



# The Impact of Policy Tools on ESG of Strategic Emerging Firms

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**Abstract.** China's economy has shifted from the stage of high-speed growth to the stage of high-quality development. Under the concept of green development and sustainable development, the ESG performance of strategic emerging industries has attracted much attention. This study uses the financial data of listed companies in strategic emerging industries from 2013 to 2021, and selects three supply, environment and demand policy tools, namely government subsidies, tax incentives and government procurement, to empirically explore the impact of policy tools on ESG performance of strategic emerging enterprises. It is found that the three policy tools have a positive impact on ESG performance.

**Keywords:** Strategic Emerging Industries; ESG; Government Subsidies; Tax Incentives; Government Procurement

## 1 Introduction

The development of new quality productivity is the inherent requirement and important focus of promoting China's high-quality development. As one of the main areas of new quality productivity, strategic emerging industries play an irreplaceable role in promoting the upgrading of the industrial system, accelerating the implementation of the innovation-driven development strategy and achieving high-quality development, and have received the attention and attention of more and more organizations and institutions. China has also set a target of "the added value of strategic emerging industries accounting for more than 17% of GDP". However, in the face of the increasingly severe "choke" problem, the simple pursuit of economic benefits is no longer enough to support the development of strategic emerging industries, and more and more countries and organizations have begun to advocate the concept of ESG (*Environmental, Social and Governance*). The concept of ESG was first proposed by the United Nations Global Compact in 2004, aiming to focus on the performance of enterprises in the aspects of environment, social responsibility and corporate governance, rather than just the financial performance of enterprises. From the traditional pursuit of maximizing economic benefits to the pursuit of coordinated development of economic society, environment and society, ESG will become the endogenous driving force for the growth of strategic emerging enterprises and drive enterprises to achieve high-quality development.

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In 2022, the added value of strategic emerging industries such as new generation information technology, high-end equipment and new energy vehicles will account for more than 13% of China's GDP, compared with 7.6% in 2014, and the overall development scale of strategic emerging industries will achieve sustained and rapid growth. However, focusing on the micro level, strategic emerging enterprises generally face problems such as small scale, lack of capital and limited market demand, so they are particularly in need of government support and regulation. Fulfilling social responsibilities and pursuing coordinated development of economy, society, environment and society are effective means for strategic emerging enterprises to obtain government support. In other words, ESG performance of strategic emerging enterprises can be used as a way to undertake social and political tasks, which is conducive to obtaining more policy support for enterprises, thereby increasing R&D funds and improving innovation output, and thus tend to high-quality development. Government policy tools play a supporting role in economic construction, political construction and ecological civilization construction, which can encourage strategic emerging enterprises to fulfill their social responsibilities and further promote enterprises to pursue long-term benefits and high-quality development.

Government subsidies, tax incentives and government procurement are the main policy tools on the supply, environment and demand sides, respectively<sup>1</sup>. In the existing researches, there are abundant theories and studies on the effects of government subsidies and other policy tools or a certain policy on corporate green performance, corporate social responsibility fulfillment and corporate internal management, which correspond to the core elements of ESG, such as environment (E), social responsibility (S) and corporate governance (G). Scholars have discussed policy tools, corporate value and corporate financial performance extensively, but few have discussed the impact of policy tools on ESG, including environment, society and corporate governance. There are more empirical studies on the impact of ESG performance on enterprises, and relatively few discussions on the influencing factors of ESG performance, and few focus on strategic emerging enterprises such as artificial intelligence and new energy vehicles. Therefore, this study will empirically examine the effects of government subsidies, government procurement and tax incentives on ESG performance of strategic emerging enterprises, in order to provide theoretical basis for governments at all levels to design targeted support policies according to the actual situation of ESG performance of strategic emerging enterprises.

