



# The Impact of Green Credit Policy on Corporate Environmental Social Responsibility: The Moderating Role of Media Attention

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**Abstract.** This study aims to explore the impact of green credit policy on corporate environmental social responsibility (CESR), with a particular focus on the moderating role of media attention. All listed businesses in China's A-share market between 2008 and 2022 make up the research sample, and the difference-in-differences (DID) model is used for analysis. The study finds that green credit policy significantly enhances corporate environmental social responsibility performance, with this effect being particularly pronounced in non-state-owned enterprises and heavily polluting companies. Media attention plays a moderating role in the process by which green credit policy influences corporate environmental social responsibility. Specifically, higher levels of media attention amplify this positive effect. This suggests that the environmental supervisory effect of the credit market depends on the perfection of the market environment, and media attention can promote the corporate undertaking of environmental social responsibility.

**Keywords:** Green Credit Policy; Corporate Environmental Social Responsibility (CESR); Difference-in-Differences (DID); Media Attention.

## 1 Introduction

The importance of Corporate Environmental Social Responsibility (CESR) is increasingly prominent on a global scale. It is not only a crucial pathway for enterprises to achieve sustainable development but also a key factor in driving social progress and environmental protection. However, the current situation of CESR in China still faces numerous challenges. Some enterprises, while pursuing economic interests, neglect environmental protection and social responsibility, leading to frequent issues such as environmental pollution and resource waste.

The Chinese government has implemented a number of programs in response to the dearth of CESR; the green credit policy stands out in particular. This strategy seeks to direct businesses in strengthening environmental protection and advancing green economic growth through financial institutions' lending instruments. The green credit pol

icy limits the unchecked expansion of polluting industries by requiring financial institutions to use differentiated credit interest rates for various enterprises and take into account the environmental performance of enterprises when approving credit.

On the other hand, media attention acts as a moderating factor and influences how green credit programs affect CESR. The media can improve public scrutiny of businesses by reporting on their environmental practices and social responsibility results. This will encourage businesses to give environmental protection and social responsibility more thought. This study uses the Difference-in-Differences (DID) model to analyze data from all listed businesses in China's A-share market from 2008 to 2022. Its goal is to investigate the unique effects of green credit policies on corporate environmental sustainability (CESR) and the moderating role that media attention plays in this process. This study is very important for encouraging businesses to meet their social obligations and fostering green economic growth.

## **2 Theoretical Analysis and Research Hypotheses**

### **2.1 Green Credit Policy and Corporate Environmental Social Responsibility**

China integrates green credit performance into the macro-prudential assessment system and integrates the evaluation results of green credit performance into the public management system of financial institutions. Beginning at the institutional level, banks and other financial institutions are working to put more of an emphasis on the green credit business and to be more enthusiastic about offering green credit services<sup>[1]</sup>. Institutional theory states that to direct loan funds toward energy-saving and emission-reduction initiatives, local governments at all levels implement a variety of incentive strategies<sup>[2,3]</sup>, and the total balance of China's green financing tools is growing rapidly.

Environmental regulations and institutions can incentivize businesses to invest in appropriate environmental protection technology in order to enhance their environmental performance, as shown in the study conducted by Vachon and Klassen<sup>[4]</sup>. Scholars also discovered that the government plays a crucial role in enhancing the environmental behavior of corporations<sup>[5]</sup>.

The perspective of institutional isomorphism also suggests that organizations can obtain institutional legitimacy from various stakeholders through isomorphic behavior. In contrast, as noted by Michaels and Grüning<sup>[6]</sup>, stakeholders may "punish" an enterprise by ceasing or decreasing their support if the government, through the implementation of a green credit policy, expresses its preference for environmental protection while businesses fail to fulfill their environmental social responsibilities.

Therefore, we propose Hypothesis H1: The implementation of green credit policy is positively correlated with the fulfillment of environmental social responsibilities.

