

The Impact of Corporate ESG Performance on Leverage Manipulation Empirical Evidence From A-Share Panel Data of Chinese Listed Companies

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Abstract: ESG stands for Environment (Environment), society (Social) and corporate governance (Government) respectively. It is a non-financial performance investment concept and enterprise evaluation standard, and has been used by enterprises as an important indicator to measure its quality. In the context of "deleveraging", there is a lack of targeted research on whether enterprise ESG performance can help enterprises "healthy" deleveraging. In this paper, the A-share listed companies in Shanghai and Shenzhen stock markets from 2008 to 2022 are selected as the original samples to explore the influence of ESG performance on the degree of leverage manipulation of enterprises. The empirical results show that good ESG performance can significantly reduce the degree of leverage manipulation of enterprises; In terms of mechanism test, ESG weakens enterprises' leverage manipulation motivation by reducing their own credit level, and enterprises' digital transformation inhibits their own leverage manipulation. Further heterogeneity test shows that ESG performance is better in eastern and central regions and state-owned enterprises. It is suggested that the ESG performance of enterprises should be further optimized and relevant supervision should be strengthened.

Keywords: Enterprise ESG performance, Lever control, Financial supervision.

1. Introduction

In recent years, environmental, social and governance (ESG) factors have become increasingly important in business operations. Companies are increasingly aware of the need to focus not only on financial performance, but also on their performance in environmental protection, social responsibility and good governance. ESG factors are not only related to sustainable development and social responsibility of enterprises, but also directly affect the reputation, credibility and long-term value of enterprises. The term ESG was coined by the United Nations in 2005 to measure and codify a responsible investment approach. It refers to a set of corporate performance evaluation criteria used to assess the robustness of a company's governance mechanisms and its ability to effectively manage its environmental and social impacts. Institutional investors, stock exchanges and boards are increasingly using sustainability and social responsibility disclosures to explore the relationship between a company's management of ESG risk factors and its business performance. In 2006, the United Nations also established the United Nations Principles for Responsible Investment (PRI), which is an organization dedicated to incorporating ESG into investment decisions. The core idea behind it is that ESG is an important relevant factor in investment decisions, so responsible investors should use ESG to measure a company's social responsibility performance when investing. This shift requires companies to break down departmental divisions and establish more thoughtful coordination and collaboration across key functions such as environmental, social and governance sustainability, public affairs, risk, ethics and compliance. Widespread public concern about corporate hypocrisy and "greenwashing" has further called for a more strategic and coordinated approach to corporate integrity commitments. In this context, scholars began to pay attention to the influence of ESG on leverage manipulation behavior.

Leverage manipulation refers to the behavior of an enterprise using debt and financial leverage to control, mislead or influence the company's financial status and performance by adjusting financial statements and data. Companies with good ESG practices may be more focused on long-term sound financial management and transparency, thereby reducing the likelihood of short-term leverage manipulation; Conversely, companies with poor ESG performance may be more inclined to manipulate financial data in response to market pressures or to pursue short-term performance targets. Therefore, studying how corporate ESG affects leverage manipulation behavior not only contributes to a deeper understanding of the relationship between corporate financial management and moral hazard management, but also has great significance in promoting the development of enterprises in the direction of sustainable development and financial transparency. Through in-depth study of this topic, it can provide more specific guidance for enterprises to practice ESG, and promote the long-term steady development of enterprises in financial management.

2. Literature Review and Theoretical Hypothesis

There has been some research on the relationship between corporate ESG (environmental, social and governance) and leverage manipulation. Some studies have found that companies with good ESG performance may run their businesses more carefully and transparently, reducing the likelihood of being suspected of engaging in leverage manipulation. For example, some studies have pointed out that high levels of social responsibility and governance practices can improve a company's reputation and trust, reducing investors' and other stakeholders' suspicion of financial manipulation. This accumulation of trust and reputation helps companies gain access to more financing channels and lower financing costs, thus reducing the

