# A study of the impact of equity incentives on corporate ESG performance

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**Abstracts.** With the concept of sustainable development taking root in people's minds, enterprises are evolving from commercial organisations to socially responsible entities. Although equity incentives have been commonly used to promote corporate business development, there is still a theoretical gap as to whether they can enhance corporate ESG performance. Based on the 2010-2022 Shanghai and Shenzhen A-share data, this study employs a two-way fixed-effects model to reveal the dual-action mechanism of equity incentives on ESG performance, as well as the mediating effect through financing ability and innovation ability. The heterogeneity test shows that equity incentives in SOEs have a more significant effect on ESG enhancement, which stems from the fact that SOEs are more likely to direct incentive resources to sustainable development due to their policy synergies and institutional norms. Mechanism analyses show that equity incentives provide financial support for ESG investment by alleviating financing constraints, but after the improvement of financing, there is a tendency for firms to tilt their resources towards short-term profit-making projects. Meanwhile, equity incentives significantly promote corporate innovation, but the competition between innovation and ESG inputs reduces the direct ESG promotion effect of equity incentives. This study fills the theoretical gap in the relationship between equity incentives and firms' ESG performance, and provides theoretical references for the sustainable development of firms and the promotion of policy improvement.

**Keywords:** Equity Incentives, ESG Performance, Financing Capacity, Innovation Capacity.

## 1. Introduction

The concept of ESG criteria was first proposed in 1992 by the United Nations Environment Programme Financial Action Facility (UNEPFI). The aim of ESG is to integrate the concepts of environmental and social responsibility with governmental criteria, with the objective of measuring the environmental sustainability of companies, and their performance in terms of social responsibility and corporate performance [1]. The global macro-environment is now recovering, and companies, as micro-entities driving the quality development of the global economy, are vigorously promoting ESG investment approaches to minimise risk, improve investment returns and yields, and create long-term value.These ratings have been shown to have a direct bearing on the long-term competitiveness, social reputation and financial performance of companies. Consequently, numerous companies have initiated the exploration of diverse management strategies and incentives to enhance their ESG performance. Among these strategies, equity incentives, as a form of long-term incentive, have garnered significant attention for their potential impact on enhancing corporate ESG performance.In the domain of enterprise management, a robust correlation has been observed between the remuneration of executives and the short-term efficiency of enterprises. From the perspective of interest pursuit, corporate executives are often more inclined to continue to maintain the "destructive" mode of production and operation for the sake of personal interests, rather than pursuing the goal of maximising the overall interests of the enterprise. However, the advent of equity-based incentives has introduced a novel approach to address this quandary. Equity incentives, through ingenious system design, forge

a nexus between the personal interests of executives and core employees with the enterprise's long-term value. This linkage mechanism fosters a sense of shared purpose and responsibility, engendering a profound sense of ownership and fostering a close-knit community of interest. This sense of shared purpose and collective ambition is known to stimulate the innovative spirit of employees, encouraging them to proactively seek ways to enhance the performance of the enterprise.

In recent years, a significant number of scholars have conducted in-depth research on equity incentives, encompassing a variety of aspects such as the methods, impacts and effects of equity incentives. Of particular note has been the impact of environmental, social, and corporate governance (ESG) factors on firm development and firm value. CEO equity incentives have a significant impact on companies' willingness to embrace digital transformation, this study shows.

Meanwhile, studies by scholars like Zuo et al. (2024) focus on the relationship between executive incentive dynamics and firm performance. They examined the mediating effect of R&D investment in the following areas and also find that the dynamic change in executive equity incentives has a significant impact on firm performance, while R&D investment plays a mediating role in this process. This suggests that the equity incentive mechanism can increase R&D investment and thus enhance firms' innovation capabilities and core competitiveness.

Although extant studies have achieved certain results on the impact of equity incentives on various aspects of the firm, few scholars have conducted systematic empirical studies on whether equity incentives can enhance the ESG performance of firms, especially in the Chinese context where the equity incentive system has distinctive characteristics. This clearly indicates a significant gap in the existing research and a promising avenue for future exploration.