### **2.2 The Moderating Role of Media Attention**

Media attention is an information vehicle or communication form designed to achieve certain communication objectives. To establish a positive corporate image, companies

manage legitimacy in aspects such as the environment, society, and corporate governance<sup>[7]</sup>, and media attention is a primary pathway for companies to achieve legitimacy. Faced with market pressure from media attention, corporate managers, aiming to protect their reputation and development, often actively take measures to respond<sup>[8]</sup>, thereby reducing corporate agency costs, alleviating corporate financing constraints, and facilitating green credit approval. Media attention can influence corporate image and reputation, prompting companies to voluntarily adopt environmental and social responsibility measures, thereby improving social and environmental issues and achieving sustainable development. This study proposes the following hypothesis H2: Media attention positively moderates the direct effect of green credit policy on the fulfillment of corporate environmental social responsibility. That is, the higher the level of media attention, the stronger the promoting effect of the implementation of green credit policy on the fulfillment of corporate environmental social responsibility.

### 3 Research Design

#### 3.1 Sample Selection and Data Description

The China Banking Regulatory Commission released the "Notice on Printing the Green Credit Guidelines" (Yinjianfa [2012] No. 4) in 2012 in order to put the policy requirements of the "12th Five-Year Plan for Comprehensive Energy Conservation and Emission Reduction" (Guofa [2011] No. 26) and the "12th Five-Year Plan for Environmental Protection" (Guofa [2011] No. 42) into practice. The notice covered five areas: internal control, green credit organization management, capacity building, process management, and information disclosure.

This article primarily examines the effects of the green credit program on corporate environmental social responsibility against this policy context. The research sample consists of all listed businesses in China's A-share market, and it spans the years 2008 through 2022. To investigate whether green credit policies can improve business environmental and social responsibility, the DID (Difference-in-Differences) model is employed. The China Stock Market & Accounting Research Database (CSMAR) provided statistics for listed businesses, while the China Economic News Database provided information on media interest. The STATA18.0 analytic tool is used.

The following treatments were applied to the data of listed companies in the A-share market: (1) Exclude companies that were ST or \*ST during the sample period. These companies have abnormal financial data; ST indicates stocks under special treatment, and \*ST companies have consecutive losses for three years and are likely to be delisted, posing significant risks that can affect the reliability of the empirical results. (2) Exclude financial, insurance, banking, and real estate listed companies. These industries do not belong to the tangible economy, and their business models are not representative. The particularities of accounting practices can lead to misunderstandings. (3) Exclude companies that went public in the same year. Companies' financial data after going public can fluctuate significantly and are easily influenced by the securities market, leading to outliers. (4) Exclude missing values. This results in 23,129 observations.

## 3.2 Variable Description

### 3.2.1 Dependent Variable.

This paper refers to the practices of <sup>[9,10]</sup>, and evaluates the undertaking of corporate environmental social responsibility from three aspects: front-end governance, end governance, and post-evaluation. Front-end governance includes whether the company develops products beneficial to the production environment, whether it carries out measures to reduce "three wastes," whether it uses policies and measures for renewable energy or circular economy, whether it uses energy-saving policies and technologies in the production process, and whether the company carries out green office measures.

Indicators such as "environmental protection concept, environmental protection goals, environmental protection management system, environmental protection education and training, and special environmental protection actions" are specifically used to measure the front-end governance status. Each sub-indicator is 1 if it exists and 0 otherwise, and the sum of all indicators is taken, with a larger value indicating greater investment in environmental protection front-end governance by the company; end governance refers to the company's treatment of pollutant emissions, measured by indicators such as "waste gas reduction and treatment, wastewater reduction and treatment, and dust and smoke treatment." Each sub-indicator is 1 if it exists and 0 otherwise, and the sum of all indicators is taken, with a larger value indicating greater investment in end governance by the company; post-evaluation includes whether the company's environmental management system has passed ISO14001 certification and whether the company has received environmental recognition and other positive evaluations. If the company receives recognition or certification, it is assigned a value of 1, otherwise 0. The sum of front-end governance scores, end governance scores, and post-evaluation scores reflects the company's environmental social responsibility undertaking, with a larger value indicating that the company pays more attention to environmental social responsibility.

