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WILL GREEN FINANCE BECOME A NEW DRIVING FORCE FOR ENVIRONMENTAL GOVERNANCE IN THE POST-COVID-19 ERA: EVIDENCE FROM CHINA

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ABSTRACT

Green finance stimulus plan has become an important tool for environmental governance in the post-COVID-19 era. This paper investigates the emission reduction effect and impact mechanism of Green Finance (GF). The empirical results indicate that GF reduces environmental pollution. This reduction effect is attributed to a promotion in green innovation and industrial upgrading. The emission reduction effect of GF reflects the threshold characteristics. Specifically, stricter environmental regulation increases the inhibitory effect of GF on pollution.

Keywords: Green finance; Environmental pollution; COVID-19.
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I. INTRODUCTION

The COVID-19 that swept the world in 2020 has severely damaged human health (Narayan, 2021; Michie, 2020; Phan and Narayan, 2020). Countries around the world have adopted strict preventive measures to prevent the spread of the virus (Gupta *et al*., 2020; Chang *et al*., 2021b).[1] However, the economic stagnation caused by the economic embargo has triggered a major crisis in product supply, consumer demand, and international trade (Debata *et al*., 2020). Meanwhile, the current post-pandemic economic recovery provides an excellent opportunity to address extreme climate and achieve environmental sustainability (Marazziti *et al*., 2021; O Flynn *et al*., 2021). Extreme climate change is posing a serious challenge to future economic development (Hao *et al*., 2021; Wu *et al*., 2021). Excessive use of energy, contamination of the environment, and irregular weather patterns have emerged as major impediments to low-carbon growth (Hao *et al*., 2022). Stakeholders engaged in socioeconomic programs and regulatory policymaking must evaluate their environmental impact to tackle worries over ecological durability (Shrivastava *et al*., 2020; Chang *et al*., 2021a).

Reducing carbon outputs demands prolonged collective action from government agencies and the public. Earlier studies have highlighted viable pathways to curb emissions, including binding eco-regulations, compulsory environmental disclosures, advancing green technologies, channeling investments towards sustainability, and adopting renewable energy sources (Wu *et al*., 2020; Ren *et al*., 2022b; Huang and Chen, 2015; Yang *et al*., 2022). Realizing low-carbon initiatives and green innovations necessitates enduring research and development funding paired with reliable financial backing (Zhou *et al*., 2022). However, securing adequate financing remains a foremost obstacle impeding the green transition across global industries (Irfan *et al*., 2022). Therefore, Green Finance (GF) solutions are projected to emerge as a renewed catalyst to transform industrial architectures and power high-quality economic growth in the post-pandemic era (Li *et al*., 2022). Compared to conventional fiscal instruments, GF policies mandate that financial establishments prioritize environmental stewardship enterprises for credit assistance and evaluate the ecological risks posed by corporate production activities (Zhang *et al*., 2021).

Prior studies have validated that industrial clustering, foreign direct investments, technological breakthroughs, digital economic expansion, and energy structure upgrades can meaningfully reduce environmental degradation (Liu and Zhang, 2021; Ren *et al*., 2022a; Du *et al*., 2022; Wang *et al*., 2019). Some studies have summarized the contributions of the digital technology (Li, 2024; Vladimirov *et al*., 2024; Yin *et al*., 2023; Szczepanczyk, 2023; Santos, 2023; Damaševičius, 2023). However, the impact of GF solutions on pollution mitigation remains underexplored and merits further inspection. First, while several academics have probed linkages between green fiscal policies and ecological outcomes, much of this scholarship concentrates on developed nations. Indeed, numerous developing economies confront heightened environmental strains due to lethargic industrial transitions and deficient resourcing for R&D modernization. Second, contention

[1] For special issues on COVID-19 and related studies, see the work of Sha and Sharma (2020) and Sharma and Sha (2020).