This study aims to fill this research gap by providing a comprehensive investigation of the potential of equity incentives to improve the environmental, social and corporate governance performance of firms. The objective of this paper is twofold: first, to investigate the potential of equity incentives to improve firms' environmental, social and corporate governance performance; and second, to identify the conditions under which equity incentives can have a positive impact. This study expands the scope of the research by comprehensively analyzing the association between equity incentives and corporate ESG from the perspective of incentives. It examines in detail the differentiated external transmission channels of equity incentives on companies' ESG performance. It helps to indirectly enhance innovation or financing capacity and ensure long-term sound business operations.

## 2. Theoretical analysis and research hypotheses

### 2.1. Equity Incentives, Financing Capacity and Corporate ESG Performance

Equity incentives, as a long-term incentive strategy, have been shown to enhance the financial capacity of firms by attracting skilled personnel, thereby increasing their competitiveness and share price. In addition, these incentives reduce credit spreads on corporate bonds and promote collaboration and knowledge sharing among teams [2]. In addition, as a long-term incentive, equity incentives help firms attract various types of scarce talent. Empirical evidence suggests that such incentives affect the future share price of the firm [3]. In addition, an increase in share price enhances a firm's ability to raise capital in the market for equity instruments.

H1: Equity incentives have been demonstrated to contribute to enhanced ESG performance within firms by means of improving their financing capabilities.

### 2.2. Equity Incentives, Corporate Innovation and Environmental, Social, and Governance (ESG) Performance

Equity incentives stimulate multi-dimensional innovation through the interest binding mechanism [4], which becomes a path for enterprises to realize sustainable development. Employees focus on the long-term development of the enterprise and strengthen the economic benefits of innovation output [5], accelerating green transformation. Employees' participation in corporate decision-making through shareholding creates a risk-sharing and benefit-sharing model [6], and the increase in R&D investment

driven by ESG rating further validates the role of innovation and R&D as a core element of green transformation. In conclusion, equity incentives accelerate corporate green transformation through employee innovation, which in turn enhances ESG performance, providing theoretical support for hypothesis H2.

H2: It has been demonstrated that equity-based incentives have a catalytic effect on corporate ESG performance, by increasing innovation.

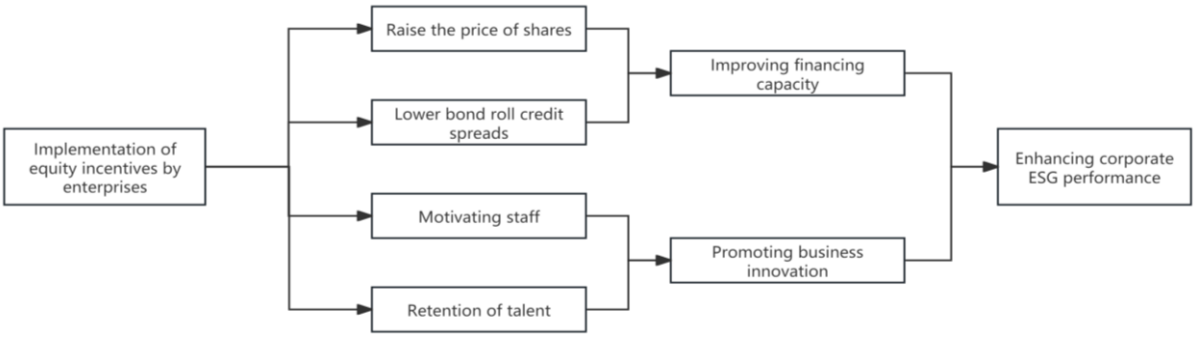


**Figure 1.** Path diagram of equity incentive effect mechanism

## 3. Research design

### 3.1. Data source and variable selection

In 2008 and 2010, the SSE and SZSE successively required listed companies to disclose their social standards. We therefore selected data after 2010 for our study.Consequently, in order to examine the impact of equity incentives on corporate ESG performance, this paper takes Chinese Shanghai and Shenzhen A-share listed companies as the research sample from 2010 to 2022, and excludes the samples with missing ESG data, control variables and mediator variables, and the samples of ST companies. In this paper, corporate financial data and equity incentive-related data are from CSMAR database, and corporate ESG performance data are from CSI ESG evaluation system. In order to reduce the influence of extreme values, this paper has Winsorize all continuous variables by 1% up and down.

