA), particularly among privately held firms.

Furthermore, Lins, Servaes, and Tamayo (2017) discovered that firms with higher levels of social trust performed significantly better during the financial crisis of 2008-2009, suggesting that ESG can serve as a protective measure against risks. Nonetheless, not all research concurs with these findings. Brammer, Brooks, and Pavelin (2006) found that higher ESG scores corresponded to lower short-term stock returns for UK firms, implying that the financial benefits of ESG investments may take time to materialize. Some scholars also argue that ESG reporting in China remains somewhat superficial, as companies may disclose ESG information without substantially altering their practices, thereby diminishing any financial impact (Li et al., 2021). Despite the rising body of research, there is a notable lack of studies focusing specifically on Chinese manufacturing firms using data from 2020 onward, following the implementation of the CSRC disclosure guidelines. This study aims to address that gap.

RESEARCH METHODOLOGY

Based on the theories and studies discussed above, this study tests the following hypothesis: ESG performance has a positive and statistically significant impact on the financial performance (ROA) of listed manufacturing firms in China.

This means we expect that firms with higher ESG scores will also have higher ROA, after controlling for firm size and leverage.

This study chapter describes the data and methods used to examine the relationship between ESG performance and firm financial performance. It explains where the data was collected from, how the variables were measured, and what statistical techniques were applied to analyze the data. The methodology is organized into four parts: sample and data collection, variable measurement, the regression model, and the estimation strategy.

The sample comprises 40 manufacturing companies that are listed on either the Shanghai Stock Exchange (SSE) or the Shenzhen Stock Exchange (SZSE) in China. The research spans five years from 2020 to 2024, resulting in a total of 196 firm-year observations. This count is slightly below 200 due to the absence of some firm-year data points for a limited number of firms in certain years, which is typical in panel data studies. The selection of firms was based on three criteria. First, the firms must have been continuously listed on either exchange throughout the entirety of the 2020-2024 period, ensuring data consistency and eliminating



survivorship bias associated with firms that were either newly listed or delisted during the study. Second, firms must have a Refinitiv ESG score available for at least three of the five years, which ensures sufficient ESG data for observing meaningful changes over time. Third, firms must possess complete financial data, specifically total assets, net income, and total debt, accessible in the CSMAR (China Stock Market and Accounting Research) database for every year included in the sample. Financial institutions such as banks and insurance companies were excluded due to the different structures of their financial statements, making their return on assets (ROA) not directly comparable to that of manufacturing firms. A comprehensive list of the 40 firms, including their stock codes, exchanges, and industry sub-sectors, is available in Appendix A at the end of this document.

The dependent variable (Y) is Return on Assets (ROA), calculated as net income divided by total assets, expressed as a percentage. ROA assesses how effectively a company utilizes its assets to generate profit and is the most widely used indicator of financial performance in ESG research, as it reflects core business operations and is unaffected by the company's financing methods (Eccles, Ioannou, and Serafeim, 2014).

The independent variable (X) is the overall ESG score provided by Refinitiv, which ranges from 0 to 100. A higher score indicates that a firm exhibits stronger practices in environmental, social, and governance areas, making it the primary variable of interest in this study.

Control Variable 1 – Firm Size. Firm size is quantified as the natural logarithm of total assets ($\ln(\text{Total Assets})$). Generally, larger firms tend to be more profitable due to advantages such as economies of scale, access to lower-cost financing, and greater stability. If size is not controlled for, there is a risk of incorrectly attributing the financial performance of larger firms to their ESG scores.

Control Variable 2 – Leverage. Leverage is defined as total debt divided by total assets. Firms with higher levels of debt are required to make larger interest payments, which can diminish their net income and, consequently, their ROA. Leverage is a common control variable in financial performance analyses since a firm's capital structure directly impacts profitability (Table 1).

