Research on the Relationship between ESG Performance and Government Subsidies

-- Based on Analyst Concern and Financial Transparency Perspective

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Abstract

Under the background of "carbon peaking and carbon neutrality" in China, whether enterprises can improve the level of government subsidies through ESG performance is of great significance to the sustainable development of enterprises. This paper uses the panel data of Shanghai and Shenzhen A-share listed companies from 2011 to 2020 to empirically analyze the impact of ESG performance on government subsidies, and explore its impact mechanism. The study found that, first, companies can obtain more government subsidies for improving their ESG performance. Second, the intermediary mechanism analysis finds that ESG performance increases government subsidies through increased analyst attention and financial transparency. Third, the heterogeneity analysis found that improving ESG performance and thus increasing the level of government subsidies is only established in high-tech enterprises and enterprises with a high degree of competition in the industry. This study further clarifies the relationship between enterprises and the government, and the conclusions of this paper provide inspiration for giving full play to the economic role of ESG to promote high-quality development of enterprises.

Keywords

ESG; Government Subsidy; Analyst Concern; Financial Transparency.

1. Introduction

At present, China's economy is in a period of transition to high-quality development. Whether enterprises can achieve high-quality development has far-reaching significance for economic development. However, at present, many enterprises ignore the fulfillment of obligations such as environmental protection and feedback to the society in the process of pursuing profits, which in turn affects the high-quality development of enterprises. ESG, an indicator that integrates environmental, social and corporate governance factors comes into being, which is used to measure the sustainable development ability of enterprises and in line with the needs of China's economic development.

The development of ESG concept has a certain history. In 1992, the United Nations Environment Programme Financial Action Facility (UNEPFI) recommended that financial institutions consider three elements of environmental (E), social (S) and corporate governance (G) when making decisions. Since then, the three dimensions of environment (E), society (S) and corporate governance (G) have gradually become the most important factors for the international community to measure the sustainable development capacity of economic entities. in 2006, the United Nations Principles for Responsible Investment (UN PRI) put

forward the concept of ESG investment. Compared with the traditional green investment responsibility, social responsibility, and ethical responsibility, the ESG evaluation system integrates environmental, social and moral value standards, has a broader concept and deeper connotation, and can be regarded as an extension of corporate social responsibility [1].Existing studies have found that better performance of social responsibility is conducive to maintaining corporate image, can alleviate the problem of information asymmetry with stakeholders [2], and is conducive to winning the trust and support of stakeholders [3], and promote the sustainable development of enterprises [4].The government, as an important stakeholder of the enterprise, plays a pivotal role in the development of the enterprise. Government subsidies are reflected in the government's Support strength for the enterprise, which promotes the R&D of the enterprise [5] and is conducive to the high-quality development of enterprises. at present, there is a lack of research on the impact of ESG on government subsidies in academia. Analyzing the relationship between ESG and government subsidies will not only contribute to the popularity of ESG evaluation systems, promote enterprises to achieve a balance between the environment, society and corporate governance, but also contribute to the fair and equitable implementation of government subsidies to relevant enterprises to maximize the efficiency of resource allocation.

In view of this, based on the panel data of Shanghai and Shenzhen A-share listed companies from 2011 to 2020, this paper empirically analyzes the impact of ESG performance on government subsidies, and explores its impact mechanism. the study found that companies can obtain more government subsidies through improving ESG performance, and analyst attention and financial transparency play a positive mediating role in it. The heterogeneity analysis found that improving ESG performance and thus increasing the level of government subsidies is only established in high-tech enterprises and enterprises with a high degree of competition in the industry.

The possible marginal contributions of this paper are reflected in the following aspects: First, this paper systematically examines the relationship between ESG performance and government subsidies and conducts an empirical test, fully explaining the economic meaning of ESG; Second, it reveals in detail the mechanism by which ESG performance affects government subsidies, and examines the mediating effect of financial transparency and analyst attention; Third, this paper uses heterogeneity analysis to deeply analyze the relationship between ESG performance and government subsidies in different situations, which improves the practical application value of this paper's conclusions and enriches ESG related literature.

