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Research on the Impact Mechanism of Green Finance on the Optimization and Upgrading of Regional Industrial Structure

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Abstract: Under the background of this era, green finance and the upgrading and optimization of industrial structure have become a hot research topic. The article focuses on Jiangsu Province, carefully explores the impact of green financial development on the upgrading and optimization of industrial structure and the real effect, collates and summarizes the theories of green finance and industrial structure at home and abroad, and carefully analyzes the development of green finance in Jiangsu Province, such as the gradual expansion of green credit scale, the characteristics of industrial structure, the change of the proportion of three industries, the development situation of emerging industries and so on. By means of econometrics, an empirical model covering Green Financial Development Indicators and industrial structure optimization indicators is established to do multiple linear regression analysis and stability test. The empirical results show that the development of green finance in Jiangsu plays an obvious positive role in the optimization and upgrading of industrial structure. Green finance is environmental protection, new energy and other green industries are given important financial support, which drives their scale expansion and technological innovation, and makes the industrial structure develop towards a higher level and a more reasonable direction. From this point of view, corresponding proposals are put forward to improve the policy incentive system, add green financial products, and strengthen the construction of green financial market. The purpose is to give better play to the advantages of green finance, accelerate the optimization and upgrading of industrial structure in Jiangsu, and provide theoretical basis and practical guidance for achieving green economic transformation and sustainable development.

Keywords: Green finance; Optimization and upgrading of industrial structure; Entropy weight method; Multiple linear regression model

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1. Introduction

The idea of green finance originated in the 1970s. With the vigorous development of the industrial revolution,

capitalism blindly pursued economic benefits, resulting in waste of resources and environmental pollution. Yes, environmental issues have gradually attracted people's attention, and some international organizations and financial institutions have begun to realize the role of Finance in environmental protection and advocate the ecological concept of harmony and unity between man and nature. But this idea did not have a global impact until the 1980s and 1990s, when the bank for International Settlements (BIS) issued the Basel Accord, which for the first time linked capital adequacy to bank risk, including environmental risk considerations, prompting banks to pay more attention to environmental factors in their business. After entering the 21st century, with the increasing attention of the international community to climate change, China's green finance has ushered in development opportunities. In 2007, the State Environmental Protection Administration and other departments issued policies such as green credit, green insurance and green securities to guide financial resources to invest in green industries. Financial institutions responded positively and continuously developed many green financial products. The scale of green credit gradually expanded, green insurance products gradually increased, and the green securities market began to rise, which shows that China's green financial system has initially taken shape.

To sum up, Jiangsu Province, as a major economic province in China, has been in the forefront of the country for a long time, but the traditional industries with high energy consumption and high emissions account for a large proportion, facing the dual pressure of resource constraints and environmental pollution. Therefore, in the current context, green finance is not only the key grasp to achieve environmental governance, but also the core driving force to promote the transformation of industrial structure from high carbon to low carbon. Therefore, this paper takes the development of green finance in Jiangsu Province in the past ten years as the research object, adopts the research method of correlation between theoretical elaboration and empirical analysis, and analyzes its mechanism of action on the improvement process of industrial structure in detail, so as to give policy suggestions with application value and give reference to the sustainable development of green finance in Jiangsu Province.

From the perspective of financial theory, we can expand the application of green finance in regional economic development, fill in the theoretical details of the relationship between green finance and industrial structure in Jiangsu, improve the analytical framework of Green Finance on the transmission mechanism of industrial structure adjustment, provide theoretical support for the transformation of traditional industries in Jiangsu to green direction and the emergence of emerging green industries within the scope of industrial economy theory, and explain how green financial resources are effectively allocated to various industries to promote the development of industrial structure towards upgrading and rationalization, and help establish a regional industrial economy theoretical system in line with the concept of sustainable development.

2. Literature review

2.1. Research on green finance

In terms of the research on the temporal and spatial characteristics of green finance, many scholars have deeply explored the temporal and spatial evolution of the development level of green finance. By measuring the development level of green finance in China's four major regions, Zhou and Tang have studied the regional heterogeneity of its development, revealing the phenomenon of club integration of green finance, that is, regions with similar development levels tend to gather [1]. In addition, some scholars focus on the spatial impact effect of green finance, and use spatial econometrics model to deeply analyze the spatial correlation and spillover effect of green finance. For example, Huang *et al*. showed that there was a positive spatial autocorrelation in green

finance by calculating the Moran index, further established a spatial measurement model, and found that there was a significant spatial spillover effect in the development of local green finance, which played a positive role in promoting the development of green finance in the surrounding areas [2].