(1) Explained Variables

There are many rating agencies that rate the ESG of listed companies. Among them, CSI ESG ratings are widely used by scholars. Therefore, this paper takes the natural logarithm of the ESG rating data on October 31 of each year as a proxy variable for the ESG performance of companies in that year. The higher the rating data score, the better the ESG performance.

(2) Core Explanatory Variables

This paper refers to the practice of Jing Xin [7], the core explanatory variables with executive incentives (Wage) for the top three executives total compensation and take the natural logarithm of the measure.

(3) Mechanism variables:

In this paper, in order to reveal the mechanism of the impact of equity incentives on corporate ESG performance, we refer to the approach of Li Zhenjie [8], and propose two transmission mechanisms of financing constraints (FC) and corporate innovation ability (INPA) for theoretical construction.

(4) Control Variables

In order to improve the accuracy of the study, this paper refers to Wen Yadong and Chen Yan (2024), Zhang Ruichen et al. (2023), and Yang Qiang (2022) [9-11], and includes a series of control variables in the model that may have an impact on the ESG performance of the firms, including the Tobin's Q value (TobinQ), the size of the firms (Size), the asset-liability ratio (Lev), and the firms' years of establishment (Firma), Total Assets Net Profit Margin (ROA), Dual (Dual), Shareholding Ratio of the First Largest Shareholder (Top1), Proportion of Independent Directors (Indep), Number of Directors (Board), Audit Quality (Big4), and Nature of Ownership (SOE) in order to exclude the

effects of environmental factors such as the economic cycle, market expectations, and so on. Specific variables are defined in Table 1.

**Table 1.** Variable Definition

| Nature of the variable | Variable name | Variable symbol | Variable Definition |
|---|---|---|---|
| explanatory variable | Corporate ESG performance | ESG | CSI Environmental, Social and Governance (ESG) Rating Index |
| explanatory variable | Executive Incentives | Wage | The sum of the top three executives' compensation is taken as the natural logarithm. |
| control variable | Tobin's Q | TobinQ | (Market value of outstanding shares + number of non-outstanding shares × net assets per share + book value of liabilities) / Total assets |
| | Enterprise size | Size | Natural logarithm of total assets for the year |
| | Gearing | Lev | Total liabilities at year-end / Total assets at year-end |
| | Years of incorporation | Firmage | ln(current year - year of incorporation + 1) |
| | Two jobs in one | Dual | The chairman and general manager are the same person as 1, otherwise it is 0. |
| | Shareholding ratio of the largest shareholder | Top1 | Number of shares held by the largest shareholder / Total number of shares |
| | Proportion of independent directors | Indep | Independent directors divided by number of directors |
| | Number of directors | Board | The number of board members is taken as a natural logarithm |
| | Audit quality (Big 4 or not) | Big4 | 1 if the company is a Big 4 auditor (PricewaterhouseCoopers, Deloitte, KPMG, Ernst & Young) and 0 otherwise. |
| intermediary variable | Enterprise innovation capacity | inop | Natural logarithm of the company's annual R&D investment amount |
| | Financing constraints | FC | FC index, with larger values indicating tighter financing constraints |

**Table 2.** Descriptive statistics

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| VARIABLES | N | mean | sd | min | max |
| wage | 38,265 | 14.45 | 0.751 | 9.038 | 18.58 |
| environment | 40,252 | 4.096 | 0.122 | 3.383 | 4.556 |
| social | 40,251 | 4.296 | 0.146 | 1.585 | 4.605 |
| Governance | 40,252 | 4.364 | 0.105 | 2.845 | 4.578 |
| kz | 52,212 | 1.815 | 2.972 | -11.46 | 20.85 |
| re | 19,205 | 0.0633 | 0.142 | -0.0522 | 8.674 |
| ESG performance | 40,252 | 4.287 | 0.0753 | 3.601 | 4.532 |
| inop | 51,616 | 17.39 | 1.636 | 1.447 | 28.41 |

### 3.2. Modeling

(1) Base regression model.

