

Employee equity incentive and Enterprises' ESG performance: An empirical study of Chinese A-share listed companies

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Abstract. There are some externalities in enterprise ESG practice, which will lead to insufficient investment in enterprise ESG. Internalizing the externalities of ESG is crucial to enhancing the practice ability of ESG and stimulating the internal motivation of enterprises. Based on the panel data of Shanghai and Shenzhen A-share listed companies from 2008 to 2020, this paper conducts an empirical analysis on the impact and mechanism of employee equity incentive on ESG performance of enterprises. The findings are as follows: (1) Employee equity incentive can significantly promote the ESG performance of enterprises and it is highly stable under the control of various dimensions. (2) The implementation of employee equity incentive in non-state-owned enterprises and enterprises with large market power has a stronger effect on promoting the ESG performance of enterprises; (3) Mechanism analysis shows that employee equity incentive can promote the ESG performance of enterprises by increasing the share of labor income and promoting the improvement of enterprise production efficiency. From the perspective of employee equity incentive, this paper provides theoretical support for improving the ESG performance of Chinese enterprises and promoting the ESG development path, which has both theoretical and practical significance.

Keywords: employee equity incentive, enterprise ESG performance, sustainable development.

1. Introduction

The report of the 20th National Congress of the Communist Party of China pointed out that high-quality development is the primary task of comprehensively building a modern socialist country. It is necessary to adhere to the theme of high-quality development and improve economy both in quality and quantity. The high-quality development of economy and society is one of the themes of the current era. As the main body of the market and the cell of the national economy, enterprises play an important role in promoting social innovation and development, enhancing social and economic benefits, and maintaining social harmony and stability. Countries around the world pay more and more attention to the ESG performance of enterprises in terms of Environmental, Social and Governance. Promoting the development of enterprise ESG is of great significance for implementing China's new development concept of "innovation, coordination, green, open and sharing". It also helps with constructing a new development pattern of "dual cycle" of China's economy and realizing the national strategy of "dual carbon" goals. Good corporate ESG performance also helps establish a good corporate image, enhance corporate value and attract investors' attention, which has important theoretical and practical significance for the development of enterprises themselves. Factors affecting ESG performance of enterprises can be summarized into macro factors and micro factors. The macro level mainly includes four aspects: political system, economic system, cultural system and legal system. The micro level is roughly divided into company characteristics and executive characteristics.

The complete principal-agent chain in the enterprise includes three parts: shareholders, executives and employees. As the core stakeholders of an enterprise, employees are an important factor affecting the development of an enterprise and their efforts will also affect the realization of the value of their principal (senior executives) and ultimate principal (shareholders) (Jiang Yingbing and Yu Yaping, 2017). The existence of principal-agent problems may lead to short-sighted behaviors of employees, who tend to pursue short-term financial performance improvement and pay less attention to environmental, social and governance investment, thus affecting the ESG performance of enterprises. Therefore, it is necessary for operators to get part of shares or options to solve the problem of

information asymmetry in corporate governance. It is also an efficient way to maximize the professional level and prevent operators from harming the profits of the enterprise, which is an important factor affecting the ESG performance of enterprises. The report of the Party's 20th National Congress emphasizes that talent is the first resource. The implementation of employee stock ownership incentive is an effective means for enterprises to assume social responsibility, attract talents, develop talents and retain talents. In December 2005, the China Securities Regulatory Commission issued the Measures for the Management of Equity Incentives for Listed Companies (Trial Implementation), which for the first time set forth normative requirements for the basic requirements, implementation procedures and information disclosure for the implementation of equity incentive plans by listed companies. After more than 10 years of precipitation and development, in July 2016, the CSRC issued Order No. 126 "Measures for the Management of Equity Incentives for Listed Companies", which officially stipulated the implementation of equity incentives for listed companies and the restrictive conditions for individuals to participate in equity incentives. The measures have been officially implemented since August 13, 2016. In 2020, the Central Committee of the Communist Party of China and the State Council's "Opinions on Accelerating the Improvement of the Socialist Market Economic System in the New Era" pointed out that qualified mixed-ownership enterprises should be supported in establishing medium- and long-term incentive mechanisms such as key employee shareholding, equity incentives for listed companies, and equity and dividend incentives for technology-based enterprises.

The existing literature has conducted a useful exploration on the effectiveness of employee equity incentive, which mainly focus on the perspective of the impact of equity incentive on economic performance and economic behavior of enterprises. In terms of economic performance, domestic and foreign scholars believe that employee equity incentives may have a positive effect on performance (Kim and Ouimet, 2014) or may not (Shen Hongbo, 2018). In terms of economic behavior, some literatures believe that employee equity incentives may bring positive governance effects. For example, Jiang Yabing (2017) made use of the data of listed companies in China and found that the implementation of core employee equity incentives can promote enterprise innovation. It may also improve the internal control of enterprises (Wang Ye et al., 2021). Moreover, employees can reduce operational risks at the implementation level of business decision making (Bova et al., 2015). Li (2019) found that employees can use confrontational methods to restrain the behavior of executives, thus reducing agency costs. Some other literature points out that employee equity incentive may also have negative governance effects. For example, the quality of financial information will be reduced (Chen Dapeng et al., 2019) and audit fees will be increased (Song Chang, 2020). It can be seen that domestic and foreign scholars have disputes about the effectiveness of employee equity incentives and almost no literature focuses on the specific issue of employee equity incentives on enterprise ESG performance.