## **2 Theoretical Analysis and Research Hypothesis**

### **2.1 Policy Tools Have an Incentive Effect on ESG Performance of Strategic Emerging Enterprises**

According to the theory of economic externality, enterprises will produce positive external effects such as improving ecological environment and promoting social harmony in the process of fulfilling their social responsibilities. If enterprises cannot get direct economic returns in the process of fulfilling their social responsibilities, there may be problems such as insufficient market incentives, resulting in negative external effects

such as environmental pollution. Government policy support is therefore particularly needed to compensate for market failures. At the same time, as strategic emerging industries are capital - and technology-intensive industries, huge financial support is needed in the early start-up stage and long product research and development. Direct government subsidies and government purchase orders can be used to restrict their financing. Government procurement can make full use of its advantages of large order scale, long cycle and high value to alleviate the financing constraints and production and operation pressure of enterprises, and further increase the capital investment of enterprises in environment, society and corporate governance. Tax incentives such as lower tax rates and research and development tax credits can reduce the tax burden on enterprises to reduce the risk of initial research and development operations. To sum up, policy tools can reduce negative economic externalities by easing financing constraints and reducing tax burden, and encourage strategic emerging enterprises to improve their efforts to control and repair environmental pollution<sup>2</sup>, so that sufficient funds can be used to improve employment opportunities and employee welfare.

Secondly, the behavior of enterprises to fulfill the corresponding environmental, social and corporate governance responsibilities is also a kind of signal transmission, which will convey positive and positive signals to the public, improve the reputation of enterprises and social attention, and further promote the market financing level of enterprises. Enterprises that receive government subsidies and government procurement support will become the focus of attention of the capital market, media, the public and analysis institutions, which will indirectly affect the focus of attention of analysis institutions and the investment direction of the market<sup>3</sup>. Enterprises with low tax burden have less marginal benefit from tax avoidance and are more inclined to invest in productive ESG activities to improve corporate reputation and sustainable development ability. The market competition of strategic emerging enterprises is fierce, and their development in the early stage and the sustainable development in the later stage are inseparable from the help of government resources and the support of policy tools. Therefore, under the guidance of winning government support and under the pressure of public and media attention after winning support, enterprises will actively strengthen environmental protection and social responsibility, and improve their internal governance capacity<sup>4</sup>. Therefore, hypothesis H1 is proposed: policy tools have an incentive effect on ESG performance of strategic emerging firms.

## **2.2 Policy Tools Have a Suppressive Effect on ESG Performance of Strategic Emerging Enterprises**

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However, the opposite view questions the effectiveness of the policy tools used by developing countries and the potential disincentives in the process of implementation.

On the one hand, according to the signal transmission theory, enterprises may send false innovation signals to the government in order to obtain the support of government subsidies, and some enterprises also declare false information to the government in order to meet the preferential tax conditions to cheat tax. Because of the information asymmetry between the government and enterprises, the policy tools deviate from the original intention, resulting in rent-seeking and other situations. At the same time, because the government cannot obtain complete information from enterprises, some "one-size-fits-all" identification methods give enterprises the opportunity to convey false information, which will induce the government to provide direct government subsidies or indirect tax incentives and government procurement, resulting in the failure of policy tools to play an effective role and the decline of the company's research and development performance, not to mention the fulfillment of social responsibilities.

On the other hand, strategic emerging enterprises are capital - and technology-intensive enterprises, and R&D, production and operation all require a large amount of financial support. According to the theory of economic externality, investment in ESG performance will result in the risk of crowding out R&D and innovation output of enterprises. When enterprises are faced with good investment opportunities to improve performance, The impact of ESG input may lead to the phenomenon of capital shortage, which will further affect the return on investment of enterprises<sup>5</sup>. Kruger (2015), from the perspective of corporate governance issues, found that factors such as social responsibility would be used by corporate executives as tools for their own performance, thus neglecting the core business of enterprises in the process of corporate management and reducing the value of enterprises<sup>6</sup>. These negative externalities will cause enterprises to restrain their investment in ESG, which in turn will inhibit the improvement of ESG performance. Therefore, hypothesis H2 is proposed: policy tools can inhibit the ESG performance of strategic emerging firms.

### **3 Research Design**

#### **3.1 Sample Selection And Data Source**

In this paper, listed companies in strategic emerging industries from 2013 to 2021 are selected as research samples. The selection basis of listed companies in strategic emerging industries is based on the "Emerging Composite Index" released by China Securities Index Co., LTD and Shanghai Stock Exchange in 2017, that is, the comprehensive index of China's strategic emerging industries. The index includes 2,300 listed companies, including energy conservation and environmental protection industries, next-generation information technology industries, biological industries, high-end equipment manufacturing industries, new energy industries, new materials industries, new energy automobile industries, digital creative industries, and high-tech service industries. In this paper, samples with missing important variables, abnormal ST, and less than one year of listing were excluded when selecting data, and all continuous variables were truncated by 1% up or down. Finally, 6848 observation data of listed companies in strategic emerging industries in 2013 and 2021 were selected. Among them, the government procurement data comes from the Chinese government procurement website,

through Python and manual crawling collated, other financial indicators and other data mainly from the National Tai 'an database.

