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Research on The Relationship Between Executive Compensation, ESG Performance and Firm Performance Based on Mediating Effect

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Abstract. With the rapid development of social economy, more and more enterprises have begun to pay attention to corporate environment, social responsibility and corporate governance (ESG), but there are still different views in the academic community on the question of whether the improvement of ESG performance can lead to the improvement of performance level, and whether the implementation of compensation incentives for executives can have an impact on the relationship between ESG performance and corporate performance. From the perspective of mediating effect, based on stakeholder theory, information asymmetry theory and reputation theory, this paper takes listed companies from 2012 to 2020 as the research object, empirically analyzes the relationship between executive compensation, corporate ESG performance and corporate performance through Multiple Regression Analysis, and further studies the mediating role of corporate ESG performance. This study not only provides a scientific basis for companies to improve their ESG performance in practice, but also provides a reference for policymakers to better balance the relationship between social responsibility and economic benefits.

Keywords: Multiple Regression Analysis; executive compensation; corporate ESG performance; business performance; mediating effect.

1. Introduction

ESG (Environment, Social Responsibility, Corporate Governance) is a global non-financial assessment framework designed to help investors assess the contribution of companies to promoting sustainable economic development and fulfilling their social responsibilities by comprehensively considering their environmental protection, social responsibility, and corporate governance performance, and then to measure the reasonableness of individual investors' investment behavior. Against the backdrop of frequent financial crises, epidemics, and increasing international tensions, the impact of listed companies' environmental protection, social responsibility, and corporate governance quality on corporate performance has received wider attention. Therefore, based on previous studies, this paper explores the interactions among executive compensation, corporate ESG performance and corporate performance through mediating effect and Multiple Regression Analysis and analyzes in detail the mechanism of their roles. This study not only helps to enrich the current theoretical system, but also provides substantial suggestions for listed companies in optimizing the relationship between executive compensation, ESG performance and corporate performance.

2. Theoretical Analysis and Assumptions

2.1. Executive compensation and corporate performance

This paper argues that executive compensation has a positive impact on the level of corporate performance. Although the separation of enterprise management rights and ownership rights is conducive to improving economic efficiency, there are problems such as "moral hazard" and "adverse selection" due to information asymmetry. Based on the mediating effect, the principal and the agent pursue the maximization of their respective utility. To reduce agency costs, companies usually regulate the relationship by signing a compensation performance contract. In this context, executives,

as rational economic persons, will consciously devote themselves to the healthy and sustainable development of the enterprise, and closely combine personal compensation goals with corporate performance goals [1-4].

2.2. Executive compensation and corporate ESG performance

Although there are various views in the academic community on the relationship between executive compensation and corporate ESG performance, the mainstream view is broadly consistent that there is a positive impact between the two. This paper also argues that there is a positive correlation between executives' fixed compensation and corporate ESG performance, and that executives will fulfill environmental protection, social responsibility, and corporate governance to get more compensation.

As the core person of enterprise operation and management, senior management is fully responsible for the management of the entire organization and has a high degree of decision-making power. The ESG performance of a company directly reflects the decision-making effect of senior executives. On the one hand, the remuneration received by top management is directly linked to the performance of the company, and executives will do their best to improve the performance of the company to improve their own compensation level. If companies improve their ESG performance at this time, they can establish a good social image, increase users' trust in products, stimulate users' desire to buy, and improve performance [5,6].

2.3. Corporate ESG performance and corporate performance

Research on corporate ESG performance centers on optimizing stakeholder relations, reducing information asymmetry, and maintaining a strong reputation. According to stakeholder theory, engaging effectively with stakeholders and meeting their needs can enhance corporate sustainability. ESG performance, particularly in environmental and social responsibility, signals a company's commitment to these interests, thereby improving overall business outcomes. Additionally, ESG information complements financial data, increasing transparency, reducing information asymmetry, and lowering external financing pressures, all of which promote corporate sustainability. Finally, reputation theory posits that strong ESG performance accumulates reputational capital, mitigating potential adverse effects from negative events and fostering business resilience [7-9].