To sum up, it is of great practical significance to explore the impact of equity incentive on ESG performance of enterprises. On this basis, this paper takes the panel data of Shanghai and Shenzhen A-share listed companies in China from 2008 to 2020 as samples to empirically test the impact and mechanism of employee equity incentive on ESG performance of enterprises. The findings are as follows: (1) Employee equity incentive can significantly promote the ESG performance of enterprises and it is highly stable under the control of various dimensions. (2) The implementation of employee equity incentive in non-state-owned enterprises and enterprises with large market power has a stronger promoting effect on enterprise ESG performance. (3) Mechanism test shows that employee equity incentive can promote the ESG performance of enterprises by increasing the share of labor income and promoting the improvement of enterprise production efficiency.

Compared with the existing literature, the possible marginal contributions of this paper are as follows: Firstly, it includes employee equity incentive and enterprise ESG performance into the same analytical framework and studies the promoting effect of employee equity incentive on improving enterprise ESG performance from the perspective of building and enhancing enterprise ESG practical ability, which has expanded the existing research on the influencing factors of enterprise ESG

performance. At present, the domestic and foreign researches on the influencing factors of ESG mainly focus on the degree of corruption, level of economic development, the size of power distance, whether cross-listing and CEO characteristics. This paper shift the attention to the internal perspective of employee stock ownership incentive and expands the research on ESG performance of enterprises from the micro-factor level. It provides new ideas for enterprises to improve ESG performance and fills the gap in this perspective of existing research to a certain extent. Secondly, starting from the enterprises ESG performance, this paper has enriched the evaluation dimension of economic consequences of employee equity incentive. Thirdly, this paper deeply reveals the mechanism of employee equity incentive to boost ESG performance from two channels of labor income share and enterprise production efficiency. To a certain extent, it opens the black box of the causal relationship between employee equity incentives and corporate ESG performance, which has practical significance.

The follow-up structure of this paper is as follows: The second part is the review and discussion of relevant literature and the proposal of theoretical hypotheses. The third part introduces sample selection, variable definition and empirical design. The fourth part reports the empirical test results. The fifth part carries on the further mechanism analysis. Finally, summarize the full text and put forward the policy implications.

2. Literature review and theoretical hypothesis

2.1. Employee stock ownership incentives and corporate ESG performance

Employee equity incentive refers to the long-term incentive of the company to employees other than directors, supervisors and senior managers based on the company's stock. The subject matter of incentive includes stock options and restricted stock (Chen Yanyan and Guo Ran, 2017). The existing literature on employee stock incentive mainly talked about two aspects: implementation motivation and economic consequences.

In terms of implementation motivation, enterprises may carry out employee equity incentives for incentive or non-incentive purposes. On the one hand, enterprises may implement equity incentive out of incentive motivation. As a long-term incentive method, employee equity incentive can enrich the ways for employees to participate in corporate governance, enhance their sense of identity, improve their work effort, connect employee wealth with corporate value, encourage employees to take actions in line with corporate interests, and reduce agency costs (Oyer& Schaefer, 2005). On the other hand, enterprises may also implement equity incentives for non-incentive motives. For example, Cheng Zhigang (2020) found that behind the purpose of incentives lies the defensive motivation of major shareholders. Enterprises that human capital counts more or owns a higher degree of marketization and private enterprises are more willing to attract and retain employees (Chen Yanyan,2015). Financing constraints are positively correlated with equity incentives (Core &Guay, 2001). Babenko& Tserlukevich (2009) believe that employee equity incentive can bring tax benefits.

In terms of economic consequences, existing studies have found that equity incentive has both positive and negative impacts on enterprise economy. The "effective incentive view" holds that employee equity incentive can bring positive economic consequences. For example, Li Ming and Huang Xia (2017) used the data of China's A-share listed companies to prove that employee equity incentive has a positive effect on enterprise performance. Meng Qingbin (2019) found that the implementation of equity incentives for employees can improve the innovation output of enterprises. Employee equity incentive inhibits enterprise violations by strengthening internal supervision and improving the information environment (Yu Lianchao et al.,2022). Wu Qiusheng (2023) believes that equity incentives can positively increase the labor income share of enterprises. However, there are also empirical data that challenge the "effective incentive view". For example, Alchian & Demsetz (1972) believed that the wide range of employee equity incentives would lead to free-rider phenomenon, resulting in incentive failure. Ealeve et al. (2006) found that equity gives employees the right to speak in corporate governance and is more likely to exceed the goal of maximizing

shareholder value. In contrast, listed companies with more employees' right to speak have less long-term investment and are less willing to take risks, resulting in lower total factor productivity. Jones et al. (2010) used the panel data of Finland to show that employee equity incentives are not necessarily related to enterprise production efficiency.

Due to frequent social problems, the public has begun to pay attention to the balance between economic value and social value of enterprises. The concept of sustainable development represented by ESG has been paid more and more attention and the performance of enterprises' ESG has increasingly become the basis for investors' decisions (Fang Xianming, 2023). Based on the stakeholder theory, most studies believe that good ESG performance of enterprises can obtain the support of stakeholders, thereby enhancing enterprise value and easing financing constraints (Flammer, 2015). However, the ESG practice of enterprises has some problems like externalities and insufficient investment. On the one hand, the investment of enterprises in environmental and social commitment will waste the resources of enterprises, increase the extra expenses of enterprises, and bring "negative effects" to enterprises. Thus, it can weaken the competitiveness of enterprises and damage the interests of shareholders (Friedman, 2007; Garcia & Qrsato, 2020). On the other hand, due to resource constraints, backward technical means and information asymmetry with stakeholders, a large number of enterprises in ESG practice have insufficient ability and money to improve ESG performance, which leads to insufficient incentives for ESG (Hu Jie et al., 2023). As one of the effective ways of enterprise internal governance, employee stock ownership incentive provides a new way to solve this problem. First of all, employee equity incentive can stimulate the share of labor income (Wu Qiusheng, 2023) and alleviate the agency cost generated by the principal-agent relationship between shareholders and employees (Holmstrom & Milgrom, 1994) that is the third type of agency cost (Li Lianwei, 2022). Hence, it can improve internal corporate governance and enhance corporate ESG performance. Secondly, as a key part of the enterprise's output, employees equity incentive can stimulate their production enthusiasm, improve the enterprise's production efficiency, achieve better corporate performance, and thus better fulfill their social responsibilities and improve the enterprise's ESG performance. Therefore, the core hypothesis can be proposed.