2. Theoretical Analysis and Research Assumptions

2.1. ESG Performance and Government Subsidies

In the context of China's devotion to achieving "carbon peaking" in 2030 and "carbon neutrality" in 2060, traditional social responsibility fulfillment methods can no longer meet the needs of social progress and enterprise development.ESG, an emerging sustainable development concept that integrates the environment, society and corporate governance, has attracted the attention of enterprises. The ESG concept is corporate social responsibility in the new era and has deeper connotations.At present, most academics hold a positive attitude towards ESG, and some scholars believe that good ESG performance can reduce the degree of information asymmetry [6], alleviate the problem of corporate financing constraints [7] and the problem of insufficient investment [8], boosting corporate performance [9].Based on the stakeholder theory, the stakeholders of the enterprise have important external resources to promote the long-term development of the enterprise. The government, as an important stakeholder of the enterprise, supports the development of the enterprise in the form of government subsidies, and the enterprise that performs good social responsibilities is

conducivjg e to obtaining political Support and preferential treatment from the government [10], so companies' improved ESG performance is conducive to obtaining more government subsidies. In summary, the research hypothesis of this paper is put forward:

Hypothesis H1: Controlling other conditions unchanged, companies can increase government subsidies by improving their ESG performance.

2.2. Influence Mechanism Analysis

2.2.1. Mediating Effect of Analyst Concern

Analysts play a role as a link between enterprises and stakeholders. Analysts focus on the long-term information rather than the short-term information. By transmitting long-term tracking information to all sectors of society, the credibility and authority are greatly improved. Analysts pay attention to the non-financial information of enterprises. In a poor accounting environment, due to the lack of accounting information, analysts will pay more attention to non-financial information of enterprises to make objective analysis and evaluation [11]. Due to the opaque financial situation of some companies, agency problems and information asymmetry problems lead to the information disadvantage of enterprise stakeholders. In order to balance the supply and demand of market information and meet the investment needs of investors, analysts provide the society with a path to understand the real situation of enterprises by analyzing the non-financial information of enterprises. ESG, an indicator for comprehensively evaluating the sustainable development capability of enterprises, has become an important source of information for analysts to understand the development status of enterprises. Based on the signal transmission theory, companies with good ESG performance transmit signals of strong sustainable development potential to the outside world, and are more likely to attract the attention of analysts [12]. This in turn increases the trust of stakeholders in the company. As an important stakeholder, the government, based on the corporate information tracked by analysts, an authoritative intermediary, tends to target companies with good ESG performance, promote corporates value through tax incentives, financial subsidies, etc, and push corporates to create greater economic and social benefits. In summary, the research hypothesis of this paper is put forward:

Hypothesis H2: Controlling other conditions unchanged, analysts concern plays a positive mediating effect in the process of companies improving their ESG performance and thus raising the level of government subsidies.

2.2.2. Mediating Effect of Financial Transparency

ESG, an indicator that measures the environment, society, and corporate governance, has a certain authority. It can objectively and truly reveal the sustainable development capability of an enterprise by tracking the development status of the enterprise for a long time. Good ESG performance can improve the information transparency of enterprises [13], help external stakeholders to understand the capital flow and operation status of enterprises, and strengthen the disclosure of financial information [14]. The flow of funds such as investment and financing, profit and loss, R&D innovation, etc. is displayed to the public, which improves the external reputation and social image of the enterprise, thereby enhancing the trust of external stakeholders in the enterprise. As an important stakeholder of enterprises, the government pays more attention to enterprises with high financial transparency, and has a deep understanding of the real operating conditions and profit and loss of enterprises, and then tends to issue subsidies to enterprises with stable financial conditions. In summary, the research hypothesis of this paper is put forward:

Hypothesis H3: Controlling other conditions unchanged, financial transparency plays a positive mediating effect in the process of companies improving their ESG performance and thus raising the level of government subsidies.

3. Research Design

3.1. Sample Selection and Data Sources

This paper selects the 2011-2020 Huazheng Index Information Service Co., Ltd. (hereinafter referred to as "Huazheng") corporate ESG score index to study the relationship between corporate ESG performance and government subsidies. In this paper, the data are processed as follows: (1) Exclude financial enterprise samples; (2) Exclude ST and PT enterprise samples; (3) Exclude samples with missing data. In order to reduce the influence of outliers, all continuous variables are winsorized at the 1% and 99% quantiles.