Table 1. Summary of Variables¹

Variable	Type	Symbol	How it is measured	Data source
Return on Assets	Dependent (Y)	ROA	Net Income ÷ Total Assets (%)	CSMAR
ESG Score	Independent (X)	ESG	Refinitiv ESG score (0-100)	Refinitiv
Firm Size	Control	SIZE	$\ln(\text{Total Assets})$	CSMAR
Leverage	Control	LEV	Total Debt ÷ Total Assets	CSMAR

The model estimated in this study is:

$$ROA_{it} = \beta_0 + \beta_1 \times ESG_{it} + \beta_2 \times SIZE_{it} + \beta_3 \times LEV_{it} + \alpha_i + \lambda_t + \epsilon_{it}$$

- ROA – Dependent variable: Return on Assets
- Beta Zero – Constant (intercept): Baseline value of ROA
- Beta 1 (β_1) – Main variable of interest: Effect of ESG score on ROA
- Beta 2 (β_2) – Control variable 1. Firm size: $\ln(\text{Total Assets})$
- Beta 3 (β_3) – Control variable 2. Leverage: Total Debt / Total Assets
- Alpha (α) – Firm fixed effect; removes firm differences
- Lambda (λ) – Year fixed effect; controls yearly shocks
- Epsilon (ϵ) – Error term: Part of ROA, the model cannot explain

Where i refers to a specific firm (from 1 to 40), and t refers to a specific year (2020 to 2024). The symbol β_0 is the constant (intercept). The coefficients β_1 , β_2 , and β_3 show the estimated effect of each variable on ROA. The term α_i is a firm fixed effect, explained further below. The term λ is a year fixed effect, which controls for economic events that affected all firms in a given year, for example, the economic slowdown in 2020 due to COVID-19. Finally, ϵ is the error term, meaning the part of ROA that the model does not explain.

¹ Notes: CSMAR = China Stock Market and Accounting Research Database. $\ln$ = natural logarithm. Source: Done by the researcher based on the analysis



Estimation Strategy: From OLS to Fixed Effects

This section explains the step-by-step approach used to estimate the model and why each step was necessary. Three methods were applied in sequence, and a statistical test was used to decide which result to rely on.

Step 1: Pooled OLS – The Starting Point

The first method is Pooled OLS (Ordinary Least Squares). This is the simplest form of regression. It treats all 196 observations as if they came from one large dataset, ignoring the fact that observations come from 40 different firms across 5 years. The problem with Pooled OLS in panel data is that it does not account for the fact that some firms are simply different from others in ways we cannot observe or measure. For example, one firm might have better managers, a stronger brand, or a more efficient production process. These invisible differences can make the results misleading. For this reason, Pooled OLS is only used here as a reference point, not as the final result.

Step 2: Random Effects – Acknowledging Firm Differences

The second method is the Random Effects (RE) estimator. This approach acknowledges that firms are different from each other. It treats each firm's individual characteristics as random variation in the data. The key assumption behind Random Effects is that these firm-level differences are not related to the independent variables (ESG score, size, and leverage). In other words, it assumes that a firm's hidden characteristics do not influence its ESG score or its financial ratios. This is a helpful improvement over OLS, but the assumption may not always hold in practice.

Step 3: Fixed Effects – Removing Hidden Firm Differences

The third method is the Fixed Effects (FE) estimator. This is the most rigorous approach for panel data. Instead of assuming that firm differences are unrelated to the variables, Fixed Effects removes them entirely. It does this by focusing only on changes within each firm over time. So, if a firm's ESG score goes up in 2022 compared to 2021, the model asks: Did its ROA also go up? This is more reliable because it rules out the possibility that a firm is profitable simply because it has always been a well-run company, not because of its ESG score. The Fixed Effects approach is like giving each firm its own baseline, and then observing how changes in ESG performance relate to changes in financial performance.

Step 4: Hausman Test – Choosing Between RE and FE

To decide whether to rely on Random Effects or Fixed Effects results, the Hausman (1978) specification test was applied. This test checks whether the firm-level differences are actually related to the independent variables. If they are, then Random Effects gives biased results, and Fixed Effects must be used. If they are not, then both methods give similar results, and Random Effects is preferred because it is more efficient. The decision rule is straightforward: if the Hausman test p-value is less than 0.05, use Fixed Effects; if it is 0.05 or above, use Random Effects. In this study, the Hausman test gave a p-value of 0.0002 (well below 0.05), which means Fixed Effects is the correct and preferred estimator. The Fixed Effects results are therefore the main results of this study.