H1: Employee equity incentive can effectively improve enterprise ESG performance.

2.2. Influence mechanism

2.2.1 Employee equity incentive, labor income share and corporate ESG performance

According to the stakeholder theory proposed by Freeman, employees are one of the core stakeholders of enterprises. Establishing a fairer salary system and improving employee welfare and satisfaction is a key part of ESG construction (Fang Xianming, 2020). Wu Qiusheng (2023) found that employee equity incentives can help increase the labor income share of enterprises. This impact is more significant in non-state-owned enterprises and profit-making enterprises. The main characteristics of equity incentive, namely, equity incentive intensity, scope, validity period, and exercise performance assessment pressure, can positively increase the labor income share of enterprises.

The increase of labor income share has both incentive effect and cost effect. On the one hand, the increase of labor remuneration encourages workers to increase their investment in education, vocational training and medical care, which helps to accumulate human capital and thus improve the value creation ability of workers. On the other hand, by delivering positive signals to workers, it can enhance their sense of fairness in pay and their sense of belonging to the company, so as to motivate them to work hard, promote enterprise development and improve enterprise performance (Zhang Yan, 2023) and improve enterprise ESG performance. But the rising labor costs caused by labor income share may force enterprises to relieve the pressure caused by rising labor costs through improving labor productivity, developing new products or services, and adopting new technologies, so as to ensure corporate profits and competitiveness (Dong Xinxing, 2016). Technological progress and innovation are conducive to improving corporate ESG performance. In addition, employees and the company form a community of interests through profit sharing, which can exert the effect of internal

supervision, improve the information environment, strengthen internal governance, reduce corporate violations, and improve corporate ESG performance. Therefore, following hypothesis can be proposed:

H2: Employee equity incentive can promote the ESG performance of enterprises by increasing the share of labor income.

2.2.2 Employee equity incentive, enterprise production efficiency and enterprise ESG performance

The theory of human capital indicates that human resources are the driving force for the sustainable development of enterprises (Quimet et al., 2014). As a long-term incentive method, employee equity incentive can enhance the risk bearing ability of enterprises and employees (Murphy, 2003). It can also promote teamwork among employees, strengthen mutual supervision, and encourage information sharing (Baker et al., 1988; Hochberg et al., 2010) and thus lead to better internal governance. Jiang Yingbing (2017) holds that core employee equity incentive is conducive to improving enterprise innovation ability. The improvement of innovation ability can effectively reduce the production cost of enterprises, reduce the consumption of capital and labor, and then improve the production efficiency of enterprises. Good enterprise production efficiency means less waste of resources and more reasonable allocation of resources, which can encourage enterprises to better fulfill their environmental responsibilities, thereby obtaining better corporate ESG performance and capital market returns. The convergence of interests between employees and enterprises will also exert internal supervision effect, promote enterprises to improve ESG performance, and create a good corporate social responsibility image to convey positive market signals. Therefore, the following hypothesis can be proposed:

H3: Employee equity incentive can promote enterprise ESG performance by improving enterprise production efficiency.

3. Sample selection and empirical design

3.1. Sample selection and data sources

In this paper, A-share listed company panels of Shanghai and Shenzhen stock markets from 2008 to 2020 are selected as the original samples and combined. Based on the research object of this paper, the further screening process of samples is as follows: (1) The samples of the financial industry are excluded by screening according to the industry classification code of the 2012 edition of China Securities Regulatory Commission; (2) Samples of ST and PT 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. The original data of listed companies are from CSMAR database.

3.2. Variable selection and measurement

3.2.1 Explained variables

The ESG concept was first proposed by the United Nations Global Compact in June 2004, advocating that enterprises should consider the performance of the environment, society and governance while focusing on operations. As China's economy enters the stage of high-quality development, ESG in line with the concept of sustainable development has gradually received more and more attention. In this paper, a third-party evaluation agency, Huazheng ESG evaluation system 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.

3.2.2 Core explanatory variables

With reference to existing literature, the ratio of the number of restricted shares or stock options that can be unlocked by employees each year during the incentive validity period to the total number of shares of the company is used to measure the intensity of Employee equity incentive (Jiang Yingbing and Yu Yapping, 2017).

3.2.3 Control variables

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

Table 1 lists variable types, names, and detailed definitions

Variable Type	Variable Name	Alphabetic representation	Variable definition description
Explained variable	Enterprise ESG performance	ESG	According to the ESG performance score of the listed company released by the ESG third-party evaluation agency of China Securities
Core explanatory variable	Employee equity incentive	Employee	The ratio of the number of restricted stock or stock options that can be unlocked by an employee to the total number of shares in the company during the incentive validity period
	Enterprise scale	Size	ln(Total assets at the end of the current year)
	Asset-liability ratio	Leverage	Asset-liability ratio of enterprises in the current year
	Enterprise age	Age	Listed years
Control variable	Business performance	ROA	The return on assets of the enterprise in the current year
	Cash ratio	Cash	The ratio of cash held by enterprises in the current year
	Board independence	Indratio	The proportion of independent directors in the current year
	Ownership concentration	Top1	The shareholding ratio of the largest shareholder of the enterprise in that year
	Enterprise ownership	SOE	Dummy variable: If the enterprise belongs to the state-owned enterprise, the value is 1, otherwise 0
	Deficit state	Loss	Dummy variable: If the enterprise is a state-owned enterprise The value is set to 1, otherwise 0
	Audit quality	Audit	Dummy variable: 1 if the company was audited by the four major international firms in the year, otherwise 0
	Dual function	Dual	Dummy variable: if the general manager and chairman of the company are the same One person is assigned a value of 1, otherwise 0