2.4. Executive compensation, corporate social responsibility and corporate performance

Based on the above theoretical analysis, there is a mutual relationship between executive compensation can be concluded, corporate ESG performance and corporate performance. Specifically, executive compensation promotes the improvement of corporate performance through a variety of mechanisms. The ESG image of a company is not only the basis for listed companies to expand their scale and strengthen their competitiveness, but also a key strategic decision for long-term survival and development in a highly competitive market. The quality of a company's ESG image directly reflects the decision-making effect of executives, and executive compensation directly affects the decision-making behavior of executives. As companies pay executives more, executives are not only willing to put in more hard work, but also focus more on the long-term development of the business. They actively strive to improve the ESG image of the company and enhance social recognition, thereby improving the performance level of the company. As more and more companies raise their ESG image to a strategic level, executives will care about the long-term development of the company, and then improve the ESG performance of the company, enhance the company's reputation and brand competitiveness, and thus improve the level of corporate performance [10,11].

Therefore, based on in-depth analysis of theory and logic, we have sufficient reason to believe that the improvement of corporate ESG performance is likely to become a way for executive compensation to affect corporate performance. A certain transmission relationship has been formed between the three, that is, the improvement of executive compensation promotes the level of corporate performance by improving the ESG performance of enterprises. In view of this, we hypothesize that

corporate ESG performance plays a mediating role in the impact of executive compensation incentives on corporate performance.

3. Research Design

3.1. Benchmark Model

Based on the above theoretical analysis, this paper constructs the following benchmark regression model:

$$roa_{i,t} = \alpha_0 + \beta_1 comp_{i,t} + \beta_{2-7} Controls_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t} \quad (1)$$

Where $roa_{i,t}$ is the explanatory variable firm performance; $comp_{i,t}$ is the key explanatory variable representing the level of executive compensation; $Controls$ is a collection of control variables; γ_i is an individual fixed effect; λ_t is a fixed effect of time; $\varepsilon_{i,t}$ random perturbation term

3.2. Variable Selection

3.2.1. Explanatory variables

This paper uses the ROA indicator of total assets and main business return on business to measure corporate performance. ROA reflects the profitability of enterprises, and the higher the level of this indicator, the better the earnings performance of enterprises to a certain extent, and thus the relatively better performance of enterprises.

3.2.2. Explanatory variables

The measurement of executive compensation metrics is mainly considered in terms of both monetary and non-monetary aspects. Since non-monetary indicators mainly involve factors such as the shareholding ratio of executives, which are difficult to quantitatively analyze in the existing data, this paper only uses monetary compensation when studying executive compensation indicators. Specifically, the logarithm of the "total remuneration of the top three directors, supervisors and senior executives" disclosed in the annual report of the listed company is used as a surrogate variable.

3.2.3. Mediation variables

In this paper, corporate ESG performance is used as an intermediary variable. It is derived from the ESG rating data of China Securities Corporation, which is based on the information disclosure and corporate characteristics of listed companies in China, and is carried out from three aspects: environmental, social and corporate governance, which contain 14 themes, 26 key indicators and more than 130 sub-indicators, such as: environmental aspects include environmental violations and regulations, environmental management system and other indicators; The social aspects include poverty alleviation, negative business events, etc.; In terms of corporate governance, indicators such as overall financial credibility and related party transactions are included. The ESG ratings are divided into nine grades, C-AAA, and this paper assigns a value of 1-9 to each of these nine ratings to obtain the data required for the research.

