Research on the Mechanism and Path of Green Finance Boosting Rural Revitalization

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Abstract. This paper examines the crucial role and mechanisms of green finance in promoting rural revitalization. It analyzes how green finance supports rural revitalization through four dimensions: capital allocation, industrial synergy, environmental benefits, and policy coordination. The paper then reviews the current state of green finance's contribution to rural revitalization in China, identifying bottlenecks and challenges. Finally, it proposes strategies to enhance the effectiveness of green finance by promoting innovation in products and services, optimizing resource allocation, refining evaluation and risk management, and strengthening policy guidance and incentives.

Keywords: green finance; Rural revitalization; Mechanism; path

1 Introduction

Since the 19th National Congress in 2017, the rural revitalization strategy has facilitated the development of 1 billion mu of high-standard farmland and achieved an annual growth rate exceeding 8% in rural per capita disposable income by 2023. Despite these achievements, severe resource and environmental constraints and urban-rural imbalances present significant challenges. Green finance, supporting activities like environmental improvement, climate change mitigation, and efficient resource use, is emerging as a crucial force for rural revitalization.

In recent years, there has been a gradual increase in research on green finance boosting rural revitalization. Wang Bo and Zheng Liansheng (2019) pointed out in the Study on the Mechanism and Path of Green Finance to Support Rural Revitalization that green finance can effectively help the implementation of rural revitalization strategy by mobilizing social capital to support rural green industries[1]. However, it still lacks the risk control of green financial products. Tian Hanbo (2023) emphasized in the Study on the Effect of Green Finance on Rural Revitalization in China that green finance is an important means to promote the green development and ecological livability of rural industries[2]. However, further improvement can be made in the implementation of green finance. Wen Peng (2023) pointed out in the Study on the Impact of Green Finance on Rural Revitalization -- Empirical Analysis Based on Dynamic GMM Model and analyzed the mechanism of green finance affecting rural revitaliza-

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tion on this basis, but the research on the possible problems in the practice and promotion process and financial supporting issues is still slightly insufficient[3]. Chen Yuhan emphasized in the Study on the Path of Green Finance to Help Rural Development that green finance can provide financial support, risk guarantee, and strategic guidance for rural agricultural development[4]. However, it can be further improved in terms of path adaptability.

As these studies demonstrate, the academic community has made significant progress in investigating how green finance can facilitate rural revitalization. However, existing research focuses mainly on the theoretical aspects of green finance, with limited attention to specific implementation pathways. Expanding research to cover both mechanisms and pathways is essential for effective operation across diverse regions and development stages. It is also crucial to explore how green finance can be integrated into rural revitalization efforts while considering regional disparities in resources and economic development. This paper delves deeper into the concrete mechanisms and pathways of green finance in promoting rural revitalization, focusing on financial product innovation, service model optimization, and policy support systems. The goal is to provide precise references for enhancing rural revitalization strategies and offer robust theoretical support and practical guidance for national rural development initiatives.

2 Mechanism Analysis of Green Finance to Boost Rural Revitalization

2.1 Fund Guidance Mechanism

Through the fund guidance mechanism, green finance has emerged as a critical force in promoting sustainable financial support for rural revitalization, significantly advancing green development in rural areas. Green financial instruments like green credit, green bonds, and green funds provide a continuous flow of low-cost, long-term capital to green industries and projects in rural regions. These instruments have successfully attracted substantial social capital, channeling investments into key sectors such as environmental protection, energy conservation, clean energy, and ecological agriculture. This influx of capital alleviates funding shortages and accelerates green industry development. Specifically, green credit facilitates accessible financing for small and micro rural enterprises, green bonds raise essential funds for large-scale green projects, and green funds offer long-term, stable financial support for green innovation projects.

Green finance encourages financial institutions and enterprises to prioritize environmental and social benefits in investment decisions through a robust risk management and incentive framework. This framework enables informed decisions by evaluating green attributes, environmental risks, and social impacts, leading to a preference for projects that offer both economic benefits and comply with environmental and social standards. In this way, green finance not only promotes the economic development of rural areas but also promotes their transformation to a greener and more sustainable direction[5]. The capital guidance mechanism markedly enhances rural capital efficiency, maximizing economic and social benefits from limited funds while strengthening rural economic development drivers. Supported by green finance, rural areas can optimize green resources to develop distinctive green industries, establishing a unique green economy. This generates significant economic benefits and lays a foundation for long-term sustainable development.