### 3.2 Variable Declaration

#### (1) Explained Variables.

ESG index (environment, society and corporate governance) was selected and ESG rating of China Securities Index was adopted, which divided enterprise ESG into nine grades of AAA-C, namely AAA, AA, A, BBB, BB, B, CCC, CC and C, corresponding to 9-1 points respectively.

#### (2) Explanatory Variables.

This study refers to the practices of Liu Guangqiang (2016)<sup>8</sup>, Wu Wei and Liu Yuting (2020)<sup>3</sup>, Xia Yun (2023)<sup>7</sup> and others, and selects the amount of government subsidy, tax refund and government purchase order in the annual report of enterprises, and takes logarithms of the amount after adding 1 respectively to measure the three types of policy tools: government subsidy, tax preference and government procurement.

#### (3) Control Variables.

This study refers to the practices of Jiang Aihua (2023)<sup>9</sup>, Han Zhongxue (2023)<sup>10</sup> and others. Enterprise size (size), asset-liability ratio (lev), cash-asset ratio (cash), number of directors (board), Tobin's Q (q), ownership concentration (top) and return on assets (roe) were selected as control variables. The specific definitions of each variable are shown in Table 1.

**Table 1.** Variable definitions

Type	Variable Name	Symbol	Definition
Dependent Variable	Corporate ESG	esg	China Securities Index ESG Rating
Explanatory Variables	Government Subsidies	L1	Logarithm of the amount of "Government Subsidies" in the annual report + 1
	Tax Incentives	L2	Logarithm of the amount of various tax refunds received + 1
	Government Procurement	L3	Logarithm of the amount of government procurement orders + 1
Control Variables	Enterprise Size	size	Natural logarithm of the net fixed assets at the end of the year
	Asset-Liability Ratio	lev	Total liabilities divided by shareholder's equity
	Cash Asset Ratio	cash	Cash and cash equivalents divided by total assets
	Tobin's Q	q	The ratio of a company's market value to its replacement cost (used

			as a proxy for the market value of the company's assets)
	Equity Concentration	top	Concentration of the top ten shareholders
	Number of Board Members	board	Total number of board members
	Return on Assets	roe	Net profit divided by shareholder's equity

### 3.3 Model Setting

In order to test the actual effects of government subsidies, tax incentives and government procurement on strategic emerging enterprises and the combination of policy tools, and considering that the explained variable ESG is an ordered variable, the ologit model was selected in this study for empirical analysis and model construction:

$$ESG_{i,t} = \beta_0 + \beta_1 L_m + \sum CV + \sum Industry + \sum Year + \varepsilon_{i,t} \quad (1)$$

ESG represents the current ESG performance assignment of strategic emerging enterprises, and subscripts  $i$  and  $t$  represent the enterprise and the year respectively. Subscript  $m$  is 1-3,  $L_1$ ,  $L_2$  and  $L_3$  represent Explanatory Variables Government Subsidies, Tax Incentives and Government Procurement respectively;  $CV$  represents the Control Variable,  $Industry$  and  $Year$  represent virtual variables of different industries and years to which strategic emerging enterprises belong, to control the influence of unobservable factors changing with industry and time on the model results,  $\varepsilon$  is the random error term.

## 4 Empirical Analysis

### 4.1 Descriptive Statistics

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The descriptive statistical results of each variable are shown in Table 2. After taking the logarithm, the difference between the maximum and minimum amounts of government subsidies, tax incentives and government procurement is large, and the minimum value is 0, indicating that some enterprises have not obtained the support of policy tools. The minimum ESG performance (ESG) score is 1.00 (C rating), the maximum is 8.00 (AA rating), and the average is 4.0949 (B rating), which is consistent with the median 4.00 (B rating), indicating that there are significant differences in the ESG performance of strategic emerging enterprises in China, and the overall ESG performance of strategic emerging enterprises is general. Governments and businesses at all levels need to increase their focus on ESG performance.

