The Impact of Green Finance on Carbon Emission Reduction under the "Dual Carbon" Goals

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Abstract. Since the Industrial Revolution, environmental challenges stemming from social development have escalated into a pressing global challenge. To address this crisis, green finance has emerged as an innovative financial tool designed to channel funds into low-carbon and eco-friendly sectors, thereby effectively curbing the rise in carbon emissions. This paper investigates how green finance stimulates capital investment in carbon emission reduction efforts, how carbon markets manage emission quotas across various economies, the broad societal attention, and the proactive implementation of carbon reduction policies by governments. The study elucidates the operation and impact of these mechanisms in controlling and guiding carbon emission reductions. Furthermore, this paper puts forward strategic solutions and recommendations to optimize the green finance ecosystem and bolster its impact on carbon emission reduction. Through detailed analysis and strategic recommendations, this paper seeks to provide theoretical underpinnings and practical guidance for the healthy development of green finance and the achievement of global carbon reduction targets.

Keywords: Green finance; carbon emission mechanism; carbon emission reduction.

1. Introduction

Since the Industrial Revolution, technological advances have significantly improved people's lives. However, rapid technological advances have also brought negative impacts to society, particularly with energy, which has led to ecological pollution. The increasing frequency of extreme weather events and meteorological disasters in recent years has served as a stark reminder of the escalating ecological and environmental issues. To address these crises, national governments and the United Nations are actively pursuing sustainable development strategies for human society. Against this backdrop, 196 countries jointly signed the Paris Agreement, which was dedicated to addressing climate challenges and preserving ecological balance. Green finance refers to economic activities aimed at conserving energy and protecting the environment by enhancing the environment, combating climate change, and efficiently allocating resources. As a critical strategy for achieving the "dual carbon" goal, the development of green finance has played a significant role in reducing carbon dioxide emissions. Studies have shown that green finance can channel funds towards green and clean industries, fostering the growth of high-tech and low-carbon sectors while compelling non-environmentally friendly, high-polluting industries to reform or exit the market via its intermediary effects through the rationalization and advancement of industrial structures, and the transformation of energy consumption. This facilitates the transformation and development of entire social industries, enhances social development efficiency, lowers economic development costs, reduces carbon dioxide emissions, and promotes high-quality, low-carbon societal development. Additionally, green finance can significantly decrease regional carbon emission intensity, with a more pronounced effect in the eastern regions. This demonstrates that the development of green finance not only supports a reduction in overall carbon emissions but also shows differentiated emission reduction effects at the regional level. Green finance aims to direct social capital towards low-carbon, environmental protection, and sustainable development through the rational allocation of financial resources, thus achieving the dual goals of economic growth and environmental protection. Particularly with China's "dual carbon" goals—aiming to peak carbon emissions by 2030 and achieve carbon neutrality by 2060—the significance of green finance is further underscored.

This article aims to explore the impact of green finance on carbon reduction in achieving the "dual carbon" goal. The existing literature summarizes the carbon reduction effect of green finance, the support mechanism of green finance, how the government plays a policy guidance mechanism in green finance, and how it regulates the market of green finance. From the standards and policy system of green finance, funding and financing, product and service types, professional talents and available information, international attitudes towards green finance, and regional aspects, study the shortcomings and difficulties faced by current green finance and provide suggestions. This article will classify and analyze relevant literature from the perspectives of themes, methods, and viewpoints to provide reference and inspiration for future research.

2. Mechanism Analysis of Green Finance on Carbon Emission Reduction Effect

A comprehensive review of the literature on the carbon reduction impact of green finance within the context of realizing the dual carbon goals indicates that green finance, serving as a vital bridge between capital and the "dual carbon" objectives, fulfills a significant role in advancing high-quality economic growth and advanced ecological and environmental development. Through an examination of the discoveries from various research studies, this paper identifies the primary mechanisms and determinants of green finance's influence on carbon reduction.

2.1. Financial Support Mechanism

With the deepening global understanding of green development, the demand for green development investment and financing is growing at an unprecedented rate. Experts suggest that it could reach tens of trillions of dollars in the next ten years. Green finance has played a massive role in driving green investment. The main behaviors of green finance include green capital investment, which mainly covers the fields of circular economy, ecological economy, and low-carbon economy. Due to China's active implementation of green finance pilot policies, while promoting the low-carbon economic activities of enterprises, China has also introduced funds from the whole society into green and low-carbon industries [1]. A large amount of funds has flooded into the green finance market, and the low-carbon industrialization of industries in pilot areas can be more perfectly combined to stimulate the role of carbon reduction further. Financial support and mechanism guarantees have accelerated green technology innovation, and the rise of low-carbon industrialization investment has increased the demand for green investment. The widespread use of new energy has improved energy efficiency, thereby achieving low carbon emissions in China's major carbon source industries.