incentive to engage in leverage manipulation. Lou Senyuan et al. (2023) selected 41 listed commercial banks in China from the first quarter of 2018 to the fourth quarter of 2021 as research samples, and concluded that the comprehensive score of ESG performance of commercial banks was significantly negatively correlated with systemic risk. Zang Qin et al. (2023) show that good ESG performance can bring double dividends of economic and social benefits to enterprises, help enterprises improve the level of internal financing, reduce the demand for external financing, and thus achieve leverage reduction effect. Xie Ting, Wang Shuai et al. (2024) found that strategic emerging enterprises are more able to create production capacity performance for R&D and production with a longer period after obtaining medium and long-term credit, further improving their high-quality innovation and development ability. Meanwhile, excessive medium and long-term credit will lead to high leverage ratio of enterprises, and insufficient debt repayment ability of enterprises will lead to continuous decline in corporate performance. On the other hand, studies have pointed out that companies with good ESG performance are not necessarily completely immune to leverage manipulation. Some scholars have suggested that even those companies that focus on ESG may have cases of leverage manipulation, but it is more subtle or complex. In particular, in certain industries or market conditions, companies may face challenges such as pressure to meet short-term financial targets, leading to the practice of leveraging. Therefore, hypothesis 1 is proposed:

Hypothesis 1: Corporate ESG performance is positively correlated with leverage manipulation.

There are certain ways and mechanisms for ESG to influence leverage manipulation by influencing the credit mechanism of enterprises. ESG factors can directly or indirectly affect the credit conditions, financing costs and digitalization level of enterprises, and thus further affect the leverage manipulation behavior of enterprises. Good ESG performance can improve the company's reputation and credibility, making the company more favored by financial institutions. When obtaining financing, these companies may receive more favorable credit terms and lower financing costs. This advantage may reduce the incentive for companies to leverage, as they have easier access to sustainable financing. In addition, companies with good ESG practices are more environmentally and socially responsible and have better governance structures, which makes financial institutions more willing to provide financing to them and provide more favorable credit terms. In contrast, companies with poor ESG performance may face higher funding costs and tighter credit conditions, increasing the incentive to leverage. ESG considerations are also often closely related to long-term investment and sustainability. Financial institutions may be more willing to provide long-term stable financing support to ESG-focused firms, while also paying more attention to these firms' financial transparency and risk management practices. This long-term stability of funding support may reduce the incentive for firms to engage in short-term leverage. Enterprise ESG can also influence leverage manipulation by influencing the level of digitization of the enterprise. Digitization level refers to the development degree and application level of an enterprise in information technology and digitalization. Digital technologies can provide more accurate, timely and comprehensive data collection, analysis and reporting capabilities, helping to improve financial transparency. Good ESG practices require companies to

disclose and report on their environmental, social, and governance data, and digital technologies can support companies in achieving this goal. By providing more accurate and reliable data, the level of digitization may reduce the opportunities for financial manipulation by companies and increase trust among investors and financial institutions. At the same time, digital technology can help enterprises strengthen risk management and internal controls, thereby reducing the risk of manipulation. Businesses can leverage digital tools such as data analytics, automated processes, and intelligent monitoring to monitor and manage risk and reduce opportunities for financial manipulation. Good ESG practices often require organizations to establish effective risk management and internal control mechanisms, and digitalization can help achieve this goal. In terms of business operation, digital technology can improve the efficiency of corporate governance and improve the effectiveness of information disclosure, decision-making and supervision. Through digital tools and platforms, companies can achieve more efficient, transparent and timely communication and decision-making, thereby improving the quality of governance. Good ESG practices require enterprises to establish effective governance structures and processes, and digitalization can support enterprises to achieve this goal and reduce improper leverage manipulation.

Hypothesis 2: Firm ESG influences leverage manipulation by influencing the firm's credit mechanism and digitization level.

3. Sample Selection and Empirical Design

3.1. Sample Selection and Data Sources

In this paper, A-share listed companies in Shanghai and Shenzhen stock markets from 2008 to 2022 are selected as the original samples, and all the original data of listed companies are from CSMAR database and combined. Based on the research object of this paper, the further screening process of the samples is as follows: (1) The samples of the financial industry are excluded according to the industry classification code of China Securities Regulatory Commission 2012; (2) Samples of ST enterprises were excluded during the study period; (3) Samples with asset-liability ratio greater than 1 were excluded; (4) In order to eliminate the influence of extreme values on empirical analysis, this paper carries out 1% tailing treatment for all continuous variables. After processing and screening, a total of 29841 observations of 4057 listed companies were obtained in this paper.

