

Research on the Impact of Green Finance on Extreme False ESG

-- From the Perspective of Greening

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Abstract

This paper discusses the impact of Green Finance on extreme false ESG information disclosure, especially from the perspective of green drift. With the aggravation of global warming and resource depletion, China's economy is in the stage of green and low-carbon transition. Enterprises cater to external environmental protection standards through green drift to obtain low-cost green financial funds. Firstly, based on the theoretical mechanism, this study uses entropy method to construct green finance index, and verifies the impact of Green Finance on enterprises' green drift behavior based on dynamic panel regression model. Then, the heterogeneity test is carried out according to the region, the nature of property rights and industry characteristics, and green technology innovation is used as the intermediary variable to further explore its impact mechanism. The study found that green finance can significantly reduce the green drift behavior of enterprises and improve ESG performance. In addition, green technology innovation plays an important intermediary role in this process. Finally, this paper puts forward the corresponding policy recommendations to promote the development of green finance and the promotion of green innovation activities of enterprises.

Keywords

Green Finance; Extremely False ESG; Greenish Behavior; Green Technology Innovation.

1. Introduction

With the increasingly serious global environmental problems, especially the aggravation of greenhouse gas emissions, global warming and resource depletion, governments and enterprises around the world pay more and more attention to sustainable development. China has also continued to promote the construction of ecological civilization. The concept of "green water and green mountains are golden mountains and silver mountains" put forward by General Secretary Xi Jinping, as well as the pollution prevention and control of "three key battles" in the report of the 19th National Congress of the Communist Party of China, and then to the "2035 carbon peak" and "2060 carbon neutral" plans, all show that China attaches importance to the construction of ecological civilization. The green financial market is in the growth period, but the lack of clear and unified green industry access standards and accountability mechanisms makes it difficult to identify and curb the green drift of enterprises. ESG (environment, society and Governance), as an important standard to evaluate the comprehensive business performance of enterprises, is widely used in China, and has become one of the main indicators of enterprise environmental performance. However, due to the natural opportunistic tendency of enterprises and the asymmetry of market information, enterprises may opportunistically disclose carbon information that performs well or is not easy to verify for the purpose of catering to external environmental protection regulatory standards

or public opinion guidance, while concealing information with poor environmental protection performance, presenting a false image of fulfilling their responsibilities, that is, greenwashing, so as to obtain green financial funds with lower costs. In order to clarify the impact of Green Finance on enterprises' green drift behavior, based on the theoretical mechanism analysis, this paper uses the entropy method to construct the green finance index, and verifies the impact of Green Finance on enterprises' green drift behavior based on the dynamic panel regression model; Secondly, according to the regional, property rights and industry characteristics, the heterogeneity of the above effects is tested; Finally, taking green technology innovation as the intermediary variable, this paper discusses and verifies the mechanism of how green finance affects enterprises' green drift behavior through green technology innovation, and puts forward relevant countermeasures and suggestions.

Green finance refers to the financial services provided for project financing, operation and risk management in the fields of environmental protection, energy conservation, clean energy, green transportation, etc., to support the economic activities of improving the environment, coping with climate change and resource conservation and efficient utilization. Since the Stockholm agreement was put forward in 2006, green finance has developed rapidly all over the world. Internationally, institutions such as the European Investment Bank (EIB) and the Asian Development Bank (ADB) actively promote green finance projects, while China issued the overall plan for the reform of the ecological civilization system in 2015, which clearly pointed out the need to build a green financial system and a mandatory disclosure system for environmental protection information of listed companies. ESG (environment, society and Governance) is an important indicator to measure the sustainability of enterprise development. Internationally, ESG rating has gradually become an important reference for enterprises to obtain investment and loans. For example, MSCI's ESG rating system covers three major aspects: environment, society and corporate governance, and aims to provide comprehensive evaluation criteria. However, there are differences between China's ESG regulatory policies and those of the international community, mainly reflected in the corporate governance level, while the CSRC and the Shanghai and Shenzhen stock exchanges incorporate the ESG regulatory requirements into the regulatory reports of listed companies. Greenwashing refers to the behavior that enterprises mislead external rating agencies and investors through false or exaggerated environmental protection measures. In recent years, green drift events have occurred frequently. Taking the automotive industry as an example, some auto companies have obtained high ESG ratings by fuzzy processing of emission reduction data and recycling rate. This non-standard information disclosure behavior not only damages the reputation of enterprises, but also may lead investors to make wrong decisions.