2.2 Environmental Benefit Mechanism

By establishing and reinforcing the environmental benefit mechanism, green finance provides a strong ecological safeguard for implementing the rural revitalization strategy, promoting economic and environmental harmony in rural areas. Leveraging its unique financing advantages, green finance significantly supports rural environmental protection and restoration efforts, including wastewater treatment, waste management, afforestation, wetland conservation, and other initiatives to improve the rural ecological environment. Through the intervention of green finance, these projects have been successfully promoted, which not only effectively solves the long-term environmental pollution problem in rural areas, but also greatly improves the living environment and quality of life of rural residents[6]. At the same time, the good ecological environment also enhances the ecological attraction of rural areas, provides unique natural conditions for the development of green industries such as rural tourism, leisure and vacation, and promotes the diversified development of rural economy.

Green finance is crucial for transitioning enterprises and farmers to sustainable practices by incentivizing resource conservation, recycling, and reducing chemical inputs. It promotes organic and ecological agriculture, reduces agricultural pollution, and supports the circular economy in rural areas, improving resource efficiency and generating economic and ecological benefits. This fosters sustainable rural development and increases the supply of eco-friendly products. Green finance also enables economic gains through green agriculture and eco-tourism, while strengthening environmental risk management to ensure rural ecological safety.

2.3 Policy Coordination Mechanism

Through coordinated policy efforts, green finance aligns with government initiatives to foster an optimal environment for rural revitalization. The government guides these policies and supports green finance in rural areas through subsidies for initial costs of green agricultural projects, tax incentives for green financial products, and credit support for stable funding. These measures reduce risks and increase attractiveness, encouraging market participation in rural green finance.

The government has strengthened supervisory and evaluation mechanisms to ensure compliance and effectiveness in green finance. A comprehensive framework oversees all stages of these projects, from approval to operation, preventing fund misuse and wastage. Regular assessments evaluate environmental, economic, and social impacts, ensuring genuine green development. This enhances project quality and efficiency, promoting long-term sustainability for rural revitalization. Policy coordination fosters partnerships between green finance and governmental policies, advancing the rural revitalization strategy. As policies evolve and the market matures, green finance will play an increasingly significant role in rural revitalization and sustainable rural economic development.

3 The Current Situation and Bottleneck of Green Finance in Promoting Rural Revitalization in China

3.1 The Current Situation of Green Finance Boosting Rural Revitalization in China

(1) Green Credit Support in Rural Revitalization and Development

Green credit constitutes a pivotal product in green finance. It is recognized as the earliest and fastest-growing product with comprehensive policy support in China's green finance sector. Green credit involves integrating environmental criteria into traditional lending activities. Specifically, banks must evaluate whether loan projects meet environmental standards, pollution control measures, and ecological protection requirements before approving loans. This ensures that only qualifying projects receive loan support and preferential interest rates, channeling credit funds towards environmentally friendly initiatives. As shown in Figure 1, China's green loan balance has consistently increased over recent years, with a compound annual growth rate of 15%. By the end of 2023, the green loan balance reached 15.9 trillion yuan, up by 3.95 trillion yuan from the previous year, marking a 33% year-on-year growth, positioning China as a global leader.