3.3. Setting of empirical model

The two-way fixed effects model (TWFE) is used for empirical analysis. The model construction is shown in formula (1):

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

Among them, the subscript i and t represent the company and the year respectively. The explained variable ESG_{it} is the ESG performance score of listed company i in year t, and the data source is the ESG evaluation system of China Securities. The higher the value, the better the ESG performance of the enterprise. The core explanatory variable $Employee_{it}$ is the employee equity incentive

intensity in year t of the listed company i , and its specific structure is as shown above. Therefore, α_1 is the core parameter to be estimated in this paper. In addition, X_{it} is a set of control variables at the enterprise level, and the specific settings are as follows. γ_t and μ_i are year fixed effect and firm individual fixed effect 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.

4. Empirical results

4.1. Basic empirical results

Table 2 Descriptive statistics

	Sample Size	Mean value	Standard deviation	Minimum Value	Median	Maximum Value
ESG	26921	6.483	1.062	1	6	9
Employee	26921	0.039	0.149	0	0	0.826
Size	26921	22.084	1.288	19.35	21.901	26.395
Leverage	26921	0.422	0.209	0.027	0.414	0.936
Age	26921	9.54	7.125	0	8	27
ROA	26921	0.472	0.457	-0.581	0.396	2.696
Cash	26921	1.22	2.191	0.04	0.561	30.123
Indratio	26921	38.676	10.262	0	37.5	66.667
Top1	26921	0.35	0.149	0.082	0.33	0.758
SOE	26921	0.362	0.481	0	0	1
Loss	26921	0.029	0.168	0	0	1
Audit	26921	0.056	0.231	0	0	1
Dual	26921	0.26	0.439	0	0	1

Before the empirical regression analysis, the correlation analysis of the main study variables was carried out. The correlation test results of 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 highly collinear problem in the statistical inference of this paper.

Table 3 Correlation coefficient matrix among variables

	Employee	Size	Leverage	Age	ROA	Cash	Indratio	Top1	SOE	Loss	Audit	Dual
Employee	1											
Size	0.02*	1										
Leverage	-0.04*	0.52*	1									
Age	-0.09*	0.38*	0.38*	1								
ROA	-0.04*	-0.02*	0.11*	-0.02*	1							
Cash	-0.02*	-0.27*	-0.52*	-0.25*	-0.08*	1						
Indratio	-0.00	-0.06*	-0.03*	-0.07*	0.16*	0.06*	1					
Top1	-0.09*	0.20*	0.06*	-0.07*	0.11*	0.00	0.05*	1				
SOE	-0.17*	0.36*	0.31*	0.44*	0.12*	-0.15*	-0.03*	0.23*	1			
Loss	-0.01	-0.02*	0.08*	0.07*	-0.24*	-0.05*	-0.10*	-0.09*	-0.05*	1		
Audit	-0.01*	0.35*	0.12*	0.08*	0.03*	-0.06*	-0.01	0.14*	0.14*	-0.02*	1	
Dual	0.04*	-0.20*	-0.16*	-0.22*	-0.10*	0.11*	-0.01*	-0.03*	-0.26*	0.04*	-0.09*	1

Table 4 presents the results of the baseline stepwise regression of equation (2) of this paper, where the explanatory variables are all firms' ESG performance. In particular, column (1) does not incorporate any control variables. Column (2) incorporates two-way fixed effects. Column (3) further considers the important characteristics of firms and incorporates some column control variables. The baseline regression results in Table 4(3) show that the estimated coefficient of the core explanatory variable Employee is significantly positive at the 1% statistical level, implying that changes in the core explanatory variables significantly promote changes in the explained variables. This means employee equity incentives significantly contribute to firms' ESG performance, which validates Hypothesis H1.

Table 4 Results of baseline stepwise regression

VARIABLES	(1) ESG	(2) ESG	(3) ESG
Employee	0.084** (0.043)	0.178*** (0.042)	0.174*** (0.039)
Size			0.288*** (0.006)
Leverage			-0.786*** (0.040)
Age			0.001 (0.001)
ROA			0.040** (0.016)
Cash			0.000 (0.003)
Indratio			0.002*** (0.001)
Top1			-0.019 (0.042)
SOE			0.311*** (0.016)
Loss			-0.392*** (0.045)
Audit			0.172*** (0.028)
Dual			-0.044*** (0.013)
Constant	6.479*** (0.007)	6.476*** (0.006)	0.243* (0.130)
YearFE	No	Yes	Yes
IndustryFE	No	Yes	Yes
Observations	26,921	26,921	26,921
R-squared	0.000	0.096	0.233

Note: Observations are enterprise-level panel data. ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Values in brackets are White heteroscedastic robust standard error. "No" indicates that the fixed effect is not controlled, and "Yes" indicates that the fixed effect is controlled.

4.2. Robustness test

In order to verify the robustness of the core results of this paper, it is necessary to carry out a variety of robustness tests.

4.2.1 Consider the character of the city

First of all, due to the significant differences in economic, social and other factors in different cities, city-level variation factors may be important omitted variables under the analysis framework of this paper. Therefore, this paper adds control variables that can reflect important characteristics of cities to test the endogenous bias caused by missing variables. The control factors at city level in this article specifically includes: GDP(InGDP), industrial structure (measured by the proportion of output value of the tertiary industry, GDP3_ratio), the total at the end of the year Population (People) total foreign direct investment quota (FDI), local government fiscal expenditure (Infin), the above city-level data are from the "China City Statistical Yearbook" over the past years.