3.2. Variable Definition

3.2.1. Explained Variable

The government subsidy is measured by the natural logarithm of the total amount of government subsidy received by enterprises during the year plus one（GS）.In the robustness test, the government subsidy is defined as an indirect measure of the proportion of government subsidy to total assets during the year（GS2）. Under the two measurement methods, the larger the value, the higher the level of government subsidies.

3.2.2. Core Explanatory Variable

This article uses the ESG index of Huazheng, which has a wide coverage and is authoritative and professional, to measure the ESG performance of enterprises. The ESG index is divided into nine levels from high to low: AAA, AA, A, BBB, BB, B, CCC, CC, C, and quantified as 9, 8, 7, 6, 5, 4, 3, 2, 1 for convenient statistical analysis. The higher the ESG rating, the better the company's ESG performance.

3.2.3. Analyst Concern

Analyst concern (ANA) is measured by the number of securities analysts who track the company during the year plus one natural logarithm. The more the number of securities analysts tracked by the company, the stronger the analyst's attention.

3.2.4. Financial Transparency

This paper refers to the existing literature [15], quantifies financial transparency (FT), and uses the absolute value of manipulated accruals calculated by the revised Jones model to measure this variable, which is a negative indicator. The larger the value, the lower the financial transparency.

3.2.5. Control Variable

This paper selects return on total assets (ROA), financial leverage (LEV), company size (SIZE), company age (AGE), institutional investor shareholding ratio (INST), largest shareholder shareholding ratio (TOP1), property rights (SOE) as control variables.The definitions and measurement methods of each variable are shown in Table 1.

Table 1. Variable Definition Table

Variable type	Variable name	Variable symbol	Variable definition
Explained variable	Government subsidy	GS	Add one to the total amount of government subsidies received by the enterprise during the year and take the natural logarithm
		GS2	Proportion of government subsidies to total assets during the year
Core explanatory variable	ESG performance	ESG	According to the rating results, it is divided into 9 grades (AAA, AA, A, BBB, BB, B, CCC, CC, C) and assigned as (9, 8, 7, 6, 5, 4, 3, 2, 1)

Mediating variable	Analyst concern	ANA	Add one to the natural logarithm of the number of securities analysts who track the company during the year
	Financial transparency	FT	Add one to the natural logarithm of the number of securities analysts who track the company during the year
Control variable	Return on total assets	ROA	The ratio of annual net profit to the annual average balance of total assets
	Financial leverage	LEV	The ratio of total liabilities at the end of the year to total assets at the end of the year
	Company Size	SIZE	The natural logarithm of total assets at the end of the period
	Company age	AGE	Add one to the listing period to take the natural logarithm
	Institutional investor shareholding	INST	Shares held by institutional investors as a percentage of the total shares of the company
	Shareholding ratio of the largest shareholder	TOP1	The proportion of shares held by the largest shareholder of the company to the total shares of the company
	Property right	SOE	State-owned enterprises take 1, non-state-owned enterprises take 0
	Year dummy variable	YEAR	In the current year, take 1, otherwise take 0
	Industry dummy variable	IND	In this industry, take 1, otherwise take 0

3.3. Model Setting

In this paper, models (1) ~ (5) are set to test hypotheses H1 to H3, and the specific regression models are as follows. Model (1) is used to test the relationship between ESG performance and government subsidies, $GS_{i,t}$ is government subsidies, $ESG_{i,t}$ is corporate ESG performance, $Controls_{i,t}$ is a series of control variables that affect government subsidies, and $\varepsilon_{i,t}$ is a random error term , if the coefficient of α_1 is significantly positive, it is assumed that H1 holds. In order to test the hypotheses H2 and H3, this paper draws on the existing mediation effect test procedure [16] for empirical test. Models (2) ~ (3) are used to test the hypothesis H2. If the sign of $(\beta_1 \times \gamma_1)$ is positive, it is a positive mediating effect, otherwise it is a negative mediating effect. In order to verify the hypothesis H3, this paper sets the models (4) ~ (5). If both β_1 and γ_1 are significantly positive, the hypothesis H3 is established.