3.2. Enterprise ESG Performance

In this paper, a third-party evaluation agency is used to measure the ESG performance of enterprises. The value of the ESG evaluation system ranges from 1 to 9. The higher the score, the better the ESG performance.

3.3. Degree of Corporate Leverage Manipulation

In order to test the investment efficiency effect mechanism of state-owned capital participation in reducing the financial risk of private enterprises, this paper refers to the research of Li Bingxiang et al. (2023), and uses the anticipation model method under the basic XLT-LEVM method to estimate the degree of leverage manipulation (LEVM), that is, only the leverage manipulation using off-balance sheet liabilities and

real debt means is considered. The specific algorithm is as follows:

$$LEVM_{i,t} = \frac{(DEBTB_TOTAL_{i,t} + DEBT_OB_{i,t} + DEBT_NSRD_{i,t})}{(ASSETB_TOTAL_{i,t} + DEBT_OB_{i,t}) - LEVB_{i,t}}$$

LEVM is the degree of leverage manipulation, DEBTB_TOTAL is the total book liabilities of the enterprise, DEBT_OB is the total off-balance sheet liabilities of the enterprise, DEBT_NSRD is the total real debts of the enterprise's named stocks, ASSETB_TOTAL is the total book assets of the enterprise, LEVB is the book leverage ratio of the enterprise. The expectation model method is used to measure the total off-balance sheet liabilities (DEBT_OB) and the total real debts of nominal stocks (DEBT_NSRD). The calculation method and steps of the index of total off-balance sheet liabilities (DEBT_OB) are as follows: (1) According to model (2), Tobit regression is carried out by year and industry, and the residual of model (2) is calculated. If the residual is less than 0, the total off-balance sheet liabilities are 0; If the residual is greater than 0, the total off-balance sheet liabilities are equal to the difference between the total real assets and the total book assets. Where, total real assets equal sales revenue divided by the expected total asset turnover estimated by model (2).

3.4. Empirical Model Setting

The bidirectional fixed-effect panel model (TWFE) is used

for empirical analysis. The model construction is shown in equation (1):

$$LEVM_{it} = \alpha_0 + \alpha_1 ESG_{it} + \alpha_2 X_{it} + \gamma_t + \mu_i + \varepsilon_{it} \quad (1)$$

Where, subscript it represents the enterprise and the core explanatory variable of the year ESG_{it} respectively is the ESG performance score of listed company i in year t . The data source is China Securities ESG evaluation system, and the value ranges from 1 to 9. The higher the value, the better the ESG performance of the enterprise; The explained explanatory variable $LEVM_{it}$ is the leverage manipulation level of listed companies, and the specific structure is shown above. Therefore, α_1 is the core parameter to be estimated in this paper. In addition, in the model, X_{it} is the control variable set at the enterprise level, specifically set as described below. γ_t , μ_i are the fixed effect of the year and the fixed effect of the individual firm respectively. ε_{it} is the random disturbance term of the model. Finally, the White heteroscedasticity robust standard error is used for all statistical inferences in this paper.

3.5. Control Variables and Their Definitions

In order to reduce the endogenous bias caused by missing variables, this paper further controls a series of control variables. The detailed definition of variables is shown in Table 1, and the specific descriptive statistical characteristics of each variable are shown in Table 2.

Table 1. The variable types, names, and detailed definitions

type of variable	Variable name	Letters indicated	Variable definition description
explained variable	Corporate leverage manipulation	LEVM	The degree of lever manipulation was estimated using the expected model method under the basic XLT-LEVM method
Core explanatory variables	Enterprise ESG performance	ESG	According to the ESG performance scores of listed companies in the same year released by the ESG third-party evaluation agency
controlled variable	enterprise scale	Size	Ln (The total assets of the enterprise at the end of the current year)
	asset-liability ratio	Leverage	The asset-liability ratio of the enterprise in the current year
	enterprise age	Age	Enterprise listing years
	Business performance	ROA	Enterprise return on assets of the year
	Size of fixed assets	FATA	The proportion of fixed assets of enterprises
	Enterprise ownership	SOE	Virtual variable: If the enterprise belongs to a state-owned enterprise, it is assigned 1, otherwise 0
	Board size	Boardsize	Ownership ratio of the board of directors
	Equity concentration	SHRCR1	Enterprise in that year the largest shareholder shareholding ratio