3.2.4. Control variables

To ensure accurate empirical results, the following control variables were selected based on data availability and relevant literature, with the inclusion of annual and industry dummy variables to control for related impacts. Enterprise size is a fundamental determinant of social responsibility, as larger firms, due to their scale, are more inclined to assume greater social responsibilities and face heightened societal expectations. In this study, the natural logarithm of total assets at the end of the year is used to measure enterprise size. The debt-to-asset ratio, which reflects a firm's solvency, is

considered as firms with higher liabilities may prioritize maintaining a strong social image to gain creditors' trust, thus ensuring stable funding. The size of the board of directors, represented by the number of directors, enhances management oversight, encouraging more comprehensive and informed decision-making, which can improve corporate performance. As equity concentration increases, major shareholders are more likely to prioritize the long-term healthy development of the enterprise and support greater social responsibility efforts. This is measured by the shareholding ratio of the largest shareholder. Finally, the growth rate of operating income, calculated as the year-over-year percentage increase, is used to assess the firm's operating performance.

3.3. Sample selection and data sources

This study uses an initial sample of A-share listed companies in China between 2012 and 2020. To ensure the reliability of the study, ST, *ST companies, and some listed companies with missing financial data were excluded, and 966 listed companies were finally identified, of which 9 consecutive years of financial data were formed, and a total of 8694 research samples were formed, shown in Table 1.

Table 1: Descriptive statistics

VarName	Obs	Mean	SD	Min	Median	Max
Roa	8694	5.688	4.292	0.034	4.676	21.609
comp	8694	14.572	0.699	12.904	14.539	16.585
esg	8694	4.367	1.048	1.000	4.000	8.000
size	8694	22.652	1.345	20.188	22.460	26.973
lev	8694	0.420	0.194	0.059	0.413	0.844
boardsize	8694	8.800	1.714	5.000	9.000	15.000
top1	8694	36.565	15.199	9.272	35.360	74.976
growth	8694	0.144	0.281	-0.421	0.102	1.583

4. Empirical Test and Analysis of Results

4.1. Correlation coefficient matrix test

Table 2: Correlation analysis results

	Roa	comp	size	lev	boardsize	top1	growth
Roa	1.000						
comp	0.150***	1.000					
size	-0.121***	0.483***	1.000				
lev	-0.422***	0.217***	0.568***	1.000			
boardsize	-0.021**	0.097***	0.217***	0.104***	1.000		
top1	0.020*	-0.093***	0.199***	0.096***	0.025**	1.000	
growth	0.171***	0.044***	0.031***	0.071***	-0.023**	-0.034***	1.000

Before the regression analysis, the Pearson correlation coefficient matrix test was performed on the core explanatory variable executive compensation and firm performance, shown in Table 2. The

results show a significant positive correlation between the two, which is consistent with the expected assumptions. In addition, the control variables were significantly correlated with firm performance at a significance level of at least 1%. It is important to note that the correlation coefficient matrix only reflects the relationship between the bivariate but does not consider the effects of control variables and latent variables (such as temporal and individual effects).

Table 3: VIF

	BRIGHT	1/LIVE
size	2.045	.489
lev	1.496	.668
comp	1.384	.722
top1	1.098	.91
boardsize	1.052	.951
growth	1.009	.991
MeanVIF	1.347	.

To rule out the possibility of data collinearity, a multicollinearity test is performed in this paper and in general shown in Table 3, scholars evaluate the existence of multicollinearity based on the variance expansion factor (VIF). VIF is the ratio of the variance in the presence of multicollinearity between explanatory variables to the variance in the absence of multicollinearity. From the results of the multicollinearity test of the model, the VIF values of each variable are less than 10, so it can be concluded that the selected index does not show obvious collinearity.

4.2. Model Selection

When it comes to panel data, the key is to determine what model to use for analysis.

In general, panel data involve mixed-effect, fixed-effect, and random-effects models. The Haussmann test can be used to determine which model to choose, while the F-test can determine whether to choose a fixed-effect model or a mixed-effect model. This article relies on these two tests to determine the best model to analyze the data. The specific test results are shown in Table 4.