Heo and Lee also came to the conclusion that the development of green finance can have a positive spillover effect on the development of renewable energy in the surrounding areas when they studied the relationship between green finance and renewable energy by building a spatial Dubin model [3].

2.2. Research on the impact of green finance on the upgrading of industrial structure

From the development process of green finance, its development model gradually tends to be green and environmentally friendly, focusing more on promoting the optimization and upgrading of industrial structure through resource allocation to achieve a win-win situation between economic development and environmental protection [4]. Green finance helps to optimize and adjust the industrial structure by innovating financial instruments and service modes, such as green credit and green bonds, and also brings new profit growth points to the financial industry [5].

From the perspective of enterprises, green finance, through differentiated financial support, has effectively promoted traditional enterprises to accelerate the pace of technological innovation, so that enterprises can increase investment in green projects, thus realizing the upgrading of industrial structure. From the analysis of correlation degree, there are differences in the correlation degree between green credit and the three major industries, green credit is most closely related to the tertiary industry, and the primary industry is the smallest [6]. In addition, Palencia *et al*. used the double difference method to analyze the relationship between the construction of green finance "Experimental Zone" and the development of industrial structure by collecting and sorting out green finance policies as a quasi-natural experiment [7]. Peneder further confirmed the significant role of green finance in the upgrading of industrial structure through the application of grey correlation model in green finance and industrial structure upgrading [8]. At the same time, the establishment of financial reform pilot zones is also regarded as an effective means to promote the upgrading and rationalization of regional industrial structure [9]. Chengchao *et al*. found that green finance can actively guide enterprises to transform to green production mode, reduce dependence on and destruction of natural resources, and promote the vigorous development of the tertiary industry [10].

3. Definition and related concepts

3.1. Green finance

Green finance is a market tool and financial instrument aimed at effectively addressing environmental issues, and this concept has been widely recognized in Western countries. The core mechanism of its operation lies in promoting environmental protection and sustainable development through the voluntary actions and self-discipline of financial institutions. Specifically, green finance encompasses various policies and guidelines, playing an important role in guiding the flow of funds towards green industries and promoting the research and application of environmentally friendly technologies. Pigouvian taxes, as an environmental and economic policy tool, effectively incentivize companies to reduce pollution emissions and improve resource utilization efficiency by levying taxes and fees related to environmental pollution, incorporating environmental costs into their production and consumption processes. In addition, the Equator Principles, as a voluntary guideline, require

financial institutions to fully consider environmental and social risks when financing projects. This reflects the proactive and responsible role of financial institutions and has become a sustainability standard widely followed by the international banking industry. The environmental equity trading market based on Coase Theorem also provides new opportunities for the development of green finance. For example, the carbon finance market allows companies to achieve emission reduction targets by buying and selling carbon emission rights, thereby optimizing the allocation of emission reduction costs and improving the efficiency of resource allocation. The application of this market mechanism provides enterprises with flexible and diverse emission reduction options. With the passage of time, these environmental financial instruments have been continuously expanded and improved, and their application scope has gradually expanded to more fields, ultimately forming a comprehensive green financial system covering multiple fields.

3.2. Upgrade of industrial structure

The upgrading of industrial structure is a process involving the reconfiguration of production resources, with the core objective of promoting the evolution of industrial structure towards a more advanced and rational direction. This process is not just about adjusting the proportional relationship between the three major industries, but a profound transformation that touches on the foundation of the industry. Specifically, it manifests as the dominant industry gradually shifting from traditional industries with low added value, high consumption, and low technology to emerging industries with high added value, low consumption, and high technology. This transformation not only enhances the overall efficiency and competitiveness of the industry, but also marks a process of upgrading and rationalizing the industrial structure. During this process, resource allocation has been optimized and industrial structure has been upgraded, providing a solid foundation for the sustained and healthy development of the economy. In addition, the upgrading of industrial structure is also a dynamic process that continues to evolve with the continuous improvement of social productivity levels. During this process, the industrial development mode has shifted from extensive to intensive, and the development layout has shifted from scattered to clustered. This transformation not only brings significant improvements in production efficiency, but more importantly, it effectively promotes the agglomeration development and collaborative innovation of industries, injecting new vitality into enhancing industrial competitiveness.

Sustainable industrial structure refers to the principle of sustainable development that must be followed in the process of optimizing and upgrading industrial structure, taking into account economic benefits, social welfare, and ecological environment protection. Sustainable industrial structure is the process of traditional industrial structure evolving towards a green and environmentally friendly industrial system, aimed at breaking the bottleneck of resource and environmental constraints faced by economic development. With the development of green industrial structure, it is manifested in the gradual decline of traditional polluting industries and the rapid rise of emerging green environmental protection industries. Promoting sustainable development of industrial structure can not only solve the problem of heavy industrial structure in China, but also provide important support for achieving high-quality economic and social development.