2.2. Policy Guidance Mechanism

Against the backdrop of green finance becoming a global consensus, China has actively launched a series of related financial policies and proposed the "dual carbon" goal. Policies can relatively reflect the current level of social attention to green finance. The emergence of green finance has promoted emerging green finance products and green credit methods in various fields, and society's attention to green finance continues to rise while the government's attention has also increased. Recently, the number of policy publications on green finance in China has shown explosive growth [2]. Financial policy, as a forward-looking and directional policy tool, plays a crucial guiding role in the development of green finance. It not only points out the development direction for green finance but also profoundly penetrates multiple vital areas such as energy, transportation, and industry through a series of specific measures, ensuring that green finance can be effectively implemented and continue to play a role in these areas. The formulation and implementation of financial policies have built a comprehensive and multi-level support system for green finance, helping it become an essential force in promoting economic green and low-carbon transformation.

The information on low-carbon policies related to finance is also constantly improving, from "energy conservation and emission reduction" to "low-carbon" to "dual carbon." The theme of low-carbon development is gradually refining, and the system is becoming more mature. The focus of financial policy has steadily deepened, and its emphasis has undergone a significant transformation process. Initially, financial policies focused on encouraging enterprises to achieve energy conservation and emission reduction in traditional industries such as steel, coal, and electricity through technological innovation to improve energy efficiency and reduce environmental pollution [3]. Subsequently, the focus of the policy gradually expanded to the level of adjusting the energy structure and is committed to building a safe, low-carbon, and efficient energy system to promote the optimization and upgrading of the energy structure and sustainable development.

2.3. Market Regulation Mechanism

The investment demand for China's low-carbon industry is high, and green finance can use the carbon trading market to make up for its funding gap. The carbon trading market relies on reallocating carbon emission quotas to guide companies in reducing environmental pollution. Since the formation of China's carbon market in 2011, it has also helped companies achieve carbon reduction targets through technological innovation and incentivized them to reduce emissions through financial rewards. At present, the carbon trading market has become an essential platform for countries to achieve carbon neutrality. Each country has improved its carbon emission trading system through the carbon emission trading market in a fixed total amount and controlled variables. The flexible quota system helps different countries better adapt to the carbon market and the social context of striving for environmental protection. The carbon emission market's free allocation of quotas to enterprises in the early stages of operation also encourages more enterprises to enter the carbon market and actively participate in green environmental protection activities to control carbon emissions and achieve carbon reduction in the later stage [4].

3. Recommendation

Under the dual carbon target, based on the current problems faced by China's carbon trading market, this article will provide development suggestions from the perspectives of improving the rules and regulations for green development, strengthening the guiding role of green finance in industrial structure, promoting green technology innovation, and improving the development system of green finance

3.1. Improve the Rules and Regulations for the Development of Green Finance

To improve the regulations and systems for the development of green finance, the government needs first to increase policy support for green finance, introduce corresponding green finance policies, leverage the subsidy and incentive role of the government in green finance and low-carbon projects, and strengthen the coordination between green finance policies and industrial policies. The government should develop different standards for different projects, strictly control funding support for high-polluting industries, and increase transaction costs for high energy-consuming enterprises. At the same time, the government needs to increase loan support for enterprises in the field of green environmental protection and reduce the cost of green products.

Secondly, the legal department should strengthen legislation and supervision related to green finance, gradually establish and improve laws and regulations related to green finance, constrain the behavior of banks and enterprises from a legal perspective, and ensure the orderly development of green finance business. Sound laws and regulations can provide the effective implementation of green finance policies and guide funds toward projects with low resource consumption. In addition, the government needs to pay attention to the development of green finance infrastructure, encourage financial institutions to actively respond to the call, ensure the effective allocation of green finance resources, and promote the effective implementation of carbon reduction and green finance projects.

Finally, regulatory authorities should establish relevant information disclosure systems, improve the green finance regulatory system, form a standardized and transparent green finance regulatory and corporate environmental pollution information disclosure system, and increase the punishment for environmental pollution violations. The supervisory department should strengthen relevant supervision to avoid the risk problems caused by the rapid development of various green financial instruments. In terms of information disclosure, the symmetry of information between both parties is improved, transaction costs are reduced, and the return rate of green finance is increased [5].

3.2. Strengthening the Guiding Role of Green Finance in Industrial Structure

Firstly, the government should promote the integration of the corporate finance industry. The government should provide financing support for the development of clean energy, low pollution, and low emission enterprises, as well as increase the utilization rate of resources and energy. At the same time, the government can rely on the information platform to collect information such as up and down information flow and capital flow of the industry through the Internet, big data, AI intelligence, and other technologies, and then conduct integration and processing to improve the chain information, ensure information symmetry between buyers and sellers, and achieve precision marketing. To simplify online transaction procedures and promote the integration of industrial chain finance and technology finance.

Secondly, people need to strengthen international cooperation in the financial industry. Based on the advantageous resources of each region, achieve a professional and refined division of labor, jointly build a global economic network, and realize the integration of the financial industry internationally. The government should provide one-on-one assistance to green industries to alleviate the financial pressure on enterprises, provide financial support for environmental protection enterprises, and encourage more green enterprises to raise funds. At the same time, absorbing the successful experience of foreign enterprises, integrating industries with multinational corporations, promoting industrial structure upgrading, and ultimately promoting carbon emissions reduction.