**Table 2.** Descriptive statistical results of variables

Variable	Sample Size	Mean	Standard Deviation	Minimum	Median	Maximum
ESG	6836	4.0949	1.083	1.00	4.00	8.00
Government Subsidies	6848	16.8005	1.898	0.00	16.85	21.39
Tax Incentives	6848	16.4312	5.499	0.00	18.00	23.26
Government Procurement	6806	4.7050	7.175	0.00	0.00	21.05
size	6848	20.1820	1.413	16.20	20.10	24.46
lev	6848	0.3726	0.186	0.03	0.37	0.86
cash	6848	0.1545	0.109	0.01	0.13	0.69
board	6848	9.1479	2.202	5.00	9.00	17.00
q	6843	2.3013	1.330	0.86	1.89	9.91
top	6848	56.2004	14.315	20.05	56.65	88.72
roe	6848	0.0416	0.063	-0.41	0.04	0.23

## 4.2 Correlation Analysis

The descriptive statistical results of each variable are shown in Table 3. The correlation coefficients between ESG rating and government subsidies, tax incentives and government procurement are all positive and significant, which is consistent with the hypothesis in this paper. This indicates that the performance of enterprises in environmental, social and governance (ESG) is positively correlated with government subsidies, tax incentives and government procurement to a certain extent, which means that companies with good ESG performance are more likely to obtain income through the three policy tools, and the government has a tendency to give more support to companies with good social responsibility and sustainability performance.

**Table 3.** Correlation analysis of variables

ESG	Government subsidies	tax incentives	government procurement
ESG	1		
Government subsidies	0.182***	1	
tax incentives	0.128***	0.291***	1
government procurement	0.149***	0.166***	0.122***
Control variables	Control*		
* In the regression model, all control variables are included in the model.			

## 4.3 Regression Result Analysis

### (1) Reference Regression.

Table 4 shows the regression results of government subsidies, tax incentives, government procurement and their combinations with ESG performance. The data of models

(1), (2) and (3) show that government subsidies, tax incentives and government procurement have a positive promoting effect on the ESG performance of strategic emerging enterprises. Assume that H1 is verified and H2 is rejected, that is, government policy tools can significantly improve the ESG performance of strategic emerging enterprises and play an incentive role.

**Table 4.** regression results

	(1)*	(2)*	(3)*
	ESG	ESG	ESG
Government subsidies	0.1109*** (-8.2054)		
tax incentives		0.0366*** (-8.5943)	
Government subsidies			0.0351*** (-11.1178)
size	0.3001*** (-14.2702)	0.3302*** (-16.4043)	0.3583*** (-17.8935)
lev	-0.9956*** (-6.5628)	-1.0506*** (-6.8922)	-1.0600*** (-6.9573)
cash	0.8956*** (-4.0226)	0.9776*** (-4.3998)	0.8268*** (-3.698)
q	-0.1044*** (-5.7569)	-0.0866*** (-4.7446)	-0.1008*** (-5.5416)
top	0.0061*** (-3.7219)	0.0069*** (-4.217)	0.0066*** (-4.0222)
roe	6.4292*** (-15.5653)	6.6404*** (-16.0611)	6.4464*** (-15.4993)
N	6835	6835	6793
<i>*Models (1), (2), and (3) are regressions of three different policy tools.</i>			

## (2) Marginal Effect.

Table 5 shows the marginal effects of the regression results. Since the regression coefficient of the ologit model could not reflect the degree of impact of different policy tools on ESG performance, this paper carried out marginal effect analysis on the regression results of the model, and the results were shown in Table 5. With each additional unit of policy instruments, ESG changes at different levels. Among them, government subsidies have the greatest impact, increasing the probability of ESG performance as 5 by 1.59% and the probability of ESG performance as 6 by 0.69%. In addition, it can be found that the impact of the three policy tools on ESG performance of 7 and 8 is relatively small, because when an enterprise's ESG performance rating reaches A, it indicates that the enterprise has paid enough attention to it and will take the initiative to improve its ESG performance, and the support of policy tools has played a icing on the cake effect.