This paper explores the impact of equity incentives on firms' ESG performance and constructs the following base regression model using panel data regression, controlling for year and individual fixed effects:

$$ESG_{i,\ t} = \alpha + \beta_1 Wage_{i,t} + \sum \gamma Controls_{i.t} + \varepsilon_{i,t} + Time + Firm \quad (1)$$

Where firms' ESG performance is the explanatory variable (ESG) and executive compensation incentives (Wage) is the core explanatory variable, i.e., the dependent variable. Controls representing nine control variables, Time and Firm are time fixed effects and firm fixed effects, respectively. $\varepsilon_{i,t}$ is the random perturbation term i.e. error term, $\alpha$ is a constant term, $\beta$ and $\gamma$ are the regression coefficients of the variables.

Mechanism test model model. This paper constructs the following mechanism testing model based on the baseline regression model as:

$$M_{i,\ t} = \alpha + \beta_1 Wage_{i,t} + \sum \gamma Controls_{i.t} + \varepsilon_{i,t} \quad (2)$$

This study mainly adopts panel data regression analysis and combines the mediation effect test to explore the transmission mechanism of financing ability and innovation ability in equity incentives affecting ESG performance. Meanwhile, the robustness test is used to verify the reliability of the results.

## 4. Baseline regression analysis

**Table 3.** Panel regression results of equity incentives and corporate ESG performance

| | (1) | (2) |
|---|---|---|
| | ESG performance | ESG performance |
| wage | 0.010*** | 0.003*** |
| | (0.001) | (0.001) |
| size | | 0.013*** |
| | | (0.001) |
| lev | | -0.022*** |
| | | (0.008) |
| board | | 0.006 |
| | | (0.005) |
| indep | | 0.001*** |
| | | (0.000) |
| dual | | 0.001 |
| | | (0.002) |
| top1 | | 0.000*** |
| | | (0.000) |
| tobinq | | 0.000*** |
| | | (0.000) |
| firmage | | -0.028*** |
| | | (0.008) |
| big4 | | 0.008** |
| | | (0.004) |
| firm fixed effect | Yes | Yes |
| time fixed effect | Yes | Yes |
| _cons | 4.146*** | 3.995*** |
| | (0.018) | (0.036) |
| N | 35963.000 | 35365.000 |
| r2 | 0.013 | 0.034 |

Table 3 presents the regression results of Model Eq. 1. In order to verify that equity incentives can enhance firms' ESG performance, this paper conducts a full-sample benchmark regression of Model (1). Columns (1) and (2) use the results of the ols regression, and use the two-way fixed effects model to verify that equity incentives can enhance firms' ESG performance, and both columns are regressed using fixed individuals and years, and the results are significant, and both pass the 1% significant test. Specifically, the marginal coefficient of wage in column (2) is 0.003, down from 0.01 in column (1),

which is due to the result that some of the effects are diluted by adding other variables, and the marginal coefficient of 0.003 suggests that for every unit increase in equity incentives, the ESG performance of the firms will be significantly improved by 0.003; after adding multiple control variables to column (2) compared to column (3), the $R^2$ is 0.034 is significantly higher than 0.013 in column (1), but the overall score is still low, indicating that ESG performance is affected by more unknown factors; the above results verify that equity incentives have a promotional effect on the ESG performance of enterprises.