### 3.2.2 Independent Variable.

The binary variable DID, which is utilized to determine whether listed businesses are impacted by green credit policy, serves as the independent variable in this study. The policy year is 2012; the years 2012 and after are assigned a value of 1, and the years prior to 2012 are assigned a value of 0. Listed companies in significantly polluting industries are assigned a value of 1, while those in other industries are assigned a value of 0.  $DID = treat * time$

### 3.2.3 Moderating Role of Media Attention.

This paper draws on the research of <sup>[11,12]</sup>, and counts the number of positive news reports about each listed company in original financial newspapers and online news. The media attention of listed companies is measured by taking the sum of the number of positive news reports in original financial newspapers and online news, adding 1, and then taking the logarithm.

Furthermore, to avoid the omitted variable problem, this paper selects relevant financial and internal control variables of listed companies as control variables to be included in the model. To eliminate heteroscedasticity and the impact of dimensions, some variables have been log-transformed. For specific details, see Table 1.

**Table 1.** Definition of key indicators and calculation methodology

Variable Type	Variable Name	Variable Symbol	Variable Measurement
Dependent Variable	Corporate Environmental Social Responsibility	CESR	Front-end governance + end-of-pipe governance + ex-post evaluation
Independent variable	Green Credit Policy	DID	treat*time ,treat is a policy variable, heavy pollution industry enterprises = 1; other industry enterprises = 0, time is a time variable, 2012 and later = 1; before 2012 = 0.
Moderating variable	Media Attention	M	ln (number of original positive financial news stories in newspapers + number of original positive news stories on the Internet + 1)
Controlled variable	Company Age	Age	Ln (firm reporting period - firm listing period)
	Asset Size	Size	ln(Number of total assets
	Corporate Growth	Growth	Incremental production rate of operating income
	Return on Assets	ROA	$\frac{\text{Net profit}}{\text{average balance of total assets}} \times 100\%$
	Inventory Turnover	Turnover	$\frac{\text{Operating costs}}{\text{closing balance of inventories}} \times 100\%$
	Shareholding Concentration	Top	The shareholding ratio of the largest shareholder
	Leverage rate	Lev	$\frac{\text{Total liabilities}}{\text{total assets}} \times 100\%$
	Tobin's Q	Tobinq	$\frac{\text{Market capitalization}}{\text{total assets}} \times 100\%$

### 4 Model Assumptions

The Difference-in-Differences (DID) model is used in this work to test the study hypotheses. Before developing the model, a stationarity test (also known as the Parallel Trends Assumption Test) and a placebo test (also known as the Placebo Test) were carried out to guarantee the validity of the estimation results. Robustness assessments were also performed using a PSM-DID model (Propensity Score Matching Difference-in-Differences).

#### 4.1 Benchmark Research Hypothesis

Using a continuous difference-in-differences technique and the Guidelines, which went into effect in 2012, this study investigates the effect of green credit policy on Corporate Environmental Social Responsibility (CESR). The fundamental principle behind the difference-in-differences approach is to calculate the average treatment effect of the policy by comparing the effects of the policy on the treatment and control groups. Random sample selection is impractical in randomized studies; hence, the propensity score matching method is used to correct sample selection flaws and enhance the comparability of sample data. This ensures the parallel trends assumption needed by the difference-in-differences method<sup>[13,14]</sup>.

The aforementioned factors form the basis of this paper's research hypothesis, which states that green credit significantly improves corporate environmental social responsibility. Model (1) is established through the above research hypothesis:

$$CESR_{it} = a_0 + \beta_1 did_{i,t} + \beta_2 age_{i,t} + \beta_3 size_{i,t} + \beta_4 roa_{i,t} + \beta_5 growth_{i,t} + \beta_6 lev_{i,t} + \beta_7 turnover_{i,t} + \beta_8 top_{i,t} + \beta_9 tobinq_{i,t} + \delta_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

In model (1),  $i$  and  $t$  represent individual and time fixed effects, respectively.  $\alpha_0$  denotes the constant term,  $\beta_i$  refers to the regression coefficients of each variable, and  $\varepsilon_{it}$  Represents the random error term that varies with individual and time. Given the panel data type, it is necessary to control for time and individual effects. In the expression,  $\delta_t$  measures the time effects, and  $\mu_i$  Measures the fixed effects on the individual dimension.

