

Research on the Mechanism of Green Finance on Economic Growth

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Abstract

Since the reform and opening up, China's economic development has been rapidly changing, and has made great achievements that have attracted the world's attention. However, China's long-term implementation of the crude growth mode has certainly brought rapid economic growth, but in the long run, it has brought very serious environmental pollution and huge consumption of energy. In the face of increasingly severe resource consumption and environmental pollution, the development of green finance is an inevitable choice to improve the ecological environment, promote the transformation of economic structure and achieve sustainable economic development. Therefore, it is of great significance to study the impact of green finance on economic growth, industrial structure adjustment and energy saving and emission reduction in China, and to explore the mechanism effect of developing green finance to promote the green growth of China's economy. How to promote green sustainable development and high-quality economic growth is an important issue in contemporary Chinese economic development. Through green investment, green finance promotes the green transformation of polluting enterprises, the ecological industrial structure and green technological innovation, and thus has an important impact on the high-quality growth of China's economy. By combing the relevant literature on green finance and economic growth at home and abroad, this project systematically analyzes the comprehensive impacts of green finance on the conduction path of economic growth, based on the premise of the externalities of green finance, the micro-mechanisms of green finance's impact on economic growth, the transmission paths and the organic combination of regional heterogeneity. On the basis of empirical research, we explore the mechanism and effect of developing green finance to promote China's economic development, and put forward countermeasures and suggestions to promote economic growth with green finance at four levels: national, local government, financial institutions and enterprises.

Keywords

Green Finance; Economic Growth; Green Transition; Regional Heterogeneity.

1. Introduction

At present, China's economic growth has begun to step into the new normal, and the traditional crude economic growth model cannot be sustained. To realize the transformation of economic growth mode, to guide the optimization, adjustment and upgrading of industrial structure, and to achieve energy saving and emission reduction can not be achieved without the support of capital. However, at this stage, the development of China's capital market is still imperfect, and it is difficult to realize the above goals by relying entirely on the market itself. Therefore, the study of green finance to promote the transformation and upgrading of industrial structure and

realize the green development of China's economy has important theoretical value and rich practical significance.

The research of this project serves the construction of green financial system, guiding social funds to flow into green projects through green finance, breaking through the financial problems encountered in the process of green production, and then cultivating new green products, creating a new source of power for economic growth, promoting the green upgrading of China's industries, realizing the transformation of the traditional crude and consumptive mode of economic growth into an innovation-driven mode of green economic growth, and promoting the high-quality growth of regional economy. The regional economic growth is of high quality.

2. Literature Review

2.1. Current Status of Overseas Research

Cowan (1999) points out that green finance is concerned with the theme of mutual promotion, integration and development of economic development and environmental protection. That is, green finance not only includes economics but also finance and environmental protection, which belongs to the cross-discipline. Climent (2011) and Roopa (2013) in their articles explaining green finance believe that the implementation of green finance is to take ecological protection and energy saving and efficiency as the goal, and to incorporate the ecological factors into the investment and financing decision-making and daily business, with the effective support of the management policy, thus guiding the resources of the society to be invested in the direction of ecological protection and sustainable development. operations, thereby directing society's resources toward ecological protection and sustainable development. Linda (2015) argues that green startups contribute to the transition to a more sustainable economy by developing sustainable and environmentally friendly innovations and bringing them to market. However, due to specific product characteristics, entrepreneurial motivations and company strategies that may be different from other startups, these companies may find it difficult to obtain financing in the early stages and therefore need to be supported by the government's development of green finance operations.

2.2. Current Status of Domestic Research

An Wei (2008) believes that green finance is a financial management policy implemented to achieve the goals of energy conservation, emission reduction and sustainable development, and Wang Jiang (2016) elaborates the connotation of green finance into two aspects, one of which refers to the investment and financing behaviors implemented by financial institutions for external partners to promote energy conservation and consumption reduction, and the other refers to the internal green management and environmental protection methods. Ma Jun (2015) summarized the core elements of green finance development from the levels of institution building, guidelines and policies, infrastructure and legal mechanisms. Du Li and Han Lina (2010) analyzed the main factors affecting the development of green finance in depth from the micro, meso and macro perspectives, respectively. Niu Haipeng et al. (2020) assessed the implementation effect of green credit policy from the perspective of debt financing by using the double difference method, and the results showed that the green credit policy significantly improved the financing convenience of green listed companies and enhanced the credit support for green listed companies, but the impact of the green credit policy on the cost of financing was not obvious.