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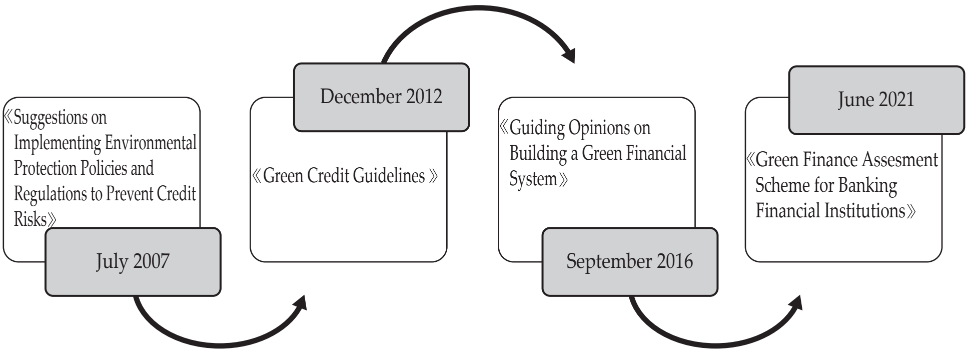
surrounds the ramifications of GF for sustainable growth. Regarding on-ground impacts, most findings indicate GF interventions are broadly effective, playing a salient role in catalyzing innovation and curtailing new lending to highly polluting enterprises (Aizawa and Yang, 2010; He *et al*., 2019). Moreover, such programs can recalibrate the composition of heavy-pollution industries and relax financial limitations for green tech innovation and contamination control (Hu *et al*., 2020). However, other scholars have confirmed that GF has not had the desired effect, or even the opposite of its goals. GF policy has caused a decline in the investment efficiency of renewable energy companies (Nabeeh *et al*., 2021), and failed to achieve the expected goals of adjusting the loan amount and term and promoting technological advances (He *et al*., 2019). Besides, for the calculation of GF, previous literature frequently considered GF policy as a natural experiment to analyze its impact on the environment issues using the difference-in-difference model. Moreover, previous literature has only analyzed the impact of GF on a specific pollution, rather than overall environmental pollution indicators.

Our research provides following novel insights to the related literature. First, we take China as the research subject, and use GMM model and mediation effect to analyze the nexus between GF and pollution. Besides, we consider the threshold effects of environmental regulations, which develops important supplements to existing related literature. As the largest developing country, China is facing serious environmental pollution and backward green technological innovation (Ren *et al*., 2021a). To address the challenges of climate change and environmental protection, diversified financial instruments and investment and financing services have been promulgated by the Chinese government to support green projects. Data from the China Banking Regulatory Commission reveals that China's loan portfolio expanded from $5.2 trillion in 2013 to $15.9 trillion in 2021, an average yearly uptick of 14.99%. In 2021, banking institutions issued 7.3 trillion yuan in green loans for carbon mitigation endeavors and 3.36 trillion yuan for ecological projects, comprising 67% of total green lending. This furnishes an illuminating test case to examine GF impacts. Additionally, per financial service types, we have constructed a GF composite gauge encompassing green securitization, credit, insurance, and investments. This enriches measurement techniques and offers valuable insights for green fiscal research. We have also developed an aggregate pollution index. This facilitates accurate assessments of GF's environmental repercussions. Our analyses signify GF meaningfully reduces contamination. This inhibitory effect arises from catalyzing green innovation and industrial upgrades. Moreover, GF demonstrates a nonlinear, threshold-dependent abatement influence. At higher environmental compliance levels, green fiscal policies elicit greater pollution reductions.

In recent years, China has indeed vigorously advocated the construction of ecological civilization, which has greatly enhanced the confidence of the international community in addressing climate change (Yang *et al*., 2021). To achieve the goal of emission reduction, the Chinese government has also proposed to establish an economic system centered on green development (Tang *et al*., 2021). A series of green credit policies have been proposed to promote the flow of funds to green and clean industries and support the technological innovation and R&D of enterprises (Figure 1). Therefore, our research framework evaluated the emission effect of GF. This research finding aims to provide important policy references for global energy transition and carbon neutrality.