The regression results are shown in Table 5. The coefficient of the core explanatory variable employee equity incentive is significantly positive at the statistical level of 1%, which proves the robustness of the regression results in this paper.

Table 5 Robustness test I: Consider city characteristics

VARIABLES	(1) ESG	(2) ESG	(3) ESG	(4) ESG	(5) ESG
Employee	0.168*** (0.040)	0.178*** (0.042)	0.175*** (0.042)	0.172*** (0.046)	0.180*** (0.046)
lnGDP	0.022*** (0.006)	0.014* (0.008)	0.008 (0.010)	0.007 (0.017)	0.086*** (0.024)
GDP3_ratio		0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.003*** (0.001)
People			0.014 (0.012)	0.004 (0.013)	0.024* (0.014)
FDI				0.002 (0.008)	0.004 (0.008)
lnfin					-0.103*** (0.022)
Size	0.287*** (0.006)	0.291*** (0.006)	0.292*** (0.007)	0.289*** (0.007)	0.288*** (0.007)
Leverage	-0.782*** (0.040)	-0.783*** (0.042)	-0.781*** (0.042)	-0.776*** (0.044)	-0.772*** (0.044)
Age	0.002 (0.001)	0.003** (0.001)	0.003** (0.001)	0.003*** (0.001)	0.004*** (0.001)
ROA	0.035** (0.016)	0.025 (0.017)	0.023 (0.017)	0.020 (0.017)	0.019 (0.017)
Cash	-0.000 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.003 (0.003)	-0.002 (0.003)
Inratio	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)
Top1	-0.028 (0.043)	-0.013 (0.044)	-0.016 (0.044)	-0.028 (0.046)	-0.025 (0.046)
SOE	0.308*** (0.016)	0.288*** (0.016)	0.287*** (0.016)	0.263*** (0.017)	0.265*** (0.017)
Loss	-0.402*** (0.045)	-0.417*** (0.048)	-0.403*** (0.048)	-0.418*** (0.061)	-0.416*** (0.061)
Audit	0.156*** (0.028)	0.153*** (0.028)	0.148*** (0.028)	0.119*** (0.030)	0.125*** (0.030)
Dual	-0.047*** (0.014)	-0.053*** (0.014)	-0.053*** (0.014)	-0.054*** (0.015)	-0.052*** (0.015)
Constant	0.073 (0.138)	-0.027 (0.145)	-0.072 (0.148)	0.051 (0.158)	0.774*** (0.220)
YearFE	Yes	Yes	Yes	Yes	Yes
IndustryFE	Yes	Yes	Yes	Yes	Yes
Observations	26,570	24,575	24,279	21,637	21,634
R-squared	0.235	0.242	0.242	0.234	0.234

Note: Observations are enterprise-level panel data. ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Values in brackets are White heteroscedastic robust standard error. "Yes" means that the fixed effect is controlled.

4.2.2 Panel Tobit estimation

The two-way fixed effect model is adopted in this paper, but the distribution of the core explained variable ESG index is truncated and cannot be negative. Therefore, this paper adopts the constrained dependent variable model panel Tobit for robustness test.

The test results are shown in Table 6. The coefficient of Employee equity incentive (Employee) is significantly positive at the statistical level of 5%, indicating that employee equity incentive has a positive impact on enterprise ESG performance. Hypothesis H1 is still valid.

Table 6 Robustness test II: Panel Tobit estimates

VARIABLES	(1) ESG	(2) ESG
Employee	0.090** (0.035)	0.091** (0.039)
lnGDP		0.045 (0.034)
GDP3_ratio		0.003*** (0.001)
People		0.020 (0.025)
FDI		0.019** (0.009)
lnfin		-0.085*** (0.031)
Size	0.210*** (0.009)	0.211*** (0.010)
Leverage	-0.620*** (0.044)	-0.621*** (0.048)
Age	0.003** (0.002)	0.005*** (0.002)
ROA	0.035* (0.019)	0.023 (0.021)
Cash	0.001 (0.003)	-0.000 (0.003)
Indratio	0.000 (0.001)	0.001 (0.001)
Top1	0.231*** (0.059)	0.213*** (0.064)
SOE	0.251*** (0.024)	0.222*** (0.026)
Loss	-0.302*** (0.029)	-0.314*** (0.039)
Audit	0.209*** (0.037)	0.180*** (0.041)
Dual	-0.007 (0.015)	-0.021 (0.016)
Constant	1.380*** (0.207)	1.960*** (0.328)
YearFE	Yes	Yes
IndustryFE	Yes	Yes
Observations	26,921	21,634
Numberofscore	3,560	3,285

Note: Observations are enterprise-level panel data. ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Values in brackets are White heteroscedastic robust standard error. "Yes" means that the fixed effect is controlled.

4.3. Heterogeneity analysis

4.3.1 Nature of enterprise property rights

According to the ownership nature of enterprises, this paper conducts grouping regression for state-owned and non-state-owned enterprises and the regression results are shown in columns (1) and (2) of Table 7. The regression coefficient of employee equity incentive on ESG performance of state-owned enterprises is 0.329, but it is not significant. The regression coefficient for non-state-owned enterprises is 0.226, which is statistically significant at the 1% statistical level. That means employee equity incentive has a significant effect on the improvement of ESG performance of non-state-owned

enterprises while it has little impact on the ESG performance of state-owned enterprises. This is mainly due to the weaker governance capabilities of non-state-owned enterprises compared with state-owned enterprises. Employee equity incentive has a more significant promoting effect on the ESG performance of non-state-owned enterprises.