Table 2. Descriptive statistics

	sample capacity	mean value	standard deviation	least value: minimum	median	crest value
LEVM	29841	0.12	0.229	0	0.039	1.792
ESG	29841	4.095	1.044	0	4	8
Size	29841	22.273	1.303	17.641	22.089	28.636
Leverage	29841	0.446	0.199	0.01	0.438	0.999
Age	29841	2.196	0.781	0	2.303	3.497
ROA	29841	0.034	0.167	-1.856	0.035	22.005
FATA	29841	0.219	0.163	0	0.186	0.971
SOE	29841	0.373	0.484	0	0	1
Boardsize	29841	00.124	0.186	0	0.003	1.314
SHRCR1	29841	0.339	0.149	0.003	0.315	0.9

3.6. Collinearity Test Between Variables

Before the empirical regression analysis, it is necessary to analyze the correlation results among the main research

variables. The correlation test results of the core explanatory variables and control variables are shown in Table 3. As can be seen from the correlation coefficient matrix in Table 3, the correlation coefficient between the core explanatory variable

and each control variable is not large, so there is no systematic bias caused by the problem of high collinearity in the

statistical inference of this paper.

Table 3. of the correlation coefficient matrix among the variables

	ESG	Size	Leverage	Age	ROA	FATA	SOE	Boardsize	SHRCR1
ESG	1								
Size	0.25*	1							
Leverage	-0.09*	0.44*	1						
Age	-0.08*	0.37*	0.34*	1					
ROA	0.07*	0.00	-0.12*	-0.06*	1				
FATA	-0.05*	0.08*	0.07*	0.10*	-0.03*	1			
SOE	0.07*	0.34*	0.28*	0.44*	-0.03*	0.19*	1		
Boardsize	0.07*	-0.31*	-0.30*	-0.55*	0.04*	-0.15*	-0.49*	1	
SHRCR1	0.11*	0.21*	0.06*	-0.08*	0.05*	0.09*	0.21*	-0.09*	1

Table 4. Benchmark stepwise regression results

VARIABLES	(1) LEVMM	(2) LEVMM	(3) LEVMM
ESG	-0.007*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Size		-0.002 (0.002)	-0.002 (0.002)
Leverage		0.135*** (0.011)	0.135*** (0.011)
Age		-0.018*** (0.002)	-0.018*** (0.002)
ROA		0.041 (0.032)	0.041 (0.032)
FATA		0.028*** (0.011)	0.028*** (0.011)
SOE		-0.006* (0.004)	-0.006* (0.004)
Boardsize		-0.021** (0.009)	-0.021** (0.009)
SHRCR1		-0.043*** (0.010)	-0.043*** (0.010)
Constant	0.149*** (0.006)	0.181*** (0.029)	0.181*** (0.029)
Year FE	No	No	Yes
Industry FE	No	No	Yes
Observations	29,841	29,841	29,841
R-squared	0.001	0.020	0.020

Note: The observed value is at the enterprise level. ***, **, * Is significant at 1%, 5%, and 10%, respectively. Numerical heteroscedasticity of robust standard error in parentheses. "Yes" represents controls for this fixed effect and "No" represents controls not for this fixed effect.

4. Empirical Result

4.1. Basic Empirical Results

Table 4 shows the benchmark stepby-step regression results of equation (1) in this paper, and the explained variables are LEVM, the degree of leverage manipulation of the enterprise. Where, column (1) does not control any variables; Column (2) considers various control variables at the enterprise level; Column (3) Further add the two-way fixed effect of industry and year. Benchmark regression results from Table 4 show that for all the core explanatory variables in all columns, ESG estimation coefficients are significantly negative at the statistical level of 1%. This result indicates that ESG performance significantly reduces the degree of leverage manipulation. This conclusion is highly robust under the control of various dimensions.