Figure 1.
China's Green Finance Policy

This figure presents the important policies on green finance issued by China from 2007 to 2021.



The rest of the paper is organized as follows: Section II presents brief mechanism analysis. Section III explains the models and data. The section IV presents results and analysis. Section V provides conclusions and related policy implications.

II. MECHANISM ANALYSIS

GF is a market mechanism instrument for solving environmental problems. It changes the behavioral choices of subjects in the financial market through the internalization of negative externalities (Iqbal *et al.*, 2021). Specifically, GF redirects the flow of credit and urges firms to fulfill their environmental and social responsibilities (Wang *et al.*, 2021). GF permeates the entire corporate production lifespan. During financing phases, green credit chiefly facilitates preferential resource allocation towards eco-friendly enterprises. Throughout manufacturing processes, financial institutions can develop credit business based on the principles of sustainable development to stimulate the green production by enterprises (Li *et al.*, 2022). Post-production, green audits, and adaptive credit rationing safeguard against firms shirking environmental duties. Thus, contrasted to conventional environmental regulation, green credit policies boast pronounced structural impacts and a more holistic governance ambit. They reshape incentive architectures beyond piecemeal compliance to promote systemic transformation.

Information asymmetry is the main obstacle that inhibits financial institution from participating in environmental governance (Wang and Zhi, 2016). Under conventional financing models, green enterprises lack distinct credit advantages absent environmental appraisals and investment oversight. Green credit accentuates corporate ecological footprints across construction, production, and commercial activities (Zhang and Wang, 2021). This compels expanded environmental disclosures to mitigate adverse selection and moral hazard.

Moreover, profit maximization pressures and lax external constraints often deter companies from fulfilling sustainability duties. Implementing green credit enables financial institutions to integrate environmental factors into corporate lending and ventures, channeling more capital toward green undertakings (Lee and Lee, 2022). Given information asymmetries in capital markets, firms can relay signals to fiscal entities through environmental social responsibility and transparency efforts (Oikonomou and Pavelin, 2014). Thus, green credit reshapes incentive structures to promote eco-conscious decision making.

From an innovation risk lens, green technology R&D entails substantial capital outlays yet low success likelihoods. When compliance costs undercut the benefits of conventional production, firms may eschew green transitions in favor of low-cost end-of-pipe solutions to skirt environmental regulations (Wu *et al*., 2020). Similarly, green finance policies considerably hike corporate eco-regulation burdens. However, per Porter's "reverse forcing effect" hypothesis, these fiscal measures spur green innovation by tying credit access to environmental performance (Yu *et al*., 2021). That is, to secure financial backing, companies must undertake sustainability initiatives. Additionally, under stringent eco-regulations, firms have heightened incentives to develop green technologies and lower risks from non-compliance (Wu *et al*., 2020). In this manner, well-designed regulatory pressures and green lending guidelines can redirect industrial ecosystems down more sustainable trajectories. The allocation of green credit resources breaks with the traditional principles of safety and efficiency and takes the environmental risk of the enterprise as an important criterion. Second, according to a research report published by the Lancet, at least 9 million people worldwide die every year due to environmental pollution such as air, water, and soil (Landrigan *et al*., 2018). This has undoubtedly prompted countries around the world to enact stricter environmental regulatory measures in response to environmental risks. Faced with the strict monitoring function of green credit, companies are forced to make green innovation investments and green transformation. Additionally, GF promotes the transformation of polluting enterprises and the industrial upgrade by raising the threshold of green credit (Li *et al*., 2022). Finally, GF increases the financial risk of polluting industries by controlling green lending business. It not only phases out obsolete high-emission industries, but also stimulates enterprises to transform toward low-energy, low-pollution and high-efficiency models.