On the whole, domestic and foreign scholars' research on the impact of green finance on economic growth is getting deeper and deeper, and a series of conclusions have been drawn, which bring corresponding reference value to the research of this project. However, there are

some shortcomings in the above studies: the scholars' studies are mostly qualitative analysis and less quantitative research. In terms of research methodology, researchers at the end of the last century and the beginning of this century conducted empirical analyses within the framework of time series analysis, and most of the methods used were unit root theory, cointegration theory, etc.; however, the above studies were carried out within the framework of linear models. From the perspective of research data, the vast majority of scholars use macro data to analyze the literature, and fewer apply micro data research.

Therefore, this project pays attention to combining qualitative and quantitative analysis in the research process, combining linear and non-linear research methods in the empirical analysis, and using both macro data at the national, provincial and municipal levels and micro data at the enterprise level in the empirical research. We try to make the empirical analysis more reliable and the normative analysis more profound.

3. Theoretical Exploration of Green Finance for High-quality Economic Development

3.1. Green Finance

Green finance refers to the financial services provided for investment and financing, project operation and risk management in the fields of environmental protection, energy conservation, clean energy, green transportation and green buildings, etc., in order to support economic activities that improve the environment, respond to climate change and conserve and efficiently utilize resources. It aims to guide social capital into the relevant fields, realize the efficient use of resources, improve the level of environmental governance, promote high-quality economic development, and achieve the goal of "double carbon".

With the continuous practice of green finance, the concept of green finance has only emerged, enriched, improved and accurate. According to combing the definitions of green finance at home and abroad, it is found that scholars at home and abroad define the definition of green finance mostly from two perspectives, one is based on the essence of green finance and the other is based on the function of green finance.

3.2. High-quality Economic Development

High-quality economic development refers to the development mode that can better meet the people's growing needs for a better life, the growth mode of an innovation-driven economy, the growth mode in which the smart economy takes the lead, high value-addedness is at the core, quality takes the lead over quantity, and the GDP is free of water, so that the total economic volume can become the effective total economic volume, and it can push the industry to upgrade continuously, and push the construction of the economy, politics, culture, society, and the building of ecological civilization to develop in a comprehensive and sustainable manner in all five aspects. The growth mode of the five-pronged construction of economic, political, cultural, social and ecological civilization is a comprehensive and sustainable development.

High-quality economic development is an essential feature of the modernized economic system and the fundamental goal of supply-side structural reform. It has such essential features as innovation, regeneration, ecology, refinement and high efficiency, and realizes the unity of growth and development, and the unity of growth mode and development model.

In high-quality economic development, innovation is the core driving force that can promote industrial upgrading and economic transformation. At the same time, increasing total factor productivity, enhancing the resilience and security of the industrial chain supply chain, and promoting urban-rural integration and coordinated regional development are also key to realizing high-quality economic development.

In addition, high-quality economic development also requires adherence to the new development concept, the direction of reform of the socialist market economy, high-level opening up to the outside world, and accelerating the construction of a new development pattern that is dominated by the domestic macrocycle and mutually reinforcing by the domestic and international double cycle.

Achieving high-quality economic development also involves not only improving the quality of economic growth, but also optimizing the level of multidimensional development in terms of people's livelihoods, resources and the environment, the level of welfare, the industrial structure and the narrowing of the regional development gap. High-quality economic development is also a comprehensive manifestation of maintaining stable economic growth, continuous optimization of economic structure, improvement of people's livelihood and welfare level, improvement of environmental quality, and improvement of resource allocation efficiency. Therefore, this paper is based on the new development concept to understand the core connotation of high-quality economic development. That is, high-quality economic development is a high-demand, high-level economic development concept that takes innovation as the driving force, coordinated development as the goal, green development as the universal form, open development as the necessary path, and shared development as the purpose.

3.3. Mechanisms of Green Finance for High-quality Economic Development

3.3.1. Green Finance for Innovative Development

In the theory of endogenous economic growth, the improvement of technological level is an important factor in promoting the realization of sustained economic growth. It can be seen that innovation is an important driving force for the continuous development of the economy and society. Under the model of high-quality economic development, innovation serves as a driving force to continuously improve the quality of economic growth and realize the transformation of old kinetic energy into new kinetic energy.

Green finance provides funds for the energy-saving and environmental protection industry through green financial instruments, encourages energy-saving and environmental protection enterprises to continue to implement technological innovation, and increases the costs of high-polluting industries by making the environmental costs of such industries visible, thereby promoting the technological innovation activities of such enterprises. In addition, since technological innovation requires a large amount of capital investment in the research and development stage, green financial tools such as green credit and green funds can both obtain funds and reduce the liquidity risk of funds. Green finance encourages technological innovation by broadening financing paths, information processing functions and risk management functions, and realizes high-quality economic development.