$$GS_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \alpha \sum Controls_{i,t} + YEAR + IND + \varepsilon_{i,t} \tag{1}$$

$$ANA_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta \sum Controls_{i,t} + YEAR + IND + \varepsilon_{i,t} \tag{2}$$

$$GS_{i,t} = \gamma_0 + \gamma_1 ANA_{i,t} + \gamma_2 ESG_{i,t} + \gamma \sum Controls_{i,t} + YEAR + IND + \varepsilon_{i,t} \tag{3}$$

$$FT_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta \sum Controls_{i,t} + YEAR + IND + \varepsilon_{i,t} \tag{4}$$

$$GS_{i,t} = \gamma_0 + \gamma_1 FT_{i,t} + \gamma_2 ESG_{i,t} + \gamma \sum Controls_{i,t} + YEAR + IND + \varepsilon_{i,t} \tag{5}$$

4. Analysis of Empirical Results

4.1. Descriptive Statistics

Table 2. Descriptive statistics

Variable	Sample size	Mean	Standard deviation	Minimum	Median	Maximum
GS	19779	15.78	3.397	0	16.34	20.25
ESG	19779	6.585	1.155	1	6	9
ROA	19779	0.0352	0.0563	-0.219	0.0329	0.187
LEV	19779	0.454	0.203	0.0644	0.451	0.894
SIZE	19779	22.43	1.302	19.91	22.26	26.37
AGE	19779	2.322	0.735	0.693	2.485	3.258
INST	19779	0.426	0.230	0.00158	0.439	0.872
TOP1	19779	35.78	15.05	9.517	33.85	74.89
SOE	19779	0.194	0.396	0	0	1

Table 2 shows the descriptive statistics of each variable. The maximum value of government subsidy (GS) is 20.25, the minimum value is 0, the standard deviation is 3.397, and the mean and median are 15.78 and 16.34, respectively. It can be seen that there is a large difference in government subsidies. The maximum value of ESG performance (ESG) is 9, the minimum value is 1, the standard deviation is 1.155, the mean and median are 6.585 and 6, respectively, indicating that the ESG performance of enterprises is uneven, and the overall number of enterprises with medium ESG performance More, indicating that this paper has certain practical significance to explore the relationship between corporate ESG performance and government subsidies. In addition, the standard deviations of all control variables are large, indicating that there are large differences among the company samples, which may affect government subsidies.

4.2. Correlation Analysis

Table 3. Correlation analysis

Variable	GS	ESG	ROA	LEV	SIZE	AGE	INST	TOP1	SOE
GS	1								
ESG	0.083***	1							
ROA	0.059***	0.138***	1						
LEV	0.067***	0.095***	-0.362***	1					
SIZE	0.316***	0.372***	0.018***	0.484***	1				
AGE	-0.046***	0.157***	-0.183***	0.300***	0.307***	1			
INST	0.116***	0.266***	0.100***	0.175***	0.428***	0.285***	1		
TOP1	0.067***	0.139***	0.141***	0.044***	0.222***	-0.119***	0.410***	1	
SOE	0.063***	0.187***	-0.040***	0.137***	0.202***	0.190***	0.230***	0.127***	1

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, same below

VIF test	ESG	ROA	LEV	SIZE	AGE	INST	TOP1	SOE	Mean
	1.22	1.28	1.62	1.79	1.33	1.56	1.33	1.10	1.40

Table 3 shows the results of correlation analysis between variables. The correlation coefficient between ESG and GS was 0.083 and was significant at the 1% level, indicating that there was a significant positive correlation between ESG and GS, which provided some support for hypothesis H1.The correlation coefficients between GS and ROA, LEV, SIZE, INST, TOP1, and SOE are 0.059, 0.067, 0.316, 0.116, 0.067, and 0.063, which are all significant at the level of 1%, indicating that the company's return on total assets, financial leverage, The size of the company,

the shareholding ratio of institutional investors, the shareholding ratio of the largest shareholder and the nature of property rights are all significantly positively correlated with government subsidies. The correlation coefficient between GS and AGE is -0.046, which is significant at the 1% level, indicating that company age is significantly negatively correlated with government subsidies. The correlation coefficients between all variables in Table 3 are all less than 0.5, and the VIF test shows that the VIF values of each variable are all less than 5, and there is no serious multicollinearity among the variables.