4.2. Robustness Test

Table 5. Robustness test: replace the corporate leverage manipulation measure

	(1)	(2)	(3)	(4)	(5)
VARIABLES	LEVMI	ExpLEVMI	ExpLEVMI	ExpLEVMI	ExpLEVMI
ESG	-0.003*** (0.001)	-0.005*** (0.001)	-0.003*** (0.001)	-0.004*** (0.002)	-0.002** (0.001)
Size	-0.005*** (0.001)	-0.002 (0.002)	-0.005*** (0.001)	-0.000 (0.002)	-0.003*** (0.001)
Leverage	0.057*** (0.006)	0.140*** (0.011)	0.060*** (0.006)	0.117*** (0.013)	0.036*** (0.008)
Age	0.006*** (0.001)	-0.018*** (0.002)	0.005*** (0.001)	-0.020*** (0.002)	0.003** (0.001)
ROA	0.037 (0.028)	0.042 (0.032)	0.037 (0.028)	0.108** (0.054)	0.095** (0.046)
FATA	0.022*** (0.006)	0.038*** (0.011)	0.031*** (0.006)	0.017 (0.011)	0.013** (0.006)
SOE	-0.006*** (0.002)	-0.006* (0.004)	-0.006*** (0.002)	-0.003 (0.004)	-0.003 (0.002)
Boardsize	-0.029*** (0.005)	-0.020** (0.009)	-0.029*** (0.005)	-0.018** (0.009)	-0.027*** (0.005)
SHRCR1	0.047*** (0.005)	-0.045*** (0.010)	0.045*** (0.005)	-0.043*** (0.010)	0.049*** (0.006)
Constant	0.177*** (0.016)	0.176*** (0.029)	0.173*** (0.016)	0.145*** (0.031)	0.138*** (0.019)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	29,841	29,841	29,841	29,841	29,841
R-squared	0.029	0.021	0.031	0.021	0.034

4.3. Endogeneity Discussion

Although the bidirectional fixed-effect model is used in this paper to estimate and control the industry characteristics that do not change at any time, some potential unobtrusive characteristics and measurement errors will still cause endogenous problems and affect the estimation results. Based on this, this paper uses the ESG mean iv of other enterprises in the same industry in the same year as the instrumental variable of the digital economy development of the city where the enterprise is located. First, the instrumental variable satisfies the correlation: the ESG of the same industry has a high correlation with the same year; Secondly, the instrumental variable also satisfies the externality. The ESG of other enterprises in the same industry in the same year can hardly directly affect the decision-making and leverage manipulation degree of the enterprise. The estimated results of the instrumental variables are shown in Table 6: Column (1) is the estimated results of the first stage, iv is positively correlated with the statistical level of 1% of the enterprise's own ESG performance, which is in line with expectations. The F test also shows that there is no weak instrumental variable problem. Column "(2) is the result of the second stage estimate, which is still significantly negative. Therefore, the core result of this paper remains even after considering the potential endogeneity problem.

Table 6. for instrumental variable estimates

VARIABLES	(1)	(2)
	ESG	LEVMI
iv	0.407*** (0.024)	
ESG		-0.035** (0.014)
Size	0.296*** (0.006)	0.004 (0.004)
Leverage	-0.938*** (0.037)	0.128*** (0.016)
Age	-0.205*** (0.009)	-0.023*** (0.004)
ROA	1.387*** (0.116)	0.236*** (0.030)
FATA	0.076* (0.041)	0.034*** (0.011)
SOE	0.270*** (0.014)	0.003 (0.005)
Boardsize	0.472*** (0.036)	-0.006 (0.011)
SHRCR1	0.046 (0.039)	-0.050*** (0.010)
Kleibergen-Paap rk Wald F statistic	294.730	
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	29,146	29,146
R-squared	0.208	-0.000

4.4. Heterogeneity discussion

Table 7. Of Regional heterogeneity

	(1)	(2)	(3)
VARIABLES	LEV_M	LEV_M	LEV_M
	Eastern region	Central region	Western region
ESG	-0.005*** (0.002)	-0.005 (0.004)	-0.000 (0.004)
Size	-0.003* (0.002)	-0.001 (0.005)	-0.003 (0.004)
Leverage	0.130*** (0.012)	0.114*** (0.028)	0.179*** (0.027)
Age	-0.019*** (0.003)	-0.017** (0.007)	-0.009 (0.006)
ROA	0.029 (0.027)	0.183*** (0.063)	0.195*** (0.049)
FATA	0.023* (0.013)	0.114*** (0.025)	-0.014 (0.028)
SOE	-0.007 (0.004)	-0.000 (0.009)	0.010 (0.010)
Boardsize	-0.014 (0.010)	-0.069*** (0.026)	-0.034 (0.025)
SHRCR1	-0.032*** (0.011)	-0.091*** (0.026)	-0.072*** (0.027)
Constant	0.209*** (0.034)	0.161* (0.088)	0.139* (0.077)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	20,761	4,049	3,874
R-squared	0.020	0.033	0.043