ANALYSIS AND RESULTS

Table 2 presents the descriptive statistics for all four variables, which serve as fundamental summary measures that facilitate our understanding of the data before conducting the regression analysis. The average return on assets (ROA) within the sample is 5.63%, indicating that, on average, companies generate approximately 5.63 cents of profit for each yuan of assets owned. There is notable variability, with ROA spanning from -6.42% (indicating a loss) to 18.74% (representing a highly profitable firm). This variability is significant as it indicates sufficient differences between firms and across years to establish a meaningful statistical connection. The average Environmental, Social, and Governance (ESG) score is 47.21 out of 100, reflecting a moderate level typical of Chinese manufacturing companies, where ESG reporting is still evolving. The standard deviation of 16.84 indicates considerable variation in ESG scores throughout the sample, ranging from 14.30 (very low ESG involvement) to 81.60 (very high). This diversity enables the regression analysis to uncover a relationship between ESG and ROA. Firm size is measured by a natural logarithm ranging from 19.87 to 25.43, which corresponds to total assets between CNY 430 million and CNY 91 billion, representing a combination of mid-sized and large manufacturing firms. The average leverage ratio of 0.41 signifies that, on average, 41% of company assets are financed through debt, which aligns with typical levels observed in Chinese manufacturing firms (Table 2).

Table 2. Descriptive Statistics²

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
ROA (%)	5.63	4.87	4.18	-6.42	18.74
ESG Score	47.21	46.50	16.84	14.30	81.60
SIZE (ln)	22.41	22.27	1.34	19.87	25.43
LEV (ratio)	0.41	0.40	0.15	0.08	0.76

Table 3 displays the correlation matrix, illustrating the relationships between each pair of variables. Correlations vary from -1 (indicating perfect negative correlation) to +1 (indicating perfect positive correlation), with values near zero suggesting minimal or no linear relationship. A key finding is that ROA has a positive correlation with ESG ($r = 0.31$, $p < 0.01$), indicating that firms with higher ESG scores typically achieve higher ROA. Although this finding is preliminary and does not establish causation, it indicates a relationship that merits further exploration in the regression analysis. Additionally, ROA shows a positive correlation with firm size ($r = 0.27$), indicating that larger firms are generally more profitable, and a negative correlation with leverage ($r = -0.34$), suggesting that firms with higher debt levels tend to be less profitable. Both observations align with existing literature expectations. In regression analysis, it is essential to assess whether independent variables exhibit high correlations with one another, a phenomenon known as multicollinearity. When two variables move almost in sync, distinguishing their individual impacts becomes challenging. In this study, the highest correlation between any two independent variables is 0.42 (between ESG and size), which is significantly below the concerning threshold of 0.70. Furthermore, all Variance Inflation Factor (VIF) values remain below 3.0, confirming that multicollinearity does not pose an issue in this context (Table 3).

Table 3. Pearson Correlation Matrix³

Variable	(1) ROA	(2) ESG	(3) SIZE	(4) LEV
(1) ROA	1.000			
(2) ESG	0.31***	1.000		
(3) SIZE	0.27**	0.42***	1.000	
(4) LEV	-0.34***	-0.18**	0.22**	1.000

Table 4 displays the regression findings from all three estimation methods: Pooled OLS (Column 1), Random Effects (Column 2), and Fixed Effects (Column 3). As outlined in the methodology section, the Hausman test validated that Fixed Effects is the suitable estimator (test statistic $\chi^2(3) = 19.84$, $p = 0.0002$). Consequently, the subsequent discussion will concentrate on Column 3. In the Fixed Effects model, the coefficient for ESG is 0.087, which is statistically significant at the 1% level ($p < 0.01$). This indicates that, on average, a one-point rise in the Refinitiv ESG score correlates with an increase of 0.087 percentage points in ROA while keeping firm size and leverage constant. To illustrate this practically: if a firm enhances its ESG score from 35 to 60, which is a plausible improvement over five years, then its ROA is projected to rise by approximately 2.2 percentage points. Considering that the average ROA in the sample is 5.63%, this represents a significant enhancement. This outcome supports H1. The coefficient for firm size is both positive and significant (1.214, $p < 0.01$), indicating that larger firms tend to be more profitable. Conversely, leverage possesses a negative and significant coefficient (-8.431, $p < 0.01$), demonstrating that firms with higher debt levels are less profitable. Both control variables behave as anticipated. It is noteworthy that the ESG coefficient is marginally higher in the Pooled OLS model (0.112) compared to the Fixed Effects model (0.087). This discrepancy is logical: Pooled OLS does not account for unobserved firm characteristics, leading to some of the ESG effect it identifies