4. Current situation and research

4.1. Environmental status in Jiangsu province

There are many urgent needs for the development of green finance in Jiangsu Province. In terms of the

environment, Jiangsu's industrial prosperity has led to pollution problems due to long-term extensive development, and there is an urgent need for green finance to guide funds to flow into the field of environmental protection, help solve pollution and restore ecology. From an economic perspective, the industrial structure urgently needs improvement. Green finance can promote the transformation of traditional high-energy consumption industries, cultivate new energy, environmental protection and other green industries, and add new impetus to economic growth. In terms of policy dimension, in response to the national green development strategy, Jiangsu province has used green finance to achieve the dual carbon goal and improve Jiangsu's position in the national green development pattern. Therefore, based on national policies, Jiangsu province has launched many policy measures to promote the development of green finance.

Table 1 lists the unit wastewater and exhaust emissions in Jiangsu Province. It can be seen from the table that these two indicators gradually declined from 2014 to 2023, indicating that Jiangsu province has made significant achievements in energy conservation and emission reduction in recent years, and also suggesting that the scale of green finance development in Jiangsu province may continue to expand.

Table 1. Environmental indicators of Jiangsu province from 2014 to 2023

Year	Unit GDP industrial wastewater discharge (10000 tons/ billion yuan)	Unit GDP industrial waste gas emissions (ton/billion yuan)
2014	3.16	25.73
2015	2.90	20.91
2016	2.32	13.47
2017	1.77	9.33
2018	1.54	6.58
2019	1.39	4.79
2020	1.12	1.09
2021	1.04	0.75
2022	1.02	0.61
2023	0.97	0.54

4.2. Current situation of industrial structure in Jiangsu province

From **Figure 1**, it can be seen that since 2014, the industrial scale in Jiangsu has experienced significant growth, gradually expanding from 6508.832 billion yuan to 1282.2216 billion yuan. This growth indicates strong and sustained economic development momentum in the region. Over the past decade, the output value of the primary industry has grown slowly, gradually increasing from 363.433 billion yuan in 2014 to 507.58 billion yuan in 2023. The output of the secondary industry has significantly increased, rising from 308.545 billion yuan to 5690.966 billion yuan during the same period. The output growth of the tertiary industry has been even greater, from 3059.949 billion yuan in 2014 to 662.367 billion yuan in 2023. In 2015, it surpassed the secondary industry and became the dominant force in the total economic output, in industrial sector.

From 2014 to 2023, Jiangsu's economic system has achieved great development, and the industrial structure has changed from the traditional "two three one" model to the "three two one" layout. The important factor to promote this change is a series of strategic measures implemented by the Jiangsu provincial Government in the

past decade. These measures aim to gradually shift the focus of investment from Resource-intensive industries to innovation driven industries, so as to effectively promote the optimization and upgrading of the industrial structure. As far as the country is concerned, the output value of the tertiary industry accounts for 53.9%, and that of Jiangsu province is 51.66%, which is significantly lower than the national average. The current economic structure of Jiangsu province shows the characteristics of the "three two one" pattern. However, from the quantitative indicators, the output of the tertiary industry has no significant advantage over the secondary industry. This shows that there is still huge growth potential and improvement space for the development of the tertiary industry.

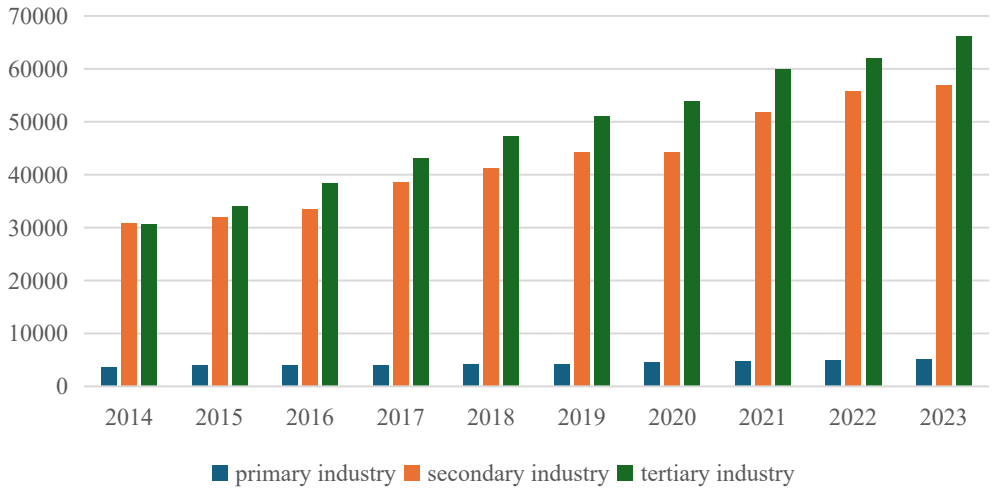

Figure 1. Output value of the three major industries in Jiangsu Province from 2014 to 2023.