Although scholars at home and abroad have done a lot of research on green finance and green drift behavior of enterprises, most of the research focuses on the macro level and lacks in-depth discussion on extremely false ESG information disclosure. In addition, most of the existing studies use qualitative analysis methods, lacking systematic empirical verification. Therefore, this study constructs a green finance index and dynamic panel regression model to analyze the impact of Green Finance on enterprises' green drift behavior from an empirical perspective. On the basis of existing theories, combined with the background of the national dual carbon strategy, this paper explores the inhibitory effect of green finance's capital guidance on false ESG performance. Empirical research is conducted through data support to enrich the empirical evidence of relevant research. Using the latest data and methods, this paper discusses how green finance can guide environmental protection enterprises through capital and its impact on extremely false ESG, and uses technological innovation as the intermediary effect to test and verify the impact on enterprises' greening.

2. Theoretical Framework and Hypothesis Establishment

2.1. Green Finance and Corporate Behavior

As a financial service supporting environmentally friendly economic activities, Green Finance aims to promote the development of low-carbon environmental protection projects through capital allocation. In theory, green finance should be able to guide enterprises to develop in the direction of environmental sustainability and reduce the negative impact on the environment. However, due to the asymmetry of market information and the self-interest tendency of enterprises, enterprises may adopt green drift behavior to obtain lower capital costs.

2.2. ESG Information Disclosure and Corporate Performance

ESG information disclosure is an important indicator to measure corporate social responsibility and environmental performance. Good ESG performance can not only attract investment, but also alleviate financing constraints, improve transparency between enterprise managers and capital market investors, and thus enhance capital market returns. However, some companies may use false disclosures to get better ESG ratings, a practice known as greenwashing.

2.3. Causes of Greenwashing Behavior

There are many reasons for the green drift behavior: first, external regulatory pressure and public expectations promote enterprises to shape their green image; Secondly, internal management defects make it difficult for enterprises to truly reflect their environmental performance. In addition, information asymmetry makes it difficult for external evaluation agencies to accurately identify the real performance of enterprises.

2.4. Research Assumptions

Based on the above theoretical analysis, this paper puts forward the following research hypotheses:

Hypothesis 1: green finance can effectively reduce the green drift behavior of enterprises.

Hypothesis 2: Green Finance indirectly reduces greenwashing behavior by promoting green technology innovation in enterprises.

Hypothesis 3: enterprises with different property rights show different inhibitory effects on green drift behavior under the influence of green finance.

Hypothesis 4: the response of enterprises with different industry characteristics to green finance is also heterogeneous.

Hypothesis 5: regional differences will also affect the impact of Green Finance on green drift behavior.

3. Research Methods

3.1. Data Sources

The data used in this study are from Bloomberg ESG database and wind database. These data sets provide the company's ESG disclosure and ESG rating information, and provide a basis for empirical analysis. Sample selection criteria include A-share companies listed on the Shanghai and Shenzhen stock exchanges, ensuring that the data span covers 2017 to 2022. Financial industry companies are excluded to eliminate the impact of their particularity on the results.

3.2. Variable Definition

Green Financial Development Indicators: including green credit, green securities, green investment, green insurance and carbon finance. Each aspect uses corresponding indicators to measure the green financial participation of enterprises.

Greenwashing behavior: studied by constructing a greenwashing indicator to measure the gap between ESG disclosure scores and ESG rating scores. The higher the index, the more serious the green floating behavior of enterprises.

Control variables include cash flow, leverage ratio, Tobin Q value, company size and age, which may affect the green drift behavior and ESG performance of enterprises.

3.3. Data Analysis

The basic econometrics model used in this paper is shown in formula(1):

$$Greewashing_{i,j,t} = \beta_0 + \beta_1 \times GreenFinance_{i,j,t} + \tau' \times X_{i,j,t} + \varepsilon_{i,j,t} \quad (1)$$

Formula (1) discusses the relationship between green finance and washing risk. Here, the variable "greenwashing" refers to the company's excessive promotion of its environmental, social and Governance (ESG) performance, rather than the actual improvement of company I's ESG performance in year J. Therefore, this paper proposes a green cleaning index, as shown in formula (2).

$$Greenwashing_{i,j,t} = [ESG_{Disclosure_{i,j,t}} - \overline{ESG_{Disclosure_{i,j,t}}} / \sigma_{Disclosure}] - [ESG_{Rating_{i,j,t}} - \overline{ESG_{Rating_{i,j,t}}} / \sigma_{Rating}] \quad (2)$$

As a provincial indicator to describe the green financing level of Listed Companies in specific regions, green finance is calculated by entropy evaluation method (EEM). In the development of green finance, financial institutions need to consider environmental protection projects in their investment and financing decisions. The goal of green finance is to guide the flow of funds to green industries and achieve environmental benefits. Therefore, this paper constructs the development index of green finance from the five dimensions of green credit, green securities, green investment, green insurance and carbon finance.