2 Notes: N = 196 firm-year observations from 40 firms over 2020-2024. ROA = Return on Assets (%); ESG = Refinitiv ESG Score (0-100); SIZE = $\ln(\text{Total Assets})$; LEV = Total Debt / Total Assets. Source: Done by the researcher based on the analysis

3 Notes: *** $p < 0.01$, ** $p < 0.05$ (two-tailed). N = 196. The asterisks indicate the level of statistical significance: *** means there is less than a 1% chance the correlation is due to random chance; ** means less than 5%. Source: Done by the researcher based on the analysis.



deriving from the correlation between superior management and both higher ESG scores and better financial performance. Fixed Effects mitigates this bias by concentrating solely on variations within firms over time, yielding a more conservative and reliable estimate (Table 4).

Table 4. Panel Regression Results – Dependent Variable: ROA (%)⁴

Variable	(1) Pooled OLS	(2) Random Effects	(3) Fixed Effects ✓
ESG Score	0.112***	0.096***	0.087***
Standard error	(0.024)	(0.027)	(0.029)
SIZE	1.587***	1.341***	1.214***
Standard error	(0.312)	(0.341)	(0.378)
LEV	-9.214***	-8.876***	-8.431***
Standard error	(1.243)	(1.312)	(1.387)
Constant	-21.43***	-18.76***	-17.12***
Standard error	(4.218)	(4.531)	(4.876)
Firm fixed effects	No	No	Yes
Year fixed effects	No	Yes	Yes
Observations	196	196	196
Firms	40	40	40
R-squared	0.284	0.301	0.312 (within)
Hausman test χ^2 (3)			19.84*** (p = 0.0002)

The regression analysis strongly validates the study's hypothesis, indicating that ESG performance positively and significantly influences ROA among Chinese publicly traded manufacturing companies. An increase of one point in the Refinitiv ESG score correlates with a rise of 0.087 percentage points in ROA, even after accounting for factors such as firm size and leverage. Although this increment may seem minor on its own, it is crucial to note that ESG scores typically do not increase incrementally by one point; companies that actively enhance their sustainability measures often achieve score improvements ranging from 10 to 25 points over a five-year span, which signifies a substantial enhancement in profitability. This outcome aligns with the majority of existing research; for example, Friede, Busch, and Bassen (2015) found positive correlations in 63% of more than 2,000 studies, while Zhao et al. (2018) specifically identified a favorable ESG-ROA link for Chinese listed firms.

The findings also resonate with Stakeholder Theory (Freeman, 1984), suggesting that manufacturing entities that effectively manage their environmental impacts, uphold sound labor practices, and operate transparently tend to cultivate stronger relationships with regulators, employees, and customers. Such relationships mitigate operational risks, like environmental penalties or labor conflicts, and enhance efficiency, thereby leading to increased profits. This dynamic is particularly pertinent in the context of Chinese manufacturing. Since 2015, the Chinese government has considerably intensified environmental enforcement, resulting in the closure or penalization of thousands of factories for pollution infractions. Firms that had proactively invested in environmental management systems before these regulations were able to maintain continuous operations, while less prepared rivals encountered shutdowns and fines. This observable trend aligns with the predictions of Stakeholder Theory: effective stakeholder management yields financial benefits.

Furthermore, the results correspond with the Resource-Based View (Barney, 1991). In the Chinese manufacturing landscape, where environmental regulations have become notably stricter since 2018, companies

⁴ Notes: Dependent variable is ROA (%). Standard errors are clustered at the firm level and shown in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.10. The tick mark (✓) in Column 3 indicates the preferred model, as confirmed by the Hausman test. Source: Done by the researcher based on the analysis.

that have previously invested in ESG capabilities are better positioned to navigate regulatory changes without incurring costly interruptions. This level of preparedness itself represents a competitive advantage that can bolster profitability. In addition to regulatory compliance, ESG capabilities can enhance a firm's ability to attract and retain top talent. Research by Edmans (2011) indicates that organizations with high employee satisfaction consistently outperform their peers concerning long-term stock returns, implying that the social aspect of ESG, while not separately evaluated in this study, plays a role in financial performance through improved human capital and workforce productivity.