Both fixed effects on the time dimension and fixed effects on the individual dimension are taken into account in this model. as well as fixed effects over time. This model's advantage lies in its ability to address two common issues: variables that are left out yet affect individuals throughout time and variables that are left out but affect individuals at any point in time.

#### 4.2 Testing for Moderating Effects

This study examines potential moderators of the relationship between corporate environmental social responsibility and green credit policy, including media coverage . Based on previous research<sup>[15]</sup>, we construct the following regression analysis model:

$$CESR_{it} = a_0 + \beta_1 did_{i,t} + \gamma_2 did_{i,t} * media_{i,t} + \rho_2 media_{i,t} + \beta_2 age_{i,t} + \beta_3 size_{i,t} + \beta_4 roa_{i,t} + \beta_5 growth_{i,t} + \beta_6 lev_{i,t} + \beta_7 turnover_{i,t} + \beta_8 top_{i,t} + \beta_9 tobinq_{i,t} + \delta_t + \mu_i + \varepsilon_{i,t}$$

$media_{i,t}$  is the firm's media attention.  $\delta_t$  represents a time effect,  $\mu_i$  represents an individual effect, and  $\varepsilon_{i,t}$  is a random error term.

## 5 Data Analysis Results

### 5.1 Parallel Trends Test and Placebo Test

Prior to the implementation of the policy, there should not be any notable disparities between the treatment group and the control group, as required by the common trend assumption of the Difference-in-disparities (DID) approach. Therefore, in order to determine whether the characteristics of the treatment and control groups are similar prior to the implementation of the policy, a parallel trends test is required when utilizing the DID technique.

Figure 1 shows the results of the parallel trends test for green credit. From the figure, it can be seen that the coefficients from pre\_2 to pre\_4 are not significant (the confidence interval includes 0), indicating that there were no significant differences between the treatment and control groups before the policy was implemented. In contrast, the coefficients from post\_1 to post\_6 are significant (the confidence interval does not include 0), indicating that significant differences emerged between the treatment and control groups after the policy was implemented. The parallel trends test is passed.

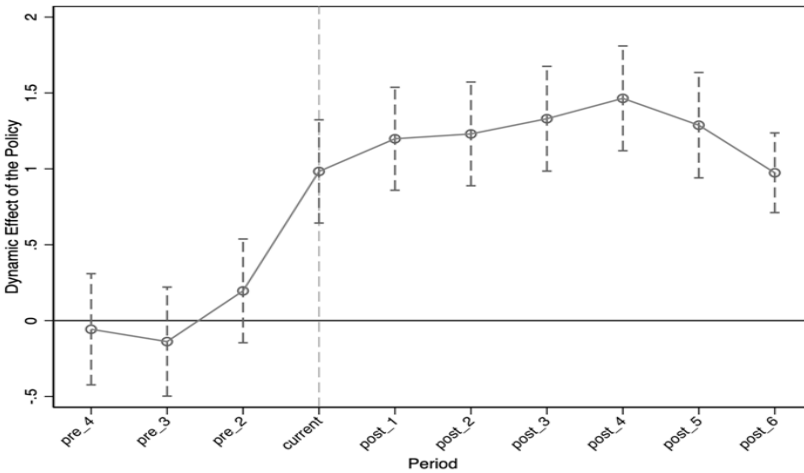


Fig. 1. Parallel Trend Test

Figure 2 is a kernel density distribution plot based on 500 sampling results. The plot reveals that the randomly sampled coefficients have a mean of zero and follow a normal distribution. Additionally, among the 500 samples, no sampled coefficient lies to the right of the dashed line representing the actual coefficient. This indicates that the benchmark regression coefficient is a low-probability event, and the placebo test is valid. The kernel density plot also shows that the distribution of estimated coefficients from random sampling is primarily centered around zero and does not encompass the true value. Therefore, the DID policy research effect in this paper is not obtained by chance and is not influenced by other policies or interfering factors.