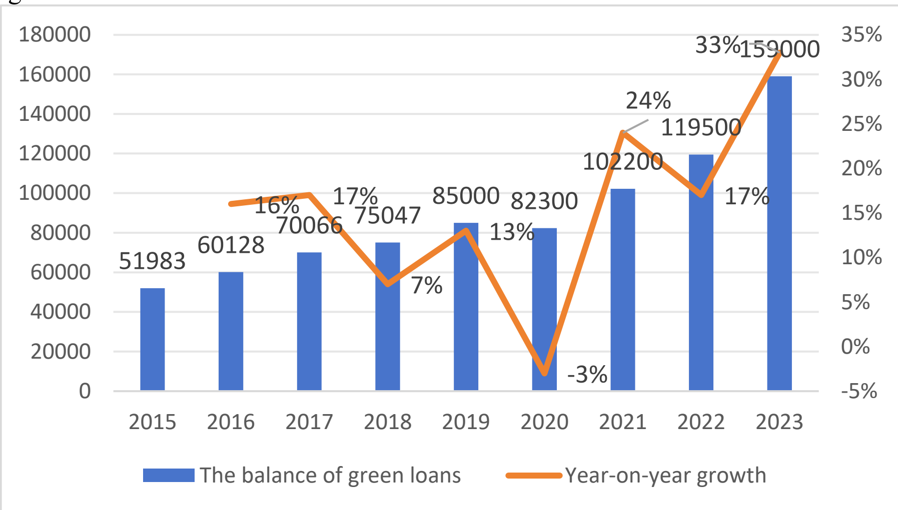

Fig. 1. Balance of green loans from 2015 to 2023

Green loan funds are primarily allocated to industries focused on green low-carbon initiatives, energy conservation, and environmental protection. According to the Green Industry Guidance Catalogue (2021 Edition), these sectors include green services, green infrastructure upgrades, clean energy, clean production, and ecological environment projects. In 2023, the largest recipients of green loans were green infrastructure upgrades, clean energy, and energy conservation and environmental protection, with outstanding balances of 7.4 trillion yuan, 4.21 trillion yuan, and 1.94 trillion yuan, respectively. These figures represent year-on-year increases of 28.3%, 31.7%, and 46.7%, accounting for 48%, 26%, and 13% of total green loans (Figure 2). Funding for rural construction, including green agriculture and forestry, rural ecological environment protection, and pollution prevention projects, is modest but steadily increasing. This trend indicates that under the rural revitalization policy, China is placing growing emphasis on green credit in rural development.

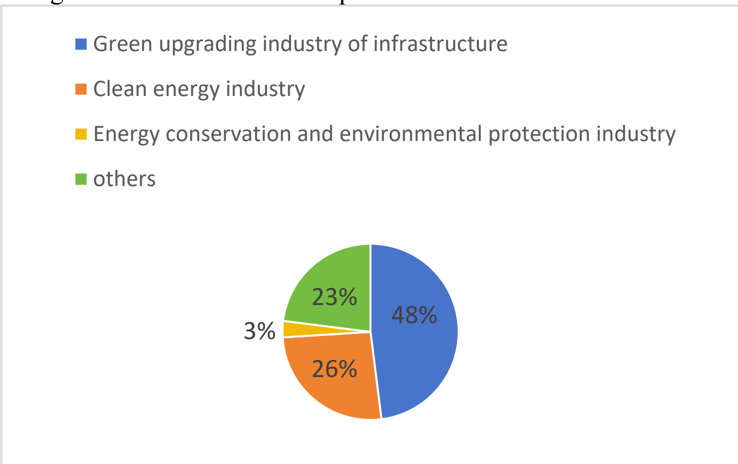

Fig. 2. Industrial orientation structure of green credit

(2) Green Insurance Support in Rural Revitalization Development

Green insurance is a vital part of the green financial system, offering essential financial support and risk protection for environmental conservation, green industries, and green energy. Initially, China's green insurance mainly focused on environmental pollution liability insurance. Over time, it has expanded to include catastrophe insurance, clean energy insurance, and green technology insurance. To meet regional needs, specialized products like agricultural catastrophe insurance, breeding industry environmental insurance, and meteorological index insurance have been developed, establishing robust risk management frameworks for agriculture. For example, forestry carbon sink index insurance in Xinluo District, Fujian Province, compensates for reduced carbon sink capacity and supports vegetation restoration. Green insurance operations encompass underwriting and investment.

From an underwriting perspective, insurance institutions have developed a variety of green insurance products to promote environmental sustainability and manage risks, providing comprehensive risk protection for agriculture. In recent years, the green insurance sector has steadily grown. Based on insurance amounts, it can be categorized into eight types: clean energy, green transportation, green building, green technology, catastrophe, green resources, environmental pollution insurance, and other green products. Notably, clean energy, catastrophe, and environmental pollution insurance are especially relevant to rural areas. Due to the lack of official data in these categories and because agricultural insurance directly supports farming, this study uses agricultural insurance data as a proxy to measure rural green insurance development. Insured and compensation amounts from 2015 to 2023 are shown in Figure 3.