4.3. Empirical analysis of the impact of green finance on the optimization and upgrading of industrial structure in Jiangsu province

This article uses a panel dataset of thirteen prefecture level cities in Jiangsu Province from 2014 to 2023 as the main analysis material. The data is sourced from statistical yearbooks of various regions in Jiangsu Province, and interpolation is used to process variables with missing values. It is important to understand several core elements in model construction: the target dependent variable, the explanatory variable at play, and the control variable used to correct potential biases. The dependent variable is the optimization of industrial structure, which is obtained by the ratio of the added value of the tertiary industry to the added value of the secondary industry. The explanatory variable is green finance, which requires a series of quantitative indicators including the scale and proportion of green financial instruments such as green credit, green bonds, green insurance, green funds, and green equity. The controlled variables include the level of economic development, degree of government intervention, level of social consumption, and population distribution.

Based on the selection of the above variables, this paper will build the following model:

$$Super = \alpha + \beta Green_{it}$$

$$Super = \alpha + \beta Green_{it} + \gamma Controls_{it} + \varepsilon_{it}$$

Among them, super represents the explained variable, green represents the explanatory variable, and control represents the control variable. The descriptive statistics of each variable are shown in **Table 2**.

Table 2. Statistical description of variables

Variable	Sample value	Average value	Minimum value	Maximum value	Standard deviation
Super	130	1.050	0.788	1.734	0.188
Green	130	0.400	0.130	0.714	0.137
GDP	130	11.50	10.44	12.20	0.435
People	130	6.634	6.192	6.998	0.209
GOV	130	0.123	0.084	0.197	0.029
Consume	130	0.350	0.221	0.497	0.068

To further explore the initial relationship between explanatory and dependent variables in the model, this article uses Pearson correlation coefficient as a statistical tool for analysis. The results show that the coefficient value of the green variable is 0.222, which shows a significant positive correlation at the 15% significance threshold, indicating that the green variable has a positive impact on the dependent variable. Therefore, a preliminary conclusion is drawn: the development of green finance in Jiangsu Province plays a crucial role in promoting the improvement and upgrading of its industrial structure towards higher efficiency and environmental protection. The correlation test is shown in **Table 3**.

Table 3. Correlation test

	Super	Green	GDP	People	GOV	Consume
Super	1					
Green	0.222**	1				
GDP	0.377***	0.108	1			
People	0.323***	0.00700	0.503***	1		
GOV	-0.0990	0.0100	-0.821***	-0.587***	1	
Consume	0.644***	0.183**	-0.111	0.0970	0.185**	1

Note: *, **, *** respectively indicate that the corresponding indicators are significant at the 10%, 5%, and 1% levels.

Subsequently, this article employs the stepwise regression method for analysis, as shown in **Table 4**. In Equation (1), separate analyses are conducted for the explanatory and dependent variables, with a coefficient value of 0.313 for the green indicator, indicating a significant positive effect at the 1% significance level. Equation (2) further explores this situation by adding control variables to the model to consider the potential impact of other factors. The revised analysis shows that green's coefficient has been reduced to 0.107, but it still maintains a positive trend at a significance level of 5%.

Table 4. Empirical results of the impact of green finance on industrial structure

Variable	Formula 1	Formula 1
	Super	Super
	(5.23)	(2.25)
Green	0.313***	0.107**

Table 4 (Continued)

Variable	Formula 1	Formula 1
GDP		0.296***
		(9.48)
People		0.247
		(1.20)
GOV		1.893***
		(2.99)
Consume		0.707***
		(4.17)
_cons	0.925***	-4.513***
	(36.77)	(-3.22)
N	130	130
R-Squared	0.191	0.594
F	27.398	32.755

From **Table 4**, it can be seen that green finance plays an indispensable role in promoting the improvement and upgrading of industrial structure, especially through mechanisms such as funding guidance, innovation promotion, and resource integration, effectively assisting the development of green environmental protection industry. This not only increases the scale of green industry, but also further stimulates the vitality of the tertiary industry, promoting the entire industrial structure to develop towards a more efficient and sustainable direction. Although the correlation coefficient is relatively small, it precisely indicates that the current development of green finance in Jiangsu Province has just entered the stage of moving from the beginning to maturity. Based on this, Jiangsu Province should further strengthen investment in the development of green finance and deepen the degree of transformation. Furthermore, there is a clear positive correlation between the level of economic development and the improvement and enhancement of industrial structure, indicating that economic growth can effectively promote the rational allocation of resources and facilitate their flow towards the more efficient tertiary industry.