## 5. Further testing

### 5.1. Robustness tests

**Table 4.** Robustness check

| | (1) | (2) | (3) |
|---|---|---|---|
| | environment | social | govern |
| wage | -0.002 | 0.007** | 0.005** |
| | (0.002) | (0.003) | (0.002) |
| control variable | Yes | Yes | Yes |
| firm fixed effect | Yes | Yes | Yes |
| time fixed effect | Yes | Yes | Yes |
| _cons | 3.845*** | 3.699*** | 4.196*** |
| | (0.051) | (0.067) | (0.055) |
| N | 35365.000 | 35365.000 | 35365.000 |
| r2 | 0.072 | 0.085 | 0.135 |

Table 4 shows the results of the robustness test are shown, from which it can be seen that equity incentives have a significant positive contribution to society and governance, indicating that equity incentives can promote the fulfillment of corporate social responsibility and optimize the corporate management system. Firm size has a significant positive effect on all three ESG dimensions (environment 0.014****, society 0.019****, governance 0.010****), reflecting that firm size provides resources for ESG construction; the level of indebtedness (Lev) has a significant inhibitory effect on society (-0.005****) and governance (-0.044****), suggesting that high debt pressure may force firms to prioritize financial risks and thus optimize corporate governance systems.

**Table 5.** Robustness tests and Heterogeneity test

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | ESG performance | ESG performance | state-owned business | private business |
| re | -0.002 | | ESG performance | ESG performance |
| | (0.005) | | 0.008*** | 0.003* |
| control variable | Yes | Yes | (0.002) | (0.002) |
| firm fixed effect | Yes | Yes | Yes | Yes |
| time fixed effect | Yes | Yes | Yes | Yes |
| _cons | 4.008*** | 4.009*** | Yes | Yes |
| | (0.046) | (0.046) | 3.753*** | 4.029*** |
| N | 17810.000 | 17785.000 | (0.059) | (0.050) |
| r2 | 0.048 | 0.048 | 12100.000 | 22385.000 |

The results of the robustness test based on the equity incentive proxy variable (replacing equity incentives (MSR) with compensation incentives (RE) as the explanatory variable) are shown in Table 5, where the effect of compensation incentives (RE) on firms' ESG performance remains insignificant (coefficient -0.002, p>0.1), indicating the heterogeneity of the role of different forms of incentives on ESG. In terms of control variables, the significant positive effect of firm size (Size) on ESG performance (0.016 ****) is consistent with the benchmark regression, which again proves that firm

size provides resources for ESG construction; whereas the significant negative inhibition of gearing ratio (Lev) on ESG (-0.002 ****) reflects that firms under the pressure of high indebtedness deviate from the resource allocation to the sustainability objectives. The year effect indicates that ESG performance improved significantly in 2011-2012, which coincides with the initial stage of China's ESG policy promotion.

### 5.2. Heterogeneity test

Table 5 shows the results of the heterogeneity test. In Table 5, columns (3) and (4) show the regression results of equity incentives and firms' ESG performance for SOEs and private firms, respectively, and the results of the heterogeneity test show that equity incentives for SOEs have a significant positive impact on firms' λESG performance at the 10% level, and the marginal coefficients are significantly higher than that of private firms, which indicates that equity incentives for SOEs are more capable of enhancing firms' ESG performance. This is because state-owned capital holdings are more concerned about the safety of state-owned assets, which makes the management focus more on the sustainability of the enterprise rather than short-term returns, and in the case of private enterprises with a long ESG input return cycle, the enterprises are more willing to carry out short-term oriented equity incentives; State-owned enterprises bear the strategic mission of the country, and their equity incentives need to be highly synergistic with the government's planning as well. For example, the State-owned Assets Supervision and Administration Commission (SASAC) requires SOEs to reduce energy consumption per unit of output value during the 14th Five-Year Plan period. The policy makes it clear that the incentive program needs to be in line with the national industrial policy and the direction of sustainable development, while private enterprises lack such mandatory constraints and rely more on their own choices.

## 6. Mechanism analysis

**Table 6.** Mechanism analysis

| | (1) | (2) |
|---|---|---|
| | kz | inop |
| wage | -0.239*** | 0.128*** |
| | (0.036) | (0.021) |
| Controlled variables | Yes | Yes |
| Fixed effect of the firm | Yes | Yes |
| Time fixed effect | Yes | Yes |
| _cons | 10.868*** | -0.924 |
| | (1.094) | (0.603) |
| N | 32590.000 | 32112.000 |
| r2 | 0.352 | 0.533 |

Table 6 presents the regression results of the mechanism analysis, based on which the hypotheses were tested as follows.