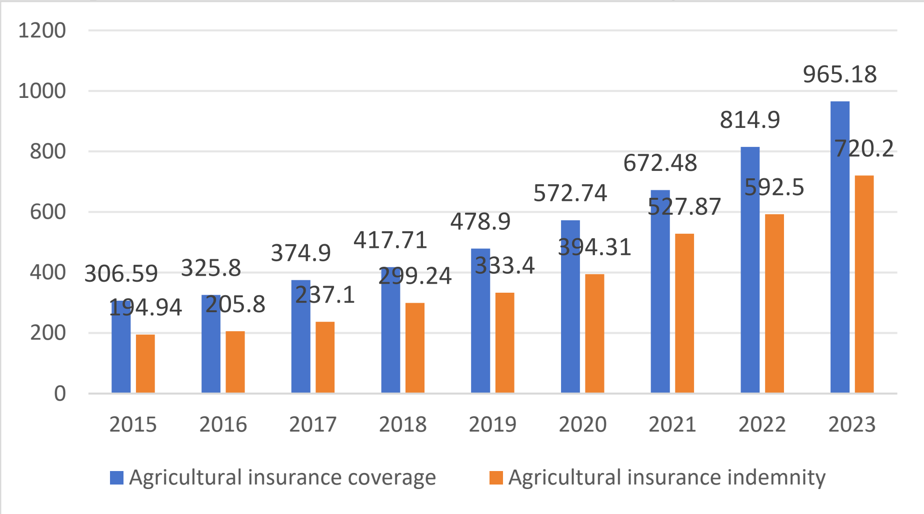

Fig. 3. Agricultural insurance coverage and compensation from 2015 to 2023

China's agricultural insurance insured and compensation amounts are increasing annually. In 2023, the insured amount reached 96.518 billion yuan, with a compensation amount of 72.02 billion yuan. Over nine years, agricultural insurance provided 492.92 billion yuan in coverage and paid out 30.5536 billion yuan in claims. Currently, China's agricultural insurance covers all agriculture, forestry, animal husbandry, and fishery sectors, including over 210 crop types such as major grains, oil crops, and live pigs. It protects 188 million rural households, significantly supporting national food security and rural revitalization.

(3) Green Bond Support in Rural Revitalization and Development

Green bonds are securities issued through legal procedures to finance green projects and industries that meet specific standards, with principal and interest repaid as agreed. Compared to traditional bonds, green bonds add stricter "green" criteria for fund usage, project evaluation, fund tracking, and disclosure. China's green bond market officially began in 2018 when Shanghai Pudong Development Bank issued the first green financial bond. From 2018 to 2023, the scale and quantity of green bond issuances in China are shown in Figure 4. The recently introduced green bond projects align with rural green initiatives under the rural revitalization strategy, enhancing green bond support for rural development. Since the 19th CPC National Congress report introduced the rural revitalization strategy, relevant departments have launched rural revitalization bonds to channel funds into rural areas, prioritizing infrastructure, agricultural modernization, and increasing farmer income. By mid-2023, China had issued 177 rural revitalization bonds, raising 729.598 billion yuan for agricultural modernization, base operations, sewage network improvements, smart energy facilities, poverty alleviation consolidation, and public service system construction

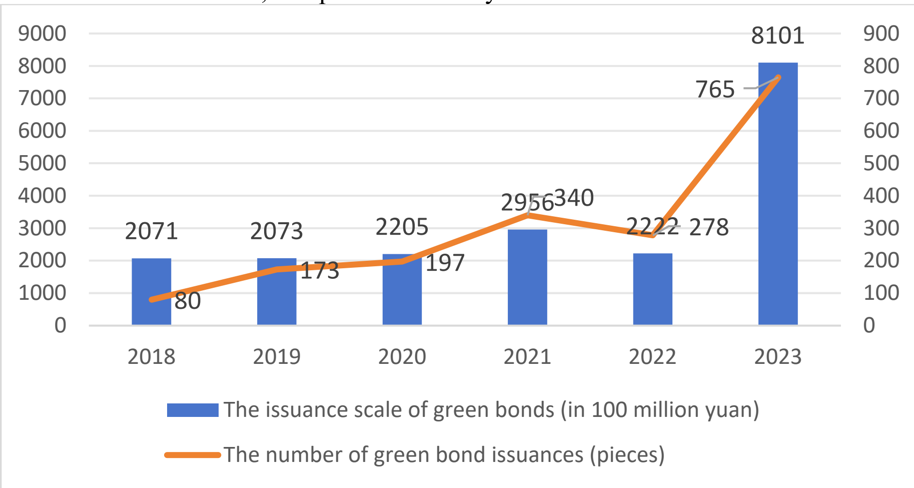

Fig. 4. Scale and number of green bonds issued from 2018 to 2023

China's green finance has significantly boosted rural revitalization. Green credit has steadily increased investment in rural projects, providing robust financial support. Innovative agricultural insurance products have enhanced the green insurance system, offering comprehensive risk protection for agriculture and supporting food security and rural development. The green bond market has expanded, with more issuances and a wider range of supported projects, aligning with the rural revitalization strategy and injecting new vitality into rural areas. Rural revitalization bonds have guided investments in infrastructure, agricultural modernization, and farmer income projects. In summary, green finance plays a crucial role in rural revitalization and will continue to do so as policies improve and the market matures.