III. METHODS AND DATA

A. Benchmark Model

We empirically test the impact of GF on pollution using Chinese data. Given that pollution emissions may be affected by earlier stages, the POL_{it-1} is added to the model.

$$POL_{it} = \beta_0 + \beta_1 GF_{it-1} + \beta_2 URB_{it} + \beta_3 FDI_{it} + \beta_4 EDU_{it} + \beta_5\, GDP_{it} + \alpha_i + v_t + \varepsilon_{it} \quad (1)$$

Where POL_{it} represents environmental pollution. The control variables include foreign direct investment (FDI_{it}), urbanization (URB_{it}), education level (EDU_{it}), and economic growth (GDP_{it}). β_1 to β_5 represent the coefficients.

B. Mediation Effect Model

According to previous research, green technology (*GT*) and industrial structure upgrade (*STR*) can effectively reduce environmental pollution. Therefore, *GT* and *STR* are considered as mediation variables to test the impact of GF on environmental pollution.

$$MED_{it} = \alpha_0 + \alpha_1 GF_{it} + \sum_j \alpha_j \, control_{it} + \mu_i + \nu_t + \varepsilon_{it} \tag{2}$$

$$POL_{it} = \beta_0 + \beta_1 MED_{it} + \beta_2 GF_{it} + \sum_j \beta_j \, control_{it} + \mu_i + \nu_t + \varepsilon_{it} \tag{3}$$

Where MED_{it} represents mediation variables. If α_1 in Equation (2) and β_1 in Equation (3) are statistically significant, it indicates that *GF* can affect the pollution through *GT* and STR. Meanwhile, if β_2 is still statistically significant, it indicates that mediation variable is a partial mediating variable.

C. Threshold Model

Equation (1) examines the linear effect between the core variables. Nevertheless, environmental regulation (*ER*) is an important system for improving environmental standards. Does the impact of *GF* on pollution change when *ER* is at different levels? Referring to Wu *et al*. (2021), the threshold model is introduced to discuss the non-linear impact of *GF* on pollution.

$$POL_{it} = \beta_0 + \beta_1 POL_{it\_1} + \beta_2 GF_{it} \cdot \mathrm{I}(ER_{it} < C) + \beta_3 GF_{it} \cdot \mathrm{I}(ER_{it} \geq C) +$$
$$\beta_4 FDI_{it} + \beta_5 URB_{it} + \beta_6 EDU_{it} + \beta_7 GDP_{it} + \alpha_i + v_t + \epsilon_{it} \tag{4}$$

D. Variables Selected

(1) Green technology innovation. This paper uses the number of green patent applications to measure green technology innovation.
(2) Environmental regulation. The *ER* is calculated from the discharge of industrial wastewater, sulfur dioxide, and solid waste emissions per unit of output value (Wu *et al*., 2020).
(3) Green finance. The *GF* indicators are constructed using four specific areas: green credit, green securities, green insurance, and green investment. Further details are provided in Table 1.

Table 1.
Green Finance Indicator System

This table presents the specific indicators included in the green finance variables.

Green finance	Green credit	Loans for energy conservation and environmental protection projects/ total loan amount
	Green bond	Market value of environmental protection companies/Total market value of A shares
	Green insurance	Agricultural insurance expenditure/Total insurance expenditure Agricultural insurance expenditure / Agricultural insurance income
	Green investment	Environmental investment /GPD

(4) Industrial structure upgrade. This paper uses the ratio of the output value of the tertiary industry and the secondary industry in the region to measure the industrial upgrading (Ren *et al*., 2021b).

(5) Environmental pollution. In the existing literature, a single pollution indicator (e.g., carbon emissions, haze, sulfur dioxide, etc.) is commonly used as a dependent variable to analyze the impact of GF on environment. To obtain accurate estimation results, a comprehensive environmental pollution index is constructed using the basic data of industrial wastewater, industrial sulfur dioxide, and industrial solid waste emissions (Ren *et al*., 2022b).