Table 7 Heterogeneity discussion 1: Nature of enterprise property rights

VARIABLES	(1) ESG	(2) ESG
	State-owned enterprise	Non-state-owned enterprise
Employee	0.329 (0.204)	0.226*** (0.040)
Size	0.315*** (0.009)	0.261*** (0.008)
Leverage	-0.854*** (0.067)	-0.713*** (0.051)
Age	0.001 (0.002)	-0.002 (0.001)
ROA	-0.013 (0.024)	0.091*** (0.022)
Cash	0.003 (0.008)	-0.005 (0.003)
Indratio	0.002 (0.001)	0.002*** (0.001)
Top1	-0.019 (0.072)	-0.102** (0.052)
Loss	-0.200** (0.092)	-0.404*** (0.051)
Audit	0.110*** (0.036)	0.251*** (0.043)
Dual	-0.098*** (0.032)	-0.029* (0.015)
Constant	0.043 (0.205)	0.802*** (0.177)
YearFE	Yes	Yes
IndustryFE	Yes	Yes
Observations	9,738	17,183
R-squared	0.247	0.167

Note: Observations are enterprise-level panel data. ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Values in brackets are White heteroscedastic robust standard error. "Yes" means that the fixed effect is controlled.

4.3.2 Enterprise market power

Referring to the research of Sun Xiaohua et al. (2020), this paper conducts a heterogeneity analysis on the differences in the price competitiveness of enterprises' products. And the difference between main business income and main business cost, sales expenses and management expenses is divided by main business income and other variables to reflect the price competitiveness of enterprise products. On this basis, the evaluation method of the company's market power in this paper is: if the company's Lerner index is higher than the industry median, it indicates that the company's market power is relatively large; otherwise, the company's market power is relatively small.

This paper conducts a sub-sample regression analysis according to the strength of the market power. The regression results are shown in columns (1) and (2) of Table 8. When the market power of the enterprise is strong, the regression coefficient of employee equity incentives on the ESG performance of the enterprise is 0.122, and it has a significant promotion at the level of 5% effect; in the case of weak market power of the enterprise, the regression coefficient is 0.047, but it is not significant. That is, in companies with strong market power, employee equity incentives have a stronger positive impact on corporate ESG performance.

Table 8 Heterogeneity discussion II: Firm market power

VARIABLES	(1) ESG	(2) ESG
	Strong market power	Weak market power
Employee	0.122** (0.057)	0.047 (0.071)
Size	0.268*** (0.010)	0.296*** (0.010)
Leverage	-0.591*** (0.066)	-0.777*** (0.066)
Age	0.002 (0.002)	0.002 (0.002)
ROA	0.121*** (0.038)	0.051** (0.022)
Cash	-0.000 (0.003)	-0.011 (0.008)
Indratio	0.002** (0.001)	0.002** (0.001)
Top1	-0.035 (0.063)	-0.236*** (0.068)
SOE	0.277*** (0.025)	0.291*** (0.024)
Loss	-0.892* (0.501)	-0.113 (0.267)
Audit	0.184*** (0.047)	0.126*** (0.041)
Dual	-0.014 (0.019)	-0.085*** (0.023)
Constant	0.679*** (0.218)	0.155 (0.200)
YearFE	Yes	Yes
IndustryFE	Yes	Yes
Observations	10,436	10,544
R-squared	0.232	0.232

5. mechanism analysis

The previous article verified that employee equity incentives can significantly improve the ESG performance of companies. In order to verify the important mechanism of influence, this paper sets up the following mediation effect model for further analysis:

$$Z_{it} = \gamma_0 + \gamma_1 Employee_{it} + \gamma_2 X_{it} + \gamma_t + \mu_i + \varepsilon_{it} \quad (2)$$

$$ESG_{it} = \delta_0 + \delta_1 Employee_{it} + \rho Z_{it} + \delta_2 X_{it} + \gamma_t + \mu_i + \varepsilon_{it} \quad (3)$$

Among them, Z_{it} is an intermediary variable. Equation (2) is the first step of the mediation effect model, and γ_1 mainly examines the influence of core explanatory variables on mediator variables. Equation (3) is the second step of the mediation effect model. ρ examines the influence of intermediary variables on the core explained variable ESG_{it} . If the model satisfies the significant γ_1 in formula (2) and the significant ρ in formula (3), it indicates that Z_{it} has a mediating effect. Based on the previous literature review and theoretical analysis, this article discusses the mechanism from two aspects: labor income share and enterprise total factor productivity.

5.1. Boosting labor income share

Based on the existing literature, this paper calculates the labor income share by dividing "cash paid to and for employees" in the cash flow statement by "total operating income" in the income statement.

In Table 9, the models control for all control variables and two-way fixed effects. It can be seen from column (1) that the estimated coefficient of the impact of the core explanatory variable Employee on the labor income share is 2.462, which is significantly positive at the statistical level of 1%, indicating that employee equity incentives significantly promote the increase of the labor income share of enterprises. Further observation of the estimation results in column (2), the laborshare estimation coefficient is also significantly positive at the statistical level of 1%, which indicates that the higher the labor income share of the enterprise, the better the ESG performance of the enterprise. Therefore, this intermediary path can be verified: employee equity incentive can improve the ESG performance of enterprises by increasing the labor income share of enterprises, indicating that hypothesis H2 is valid. +

Table 9 Mechanism analysis 1: Labor income share

VARIABLES	(1) laborshare	(2) ESG
laborshare		0.006*** (0.001)
Employee	2.462*** (0.357)	0.160*** (0.039)
Size	-1.930*** (0.059)	0.299*** (0.006)
Leverage	-3.527*** (0.368)	-0.764*** (0.040)
Age	0.029*** (0.009)	0.001 (0.001)
ROA	-5.602*** (0.131)	0.073*** (0.017)
Cash	0.103*** (0.030)	-0.000 (0.003)
Indratio	-0.004 (0.005)	0.002*** (0.001)
Top1	0.367 (0.322)	-0.021 (0.042)
SOE	1.696*** (0.118)	0.302*** (0.016)
Loss	2.706*** (0.424)	-0.406*** (0.045)
Audit	2.629*** (0.214)	0.157*** (0.028)
Dual	-0.303*** (0.117)	-0.042*** (0.013)
Constant	58.429*** (1.222)	-0.094 (0.137)
YearFE	Yes	Yes
IndustryFE	Yes	Yes
Observations	26,912	26,912
R-squared	0.309	0.234

5.2. Promote the production efficiency of enterprises

The mainstream measurement methods of enterprise total factor productivity in academic circles include C-D production function method, OP method, LP method, ACF method and so on. With reference to existing literature, LP method can make up for the defect that OP method cannot estimate missing samples of proxy variables (Lu Xiaodong and Lian Yujun, 2012). Therefore, this study uses LP method to measure TFP based on input-output perspective.