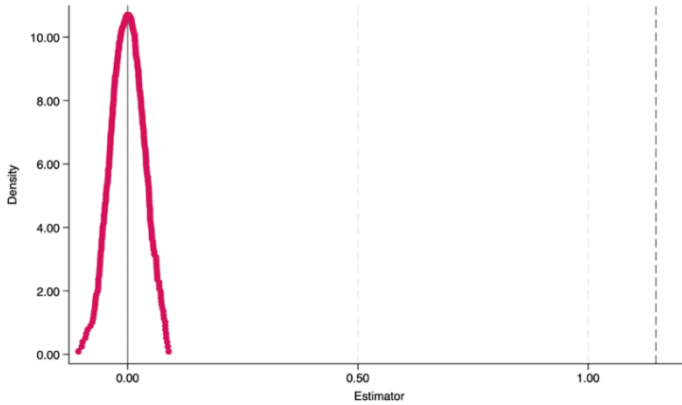


Fig. 2. Results of the Placebo Test

5.2 Analysis of DID Model Results

The DID model is built once the parallel trends test is passed. The findings of the DID model, which looked at how green credit affected corporate environmental social responsibility, are shown in Table 2. The entire sample model's results without control variables are displayed in Column (1); the full sample model's results with control variables are displayed in Column (2). The results in Column (1) indicate that the regression coefficient of did is 1.105, which is significant at the 1% confidence level. This suggests that green credit has a significant positive impact on the environmental social responsibility of enterprises. In Column (2), after including control variables, the regression coefficient of did remains significantly positive at the 1% confidence level, further indicating that the green credit policy can promote enterprises to enhance their environmental social responsibility.

Table 2. Baseline Regression Results

VARIABLES	(1) CESR(All)	(2) CESR(All)
DID	1.105*** (0.071)	1.147*** (0.071)
Age		0.232 (0.224)
Size		0.625*** (0.039)
ROA		0.711** (0.355)
Lev		-0.283* (0.163)
Turnover		-0.002*** (0.000)



Growth		-0.004 (0.026)
Top		-0.006** (0.002)
Tobinq		0.040** (0.020)
Constant	3.205*** (0.024)	-11.195*** (1.044)
Observations	23,109	23,109
Individual	yes	yes
Time	yes	yes
R-squared	0.680	0.685
Adj R-squared	0.653	0.658

**5.3 Robustness Test**

By comparing the estimated findings with the original model, one can verify a model's robustness by determining whether the direction and significance of the main explanatory variable's coefficients have changed significantly ("abnormal, not ro-bust" changes). If there are no notable alterations, the model is regarded as robust. This research uses the PSM-DID method for the robustness test in order to estimate the resilience of the model.

**5.3.1 PSM Propensity Score Matching.**

For the treatment and control groups, nearest neighbor matching is done in this paper. The propensity score matching balance test results for green credit are displayed in Table 3. It is evident that upon matching, the sample means of the treatment and control groups grew extremely similar. The findings show that most variable's standardized biases in the matched samples (Matched) have decreased after matching, with absolute values less than 10%, as compared to the mismatched samples (mismatched). In addition, all of the observable variables' p-values following matching are higher than 0.1, demonstrating a strong matching impact.