(6) Control and threshold variables. Education level (*EDU*): people with higher educational level have a higher awareness of environmental protection, which contributes to more efficient enforcement of environmental laws and promotes the development of green technologies. We use the average years of education for the public over the age of 6 to represent the education level. Foreign direct investment (*FDI*): economic opening can improve local industrial upgrading and influence the expansion of highly polluting industries. This paper selects the actual use of foreign capital to measure the degree of openness. Urbanization development (*URB*): urbanization and industrialization may increase energy consumption and affect the environmental quality of the region. Therefore, we use the proportion of urban permanent population to the total population to measure urbanization. In addition, economic development is proxied using the total GDP of each province (*GDP*). The data information of all variables is reported in Table 2.

Table 2.
Statistical Description of the Sample

This table presents the statistical information (eg., mean, standard deviation, minimum and maximum) for all variables used in this study.

Variable	Definition	Mean	Std. Dev	Min.	Max
POL	Environmental pollution	0.3111	0.1804	0.0168	0.7282
GF	Green finance	0.1748	0.1074	0.0570	0.8390
GT	Green technology	0.8313	1.3069	0.0010	8.2640
STR	Industrial structural upgrade	1.2529	0.7028	0.5271	5.2440
URB	Urbanization	0.5690	0.1322	0.2910	0.9380
EDU	Education level	9.1027	0.9189	7.0240	12.7570
FDI	Foreign direct investment	0.0207	0.0194	0.0001	0.1210
GDP	Economic development	2.1886	1.9372	0.0897	11.1152
ER	Environmental regulation	0.0031	0.0028	0.0000	0.0245

IV. RESULTS AND ANALYSIS

A. Benchmark Model

To assess the relationship between GF and pollution, we deployed OLS, FE, and RE panel regression models. However, recognizing potential endogeneity concerns, we add lagged term of pollution and employ the GMM approach to re-estimate Equation (1). The p-values for AR (2) and Hansen test imply an absence of second-order serial correlation while confirming proper instrument selection. Our results are reported in Table 3. We document that GF can curb environmental degradation. This aligns with prior conclusions (see Zhang *et al*., 2021). Collectively, the weight of evidence points to a net pollution abatement outcome stemming from well-designed GF policy. GF is a market-based environmental regulatory instrument. It focuses on the pollution emission status of enterprises in their construction, production, and operation activities, and guides polluting enterprises to disclose more environmental information and actively perform environmental and social responsibilities.

Table 3.
Basic Results

This table presents the coefficient of GF is significantly negative, indicating green finance reduces environmental pollution. ***, ** and * denote the statistical significance at 1%, 5% and 10% respectively. The t-statistics are presented in parentheses. L.POL: the lag term of environmental pollution; GF: green finance; URB: urbanization; EDU: education level; FDI: foreign direct investment; GDP: economic development; CONS: constant term.

Variables	OLS	FE	RE	GMM
L.POL				0.481***
				(20.670)
GF	-1.029***	-0.186**	-0.282***	-2.244***
	(-9.00)	(-2.074)	(-3.069)	(-8.948)
URB	-0.544***	0.389***	0.301***	0.918***
	(-4.954)	(5.136)	(3.875)	(10.132)
EDU	0.082***	-0.014	-0.013	0.025***
	(4.881)	(-1.136)	(-1.028)	(4.272)

Table 3.
Basic Results (Continued)

Variables	OLS	FE	RE	GMM
FDI	0.533	-0.242	-0.310	0.975***
	(1.443)	(-1.098)	(-1.360)	(5.410)
GDP	0.076***	-0.015***	-0.006	0.041***
	(17.520)	(-3.444)	(-1.359)	(5.941)
_CONS	-0.129	0.285***	0.325***	-0.307***
	(-1.182)	(3.298)	(3.566)	(-4.574)
R^2	0.465	0.321	0.122	
AR(2)/P-value				0.370/[0.709]
Hansen test/ P-value				28.01/[0.517]
F/Wald test				1581.760***
No of Observations	390	390	390	390