This strategy not only helps optimize China's industrial structure but also reduces carbon dioxide emissions while ensuring the country's economic development and promoting the economy's transition to green and low-carbon. Green finance, as an extension of traditional financial theory and a bold innovation in the financial field, closely links financial development with industrial structure upgrading, representing a new face and trend for the future of the financial industry. Green finance can promote the optimization and upgrading of industrial structure, but to a certain extent, technological innovation plays a reverse regulatory role. The promoting effect of green finance on industrial upgrading is mainly achieved through four mechanisms: policy guidance, capital flow, information transmission, and risk sharing. Using financial technology to broaden the scope of green financial services, supporting financial institutions to use digital technology to achieve quantitative and qualitative analysis of green enterprises and projects, more accurately evaluate the environmental benefits of green enterprises, and strengthen support for green enterprises. Green finance can achieve an effective allocation of financial resources through its value discovery function, leading funds to influence the development of green industries and the optimization and upgrading of industrial structures from two aspects.

3.3. Promote Green Technology Innovation

The strategies for promoting green technology innovation include strengthening environmental technology innovation and formulating policies for the diffusion of technology innovation. Firstly, financial institutions should play a role in green credit, support the development of low-carbon technologies, and not only focus on technological innovation for economic growth. Secondly, people should attach importance to the strength of universities and research institutes, increase investment in research and development in the field of low-carbon technology, encourage researchers to actively engage in technological innovation, and focus on building an integrated innovation technology platform of "industry-university research application." In addition, the government should promote the cross-regional flow of green funds and the diffusion of technological innovation, such as building cross-regional green finance pilot zones, joint research and development, and industrial division of labor. At the same time, people should attach importance to the development of green technology in enterprises, provide certain financial subsidies to environmental protection industries and low-carbon enterprises, and support them in building enterprises that integrate low-carbon technology and high-efficiency benefits. Through these measures, an atmosphere of low-carbon technological innovation can be created, making scientific research and innovation the driving force for carbon reduction.

3.4. Establish a Sound System for the Development of Green Finance

To build a comprehensive green information-sharing platform, it is necessary to develop a scientific, reasonable, comprehensive, and unified green finance indicator system and strengthen the acquisition and circulation of green finance information on this basis. The government, enterprises, and departments should strengthen direct information sharing, introduce third-party green finance evaluation institutions and data service institutions, and form a financial system for government department information disclosure, enterprise green environmental protection information disclosure, and third-party institution information sharing. For enterprises and projects with excellent green ratings, it is possible to consider reducing their financing costs and allowing more funds to be invested in green and low-carbon industries. In addition, green finance risk monitoring should be incorporated into the information platform to form a systematic and standardized risk monitoring mechanism.

Accelerating the construction of a unified national carbon trading market is another important direction. At present, China lacks a unified and effective national carbon trading market, and domestic financial institutions have insufficient participation in carbon financial services. There is a lack of support for various financial derivatives and services, such as carbon futures and options. In the future, people should steadily promote the construction of the national carbon market based on top-level design, reasonably plan quotas and trading mechanisms, and improve market liquidity. In the process of developing the carbon market, financial institutions are encouraged to innovate green financial services, promote green financing leasing, finance, trust, fund products related to carbon assets, and pledge financing of emission rights [6].

Through these measures, people can promote the development of green finance, support the transformation of green and low-carbon economies, and provide vital financial support for achieving the "dual carbon" goals.

4. Conclusion

Based on the comprehensive research results at home and abroad, the effect of the development of green finance on carbon emissions can be studied from three dimensions: funding, market, and policy support. This article explores a series of financial impacts brought about by specific green finance pilot experiments, explaining how funds flow and support low-carbon activities under the influence of green finance. It elucidates the guiding role and role of policy mechanisms under the influence of green finance from the mutual influence between green finance and government policies. At the same time, the operation mode of the carbon emission market generated by green finance demonstrates the effective control of carbon reduction under the influence of green finance.

However, there are still some unresolved issues, such as inconsistent standards, single products and services, high climate and environmental risks, and an urgent need to strengthen information disclosure and regulatory systems. The existence of these issues limits the in-depth development of green finance and the maximization of carbon reduction effects.

To overcome these challenges and further leverage the role of green finance in carbon reduction, it is recommended to take the following measures: firstly, the world needs to strengthen its understanding of green finance and continuously improve the green finance standard system. Secondly, green finance needs to enhance innovation in financial products and services further. Thirdly, the world needs to strengthen climate and environmental risk prevention and management and to improve information disclosure and regulatory systems. The fourth is that the government needs to introduce incentive financial policies actively. The fifth is that countries need to cultivate more green finance talents and promote international cooperation in green finance.

In summary, green finance has a significant impact on carbon reduction under the "dual carbon" target, but its development still faces a series of challenges. Through continuous efforts and policy support, the role of green finance in promoting carbon reduction and achieving sustainable development goals can be further leveraged.

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