In Table 10, the model controls all control variables and two-way fixed effects. It can be seen from column (1) that the estimated coefficient of the impact of core explanatory variable TFP lp on

enterprise production efficiency is 0.119, which is significantly positive at the statistical level of 1%, indicating that employee equity incentives significantly promote the improvement of enterprise production efficiency. Further observation of the estimation results in column (2) : The TFP lp estimation coefficient is also significantly positive at the statistical level of 1%, which indicates that the higher the production efficiency of the enterprise, the better the ESG performance of the enterprise. Therefore, this intermediary path can be verified: employee equity incentive can improve enterprise ESG performance by improving enterprise production efficiency, indicating that hypothesis H3 is valid.

Table 10. Mechanism analysis II: Total factor productivity of enterprises

VARIABLES	(1) TFP_lp	(2) ESG
TFP_lp		0.047*** (0.016)
Employee	0.119*** (0.014)	0.170*** (0.040)
Size	0.732*** (0.003)	0.252*** (0.013)
Leverage	0.231*** (0.018)	-0.793*** (0.040)
Age	-0.003*** (0.000)	0.001 (0.001)
ROA	1.175*** (0.009)	-0.015 (0.024)
Cash	-0.007*** (0.001)	0.001 (0.003)
Indratio	0.000 (0.000)	0.002*** (0.001)
Top1	0.111*** (0.017)	-0.024 (0.042)
SOE	-0.020*** (0.006)	0.313*** (0.016)
Loss	-0.036 (0.027)	-0.392*** (0.045)
Audit	-0.013 (0.012)	0.169*** (0.028)
Dual	-0.012** (0.006)	-0.044*** (0.014)
Constant	-7.332*** (0.060)	0.608*** (0.174)
YearFE	Yes	Yes
IndustryFE	Yes	Yes
Observations	26,859	26,859
R-squared	0.890	0.232

Note: Observations are enterprise-level panel data. ***, ** and * are statistically significant at 1%, 5% and 10%, respectively. Values in brackets are White heteroscedastic robust standard error. "Yes" means that the fixed effect is controlled.

6. Conclusions and policy implications

6.1. Conclusion

In recent years, with the increasing importance of sustainable development strategy, enterprise ESG performance has also received increasing attention. This paper uses the panel data of Shanghai and Shenzhen A-share listed companies in China from 2008 to 2020 as a sample to study the impact and mechanism of employee equity incentive on corporate ESG performance. The empirical test shows that, first, employee equity incentive can significantly promote the ESG performance of

enterprises, and it is highly stable under the control of various dimensions. Second, the implementation of employee equity incentive in non-state-owned enterprises and enterprises with large market power has a stronger promoting effect on enterprise ESG performance. Third, mechanism analysis shows that employee equity incentive can promote the ESG performance of enterprises by boosting the share of labor income and promoting the improvement of enterprise production efficiency.

6.2. Policy Implications

Based on the above research conclusions, this paper puts forward the following policy recommendations:

First, on the macro government level, on the one hand, the government should take multiple measures to encourage enterprises to combine economic construction with sustainable development and create a good policy environment for employee equity incentive as well as continue to improve laws and regulations to promote the establishment of incentive system. On the other hand, it is necessary to vigorously advocate and actively promote the concept of ESG, guide enterprises to enhance their ESG performance by means of employee equity incentive, actively invest in ESG practice and take the path of sustainable management.

Second, on the micro enterprise level, on the one hand, enterprises should play a good cake effect, improve the production efficiency of enterprises at the same time to carry out scientific and effective equity incentives. On the other hand, enterprises should establish a good ESG concept, strengthen the awareness and ability of energy conservation, emission reduction and green innovation, optimize the internal management system, improve operational efficiency and take the initiative to assume social responsibility.

References

- [1] Dapeng, C., Xinzhen, S., Yao, L., & Zhuo, L. . (2019). Employee stock ownership plan and accounting information quality. *Nankai Business Review*.
- [2] Yanyan, C. . (2015). Research on the determinant and economical consequence of employee stock option. *Management Review*.
- [3] Chen Yanyan & Guo Ran. (2017). A Literature Review of Foreign Research on Employee Equity Incentives: Implementation Motivation and Economic Consequences. *Management Modernization* (05), 123-129.
- [4] Xin-Xing, D., Kun, L., Business School amp, & Jinan, U. O. . (2016). The effect of the rising labor costs on enterprises' innovation behaviors:evidence from listed companies in china. *Journal of Shandong University (Philosophy and Social Sciences)*.
- [5] Fang Xianming & Hu Ding. (2023). Corporate ESG Performance and Innovation: Evidence from A-share Listed Companies. *Economic Research* (02), 91-106.
- [6] Hu Jie, Han Yiming & Zhong Yong. (2023). How Corporate Digital Transformation Affects Corporate ESG Performance: Evidence from Chinese Listed Companies. *Review of Industrial Economics* (01),105-123.
- [7] Ying-Bing, J., Ya-Ping, Y. U., & Accountancy, S. O. . (2017). Who are more direct innovators? core employee equity incentives and innovation output. *Business Management Journal*.
- [8] Li Ming & Huang Xia. (2017). An Empirical Study on the Effect of Employee Stock Ownership Incentives: Empirical Evidence from A-share Listed Enterprises in China. *Finance and Accounting Newsletter* (06), 101-104.
- [9] Lianwei Li, Lu Bong & Guo Yuanyuan: Equity Incentive and Governance Efficiency of Listed Companies: Based on the Perspective of Human Capital. *Systems Engineering*.
- [10] LIU Kaiyue, LIU Rui, LI Tianxu, MA Xinyu & LIANG Pengfeng. (2022). Manufacturing servitization level, technological innovation and total factor productivity. *Research on Finance and Economics Theory* (02), 89-101.