The degree of government intervention has outstanding positive significance for the optimization and upgrading of industrial structure. In this situation, the Jiangsu provincial government has continuously introduced and implemented a series of related policies in accordance with the national strategy of promoting green finance. With financial support, technological innovation guidance and other methods, it focuses on addressing environmental pollution problems and uses this as a breakthrough point to promote further improvement and upgrading of industrial structure. According to empirical analysis, the development of green finance has brought significant economic benefits to Jiangsu Province and achieved good results in environmental protection, which well confirms its positive role in optimizing and upgrading industrial structure.

5. Conclusion

According to the empirical research results in the previous section, green finance can to some extent promote the development of Jiangsu province's industrial structure towards optimization. However, due to various reasons

such as supply-demand imbalance and limited resource allocation, its actual effect has not yet been fully released. In response to the problems of imperfect policy system, immature market development, and obstacles to industry finance integration in the upgrading of green finance and industrial structure in Jiangsu Province, combined with theoretical analysis and empirical conclusions, systematic policy recommendations are proposed from three dimensions: institutional design, market cultivation, and technological support, in order to promote the deep integration of green finance and industry and accelerate the construction of a low-carbon and efficient modern industrial system.

6. Recommendation

Therefore, this article proposes the following suggestions: Firstly, the Jiangsu provincial government should adopt policy measures such as tax incentives and fiscal incentives to encourage financial institutions to vigorously carry out green finance business and achieve good results. For commercial banks with a high proportion of green credit, their business tax collection rate can be moderately reduced; Provide specialized subsidies to financial institutions that have successfully issued green bonds to offset their issuance costs, thereby greatly stimulating their enthusiasm and initiative to engage in green finance business. Secondly, the government has established a negative list system for green finance businesses and tightened control over financing support for high pollution and high energy consumption categories. Require financial institutions to establish a full process environmental risk assessment mechanism, dynamically track green projects, and implement environmental risk stress testing for high carbon projects. Finally, in order for financial institutions to innovate, they must develop diverse green financial tools, establish a green supply chain financial service system, create financing channels for enterprises related to the environmental protection industry chain, launch green themed credit card products for individual users, promote low-carbon consumption concepts through point rewards and rate discounts, improve the green insurance product system, and provide comprehensive risk prevention guarantees for ecological protection projects.

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References

[1] Zhou X, Tang X, 2022, Spatiotemporal Consistency Effect of Green Finance on Pollution Emissions and Its Geographic Attenuation Process. Journal of Environmental Management, 318: 115537.

[2] Huang Y, Chen C, Lei L, et al., 2022, Impacts of Green Finance on Green Innovation: A Spatial and Nonlinear Perspective. Journal of Cleaner Production, 365: 132548.

[3] Heo S, Lee H, 2019, Evolution of the Linkage Structure of ICT Industry and Its Role in the Economic System: The Case of Korea. Information Technology for Development, 25(3): 424–454.

[4] Cantner U, Graf H, 2004, The Network of Innovators in Jena: An Application of Social Network Analysis. Research Policy, 35(4): 463–480.

[5] Kratke S, 2010, Regional Knowledge Networks: A Network Analysis Approach to the Interlinking of Knowledge Resources. European Urban and Regional Studies, 17(1): 83–97.

[6] Lee C, Wang F, Chang F, 2023, Does Green Finance Promote Renewable Energy? Evidence from China. Resources Policy, 82: 103439.

[7] Palencia J, Furubayashi T, Nakata T, 2013, Analysis of CO_2 Emissions Reduction Potential in Secondary Production and Semi-Fabrication of Non-Ferrous Metals. Energy Policy, 52: 328–341.

[8] Peneder M, 2003, Industrial Structure and Aggregate Growth. Structural Change and Economic Dynamics, 14(4): 427–448.

[9] Hellmann T, Murdock K, Stiglitz J, 1995, Financial Restraint: Toward a New Paradigm. Oxford University Press, 9(3): 61–64.

[10] Lv C, Bian C, Lee C, et al., 2021, Regional Gap and the Trend of Green Finance Development in China. Energy Economics, 2021(10): 105476.