Table 1. Summary statistics of main variables

Variable	Obs	Mean	Std.dev.	Min	Max
Greenwashing	8149	0.117	1.197	- 3.957	5.286
ESG Disclosure	8496	0.425	0.119	0.112	0.960
ESG Rating	8149	0.598	0.127	0.222	1.000
Green Finance	8317	0.301	0.104	0.124	0.635
Cash Flow	8368	0.057	0.077	- 1.686	0.664
Leverage	8368	0.300	0.171	0.008	1.280
Tobin's Q	8194	2.008	1.704	0.674	29.167
Firm Size	8368	23.452	1.585	19.198	31.138
Firm Age	8363	2.916	0.328	1.099	3.970
Provincial GDP	8467	10.490	0.732	6.825	11.615
FDI Size	8496	9.764	6.420	0.000	14.941
Financial Constraint	7360	0.279	0.232	0.000	0.971
WW Index	7503	- 1.097	0.796	- 66.934	- 0.659
SA Index	8368	- 3.777	0.379	- 5.278	- 0.455

The target layer and the work of the fifth dimension are used as the standard layer. In addition, it also involves a series of control variables to be considered in our econometrical model. Specifically, we include cash flow (net profit of total assets of listed companies), leverage (total leverage ratio of total assets of listed companies), Tobin Q (market value of the company divided by asset replacement cost), company size (calculated in logarithms of total employees), company age (calculated in logarithms of the company's term in the market), provincial GDP (calculated in logarithms of provincial GDP) and foreign direct investment scale (calculated in logarithms of provincial foreign direct investment). In addition, the fixed effect is also captured, which is a special error.

As shown in Table 1, the average values of green washing, ESG disclosure score and ESG score were 0.117, 0.425 and 0.598, respectively. The average score of green finance industry is about 0.301, but there is a significant difference. As far as the control variables are concerned, the average cash flow in the complete sample is 0.057, and the average leverage ratio is about 0.300. The average value of Tobin Q is about 2.008, while the average value of company size and company age is 23.452 and 2.916, respectively. The average provincial GDP is about 10.490, and the average scale of foreign direct investment is 9.764. In addition, the financial constraints measured by the SA index are - 3.777 and the WW index is - 1.097. These data describe the correlation between core variables and reveal the multicollinearity of control variables that may exist in econometrical models.

4. Empirical Analysis

4.1. Descriptive Statistical Analysis

This study first makes a descriptive statistical analysis of the sample data. The sample covers the data of A-share companies listed on the Shanghai and Shenzhen stock exchanges from 2017 to 2022, totaling 300 observations. The main variables include green financial development indicators, green drift behavior, cash flow, leverage ratio, Tobin Q value and other control variables.

Green Financial Development Index: this index is measured by five aspects: green credit, green securities, green investment, green insurance and carbon finance. The average score shows the overall level of green financial participation of the sample enterprises.

Green bleaching behavior: by constructing green washing indicators to measure the degree of green bleaching of enterprises, the results show that the green bleaching behavior of some enterprises is more serious, and the average green washing index is higher.

Control variables: including cash flow, corporate leverage ratio, Tobin Q value, etc. these variables show certain distribution characteristics in descriptive statistics, which is conducive to further model analysis.

4.2. Results of Regression Analysis

Dynamic panel regression model was used to verify the research hypothesis. The model estimation results show that the negative impact of Green Financial Development Indicators on the green drift behavior of enterprises is significant, supporting hypothesis 1, that is, green finance can effectively reduce the green drift behavior of enterprises. The mediating effect of green technology innovation between green finance and enterprise greenwashing behavior is significant, which supports Hypothesis 5, indicating that green technology innovation is an important mechanism for green finance to affect enterprise greenwashing behavior. The response of enterprises with different property rights and industry characteristics to green finance is heterogeneous. State-owned enterprises and private enterprises respond differently to green finance, and heavily polluting enterprises and cleaner production enterprises also

show different trends. In addition, regional differences will also affect the effect of green finance, and the effect of policy incentives on enterprises in the eastern coastal areas is more obvious.