4.3. Basic Regression Results

Table 4. The impact of ESG on government subsidies

Variable	(1) GS	(2) GS
ESG	0.245***	0.054***
	(11.84)	(3.05)
ROA		0.765*
		(1.70)
LEV		0.336*
		(1.95)
SIZE		1.080***
		(36.67)
AGE		-0.567***
		(-16.50)
INST		0.323***
		(2.99)
TOP1		-0.001
		(-0.63)
SOE		0.115*
		(1.92)
Constant	14.165***	-7.541***
	(105.13)	(-12.72)
Year fixed effect	Not controlled	Controlled
Industry fixed effect	Not controlled	Controlled
Sample size	19,779	19,779
Adjust R^2	0.00687	0.264

Table 4 shows the basic regression results of corporate ESG performance on government subsidies, in which columns (1) and (2) are both fixed-effect empirical regression results, while column (1) does not add control variables, and does not control the year and industry. Column (2) adds control variables and controls year and industry. The regression coefficient of column (1) ESG is 0.245, and the regression coefficient of column (2) ESG is 0.054, both of which are significant at the 1% level. Suppose H1 is verified. The above results show that controlling for other conditions unchanged, the improvement of enterprises' ESG performance will increase the level of government subsidies.

4.4. Analysis of Mediating Effect Mechanism

4.4.1. Analyst Concern

Table 5 shows the results of the mediation effect test. Columns (1) and (2) of Table 5 are the results of the mediation effect test that analysts are concerned about. The regression coefficient of ESG in column (1) is 0.053, which is significant at the 1% level, indicating that improving the

ESG performance of companies will improve the analysis attention. The regression coefficient of ANA in column (2) is 0.081, which is significant at the 1% level, so the mediating effect of analyst concern is established. Suppose H2 holds.

Table 5. Mediating effect test

Variable	(1) ANA	(2) GS	(3) FT	(4) GS
ANA		0.081***		
		(3.92)		
FT				-1.119***
				(-3.14)
ESG	0.053***	0.050***	-0.004***	0.050***
	(8.25)	(2.82)	(-7.20)	(2.82)
ROA	6.167***	0.269	-0.081***	0.675
	(40.04)	(0.55)	(-5.04)	(1.49)
LEV	-0.427***	0.370**	0.015***	0.352**
	(-10.08)	(2.14)	(3.95)	(2.04)
SIZE	0.470***	1.043***	-0.004***	1.075***
	(71.40)	(33.70)	(-7.80)	(36.54)
AGE	-0.326***	-0.541***	0.001	-0.566***
	(-30.51)	(-15.55)	(1.04)	(-16.48)
INST	0.856***	0.254**	-0.001	0.322***
	(23.90)	(2.34)	(-0.20)	(2.98)
TOP1	-0.010***	-0.000	0.000	-0.001
	(-19.21)	(-0.18)	(0.02)	(-0.63)
SOE	-0.070***	0.121**	-0.003**	0.112*
	(-4.17)	(2.01)	(-2.10)	(1.87)
Constant	-8.102***	-6.889***	0.195***	-7.322***
	(-59.96)	(-11.26)	(17.71)	(-12.33)
Year fixed effect	controlled	Controlled	Controlled	Controlled
Industry fixed effect	controlled	Controlled	Controlled	Controlled
Sample size	19,779	19,779	19,779	19,779
Adjust R^2	0.433	0.264	0.0582	0.264

4.4.2. Financial Transparency

Columns (3) and (4) of Table 5 are the results of the mediation effect test of financial transparency. The regression coefficient of ESG in column (3) is -0.004, which is significant at the level of 1%. Since financial transparency is a negative indicator, improving corporate ESG performance increases financial transparency. The regression coefficient of FT in column (4) is -1.119, which is significant at the 1% level, so the mediation effect of analyst concern is established. The above results show that under the control of other conditions remaining unchanged, companies improving ESG performance will improve financial transparency. Suppose H3 holds.

5. Robustness Check

5.1. PSM Test

Since the return on total assets, financial leverage, company size, company age, shareholding ratio of institutional investors, the shareholding ratio of the largest shareholder, and the nature

of property rights will have impacts on companies' improvement in ESG performance, in order to reduce sample selection bias, PSM propensity score matching is used to match all the above factors in this paper. The matching results are shown in column (1) of Table 6. The regression coefficient of ESG is 0.099, which is significant at the level of 1%. The conclusion of this paper is verified, and companies can still increase government subsidies by improving their ESG performance.