Table 8. Heterogeneity of property rights of enterprises

	(1)	(2)
VARIABLES	LEV_M	LEV_M
	State-owned enterprise	Non-state-owned enterprise
ESG	-0.007*** (0.003)	-0.006*** (0.002)
Size	-0.003 (0.002)	-0.001 (0.002)
Leverage	0.141*** (0.016)	0.148*** (0.014)
Age	-0.009** (0.004)	-0.020*** (0.003)
ROA	0.264*** (0.041)	0.032 (0.028)
FATA	0.014 (0.016)	0.049*** (0.015)
Boardsize	0.042 (0.081)	-0.024*** (0.009)
SHRCR1	-0.077*** (0.016)	-0.024* (0.012)
Constant	0.193*** (0.042)	0.146*** (0.042)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	11,126	18,715
R-squared	0.027	0.024

4.5. Mechanism Analysis

Why does a firm's ESG performance influence leverage? In order to verify the influencing mechanism, the following

intermediary effect model is set up for analysis:

$$Z_{it} = \gamma_0 + \gamma_1 ESG_{it} + \gamma_2 X_{it} + \gamma t + \mu_i + \epsilon_{ict} \quad (2)$$

$$LEVE_{it} = \delta_0 + \delta_1 ESG_{it} + \rho Z_{it} + \delta_2 X_{it} + \gamma t + \mu_i + \epsilon_{ict} \quad (3)$$

Where Z_{it} is the mediation variable. Equation (2) is the first step of the mediating effect model. γ_1 mainly examines the influence of core explanatory variables on mediating variables. Formula (3) is the second step of the intermediary effect model. ρ Examine the influence of the mediator variable on the core explained variable. If the model satisfies both the significance of γ_1 in equation "(2) and the significance of ρ in equation" (3), it indicates that Z_{it} plays an intermediary role. According to the previous literature review and theoretical analysis, this paper will discuss the mechanism from the following two aspects.

4.6. Enterprise Credit Mechanism

Corporate credit measure: The sum of short-term and long-term borrowings to total assets. The results in column (1) of Table 9 show the regression of ESG to Loan_bank, and the ESG coefficient is significantly negative at 1%, which indicates that the ESG performance of enterprises relieves the capital pressure and reduces the dependence on the credit of the banking sector. Further, the results of column (2) of Table 9 show that the higher the bank credit Loan_bank of an enterprise, the greater the degree of manipulation of its own supply chain. To sum up, this mechanism can be verified: ESG weakens the leverage manipulation motivation of enterprises by reducing their own credit level.

Table 9. Mechanism Analysis 1: Enterprise credit

	(1)	(2)
VARIABLES	Loan_bank	LEV_M
Loan_bank		0.484*** (0.021)
ESG	-0.001** (0.001)	-0.004*** (0.001)
Size	0.002** (0.001)	-0.003** (0.001)
Leverage	0.424*** (0.004)	-0.070*** (0.010)
Age	-0.003*** (0.001)	-0.016*** (0.002)
ROA	-0.033*** (0.010)	0.058 (0.036)
FATA	0.150*** (0.004)	-0.045*** (0.011)
SOE	-0.015*** (0.001)	0.001 (0.004)
Boardsize	0.012*** (0.003)	-0.026*** (0.009)
SHRCR1	-0.047*** (0.004)	-0.021** (0.010)
Constant	-0.079*** (0.013)	0.219*** (0.029)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	29,841	29,841
R-squared	0.533	0.054

4.7. Enterprise Digital Transformation

First, refer to academic papers and policy documents on the digital economy to build a thesaurus of digital transformation keywords. Second, referring to Wu Fei et al. "(2021), Fang Mingyue et al." (2022), digital technology is divided into four categories according to the types and application departments of digital technology: big data technology, including the keyword "big data" cloud computing "; Intelligent manufacturing, including keywords "artificial intelligence" integrated control, etc.; Internet business model, including keywords "e-commerce", mobile Internet, etc.; Information technology, including key words "information" industrial communication. Finally, according to the digital transformation lexemes, the proportion of the keywords "management discussion and analysis" in all words in the annual reports of listed companies is calculated, and the enterprise digital transformation variable `digital_funeng` is constructed for empirical analysis. In Table 10, the models control for all control variables and two-way fixed effects. First, it can be seen from column (1) that the estimation coefficient of `digital_funeng` is significantly positive at the statistical level of 1%, that is, the enterprise ESG performance significantly promotes its own degree of digital transformation. Further observe the estimated results of column (2): the estimated coefficient of `digital_funeng` is -0.034, which is significantly negative at the statistical level of 1%, indicating that the enterprise's digital transformation inhibits the enterprise's own leverage manipulation. Therefore, this mediation path is validated.