**Table 3.** PSM Matching Score Balance Results

Variable	Unmatched (U)	Mean		%bias	%reduct	t-test	
	Matched (M)	Treated	Control		bias	t	p>t
Age	U	2.987	2.830		44.500	27.820	0.000
	M	2.987	2.993	-1.800	96.000	-1.100	0.271
Size	U	22.694	22.264		32.200	21.530	0.000
	M	22.694	22.673	1.600	95.100	0.850	0.397
Lev	U	0.455	0.457		-0.700	-0.500	0.619

Turnover	M	0.455	0.455	0.000	93.400	-0.030	0.978
	U	12.208	16.165		-7.900	-4.890	0.000
Top	M	12.208	12.643	-0.900	89.000	-0.580	0.564
	U	34.907	34.204		4.600	3.090	0.002
Tobinq	M	34.907	34.551	2.300	49.300	1.270	0.205
	U	1.917	2.024		-8.200	-5.460	0.000
	M	1.917	1.937	-1.600	81.000	-0.860	0.390

A comparison of the variables' standardized biases is shown in Figure 3. It is evident that the variables' standardized biases are considerably smaller following matching than they are before, with the former being rather high. Severe estimation bias will unavoidably result if matching is not done and a Difference-in-Differences regression is applied straight to the two sets of samples. Nonetheless, the sample persons that were kept are extremely similar in terms of particular factors after matching and eliminating the unmatched samples. The criterion for comparability are met due to a significant reduction in the bias in sample selection. A satisfactory matching result is shown by the statistical differences in observable variables between the treatment and control groups being not significant.

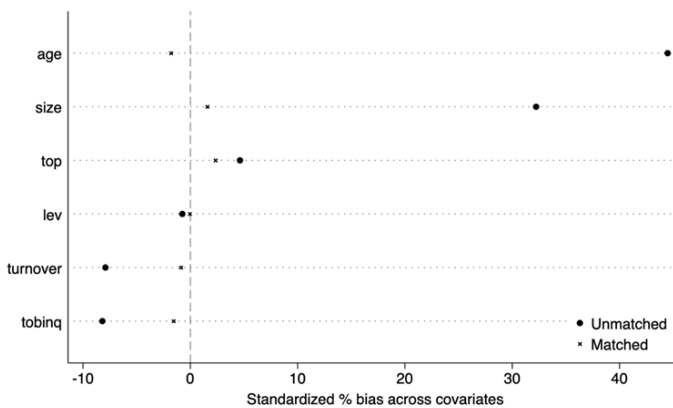
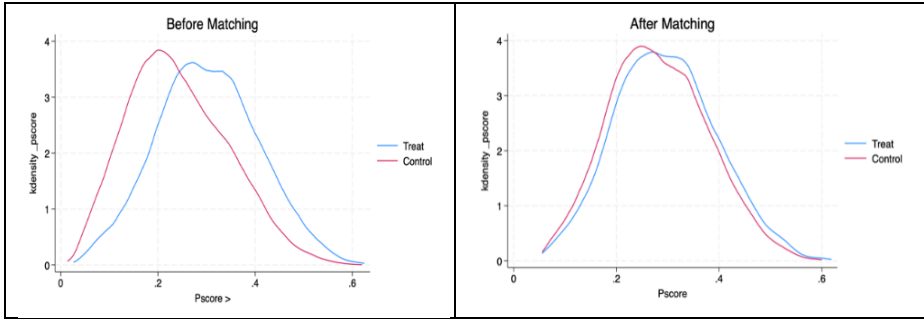


Fig. 3. Comparison of standardized deviations for PSM matching

Figure 4 presents the kernel density functions of the propensity scores before and after matching. The common support assumption requires that the distributions of the kernel density graphs are essentially the same after matching. The Pscore numbers before and after matching can be compared to see if this assumption is true. The distribution center of the treatment group's propensity score Pscore is noticeably greater than that of the control group prior to matching, as the left graph demonstrates. Following matching, the treatment group's distribution center moves to the left and approaches the control group, reducing the gap between the centers. This shows that the sample selection bias problem is largely fixed by PSM, and the matching effect is comparatively perfect, meeting the common support assumption.