Table 6. Robustness check

Variable	(1) PSM	(2) GS2	(3) GSt+1	(4) Drop 2015 and 2020
ESG	0.099***	0.000***	0.058***	0.056***
	(4.04)	(5.07)	(2.99)	(2.62)
ROA	1.040	0.003***	0.962*	0.965*
	(1.58)	(4.41)	(1.94)	(1.81)
LEV	0.587**	0.002***	0.629***	0.428**
	(2.48)	(6.40)	(3.44)	(2.13)
SIZE	1.122***	-0.001***	0.993***	1.101***
	(27.96)	(-15.71)	(31.55)	(32.50)
AGE	-0.630***	-0.000***	-0.507***	-0.622***
	(-12.71)	(-7.95)	(-14.27)	(-15.62)
INST	0.340**	0.001***	0.358***	0.332***
	(2.18)	(5.82)	(3.26)	(2.61)
TOP1	-0.006**	-0.000	-0.001	-0.003
	(-2.55)	(-1.54)	(-0.56)	(-1.57)
SOE	0.199**	0.000***	0.094	0.148**
	(2.48)	(2.88)	(1.49)	(2.14)
Constant	-8.439***	0.017***	-5.712***	-7.795***
	(-10.15)	(21.73)	(-9.00)	(-11.51)
Year fixed effect	Controlled	Controlled	Controlled	Controlled
Industry fixed effect	Controlled	Controlled	Controlled	Controlled
Sample size	9,163	19,779	16,207	15,586
Adjust R^2	0.288	0.101	0.259	0.257

5.2. Replace Explained Variable

This paper replaces the explained variables to test the robustness, and changes the measurement method of government subsidies, from the direct method of adding one to the natural logarithm of the total amount of government subsidies received by enterprises in the year to the indirect method that is the government subsidies proportion of total assets. Column (2) in Table 6 is the regression result of replacing the explained variable. The regression coefficient of ESG is significantly positive at the level of 1%, indicating that under the control of other conditions remaining unchanged, after replacing the explained variable, the enterprise improved ESG performance can still improve government subsidies, and the conclusion of this paper is verified.

5.3. Use the Explained Variable for Period T+1

In order to test the influence of the endogenous problem of mutual causality on the robustness of the conclusions, this paper selects the government subsidies in the (t+1) period for regression. Column (3) of Table 6 is the regression result of the explained variable in the (t+1) period. The regression coefficient of ESG is 0.058, which is significant at the 1% level, indicating

that under the control of other conditions remaining unchanged, after using the explained variables in the (t+1) period, companies can still improve government subsidies through improving their ESG performance. The conclusion of this paper is verified.

5.4. Exclude 2015 and 2020 Data

Due to the impact of the stock market crash in 2015 and the new crown epidemic in 2020, the development of the world economy has been severely hindered, and the economic downturn has brought huge trauma to the innovation and development of enterprises. In view of the severe economic situation and the vulnerability of ESG to changes in the external environment, the robustness of the conclusions needs to be further tested. Column (4) in Table 6 shows the regression results after excluding the two years of 2015 and 2020. The regression coefficient of ESG is 0.056, which is significant at the 1% level.This shows that the conclusion of this paper is still established after excluding the two external factors of the stock market crash and the epidemic, which further strengthens the robustness of the conclusion.