3.3.2. Green Finance for Coordinated Development

Based on the understanding of realizing high-quality economic development under the new development concept, it is inevitable to adjust and optimize the industrial structure to achieve coordinated economic development. One of the characteristics of green finance is that through the fund-oriented mechanism, industry integration mechanism and policy-oriented mechanism, the use of financial instruments to guide funds to invest in green projects with positive externalities on the environment, gradually transfer the focus of industrial development from the "two high and one leftover" industries to energy-saving and environmental protection industries, thus curbing the blind expansion of the "two high and one leftover" industries and realizing the blind expansion of the industrial structure, as well as the development of the industrial structure. Gradually shift the focus of industrial development from the "two high and one leftover" industries to energy-saving and environmental protection industries, so as to curb

the blind expansion of the "two high and one leftover" industries, realize the green transformation of the industrial structure, and guarantee the quality of economic development.

3.3.3. Green Finance for Green Development

Among the basic connotations of high-quality economic development, its inherent requirement lies in the realization of green development. This requires that the restoration and protection of the ecological environment be emphasized on the basis of ensuring the economic growth rate. Green finance, as a new industry in the process of financial development, pays more attention to the impact on the ecological environment in the process of development, reduces energy consumption and pollutant emissions in the process of ensuring economic growth, realizes the win-win situation of ecological construction and economic construction, and improves the quality of economic development.

3.3.4. Green Finance for Open Development

High-quality economic development implies a higher level and deeper openness to development. In the theory of financial deepening, financial openness can enhance the efficiency of the financial system of developing countries, promote the accumulation of capital, complete the perfect combination of capital and technology and realize the goal of economic growth. The supporting effect of finance on economic development is not only reflected in the scale, efficiency and structure, but also in the deep opening of finance. Under the economic development model aiming at improving the quality of economic development, high-level financial openness is not only an inevitable requirement for improving the quality level of economic development, but also an important driving force. As green finance in the development process focuses on the impact on the ecological environment, can realize the green development of the economy, is the future development trend. Although the domestic implementation of green finance started to develop a relatively short period of time, but China's green finance has formed a relatively perfect system, can effectively guide, encourage the development of green finance.

Financial institutions have increased their efforts to develop green finance. With the establishment of China's green financial market system, the guiding role of financial institutions has been strengthened to actively participate in the green financial market. Green finance, as a new financial development model incorporating the concept of sustainable development, can influence the open development of the economy through technological innovation effects and investment effects.

4. Empirical Analysis of the Impact Effect of Green Finance on Economic Growth

4.1. Modeling

$$y_{it} = \alpha_0 + \beta X_{it} + \alpha_1 control_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

where i denotes the provinces and cities, t denotes the year, and y_{it} is the explanatory variable, denoting the natural logarithm of the real GDP of the region. X_{it} is the explanatory variable, indicating the level of green finance development in each province. $control_{it}$ is the control variable. μ_i is the individual effect, and δ_t is the time effect, and ε_{it} is the random error term.

Table 1. Green finance development evaluation indicators

Level 1 indicators	Secondary indicators	style of measurement	causality
green investment	Percentage of investment in combating environmental pollution	Investment in combating environmental pollution/GDP	Positive indicators
	Percentage of expenditure on energy conservation and environmental protection	Fiscal expenditure on energy-saving and environmental protection industry/total fiscal expenditure	Positive indicators
Green Securities	Market capitalization share of environmental protection companies	Gross output value of environmental protection enterprises/total A-share market capitalization	Positive indicators
	Percentage of market capitalization of energy-intensive industries	Gross output value of energy-consuming industries/total market capitalization of A-shares	Negative indicators
green credit	Scale of credit for environmentally friendly enterprises	Loan amount for environmental protection enterprises	Positive indicators
	Percentage of interest expenses in energy-intensive industries	Interest Expenditures of the Six Major Energy-Consuming Industries/Interest Expenditures of Industrial Industries	Negative indicators
green insurance	Agricultural insurance scale share	Agricultural insurance expenditure/total insurance expenditure	Positive indicators
	Agricultural insurance payout ratio	Agricultural insurance expenditure/income from agricultural insurance	Positive indicators
carbon finance	Carbon loan intensity	Loan balance/carbon emissions	Positive indicators

4.2. Selection of Variables

4.2.1. Explained Variables

In this paper, the logarithm of the real value of the gross domestic product for the year, or $\ln(\text{gdp})$, is chosen to measure economic growth.