B. Mediation Effect

We analyze the empirical results with reference to the analytical principles of the mediation effect model (see Table 4). Model 1 reports the empirical results on the impact of GF on GT. The influence coefficient of GF on GT is 9.013, indicating that green finance enhances green innovation. Model 2 shows regression results of the GT on the pollution. The influence coefficient of *GT* on pollution is -0.089, indicating that green innovation reduces environmental pollution. Model 3 adds the mediation variable (industrial upgrading) to the model. The impact coefficient of GF on STR is significant (6.725). The influence coefficient of STR on pollution is still negative and significant, indicating that green finance reduces environmental pollution by upgrading industrial structure. Therefore, green technology and industrial upgrading produce a significant mediation role in the influence of *GF* on pollution.

Table 4.
Mediation Effect Results

This table presents the green finance can reduce environmental pollution through green technology innovation and industrial structure upgrading. ***, ** and * denote the statistical significance at 1%, 5% and 10% respectively. The t-statistics are presented in parentheses. GT: green technology; STR: industrial structural upgrade; GF: green finance; URB: urbanization; EDU: education level; FDI: foreign direct investment; GDP: economic development; CONS: constant term.

Variables	GT	POL	STR	POL
GT		-0.089***		
		(-8.954)		
STR				-0.112***
				(-8.248)
GF	9.013***		6.725***	
	(24.760)		(24.941)	
URB	-1.809***	-0.726***	-0.699***	-0.648***
	(-5.180)	(-6.616)	(-2.700)	(-5.846)

Table 4.
Mediation Effect Results

Variables	GT	POL	STR	POL
EDU	0.114**	0.077***	0.120***	0.077***
	(2.111)	(4.628)	(3.004)	(4.493)
FDI	-3.151***	0.298	-4.728***	0.060
	(-2.678)	(0.799)	(-5.423)	(0.157)
GDP	0.275***	0.097***	-0.187***	0.050***
	(19.808)	(16.564)	(-18.212)	(12.787)
CONS	-1.285***	-0.121	-0.107	0.009
	(-3.709)	(-1.116)	(-0.417)	(0.088)
R^2	0.897	0.464	0.804	0.450
N	390	390	390	390

C. Threshold Model Analysis

To avoid the subjective bias caused by the artificial division of the sample interval, we use the threshold regression method to further test the threshold effect of *GF* on pollution. Before estimating the threshold model, we test the panel threshold existence according to Hansen (1999). It shows that the threshold variable (*ER*) passed the second threshold, and the threshold values are 0.01 and 0.06, respectively (see Table 5). In order to visualize the dynamic change process of the environmental regulation threshold, we use the minimum residual sum of squares to calculate the threshold value (i.e., the lowest point in the LR plot). The results and corresponding 95% confidence intervals are shown in Figure 2.

Figure 2.
Threshold Likelihood Ratio Plot

This figure presents the significant environmental regulation threshold effect of green finance on environmental pollution.