6. Further Analysis

6.1. Whether it is a High-tech Enterprise

Table 7. Further analysis

	(1)	(2)	(3)	(4)
Variable	Whether it is a high-tech enterprise		Degree of competition in the industry	
	Yes	No	High	Low
ESG	0.072***	0.020	0.086***	0.032
	(4.21)	(0.74)	(3.34)	(1.32)
ROA	2.080***	0.626	-0.012	1.608***
	(4.60)	(0.95)	(-0.02)	(2.76)
LEV	0.327**	0.714***	0.268	0.561**
	(2.22)	(2.80)	(1.08)	(2.36)
SIZE	0.787***	1.177***	1.196***	0.947***
	(22.55)	(30.18)	(31.11)	(20.65)
AGE	-0.061*	-0.658***	-0.772***	-0.379***
	(-1.83)	(-13.79)	(-15.32)	(-8.17)
INST	0.200**	0.332*	0.385***	0.252
	(2.11)	(1.85)	(2.64)	(1.57)
TOP1	-0.005***	0.004	-0.004*	0.001
	(-3.94)	(1.36)	(-1.70)	(0.46)
SOE	0.007	0.118	0.188**	0.031
	(0.10)	(1.46)	(2.22)	(0.36)
Constant term	-2.099**	-9.712***	-9.547***	-5.101***
	(-2.09)	(-12.71)	(-12.97)	(-5.49)
Year fixed effect	Controlled	Controlled	Controlled	Controlled
Industry fixed effect	Controlled	Controlled	Controlled	Controlled
Sample size	8207	11572	9,877	9,902
Adjust R^2	0.251	0.275	0.285	0.253

Scientific and technological innovation is an important driving force in the process of enterprise development. my country pays attention to the development of high-tech enterprises, and has issued preferential policies such as financial support for high-tech enterprises. However, high-tech enterprises often face problems such as financing difficulties and fierce competition.

Therefore, obtaining higher levels of government subsidies by improving the ESG performance of enterprises has become an important way for enterprises to solve development difficulties. This paper divides the selected enterprise sample into high-tech enterprise group and non-high-tech enterprise group. The results are shown in column (1) and column (2) of Table 7. Column (1) of Table 7 is the high-tech enterprise group, and the regression coefficient of ESG is 0.072, which is significant at the 1% level. Column (2) is the non-high-tech enterprise group, and the regression coefficient of ESG is 0.020, which is not statistically significant. It shows that the conclusion that enterprises increase the level of government subsidies by improving ESG performance is only established in the high-tech enterprise group.

6.2. Heterogeneity in the Degree of Competition in the Industry

The same industry environment has the same institutional policies and external resources, so there is competition among enterprises in the same industry [17]. Based on the theory of resource dependence, the competition and development of enterprises depend on limited external resources, and the government, as an important stakeholder of enterprises, can provide enterprises with high-quality resources such as government subsidies. This paper uses the Herfindahl-Hirschman index to define the degree of industry competition, which is an inverse index to measure the degree of industry competition. The larger the index, the lower the level of industry competition, and vice versa, the higher the level of industry competition. In this paper, the selected sample enterprises are divided into two groups of strong industry competition and weak industry competition for empirical research. The results are shown in columns (3) and (4) in Table 7. Column (3) the ESG coefficient of the group with strong industry competition is 0.086, which is significant at the 1% level. Column (4) the ESG coefficient of the group with a low degree of industry competition is 0.032, which is not statistically significant. This shows that in an environment with strong industry competition, the improvement of ESG performance can increase the level of government subsidies.

7. Conclusion

This paper uses the panel data of Shanghai and Shenzhen A-share listed companies from 2011 to 2020 to empirically analyze the impact of ESG performance on government subsidies, and explore its impact mechanism. The study found that, first, companies can obtain more government subsidies for improving their ESG performance. Second, the intermediary mechanism analysis finds that ESG performance increases government subsidies through increased analyst attention and financial transparency. Third, the heterogeneity analysis found that improving ESG performance and thus increasing the level of government subsidies is only established in high-tech enterprises and enterprises with a high degree of competition in the industry. This study further clarifies the relationship between enterprises and the government, and the conclusions of this paper provide inspiration for giving full play to the economic role of ESG to promote high-quality development of enterprises. Based on the conclusions of this study, this paper puts forward the following recommendations:

First, build a sound enterprise ESG evaluation system and supervision mechanism, and use the ESG evaluation system to select companies with strong sustainable development capabilities, so that the distribution of government subsidies can be truly implemented, and this will stimulate the innovation and development of enterprises.

Second, give full play to the role of analyst groups in information transmission and external supervision, close the relationship between enterprises and the government, guide government subsidies to favor companies with good ESG performance, and ensure the fairness of government subsidies.

Third, differentiate the distribution of government subsidies. Due to the differences in the nature of enterprises and business environment, different enterprises have different needs for government subsidies. Therefore, relevant departments should conduct in-depth investigation of relevant information of enterprises before issuing subsidies to maximize the efficiency of subsidy distribution.

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