- [11] Lu, X. D., & Lian, Y. J. . (2012). Estimation of the total factor productivity of industrial enterprise in China: 1999-2007.
- [12] Meng Qingbin, Li Xinyu & Zhang Peng. (2019). Can Employee Stock Ownership Plans Promote Corporate Innovation?—— Empirical Evidence Based on the Perspective of Employees. *Management World* (11), 209-228.
- [13] Shen Hongbo, Hua Linghao & Xu Jiji. (2018). Business Performance of State-Owned Enterprises in Implementing Employee Stock Ownership Plans: Incentive Compatibility or Insufficient Incentives. *Management World* (11), 121-133.
- [14] Song Chang, Wang Lijuan & Wang Meiqi. (2020). Employee Stock Ownership Plan and Audit Fees: Based on the Empirical Evidence of A-share Listed Companies in China. *Audit Research* (01), 51-58+67.
- [15] Sun Xiaohua, Zhang Junman & Zheng Hui. (2020).“ Does "replacing business tax with VAT" promote the integrated development of manufacturing and service industries? *China Industrial Economics*(08),5-23.
- [16] Wang Ye, Sun Yani, Sun Huiqian & Liu Wang. (2021). How Employee Stock Ownership Plans Improve the Effectiveness of Internal Control?—— An Empirical Study Based on PSM. *Audit and Economic Research*(01),14-25.
- [17] Wu Qiusheng & Zheng Yang. (2023). Research on the impact of equity incentives on the share of labor income of enterprises. *Friends of Accountancy* (05), 101-110.
- [18] Yu Lianchao, Liu Qiang & Bi Qian. (2022). Research on the governance effect of employee stock ownership plan on corporate violations. *Securities Market Herald* (02), 44-55.
- [19] Zhang Yan & Liu Wei. (2023). Labor income share, internal and external environment and firm performance. *Economic Issues* (04), 122-129.
- [20] Zheng Zhigang, Yong Hongyan & Huang Hei. (2021). Motivation for implementing an ESOP: incentive or defense. *China Industrial Economics*(03),118-136.
- [21] ZHOU Donghua, HUANG Jia & ZHAO Yujie. (2019). Employee Stock Ownership Plans and Corporate Innovation. *Accounting Research*(03),63-70.
- [22] Alchian, A. A., & Demsetz, H. (2009). Production, information costs, and economic organization. In *Cambridge University Press eBooks* (pp. 173–196).
- [23] Babenko, I., & Tserlukevich, Y. (2009). Analyzing the Tax Benefits from Employee Stock Options. *Journal of Finance*, 64(4), 1797–1825.
- [24] Baker, G. A., Jensen, M. C., & Murphy, K. (1988). Compensation and Incentives: Practice vs. Theory. *Journal of Finance*, 43(3), 593–616.
- [25] Bova, F., Kolev, K., Thomas, J. K., & Zhang, F. (2015b). Non-Executive Employee Ownership and Corporate Risk. *The Accounting Review*, 90(1), 115–145.
- [26] Core, J. E., & Guay, W. R. (2001). Stock option plans for non-executive employees. *Journal of Financial Economics*, 61(2), 253–287.
- [27] Faleye, O., Mehrotra, V., & Morck, R. (2006). When Labor Has a Voice in Corporate Governance. *Journal of Financial and Quantitative Analysis*, 41(3), 489–510.
- [28] Flammer, C. (2015). Does Corporate Social Responsibility Lead to Superior Financial Performance? A Regression Discontinuity Approach. *Management Science*, 61(11), 2549–2568.
- [29] Friedman, M. (2007). The Social Responsibility of Business Is to Increase Its Profits. In *Springer eBooks* (pp. 173–178).
- [30] Garcia, A. M., & Orsato, R. J. (2020). Testing the institutional difference hypothesis: A study about environmental, social, governance, and financial performance. *Business Strategy and the Environment*, 29(8), 3261–3272.
- [31] Hochberg, Y. V., & Lindsey, L. E. (2010). Incentives, Targeting, and Firm Performance: An Analysis of Non-executive Stock Options. *Review of Financial Studies*, 23(11), 4148–4186.
- [32] Holmstrom, B., & Milgrom, P. (1994). The Firm as an Incentive System. *The American Economic Review*, 84(4), 972–991.
- [33] Jones, D. K., Kalmi, P., & Mäkinen, M. (2010). The productivity effects of stock option schemes: evidence from Finnish panel data. *Journal of Productivity Analysis*, 33(1), 67–80.

- [34] Kim, E. H., & Ouimet, P. (2014). Broad-Based Employee Stock Ownership: Motives and Outcomes. *Journal of Finance*, 69(3), 1273–1319.
- [35] Liu, L. (2019). Moral Hazard and Internal Discipline: Theory and Evidence. *The Accounting Review*, 94(4), 365–400.
- [36] Oyer, P., & Schaefer, S. (2005). Why do some firms give stock options to all employees?: An empirical examination of alternative theories. *Journal of Financial Economics*, 76(1), 99–133.