4.2.2. Explanatory Variables

The explanatory variable of this paper is the level of green financial development (gfi). The method of establishing a green financial indicator system is used to measure the level of green financial development, and the green financial indicator system shown in Table 1 is constructed from five aspects, namely, green investment, green securities, green credit, green insurance, and carbon finance, and then the entropy method is utilized to calculate the composite index.

4.2.3. Control Variables

Choose the level of economic openness OPEN (import and export trade volume/GDP), the fixed asset investment rate INV (fixed asset investment volume/GDP), the urbanization rate URBAN (number of urban population/total resident population at the end of the year), the employment situation (denoted by the unemployment rate U), and the level of the tax burden TAX (tax revenue/GDP).

4.3. Data Selection

In this paper, data from 30 provinces (excluding Tibet) in China from 2013 to 2020 are selected as samples for empirical analysis. The data on green investment, green bonds, green credit, green insurance and carbon finance are from the Wind database and provincial statistics.

Yearbook, gross regional product, import and export trade volume, unemployment rate and tax revenue from csmar database, fixed asset investment volume from China Macroeconomic Database, urban population and total resident population at the end of the year from National Bureau of Statistics.

4.4. Empirical Results

By constructing the assessment index system of green finance and economic high-quality development, we synthesize the comprehensive level of green finance development and the comprehensive index of economic high-quality development by using principal component analysis, and test the influence effect of green finance on economic high-quality development by using panel data. The research results show that in the comprehensive dimension, green finance enhances the comprehensive level of economic high-quality development, and its influence coefficient is 0.2814. In the sub-dimension, green finance promotes the green development of the economy, the optimization of the economic structure, and the innovative development of the economy, but inhibits the stable development of the economy, and the role of the efficient development of the economy is not significant.

In addition, through the double resource allocation optimization effect, green finance guides the flow of production factors and capital from "two high" enterprises to "green" enterprises, and from low-efficiency enterprises to high-efficiency enterprises, so as to realize the reconfiguration of capital and resources, improve the efficiency of resource use, optimize the industrial structure, and enhance environmental efficiency, and ultimately promote the high-quality development of the economy. Optimize industrial structure, enhance environmental efficiency, and ultimately promote high-quality economic development.

However, green finance has been better in improving the ecological environment, but it has yet to be strengthened in restructuring the economy and supporting green technologies. Meanwhile, green financial policies are not well matched with industrial development, which affects economic stability. In addition, green financial services have reduced the efficiency of economic development.

Therefore, the focus of green financial policy reforms to promote high-quality economic development is to establish a green financial performance assessment agency to evaluate the effectiveness of green financial activities in order to stabilize economic development; to formulate a list of green industry catalogs to optimize the economic structure driven by the development of green industries; and to encourage the main players of green financial services to promote green technological innovation, thereby facilitating the innovative development of the economy.

5. Green Finance for Economic Growth

Green finance can contribute to economic growth by supporting the development of areas such as environmental protection, energy conservation, clean energy, green transportation and green buildings. The following are some possible responses:

Increasing investment in green industries: The Government can encourage enterprises and financial institutions to invest funds in green industries, such as environmental protection, energy conservation and clean energy, by guiding the flow of funds and promoting the development of these industries. At the same time, increasing investment in green industries can also drive the development of related industrial chains and improve the quality and efficiency of economic growth.

Innovative green financial products and services: Financial institutions can innovate green financial products and services, such as green bonds, green funds and green insurance, to meet the needs of different green industries. At the same time, financial institutions can also provide

professional financial consulting services to help enterprises improve their environmental awareness and risk management capabilities.

Strengthening policy support and regulation: Governments can introduce relevant policies and regulations to encourage and support the development of green finance. For example, it can provide policy support such as tax incentives and financial subsidies for green financial products and services, and at the same time strengthen the supervision of green finance to ensure its compliance and risk controllability.

Strengthening international cooperation: China can strengthen cooperation with other countries to jointly promote the development of green finance. By strengthening international cooperation, it can introduce advanced green finance concepts and technologies and improve China's competitiveness in the international green finance market.

Cultivate green financial talents: the development of green finance requires a large number of professionals, the government and enterprises can strengthen the training and introduction, to cultivate a high-quality, specialized green financial talent team, to provide talent security for the development of green finance.

In short, green finance can promote economic growth and achieve sustainable economic and social development through countermeasures such as supporting green industries, innovating financial products and services, strengthening policy support and regulation, enhancing international cooperation, and cultivating green financial talents.

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