**Fig. 4.** Kernel density function plot before and after PSM matching

**5.3.2 PSM-DID Model Results.**

After PSM matching, a new sample is used for Difference-in-Differences (DID) estimation. Table 4 presents the PSM-DID model test results for the impact of green credit policy on corporate environmental social responsibility.

The model findings without control variables are displayed in Column (1). At the 1% confidence level, the regression coefficient of DID is 1.102, which is significant. The model findings with control variables are displayed in Column (2), and at the 1% confidence level, the DID coefficient is still considerably positive. The robustness and credibility of the baseline regression results are further demonstrated by the PSM-DID regression results' consistency with the DID model's regression results.

**Table 4.** PSM-DID model results

VARIABLES	(1)	(2)
	CESR(PSM)	CESR(PSM)
DID	1.102*** (0.071)	1.143*** (0.071)
Age		0.359 (0.231)
Size		0.620*** (0.040)
ROA		0.706** (0.357)
Lev		-0.282* (0.164)
Turnover		-0.002*** (0.001)
Growth		-0.004 (0.026)
Top		-0.006** (0.003)
Tobinq		0.039* (0.020)

Constant	3.215*** (0.024)	-11.441*** (1.060)
Observations	23,002	23,002
Individual	yes	yes
Time	yes	yes
R-squared	0.680	0.685
Adj R-squared	0.653	0.658

#### 5.4 Moderating Effect Test

The moderating impact test results are shown in Table 5. The moderating impact test findings for corporate media attention are displayed in Column (1).

At the 1% confidence level, the regression coefficient of did remains considerably positive, but the interaction term between did and media has a coefficient of 0.110, which is significant at the 10% confidence level. This suggests that media attention from corporations also has a moderating effect, and that favorable media attention amplifies the benefit of green credit in promoting environmental and social responsibility among businesses.

**Table 5.** Moderating affects test results

VARIABLES	Model_1(cesr)
did	0.741*** (0.227)
did*media	0.110* (0.058)
media	0.138*** (0.038)
age	0.266 (0.224)
size	0.576*** (0.041)
roa	0.510 (0.358)
lev	-0.292* (0.163)
turnover	-0.002*** (0.000)
growth	-0.001 (0.026)
top	-0.005** (0.003)
tobinq	0.020 (0.021)

Constant	-10.681*** (1.049)
Observations	23,109
Individual	yes
Time	yes
R-squared	0.685
Adj R-squared	0.658
F value	53.35

## 6 Conclusion

In order to thoroughly examine the changes in the environmental and social responsibility performance (CESR) of listed firms in China's A-share market before and after the introduction of the green credit policy between 2008 and 2022, this study used the Difference-in-Differences (DID) methodology. The findings demonstrate how the green credit program improved businesses' performance in terms of social and environmental responsibility. Using this model, we were able to further demonstrate the significant moderating impact that media attention has in this process, in addition to confirming the direct promotional influence of green credit policies on corporate environmental social responsibility.

This study provided strong evidence of the beneficial effects of policy implementation on pollution-intensive listed companies in terms of environmental and social responsibility fulfillment. It also covered in detail the complex and multifaceted effects of green credit policy on corporate environmental social responsibility. Compared to non-pollution-intensive companies, these pollution-intensive industries have performed better in terms of environmental protection and social responsibility since the green credit program was put into place in 2012. This notable disparity completely supports the green credit policy's efficacy in fostering business sustainable development, as well as its considerable influence.

This study additionally employed the Propensity Score Matching Difference-in-Differences (PSM-DID) method for robustness tests in order to guarantee the reliability and robustness of the research findings. By carefully designing the treatment and control groups using this strategy, we minimized the impact of other potential factors on the research findings by making sure the two groups are as similar as possible in various observable aspects. This boosts the validity of the research findings and increases their dependability.

This study offers a comprehensive and detailed analysis of the role that media attention plays in this process, in addition to demonstrating the beneficial effects of green credit policies in encouraging corporate environmental social responsibility. The research results offer significant insights for policymakers and practical recommendations for businesses seeking to attain sustainable growth through the implementation of green credit policy.

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