Table 2. Pearson correlation coefficient of variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Greenwashing	1.000							
Green Finance	– 0.070 (0.000)	1.000						
Cash Flow	0.034 (0.002)	0.043 (0.000)	1.000					
Leverage	0.073 (0.000)	– 0.079 (0.000)	– 0.141 (0.000)					
Tobin's Q	– 0.047 (0.000)	0.043 (0.000)	0.190 (0.000)	– 0.190 (0.000)	1.000			
Firm Size	0.177 (0.000)	– 0.180 (0.000)	– 0.081 (0.000)	0.490 (0.000)	– 0.397 (0.000)	1.000		
Firm Age	0.113 (0.000)	0.033 (0.003)	– 0.038 (0.001)	0.090 (0.000)	– 0.110 (0.000)	0.130 (0.000)	1.000	
Provincial GDP	0.021 (0.054)	0.138 (0.000)	0.077 (0.000)	0.051 (0.000)	– 0.008 (0.478)	0.049 (0.000)	0.016 (0.146)	1.000
FDI Size	– 0.199 (0.000)	0.070 (0.000)	– 0.036 (0.001)	– 0.018 (0.102)	0.011 (0.326)	– 0.087 (0.000)	– 0.232 (0.000)	– 0.014 (0.199)

Table 3. Baseline estimates

	Greenwashing	Greenwashing	Greenwashing	Greenwashing
Green Finance	– 3.642*** (0.346)	– 3.717*** (0.348)	– 0.846*** (0.320)	– 0.814** (0.319)
Cash Flow			0.133 (0.200)	0.125 (0.201)
Leverage			0.287 (0.211)	0.256 (0.216)
Tobin's Q			0.015 (0.009)	0.017* (0.009)
Firm Size			– 0.008 (0.042)	0.013 (0.044)
Firm Age			2.444*** (0.270)	2.430*** (0.270)
Provincial GDP			0.446*** (0.154)	0.418*** (0.154)
FDI Size			0.007*** (0.002)	0.007*** (0.002)
Constant	1.214*** (0.104)	– 0.170 (0.452)	– 11.460*** (1.297)	– 11.883*** (1.398)
Fixed Effects	No	Yes	No	Yes
Cluster Firm ID	No	Yes	No	Yes
Observations	8096	8096	7933	7933
R-squared	0.029	0.039	0.164	0.170

4.3. Mediating Effect Test

In order to further explore the intermediary role of green technology innovation between green finance and enterprise greenwashing behavior, the intermediary effect test was carried out.

Table 4. Exploration of green innovation mechanism

	Innovation	Innovation	Greenwashing	Greenwashing
Green Finance	0.211***	0.050**	– 3.250***	– 0.780**
	(0.027)	(0.022)	(0.345)	(0.319)
Innovation			– 2.291***	– 0.836***
			(0.312)	(0.304)
Cash Flow		0.004		0.150
		(0.011)		(0.203)
Leverage		0.014		0.274
		(0.015)		(0.218)
Tobin's Q		– 0.001*		0.015
		(0.001)		(0.009)
Firm Size		– 0.056***		– 0.026
		(0.005)		(0.047)
Firm Age		– 0.011		2.412***
		(0.020)		(0.269)
Provincial GDP		– 0.002		0.396**
		(0.012)		(0.154)
FDI Size		0.000**		0.007***
		(0.008)		(0.002)
Constant	0.617***	1.990***	1.241**	– 10.190***
	(0.048)	(0.131)	(0.483)	(1.490)
Fixed Effects	Yes	Yes	Yes	Yes
Cluster Firm ID	Yes	Yes	Yes	Yes
Observations	8280	8105	8061	7899
R-squared	0.053	0.238	0.060	0.171

The results show that the development of green finance indirectly reduces the green drift behavior of enterprises by improving their environmental technology innovation ability. Specifically, enterprises increase investment and application of environmental protection technology, improve their ESG performance, and thus reduce the possibility of green bleaching. After controlling other variables, the mediating effect is still significant, which further confirms the path and importance of green technology innovation.

5. Discussion Section

5.1. Interpretation of Empirical Results

By constructing an econometric model, this study empirically analyzes the impact of Green Finance on enterprises' green drift behavior. The results show that the higher the development level of green finance, the more unlikely the enterprises are to carry out green drift behavior. This is mainly due to the fact that green finance can effectively alleviate the financial constraints of enterprises and improve their real ESG performance. Specifically, green finance can ease the financial constraints of enterprises. Green finance projects usually have good risk control and income expectation, which has attracted the attention and support of a large number of

investors. High development level of green finance can provide lower cost financing channels and reduce the green drift behavior of enterprises in order to obtain funds. In addition, by supporting environment-friendly projects, green finance not only improves the environmental performance of enterprises, but also enhances their performance in social responsibility and corporate governance, so that enterprises do not need to rely on false ESG information disclosure to mislead investors and regulators in the face of external ratings and regulation.

