

# Research on the Effect of Green Finance on the Upgrading of China's Industrial Structure

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**Abstract:** *With the rapid development of China's economy, ecological and environmental problems have become increasingly prominent. The study of the effect of green financial development on the upgrading of industrial structure has become a hot national issue. Financial development based on the analysis of China's green, green financial development to promote China's industrial structure upgrading, on the basis of through the establishment of plural regression model for China's green financial development in the first half of 2014-2019 degrees to the empirical analysis of the effect of industrial structure upgrade, concluded that the added value of the financial sector, the development of green credit positive impact on the upgrading of industrial structure; The ratio of energy conservation and environmental protection expenditure to industrial structure upgrading has a negative impact. The development of carbon finance and green bonds has no significant impact on the upgrading of industrial structure. On this basis, the paper puts forward corresponding countermeasures and suggestions for promoting the upgrading of China's industrial structure with the development of green finance.*

**Keywords:** Green finance, The credit, Industrial upgrading

## 1. Introduction

In 2016, seven ministries and commissions including the People's Bank of China, the Ministry of Finance and the National Development and Reform Commission jointly issued the Guidance on The Construction of green Financial System, which elaborated the mission, direction and requirements of the development of green financial system from the perspective of national strategy, and preliminarily established the top-level design for the development of green finance. In his report to the 19th National Congress of the Communist Party of China (CPC), General Secretary Xi Jinping pointed out that we should vigorously develop green finance and build a sound economic system featuring green, low-carbon and circular development. This series of policies shows that the country hopes to promote green production and management of enterprises and green consumption of individuals through the development of green finance, and to jointly promote the upgrading of industrial structure by combining the visible hand of the government with the invisible hand of the market, so as to realize the common sustainable development of economy and environment.

At present, China's green financial system is represented by green credit and green bonds. The scale of development is increasing year by year, and green financial products gradually show a trend of diversification and scale. At the same time, green finance has opened up new growth points for China's economic development, provided broad development direction and space for financial innovation for China's financial industry, and provided a continuous driving force for The upgrading of China's industrial structure. Therefore, it is of far-reaching significance to study the effect of green finance development on the upgrading of China's industrial structure.

## 2. Literature Review

In terms of the connotation of green finance, Deng Xiang (2012) believes that green finance is to seek an optimal investment portfolio among financial products and financial instruments, so as to promote the coordinated development of economy, society and environment.<sup>[1]</sup> Zhang Quanxing (2011) believes that green finance refers to a financial development strategy that implements environmental protection, energy conservation and emission reduction policies in the financial sector, promotes the transformation of economic development mode and the transformation and upgrading of industrial structure through financial business operation, and realizes the sustainable development of finance.<sup>[2]</sup> Fu Jingyan (2018) argues that green finance is the integrated use of green credit, green bonds, green funds and green stocks and other financial instruments, in environmental protection, energy saving, clean energy, green transportation, and green building projects, such as to environmental pollution control, energy conservation and emissions reduction, with the financial means to realize the sustainable development of economy and environment.<sup>[3-4]</sup> Shu Xiaoting (2018) divided the definition of green credit into two levels: one is the fund used to develop green environmental protection industry, and the other is the explicit prohibition of investment in loan objects that do not meet the environmental protection requirements.<sup>[5]</sup> Liu Yan(2019) argues that green finance refers to financial markets in the Banks, funds, securities and other kinds of institutions from the perspective of environmental protection and energy saving.

In terms of research on green finance and industrial upgrading, Luo Chaoping, Zhang Ziyu and Wang Zhizhang (2016) confirmed through empirical research that there is a certain long-term stable relationship between financial output rate, financial operation efficiency and industrial structure upgrading rate<sup>[7]</sup>. Liang Yu(2017) used the grey

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correlation method to draw a conclusion that China's green credit has little correlation with the primary and secondary industries, but significant correlation with the tertiary industry, and has a certain correlation with the rationalization direction of industrial structure adjustment.<sup>[8]</sup> Long Yunan (2018) used the grey correlation model to draw an empirical conclusion that the effect of restrictions on loans to industries with high energy consumption is better than that of green credit, that is, restrictions on loans to industries with high energy consumption have a more positive effect.<sup>[9]</sup> Tang Yong (2018), by establishing a VAR model, using cointegration relationship test, impulse response function and variance decomposition methods, prove green credit, green insurance and green investment in the short term the impact on the transformation<sup>[10]</sup> Chen Guoqing (2018) took Jiangxi Province as an example to study the relationship between green finance and the optimization and upgrading of industrial structure and concluded that green finance plays a certain role in promoting the adjustment of industrial structure.<sup>[11]</sup>

### 3. The action mechanism of green finance development on industrial structure upgrading

The action mechanism of green finance on industrial structure upgrading is mainly reflected in the following aspects: take finance as the contract point, guide the capital flow and industrial integration, and provide financing convenience for green industry; Combined with the development status of green finance in China, this paper analyzes the mechanism of the effect of green finance development on the upgrading of China's industrial structure, which is mainly reflected in the four functions of green finance.