(1) The impact of improving corporate finance capacity. Column (1) of Table 6 reports the test results of the mediating effect of corporate financing constraints between equity incentives and firms' ESG performance. China promotes inclusive and green financial policies to alleviate corporate financing constraints, and executive incentives (salaries) can synergize the policies to alleviate financing pressures with the help of governance optimization effects (FC index decreases) and release resources for ESG inputs. As can be seen from the table, in Model 1, executive incentives (wages) indirectly promote ESG by alleviating financing constraints (FC index decreases), but in Model 2, the coefficient of FC's impact on ESG is significantly negative, indicating that firms favor short-term profitability after financing constraints are alleviated. This phenomenon reflects the trade-off between policy support and market orientation of some enterprises, i.e., the mediating effect of financing

constraint alleviation, which inversely inhibits the direct promotion of ESG by executive incentives. In other words, H1 is proved.

(2) In the benchmark regression, the direct effect of executive incentives (Wage) on firms' ESG performance is significantly positive, but the coefficient of Wage turns significantly negative after the introduction of innovation capability (INPA) as a mediating variable. This suggests that executive incentives (Wage) motivate firms to increase R&D investment and improve innovation output; at the same time, resource competition between innovation investment and ESG investment weakens the direct ESG promotion effect of Wage, which verifies part of the mediating effect of innovation capability. That is, H2 is proved.

## 7. Conclusions and recommendations

### 7.1. Reach a verdict

(1)This study utilised the dataset comprising A-share listed companies in Shanghai and Shenzhen between 2010 and 2022 to empirically analyse the impact mechanism of equity incentives on corporate ESG performance. The analysis employed a dual lens: financing constraints and innovation ability. The following core conclusions emerged: Secondly, it is evident that equity incentives have a substantial impact on enhancing firms' ESG performance. Firstly, equity incentives provide financial support for ESG investment by alleviating financing constraints.Secondly, the provision of equity incentives has been shown to have a significant impact on the promotion of corporate innovation, thereby unveiling both the synergistic and conflicting attributes of "innovation-ESG".

(2)The heterogeneity of ESG dimensions is significant. Robustness tests show that equity incentives have a significant positive effect on social, environmental and governance performance.and relatively low impact on environmental dimensions.

(3)the ESG effect of equity incentives is more pronounced in state-owned enterprises. The heterogeneity test shows that the boundary effect of equity incentives on ESG is significantly higher in SOEs than in private companies.

The findings of this paper will help enterprises to develop a more perfect equity incentive system, echoing the national green sustainable development strategy.

### 7.2. Recommendations

Based on the regression analysis of equity incentives on corporate ESG performance, this paper gives the following suggestions for enterprises, governments and investors respectively:

First, At the company level, share incentives can improve ESG performance; companies should use share incentives not only as a means to motivate employees but also to improve ESG performance.Nowadays, the pressure to work means that company employees don't have time to think about the long-term development of the company, thus weakening the effect of share-based incentives.Companies need to diversify the way share incentives are designed to ensure that incentives effectively align with objectives. (Tang, 2024)

Second, for SOEs,heterogeneity test proves that equity incentives are more effective in improving ESG performance of state-owned enterprises, an important material foundation of socialism with Chinese characteristics.SOEs can improve both innovation and financing through equity incentives.This will enable technologically innovative SOEs to focus on ESG-related areas such as new energy and digitalisation, and realise a century-long sustainable development plan.

Third, governments can have a positive policy influence and encourage companies to adopt sustainable development strategies, for example through the promotion of ESG scoring for good companies.Policymakers must consider the objectivity of ESG ratings and rationalise the choice of objective and fair ESG performance ratings. Simultaneously, efforts are underway to nurture a domestic ESG rating initiative.

Forth, at the investor level, investors should include ESG among their investment factors, rather than just looking at, or paying too much attention to, a company's traditional metrics.Under the same

conditions, investors can focus on the frequency and degree of a company's equity incentives to make the right investment if ESG ratings between companies are not meaningful.

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