3.2 Bottlenecks of China's Green Finance in Boosting Rural Revitalization

(1) Insufficient Innovation of Green Financial Products and Services

Currently, China's green financial products and services are primarily concentrated in traditional sectors like credit, insurance, and bonds. While these support the green economy to some extent, there is a lack of innovative products tailored for rural revitalization. Rural revitalization requires diversified and flexible green financial solutions to address financing and risk management needs across agricultural modernization, infrastructure development, and environmental protection. However, the market lacks customized green financial products suited to rural areas and farmers, limiting the application of green finance in rural regions. Additionally, awareness and acceptance of green finance in rural areas need improvement, as some farmers lack understanding of its concept, role, and application process.

(2) Green Project Evaluation and Risk Management are Difficult

Rural revitalization initiatives frequently cover agriculture and ecology, among other sectors. Assessing the environmental and economic benefits of these projects is complex, posing significant challenges for evaluating and managing green finance projects. Agricultural ventures face uncertainties from natural conditions and market volatility, leading to unpredictable outcomes and risks. Ecological projects, characterized by their long-term nature and public welfare focus, often yield environmental benefits that are hard to quantify and monetize directly. This complicates the evaluation and management of green projects. Additionally, rural projects carry high risks due to a lack of effective risk management tools, further hindering the implementation of green finance projects in rural areas.

(3) Imperfect Policy Guidance and Incentive Mechanism

Despite the government's introduction of policies to support green finance and rural revitalization, significant shortcomings remain in policy synergy and incentive mechanisms. Firstly, ineffective coordination among policies hinders their full effectiveness. Secondly, insufficiently comprehensive incentives limit financial institutions' motivation for green finance projects aimed at rural revitalization. Financial institutions often face high costs and risks in these projects, while government support is limited, leading them to potentially avoid such projects after a cost-benefit analysis.

4 Discussion on the Path of Green Finance to Boost Rural Revitalization

4.1 Strengthen Innovation in Green Financial Products and Services

To effectively address the specific requirements of rural revitalization, it is imperative to innovate green financial products and services. Rural revitalization encompasses agricultural modernization, infrastructure development, and environmental protection, each with unique demands for green finance. Financial institutions should research rural markets and farmers' needs and develop tailored green financial solutions. For example, specialized loans for agricultural green transformation or insurance products for environmental protection could be introduced. It is also crucial to integrate green finance with technology, using big data and AI to enhance accessibility and coverage. Technology can accurately identify financing needs, optimize service processes, reduce costs, and ensure green finance benefits rural regions and inhabitants.

4.2 Improve the Evaluation and Risk Management Mechanism for Green Projects

To ensure effective implementation of green finance initiatives in rural revitalization, it is imperative to establish a robust evaluation framework that comprehensively assesses environmental, economic, and social benefits. This requires focusing on both economic returns and thoroughly evaluating environmental impacts and social contributions, ensuring alignment with sustainable development principles. Advanced risk management tools should be introduced to enhance risk management capabilities. By establishing and refining early warning mechanisms and strengthening risk monitoring, potential risks can be identified and mitigated promptly, ensuring sound project operation. Collaboration with local governments and industry associations should be strengthened to build a risk prevention system and foster a cooperative mechanism for risk and benefit sharing.

4.3 Improve Policy Guidance and Incentive Mechanisms

In order to give full play to the role of green finance in rural revitalization, we must improve policy guidance and incentive mechanisms. The government should strengthen the synergy between policies to ensure the synergy between policies in supporting green finance and rural revitalization. This includes policy coordination and cooperation in fiscal, taxation and finance, so as to form a policy superposition effect. At the same time, we need to establish and improve incentive mechanisms to motivate financial institutions to participate in green finance projects for rural revitalization through financial subsidies, tax incentives, credit support and other measures. This can not only reduce the participation cost of financial institutions, but also improve their income expectations from participating in green projects, thus attracting more financial resources to the field of rural revitalization. In addition, supervision and evaluation should be strengthened to ensure the compliance and effectiveness of green finance projects. By establishing a sound regulatory mechanism and strengthening project evaluation and tracking management, we can prevent the misuse and waste of funds and ensure that green finance projects are truly effective.

5 Conclusions

As a pivotal force for rural revitalization, green finance plays a critical role through capital guidance, industrial integration, environmental benefits, and policy coordination. Despite progress, several bottlenecks persist in China's rural revitalization efforts. Close collaboration among the government, financial institutions, and society is essential to unlock green finance's full potential. This includes enhancing product and service innovation, optimizing resource allocation, refining evaluation and risk management, and improving policy guidance and incentives. As green finance matures, its contributions to rural revitalization and China's agricultural modernization will become increasingly significant.

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