Table 10. Mechanism Analysis 2: Digital transformation of enterprises

VARIABLES	(1) digital_funeng	(2) LEVMM
digital_funeng		-0.034*** (0.010)
ESG	0.010*** (0.001)	-0.006*** (0.002)
Size	0.002** (0.001)	-0.005*** (0.002)
Leverage	-0.006 (0.006)	0.160*** (0.011)
Age	-0.005*** (0.002)	-0.017*** (0.002)
ROA	-0.022** (0.011)	0.179*** (0.020)
FATA	-0.136*** (0.005)	0.039*** (0.011)
SOE	-0.001 (0.002)	-0.004 (0.004)
Boardsize	0.001 (0.006)	-0.023*** (0.009)
SHRCR1	-0.049*** (0.006)	-0.057*** (0.010)
Constant	0.064*** (0.016)	0.239*** (0.031)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	27,237	27,237
R-squared	0.378	0.025

5. Conclusion and Suggestion

5.1. Research Conclusions

In this paper, the A-share listed companies of Shanghai and Shenzhen stock markets from 2008 to 2022 are selected as the original samples, and all the original data of listed companies are from the CSMAR database to explore the impact of ESG performance on corporate leverage manipulation and its mechanism. The results show that: First, ESG performance significantly reduces the degree of leverage manipulation; Second, mechanism analysis shows that good ESG performance can reduce the degree of leverage manipulation by influencing the credit mechanism and the level of familiar language transformation of enterprises. Third, the inhibitory effect of good ESG performance on corporate leverage manipulation is heterogeneous, and the inhibitory effect of corporate ESG performance on corporate leverage manipulation is more significant in the central and eastern regions and state-owned enterprises. After passing a series of robustness tests, the above conclusion is still robust.

5.2. Countermeasures and Suggestions

At the enterprise level, enterprises should strengthen internal control and governance mechanisms to ensure the authenticity and accuracy of financial data. By establishing an effective internal audit system and supervision mechanism, the possibility of manipulating financial data can be reduced and the financial transparency of enterprises can be improved. At the same time, clear ESG policies and objectives are developed and integrated into the corporate governance structure and performance evaluation system. By setting goals and incentives related to ESG, management can be guided to pay more attention to ESG practices and reduce reliance on short-term financial manipulation. Companies can establish independent oversight bodies and anonymous reporting channels to enable employees and stakeholders to report and monitor potential leverage manipulation. This helps detect and prevent manipulation in a timely manner. At the government level, governments and regulators can push companies to establish more comprehensive and transparent ESG disclosure mechanisms, including environmental, social and governance data reporting. Through standardized information disclosure requirements, companies can increase the transparency of ESG and reduce the possibility of data manipulation. The government can also work with the industry to establish an objective and scientific ESG evaluation and ranking system to evaluate and compare the ESG performance of enterprises. Such a system could serve as a reference for investors, regulators, and the public to encourage firms to improve their ESG performance and reduce incentives for financial manipulation. Governments and financial institutions can work together to promote the idea of long-term investment and encourage investors to focus on long-term value creation rather than short-term profits. Long-term investors are more likely to focus on ESG performance, which helps reduce leverage for short-term gain. In addition to strengthening the supervision and management of enterprises themselves, the government should also strengthen the supervision and law enforcement of the authenticity and compliance of financial statements, and severely crack down on any form of financial manipulation. The establishment of effective regulatory mechanisms and punishment measures can reduce the risk of improper leverage manipulation by enterprises and safeguard market

order and investors' rights and interests. The comprehensive implementation of the above countermeasures and suggestions can help enterprises reduce the risk of leverage manipulation behavior, promote enterprises to pay more attention to ESG practice, and then promote enterprises to develop in a more sustainable and responsible direction.

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