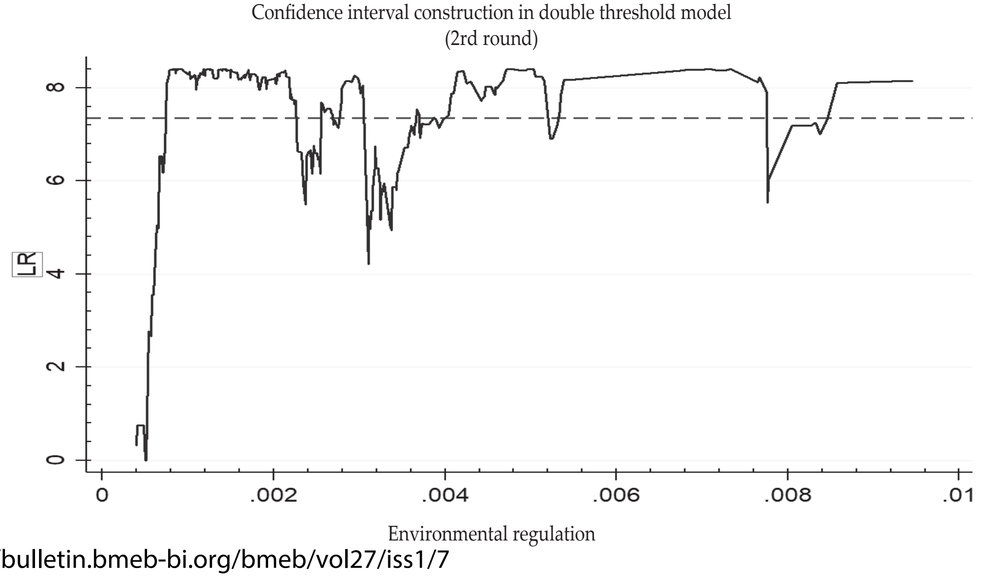
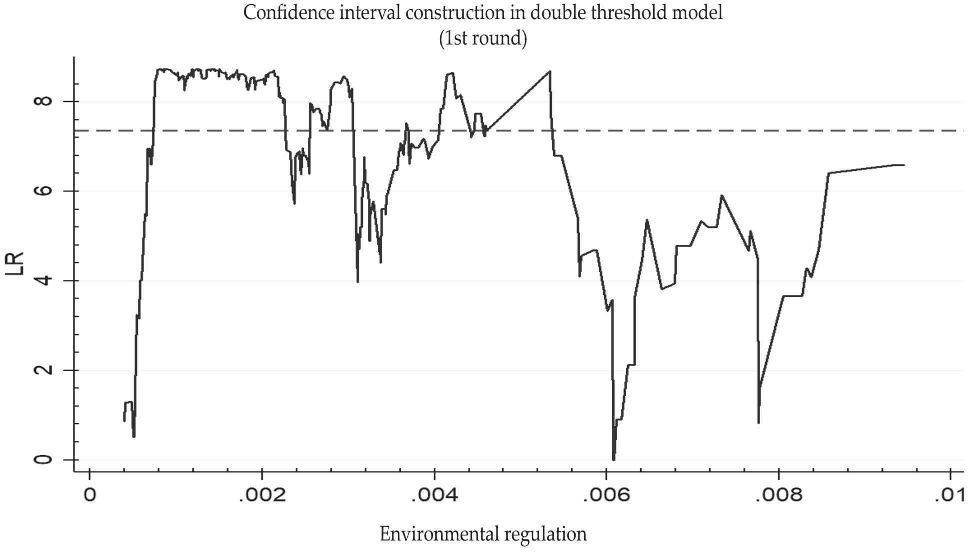


Figure 2.
Threshold Likelihood Ratio Plot (Continued)



To mitigate heteroskedasticity concerns, we employ robust standard errors for panel threshold estimation. These results are reported in Table 6. We unveil a statistically significant nonlinear association between *GF* and pollution emissions across regimes. When the environmental regulation index lies below 0.001, the *GF* coefficient stands at -0.740, denoting a marked pollution abatement effect in the first threshold band. As regulations tighten within the following range [0.001, 0.006], the magnitude of coefficient decreases from -0.740 to -0.898, implying progressively higher emission reductions from green fiscal policies. Beyond a 0.006 index value, this negative effect expands further. Evidently, ratcheting up compliance mandates amplifies GF's nonlinear mitigation capacity. Thus, pairing green credit measures with rigid administrative eco-regulations optimizes environmental governance outcomes. Policymakers should utilize both economic tools alongside regulatory directives to control contamination. Environmental oversight curbs high-pollution activities and steers green industrial transitions via an "innovation compensation" route. However, stricter controls also hike abatement costs and may "crowd out" corporate R&D spending. GF incorporates environmental considerations into capital allocation, facilitating sustainable growth. By financing green projects and technologies, green credit relieves the fiscal pressures of rising compliance requirements while relaxing financial constraints on eco-innovation.