Table 4: Hausman test & F test

Hausmantest			Ftest		
chi2statistic	pvalue	result	chi2statistic	pvalue	result
186.74	0.000	reject	10.97	0.000	reject

Both the Haussmann test and the F-test result statistic significantly reject the null hypothesis, so the fixed-effect model should be selected under the framework and data of this study.

4.3. Baseline regression results

The regression result equation is:

$$roa_{i,t} = \alpha_0 + \beta_1 comp_{i,t} + \beta_{2-7} Controls_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t} \quad (2)$$

Where *Controls* is the set of control variables; α_0 is the constant terms; β_{1-7} is the coefficients of each explanatory variable; γ_i is the individual fixed effect; λ_t is the time fixed effect; $\varepsilon_{i,t}$ is the random perturbation term.

Based on the results of the Hausmann test and F-test, a fixed-effect model was finally used for regression analysis. To improve the reliability of the results, we use a stepwise regression method to test the hypothesis, shown in Table 5.

In the first column, at the significance level of 1%, the core explanatory variable executive compensation was positively correlated with the dependent variable firm performance, with a coefficient of 1.559. This means that, all other things being equal, for every 1 unit increase in executive compensation, the average increase in corporate performance is 1.559 units. In the second regression, executive compensation was also positively correlated with firm performance at a significance level of 1%. Hypothesis 1 is preliminarily verified, that is, to a certain extent, the improvement of executive compensation level can help promote the improvement of enterprise performance. In addition, the R square of the equation is more than 0.7, which shows that the model has a good fitting effect and strong explanatory power.

Table 5: Baseline regression results

	(1)	(2)
VARIABLES	Roa	Roa
comp	1.559***	1.585***
	(15.70)	(16.26)
size		-0.051
		(-0.50)
lev		-7.964***
		(-20.68)
boardsize		0.101***
		(2.85)
top1		-0.003
		(-0.50)
growth		2.506***
		(23.70)
Constant	-17.022***	-14.062***
	(-11.77)	(-6.10)
Observations	8,694	8,694
R-squared	0.668	0.704
FIMR	YES	YES
year	YES	YES

t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

4.4. Heterogeneity

Table 6: Results of heterogeneity tests

	Large-scale enterprises	Small and medium-sized enterprises	Differences in coefficients between groups
VARIABLES	Roa	Roa	Roa
comp	1.340***	1.816***	2.493***
	(10.91)	(11.90)	(10.22)
o.size2			-
c.comp#c.size2			-0.602***
			(-4.06)
size	0.116	-0.104	-0.010
	(0.92)	(-0.64)	(-0.09)
lev	-9.831***	-6.998***	-8.153***
	(-18.18)	(-12.47)	(-21.04)
boardsize	0.091**	0.112*	0.101***
	(2.17)	(1.84)	(2.83)
top1	-0.002	0.003	-0.002
	(-0.35)	(0.32)	(-0.33)
growth	2.032***	3.054***	2.506***
	(15.53)	(18.15)	(23.72)
Constant	-13.304***	-16.861***	-14.953***
	(-4.54)	(-4.69)	(-6.47)
Observations	4,347	4,347	8,694
R-squared	0.744	0.665	0.705
FIMR	YES	YES	YES
year	YES	YES	YES

t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

To explore the possible differences in the relationship between independent variables and dependent variables in enterprises of different sizes, this paper uses group regression and the addition of interaction terms to study the performance. In order to further study the difference in the size of the coefficients, the regression of the interaction term was introduced, and the interaction term significantly showed that there was a significant difference in the size of the coefficients between the two groups, and the sign of the interaction term was positive, indicating that the level of executive compensation had a stronger effect on the promotion of enterprise performance in a large-scale sample.

5. Mechanism analysis

To examine the relationship between executive compensation, social responsibility and corporate performance, as well as the mediating role of corporate social responsibility, and avoid the endogeneity problem of the traditional three-step method, this paper uses the two-step method to analyze the mediating effect.