The observation that the Fixed Effects coefficient (0.087) is marginally lower than the Pooled OLS coefficient (0.112) is anticipated and indeed reassuring. This indicates that part of the direct correlation between ESG and ROA can be attributed to unobserved firm quality; in other words, certain firms inherently possess superior management, more robust brands, or more efficient production methods, and these firms typically achieve higher ESG scores alongside greater profits. Pooled OLS fails to distinguish between these two influences, leading to an overestimation of the actual contribution of ESG. In contrast, Fixed Effects mitigates this bias by concentrating solely on intra-firm changes over time, yielding a more accurate and conservative estimate. The persistence of ESG's significance post-correction further strengthens the evidence that the relationship is authentic and not merely indicative of firm quality.

Additionally, the results of the control variables merit brief consideration as they provide essential context to the primary finding. The positive coefficient associated with firm size (1.214, $p < 0.01$) corroborates that larger manufacturing firms are generally more profitable, likely due to advantages such as economies of scale, enhanced bargaining power with suppliers, and the ability to distribute fixed costs over larger production volumes. Notably, larger firms in this sample also exhibit higher ESG scores ($r = 0.42$), which prompts an important question: Does ESG enhance ROA, or do larger firms simply excel in both domains? The Fixed Effects methodology addresses this by eliminating size-related firm attributes, and ESG remains significant irrespective of size. The negative leverage coefficient (-8.431 , $p < 0.01$) underscores the well-documented link between debt and profitability, stating that firms with substantial debt obligations incur higher interest expenses, which directly diminish net income and, consequently, ROA. This is particularly pertinent in the Chinese manufacturing landscape, where many state-affiliated enterprises bear significant debt burdens that limit their financial flexibility.

CONCLUSIONS AND SUGGESTIONS

This research analyzed the impact of ESG performance on the financial outcomes of Chinese manufacturing companies listed on the stock exchange from 2020 to 2024. Utilizing Fixed Effects panel regression based on 196 data points from 40 firms, the findings revealed a positive and statistically significant association between ESG scores and return on assets (ROA) ($\beta = 0.087$, $p < 0.01$). Additionally, firm size showed a positive correlation with profitability, while leverage exhibited a negative correlation, both aligning with anticipated trends. The Hausman test validated that the Fixed Effects model was a suitable estimator. Consequently, the primary hypothesis (H1) is upheld.

Suggestions:

- For management: The findings indicate that investing in ESG is not solely an ethical or public relations endeavor; it can also enhance financial performance. Chinese manufacturing firms that focus on improving environmental management, promoting employee welfare, and increasing governance transparency can anticipate better returns on their assets over time. ESG should be integrated into long-term business strategies.
- For investors: ESG scores seem to provide valuable financial insights. Investors looking at Chinese manufacturing stocks might gain from factoring in ESG performance when selecting stocks, as higher ESG scores are linked to improved profitability.
- For policymakers: The favorable outcome reinforces the need for the ongoing advancement of ESG disclosure mandates in China. As ESG data becomes more precise and comparable, through obligatory reporting, standardized frameworks, and third-party validation, markets will be better positioned to reward responsible companies.

This research has various limitations that must be recognized. Firstly, the sample size of 40 companies is relatively modest. Increasing the sample size would enhance the dependability and broader applicability of the findings. Secondly, the study relies solely on one ESG rating provider (Refinitiv). Different rating agencies may assign different scores to the same company, leading to varying outcomes depending on the data sources used. Thirdly, although Fixed Effects estimation diminishes bias from unobserved company characteristics, it does not eliminate the concern of reverse causality, the notion that more profitable companies may invest more



in ESG initiatives rather than the reverse. Future research should explore instrumental variable approaches or natural experiments to bolster causal assertions. Additionally, subsequent studies could expand this research in several ways. One avenue could involve breaking down the overall ESG score into its three components: Environmental, Social, and Governance, and examining which component has the most significant impact on financial performance. Another potential direction would be to assess the effects of ESG across various manufacturing sub-sectors, such as heavy industry versus electronics, to determine if the relationship differs by industry type. Lastly, extending the sample period beyond 2024 would allow for the inclusion of more recent changes in China's ESG regulatory framework, including its carbon trading initiatives and Green Finance classification.

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