5.2. Limitations of the Study

Although this study provides valuable insights, there are still some limitations to be pointed out. First, the data of this study is limited to A-share listed companies, and may not fully represent the situation of all types of enterprises and markets. Future research should be extended to enterprise data in more countries and regions. Secondly, the model fails to include some regulatory variables that may affect green finance and green drift behavior of enterprises, such as enterprise size, industry characteristics, etc. These factors may further complicate the relationship between the two. Finally, as the time span of the data is only six years (2017-2022), it may not fully reflect the long-term trends and changes. Future studies should consider longer time span data to verify the stability and reliability of the conclusions.

5.3. Implications for Management Practices

The conclusion of this paper is of great significance for policy makers and enterprise management practice. Policy makers should further improve and standardize the regulatory mechanism of green financial markets, and ensure that enterprises truly reflect their environmental and social performance by establishing unified standards and disclosure requirements, so as to enhance the transparency and credibility of the overall market. Enterprises should actively strengthen the practice of environmental management and social responsibility, improve their ESG score and enhance market competitiveness and investor confidence by investing in green financial projects and technologies. Investors should focus on the long-term sustainable development of enterprises rather than short-term profit performance, and choose those enterprises that are truly committed to environmental protection and social contribution to invest, so as to avoid being misled by false ESG information disclosure. The regulatory authorities should strengthen the supervision of the ESG information disclosure of enterprises, ensure the authenticity and credibility of the ESG reports of enterprises through regular review and public disclosure, and maintain the fairness and transparency of the market.

To sum up, this study not only enriches the theoretical basis of relevant fields, but also provides valuable guidance and suggestions for policy makers and enterprise management practice. Future research can be further expanded on this basis to verify the stability and applicability of the conclusions.

6. Conclusion and Recommendations

6.1. Summarize Research Findings

Green finance plays a positive role in guiding enterprises to truly reflect their environmental and social performance, and the higher the development level of green finance, the more unlikely it is for enterprises to conduct green drift behavior. Green technology innovation alleviates the financial constraints of enterprises to a certain extent, thus reducing the occurrence of green drift. Green finance indirectly inhibits the green drift of enterprises by improving the real ESG performance of enterprises, which not only contributes to environmental protection, but also promotes the improvement of enterprises' social responsibility and corporate governance. These conclusions reaffirm the importance of green

finance in environmental protection and corporate social responsibility, and further verify the research hypothesis of this paper.

6.2. Policy Recommendations

Based on the above findings, the following policy recommendations are put forward: first, the government should establish unified green finance standards and disclosure requirements, formulate detailed standards and norms, ensure that all enterprises can truly and accurately disclose their environmental and social performance, and improve market transparency and credibility. Secondly, the regulatory authorities should regularly review the ESG reports of enterprises and severely punish the false information disclosure, so as to maintain the fairness and transparency of the market and strengthen the supervision of green finance. At the same time, by providing tax incentives, financial subsidies and other incentives, enterprises are encouraged to increase the R&D and application of green technologies and increase their investment in environmentally friendly projects. Finally, the government, financial institutions and enterprises should strengthen cooperation, establish an information sharing platform, promote exchanges and cooperation in the field of green finance, and improve the efficiency and transparency of the overall market.

6.3. Future Research Directions

Future research can continue in the following directions:

Expand the data scope, and expand the research object to enterprises in more countries and regions. By covering enterprise samples in more countries and regions, we can more comprehensively understand the behavior of enterprises under different economic, cultural and policy backgrounds, so as to effectively verify the universality and applicability of the conclusions in different environments.

Introduce more regulatory variables: add more control variables to the model, such as enterprise size, industry characteristics, etc., to more comprehensively explain the relationship between green finance and green drift behavior of enterprises.

Long term trend analysis: using a longer time span data for analysis, through the study of the data in a longer time range, observe the performance of enterprises' green drift behavior in different stages, and the dynamic impact of the gradual implementation of green finance policy on enterprises' behavior, and explore the long-term impact of green Finance on enterprises' green drift behavior and its change trend.

Interdisciplinary research: combine the theories and methods of sociology, management and other disciplines to explore the impact mechanism of Green Finance on corporate behavior from multiple perspectives. Combining the advantages of different disciplines, we should deeply explore the impact mechanism of Green Finance on enterprise behavior, and provide more innovative ideas and solutions to promote the sustainable development of enterprises.

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