Model 1: $roa_{i,t} = \alpha_0 + a_1 comp_{i,t} + \varepsilon$

Model 2: $esg_{i,t} = \beta_0 + \beta_1 comp_{i,t} + \beta_2 size_{i,t} + \beta_3 lev_{i,t} + \beta_4 boardsize_{i,t} + \beta_5 top1_{i,t} + \beta_6 growth_{i,t} + \varepsilon$

Table 7: Results of mediating effect analysis

	(1)	(2)
VARIABLES	Roa	esg
comp	1.559***	1.585***
	(31.15)	(23.08)
size		-0.051
		(-0.50)
lev		-7.964***
		(-11.84)
boardsize		0.101***
		(3.32)
top1		-0.003
		(-0.50)
growth		2.506***
		(8.13)
Constant	-17.758***	-14.488***
	(-23.77)	(-9.91)
Observations	8,694	8,694
R-squared	0.0426	0.147
Numberofgroups	966	966
FIMR	YES	YES
year	YES	YES

t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

In the above model, *roa* is an indicator of enterprise performance; *comp* is an indicator of executive compensation; *esg* is a corporate social responsibility indicator; size represents the size of the company; lev stands for Debt-to-Asset Ratio; *boardsize* represents the size of the board; *top*1 represents equity concentration; *growth* stands for the company's ability to grow.

The first step is the regression of executive compensation and firm performance, that is, the regression of the above conclusions, and the results are significantly passed, and executive pay can improve firm

performance. In the second step, the dependent variable is replaced with the mechanism variable corporate ESG rating, and the core explanatory variable executive compensation is still significantly positively correlated with the corporate ESG rating at the significance level of 1%, and the mediating effect is established, and the improvement of the ESG rating positively promotes the improvement of corporate performance, which indicates that the increase of executive compensation is the improvement of corporate ESG performance by improving corporate ESG performance. Corporate ESG performance plays a mediating role in the impact of executive compensation level on corporate performance.

6. Robustness test

To enhance the reliability of the research results, two methods are used to test the robustness.

Table 8: Robustness test results 1

	Eliminate the impact of covid	Eliminate the impact of covid
VARIABLES	Roa	Roa
comp	1.535***	1.529***
	(14.34)	(14.50)
size		-0.020
		(-0.19)
lev		-8.251***
		(-20.32)
boardsize		0.133***
		(3.53)
top1		-0.001
		(-0.24)
growth		2.234***
		(20.40)
Constant	-16.591***	-14.054***
	(-10.67)	(-5.67)
Observations	7,728	7,728
R-squared	0.691	0.724
FIMR	YES	YES
year	YES	YES

t-statistics in parentheses, ***p<0.01, **p<0.05, *p<0.1

7. Conclusions

Based on the framework of mediating effect, stakeholder theory, information asymmetry theory and reputation theory, this paper independently examines the correlation between executive compensation and firm performance, executive compensation and firm ESG performance, and firm ESG performance and firm performance. On this basis, the mediating role of corporate ESG performance

in the impact of executive compensation on corporate performance is further revealed, and the following conclusions are drawn:

There is a strong positive correlation between the increase in executive compensation and the improvement of corporate performance. As the key management of a listed company, top management plays an important role in the company's decision-making. The mediating effect holds that executive compensation is directly linked to corporate performance through compensation performance contracts, motivating executives to work harder, thereby promoting performance improvement. The increase in executive compensation encourages companies to be more proactive in environmental protection, social responsibility and improve the quality of corporate governance. Whether it is a short-term or long-term compensation incentive, it has an impact on the ESG performance and performance of enterprises. Executive compensation enables executives to make decisions more considerate of the long-term development of the company, avoid irresponsible activities, and promote the company's reputation, which further affects the company's performance. Good corporate ESG performance helps improve corporate performance. By building a good reputation and satisfying the needs of various stakeholders, the company not only gains competitiveness and economic profits in the current period, but also lays the foundation for sustainable and healthy development in the future, which has a positive effect on the company's performance.

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