#### 3.1 Capital aggregation

The financial market uses its unique function to gather idle funds in the market to form investment capital in the financial market, which forms the basis of industrial development. In recent years, the development of green industry needs a lot of capital investment, the development of green finance for green industry capital investment pool formation, through diversified green financial instruments will be accumulated capital in the capital pool into green industry developing effective financial capital, reduce financing costs, funding for the development of green finance is very convenient.

#### 3.2 Guide capital

Finance plays a vital role in the process of resource

allocation. The investment pool formed after capital aggregation will flow to various industries and regions under the guidance of the mechanism of government and market operation to realize the optimal allocation of capital. On the one hand, the government directly intervenes in the financial market by means of policy-based finance to make up for the market failure and make effective allocation of financial resources. We will remove leftover industries from preferential policies, and strengthen support for the development of green and technology-innovative industries.

#### 3.3 Economies of scale

The operation of financial capital also has the effect of economies of scale. By expanding the scale of financial industry, the total economic benefits can be increased. Green projects can get on the right track of scale economy in terms of financing, investment, execution and supervision, which will inevitably form a virtuous cycle system and promote industrial upgrading.

#### 3.4 Risk control

Risk control is often a very important link in the development of finance. Green finance is generally characterized by long term and high risk. Therefore, it is more necessary to carry out risk control for green finance and establish around environmental risk assessment system and environmental damage identification system to control risks.

## 4. The Empirical Analysis

#### 4.1 Index selection

Most studies on green finance's effect on industrial upgrading remain in qualitative analysis, while quantitative empirical analysis is more able to illustrate the connection between the two. This paper adopts a combination of qualitative and quantitative methods to jointly measure the effect of green finance's development on industrial structure upgrading in China. Among the many influencing factors that affect the development of green finance on the upgrading of industrial structure, the influence degree of each factor needs to be measured by multiple regression model.

According to the compatibility of indicators and the availability of data, this paper uses the data of the first half year from 2014 to 2019 to establish the green financial system and measure its influence on the upgrading of industrial structure.

Table 1: Green finance evaluation index system

Level indicators	Level 3 indicators	Level 3 indicators	variable	The data source
Green finance	Public indicators	GDP	X1	Website of National Bureau of Statistics
		The proportion of spending on energy	X2	Website of National Bureau of Statistics

		conservation and environmental protection		
		Financial added value	X3	Website of National Bureau of Statistics
	Green credit	Green credit loan balance	X4	Website of China Banking Regulatory Commission
	Green bonds	Amount of green bond issuance	X5	Wind database
	Carbon finance	Trading volume of carbon finance	X6	National Tai 'an database

**4.2 Regression model**

Since the time series data of each variable from 2014 to the first half year of 2019 are selected, in order to avoid the phenomenon of "false regression", the stationarity test of each variable is required at first, that is, the variables in the random process are transformed into a stable multiple regression process after N times of difference. In this paper, ADF unit root test method is adopted and Eviews8.0 is used to process the data. The stationariness test results are shown in Table 3. It can be seen from the results that the variable X1 is non-stationary, and it is still unstable after the secondary difference.

**Table 2: Regression results**

Coefficients:				
Estimate Std. Error t value Pr(> t )				
	The coefficient	The standard deviation	T value	P value
(Intercept)	4.188e-01	1.381e-02	30.319	8.54e-08***
X1	-5.005e-07	7.928e-08	-6.314	0.000737***
X2	-7.772e-06	2.854e-06	-2.723	0.034503*
X3	3.915e-06	1.197e-06	3.270	0.017042*
X4	2.225e-06	5.989e-07	3.715	0.009906**
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Residual standard error: 0.003419 on 6 degrees of freedom				
Multiple R-squared: 0.987, Adjusted R-squared: 0.9783				
F-statistic: 113.8 on 4 and 6 DF, p-value: 8.711e-06				

After variables x5 and x6 are removed, the significance of parameters is greatly improved, and the regression equation is finally obtained as follows:

K value is 33.6, indicating that this process also eliminates the complex collinearity, and the equation can be said to be reasonable at this time. The variable X1 is removed, the unstable variable is eliminated, and the regression equation finally obtained is:

$$Y=0.4188e^{-1}-5.005e^{-7}X_1-7.772e^{-6}X_2+3.915e^{-6}X_3+2.225e^{-6}X_4$$

The stepwise regression method was adopted in this part, and the results showed that the overall significance level of the model was high. Finally, through the test and the model setting was reasonable. The proportion of energy conservation and environmental protection expenditure in the fiscal expenditure has a significant negative impact on the upgrading of industrial structure. State support for the development of energy conservation and environmental protection will inevitably mean cracking down on those enterprises that bring high profits and profits at the cost of destroying the environment and wasting resources, which

will slow down economic growth in the short term. Because in the long run, the green economy is sustainable, is the perpetual motion machine for economic growth.

The added value of the financial industry and the balance of green credit are significantly positively correlated with the upgrading of industrial structure. In the adjustment of industrial structure, financial play an irreplaceable role, financial institutions by promoting capital movement to guide the transverse flow between the various factors of production in the industry, improve the proportion of the relationships between elements, so as to realize the structure optimization, it can be said that the financial is the direct impetus to realize the upgrading of industrial structure. Green credit is one of the important contents of green finance. At present, China's green financial products mainly focus on green credit. Since the formal implementation of green credit in 2007, the growth rate of green credit has been significantly accelerated. In recent years, banks have strictly controlled the credit in the "two, high and surplus" industries, vigorously supporting the development of clean energy industries such as garbage disposal, wind power, hydropower and photovoltaic, and increasing the loans for environmental protection and energy conservation projects year by year.

The issuance scale of carbon finance and the impact of green bonds on the upgrading of industrial structure are not significant. China's carbon finance trading market has been initially established, but it is still in a stage of exploration. It has great limitations, mainly manifested as a single participant, imperfect carbon finance related institutions and policies, and lack of innovation in carbon finance products. At the present stage of the development of carbon finance market, China has promulgated and formulated very few laws and regulations for its market development, and some existing carbon finance market systems are only limited to a small scope of use.

**5. Policy Suggestions**

**5.1 Perfect the green financial product system, rating system and credit system.**

The development system of green finance needs to be improved. The innovation degree of financial products, tools and collateral is low. The green fund, green insurance and green financial derivatives are still in the embryonic development stage, with single product system and lack of perfect laws and regulations for green financial products. With a proper understanding of the vast market that green finance will have in the future, the market is more willing to finance environmentally friendly projects than oil or coal

companies in today's highly polluted climate, because of the ever-present macro risks of climate change. In addition, the development of green finance can play a positive role in supporting and winning the battle against pollution, serving rural revitalization, and promoting the green transformation of economy and society.

Secondly, it is particularly important to establish a scientific and reasonable green rating system and green credit system. Financial institutions always refer to other relevant laws and regulations for their green business, which leads to the division of rights and responsibilities in the implementation of green projects, and the legal void, which hinders the development of green finance. We should actively formulate laws and regulations that are compatible with green finance to provide reliable legal guarantee and expenditure support for its development.

### **5.2 Enhance the initiative of the financial service green industry and mobilize the vitality of green products.**

It is particularly important to increase the substantial support of the financial industry, especially for the green projects of the real economy, clarify the important responsibility of the financial industry to serve the real economy, and improve the initiative of the large financial service industry to serve the green industry. However, commercial banks tend to provide credit, interest rate and discount interest support to projects with stable returns and low risks. The fundamental reason is that the government and taxpayers give a large number of policy subsidies. Therefore, commercial banks should also actively undertake social responsibilities and obligations to solve the problem of shortage of funds for green projects. The development of green finance can not only effectively improve climate change and control pollution, but also stimulate the virtuous development of the economy and open up new economic growth points.

### **5.3 Strengthen the market incentive mechanism and promote the construction of third-party service infrastructure**

Due to the game of green finance itself exists profitability and public welfare, and most of the social capital is given priority to with profit, the environment is complementary, so at the beginning of the green financial products development need more market incentives, such as some green bonds incentive policies and supporting measures, such as to develop some green bonds, discount and credit, and other supporting preferential tax policies, encourage social security fund, enterprise annuity, the social public welfare fund and so on, all kinds of investors invest in green financial bonds, the government guidance and market restraint mechanism more organically unifies in together, not only can promote the sustainable and healthy development of the green financial bonds market In addition, all kinds of funds can be encouraged to participate in supporting the green industry, and the bond market can better play a positive role in serving the development of

green economy and the construction of ecological civilization.

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