**Table 5.** Marginal effect result

	ESG=1	ESG=2	ESG=3	ESG=4	ESG=5	ESG=6	ESG=7	ESG=8
<b>Government subsidies</b>	- 0.00224 55	- 0.00472 26	- 0.01256 34	- 0.00421 02	0.01610 48	0.00701 24	0.00059 24	0.00003 22
	(-6.78)	(-7.65)	(-8.24)	(-6.86)	(8.23)	(7.83)	(4.92)	(1.39)
<b>tax incentives</b>	- 0.00073	- 0.00153 89	- 0.00411	- 0.00138	0.00525 7	0.00229 31	0.00019 4	0.00001 06
	(-7.06)	(-7.94)	(-8.62)	(-7.12)	(8.65)	(8.15)	(5.00)	(1.40)
<b>Government subsidies</b>	- 0.00071	- 0.00148 6	- 0.00395	- 0.00126	0.00503 24	0.00217 2	0.00018 7	0.00001 02
	(-8.28)	(-9.17)	(-11.03)	(-8.62)	(11.29)	(10.27)	(5.38)	(1.40)
<b>cv</b>	Control							

#### 4.4 Robustness Test

##### (1) Reference Regression.

Table 4 shows the regression results of government subsidies, tax incentives, government procurement and their combinations with ESG performance. The data of models (1), (2) and (3) show that government subsidies, tax incentives and government procurement have a positive promoting effect on the ESG performance of strategic emerging enterprises. Assume that H1 is verified and H2 is rejected, that is, government policy tools can significantly improve the ESG performance of strategic emerging enterprises and play an incentive role.

In order to ensure the robustness of the empirical results, this paper makes reference to the practice of Jiang Aihua et al. (2023) and conducts the following tests:

First, change the valuation method of ESG in China Securities. From low to high according to the C, B, A file, change the value of 1-9 points to 1-3 points. Second, lag the main explanatory variables. Considering that the main explanatory variable is the policy tool, the implementation of the policy may be delayed, so the main explanatory variables of government subsidies, tax incentives and government procurement are delayed for one year, and the regression is carried out again. Third, replace the explained variable. In order to avoid the particularity of a single ESG evaluation index, ESG evaluation data provided by Wind database and Bloomberg were selected respectively for regression.

All the results are shown in Table 6. Through the robustness analysis above, it can be found that the coefficient signs and significance of major variables have no significant changes, which further verifies hypothesis H1.

**Table 6.** Robustness test

Policy Tool	Test Method	Coefficient
Government subsidies	Change Variable Assignment	0.0754*** -4.8583
	Lagged Explanatory Variable	0.0941*** -6.808
	Replace Dependent Variable with Wind	0.5793*** -14.9088
	Replace Dependent Variable with Bloomberg	0.0968*** -4.9387
tax incentives	Change Variable Assignment	0.0353*** -6.7685
	Lagged Explanatory Variable	0.0362*** -8.174
	Replace Dependent Variable with Wind	0.0578*** -5.9569
	Replace Dependent Variable with Bloomberg	0.0647*** -8.5903
Government subsidies	Change Variable Assignment	0.0319*** -7.4786
	Lagged Explanatory Variable	0.0398*** -11.5303
	Replace Dependent Variable with Wind	0.0380*** -7.6014
	Replace Dependent Variable with Bloomberg	0.0172*** -3.6711

## 5 Conclusions

Based on the financial data of listed companies in strategic emerging industries from 2013 to 2021, with a total of 6,848 observation samples, this paper selects three policy tools of supply, environment and demand side, namely government subsidies, tax incentives and government procurement, to empirically explore the impact of policy tools on ESG performance of strategic emerging enterprises. It is found that government subsidies, tax incentives and government procurement all have a positive impact on ESG performance of enterprises, regardless of whether the policy tools obtained by enterprises are in the form of combination.

The difference between this paper and previous studies is that the current domestic and foreign studies mainly focus on the study of policy tools on environmental protection, social responsibility and corporate governance, etc. This paper focuses on the discussion of policy tools on the overall performance of enterprises ESG, and enriches the study of factors affecting ESG performance. In addition, this study has the following implications: First, for the government, the government should actively guide strategic

emerging enterprises to pay attention to ESG performance and formulate corresponding reward and punishment measures; In the process of policy formulation, more attention should be paid to the combination effect of policies, and differentiated support should be given to different stages and types of enterprises, so as to improve the ESG performance of strategic emerging enterprises more effectively. Second, for enterprises, strategic emerging enterprises should actively strive for the support of governments at all levels, make good use of various policy tools, deeply understand the influence mechanism of different policy tools, and formulate corresponding ESG management strategies according to their own characteristics, so as to better adapt to the policy environment and market demand. The government, strategic emerging enterprises and the market should work together to promote the sustainable development of strategic emerging industries through rational use of policy tools, formulation of effective ESG management strategies, strengthening market supervision and financial institution incentives

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