Table 5
Threshold Test

This table presents the impact of green finance on environmental pollution has a dual threshold effect of environmental regulation. ***, ** and * denote the statistical significance at 1%, 5% and 10% respectively. The t-statistics are presented in parentheses.

Threshold	*F* value	*P* value	BS	Confidence Interval		
First threshold	4.440**	0.043	300	6.065	3.867	2.529
Second threshold	17.504***	0.007	300	15.727	4.376	1.977
Triple threshold	0.000	0.233	300	0.000	0.000	0.000

Table 6
Threshold Regression Results

This table presents the green finance has a greater effect on reducing environmental pollution as the improvement of environmental regulation intensity. ***, ** and * denote the statistical significance at 1%, 5% and 10% respectively. The t-statistics are presented in parentheses. URB: urbanization; EDU: education level; FDI: foreign direct investment; GDP: economic development; CONS: constant term; GF: green finance.

Variables	Coef.	Std. Err.	t	P>|t|	95% Conf. Interval
URB	-0.566	0.074	-7.65	0.000	[-0.711, -0.420]
EDU	0.016	0.013	1.26	0.207	[-0.009, 0.040]
FDI	-1.754	0.231	-7.61	0.000	[-2.208, -1.301]
GDP	0.050	0.004	13.65	0.000	[0.043, 0.057]
CONS	0.576	0.084	6.90	0.000	[0.412, 0.740]
GF_1	-0.740	0.079	-9.32	0.000	[-0.896, -0.584]
GF_2	-0.898	0.091	-9.92	0.000	[-1.076, -0.720]
GF_3	-1.289	0.144	-8.98	0.000	[-1.571, -1.007]
R^2	0.706		Sigma_u		0.158
F value	65.75***		Sigma_e		0.067

V. CONCLUSION

Leveraging baseline and threshold models, this research investigates linkages between GF and environmental degradation. We make several salient conclusions: Green fiscal policies constitute a renewed catalyst for ecological stewardship, eliciting sizable pollution mitigation outcomes. ER positively moderates the relationship between green credit and contamination. Additionally, green lending curtails emissions by advancing green technologies and industrial upgrading. With environmental regulations acting as a threshold variable, GF demonstrates an amplified abatement effect. Collectively, the findings cement GF interventions as potent sustainability policy levers. To energize decarbonization and pollution control in the post-pandemic climate, we propose the following recommendations.

Energy transition and climate governance in the post-COVID-19 era will require close international cooperation. All countries need to actively introduce external capital and technology, strengthen technology R&D, and develop feasible financial policies. It is worth noting that although green recovery has positive long-term climate benefits, a surge in global energy demand and a rebound in carbon emissions are still likely to occur in the near future. Therefore, it is an urgent task in the post-pandemic era to formulate strategies for green growth in advance and accelerate the emission reduction of coal-fired power companies.

To increase the role of green credit in capital allocation, the government should continue to increase long-term financial support for environmental industries and guide the flow of capital from polluting industries to clean industries. It will force polluting enterprises to reduce pollution discharge and improve R&D intensity and technical level.

Following the "equator principles", financial institutions should comprehensively assess the contribution of enterprises in environmental protection and social responsibility. It provides a sound external financing environment and ease financing constraints of enterprises. Importantly, enterprises should allocate funds reasonably and invest green credit funds in technology R&D. Besides, credit policies and environmental protection policies should be coordinated to effectively enhance the emission reduction effect of GF.

Countries around the world should build a comprehensive information platform for green bonds issuance. In the era of digital economy, digital technology can obtain ecological environment information and improve the efficiency of ecological environment protection. Relying on big data, artificial intelligence, and other advanced technical means, all countries need to establish a green bond information platform and disclose relevant information in a timely manner. Besides, digital technology can also reduce the management cost of GF business and facilitate the marketization of global green finance.

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