



From Policy to Practice: Assessing the Impact of Green Finance Innovation in China

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Abstract. The escalating impacts of climate change have significantly influenced global financial market dynamics. Recognizing this challenge, China has strategically adopted eco-financial mechanisms as a policy response. These innovative financial instruments encompass environmentally focused banking services, climate-aligned securities, sustainable investment vehicles, ecological risk management products, emissions trading systems, environmentally responsible trust services, and eco-friendly leasing arrangements. Unlike conventional financial models, these sustainable financial approaches better align with contemporary societal progress and effectively address the pressing issue of worldwide environmental transformation. Through systematic evaluation, Chinese policymakers have identified eco-financial strategies as crucial components of long-term economic sustainability, with these mechanisms demonstrating substantial influence in maintaining equilibrium within the nation's economic systems. This study examines the evolution of China's sustainable financial system through various analytical frameworks, including environmental-social-governance metrics, climate-related risk coverage, and environmentally conscious lending practices. Furthermore, it provides an integrated assessment of how these ecological financial instruments have contributed to national economic growth indicators. While China has made progressive refinements to its sustainable financial regulations, certain limitations persist, including regulatory oversight gaps, elevated sector uncertainties, and limited participation from individual investors. The present research primarily investigates the role of ecological finance in China's economic systems, along with the ongoing advancements in its sustainable financial methodologies.

Keywords: Green Finance, Green Finance Policies, financial markets.

1 Introduction

With the intensification of global climate change and environmental pollution, there is a shortage of rare resources, countries around the world are increasingly concerned about environmental issues and investing more resources in environmental governance. Green innovation is considered an effective way to address environmental issues, as it can achieve a win-win situation for both environmental and economic benefits. Existing literature has mainly explored the influencing factors of green innovation from both

internal and external perspectives, including corporate governance, government subsidies, credit policy, etc. Among the many factors that affect green innovation, financial support plays an important role.

Sustainable finance differs significantly from traditional financial systems by placing a stronger focus on ecological management and ensuring long-term environmental sustainability. This unique financial strategy involves the use of capital allocation methods aimed at achieving favorable ecological outcomes and reducing environmental risks. Current academic studies in this area have mainly explored two crucial aspects: the numerical evaluation of sustainable financial tools and their macroeconomic consequences. For corporate environmental innovation, reliable funding mechanisms are essential, since technological progress in this area is a vital route for alleviating climate change [1].

In the context of sustainable finance, alternative debt tools like restricted environmental bonds allow companies to raise capital via private offerings, often using real estate as collateral. In the U.S. residential market, environmentally friendly home loans are another financing choice, although currently they are only available to borrowers with a history of conventional mortgages. These specialized lending products support the implementation of clean energy technologies, such as photovoltaic systems, which may lead to substantial cost savings for homeowners. Conventional mortgage products might include early repayment options, which can later make borrowers eligible for interest-free environmental financing alternatives. The expected return for investors in these instruments usually falls within the range of 1-5%, depending on factors like risk exposure, guarantee agreements, and the quality of assets [2].

Accordingly, China has introduced environmentally focused lending mechanisms and sustainability-linked securities as part of its eco-financial reform initiatives, while also publishing specialized documentation to outline future strategic directions. This study systematically examines the progression of China's sustainable financial regulations from conceptual formulation to practical implementation, with the objective of assessing the multifaceted consequences arising from these financial innovations. These effects include, but are not limited to, stimulating growth in environmentally sustainable sectors and facilitating the conservation and rehabilitation of natural ecosystems.

2 Overview of Green Finance

As the word implies, Green Finance relates to the investments that help improve the environment/climate. This includes the actions by the private and public entities, including banks, governments, companies, non-profit organizations, and others. This finance includes all types of actions and initiatives, such as developing, implementing, and promoting projects that can have sustainable impacts or sustainable business models. Along with making funds available for green projects, another objective of green financing is to reduce risk perceptions for green projects.

In essence, green finance encompasses all organized monetary operations aimed at fostering environmental benefits. This includes various financial mechanisms such as

credit facilities, capital allocations, and other monetary tools. More specifically, it applies when funds generated through financial products are allocated toward environmentally sustainable projects [3].

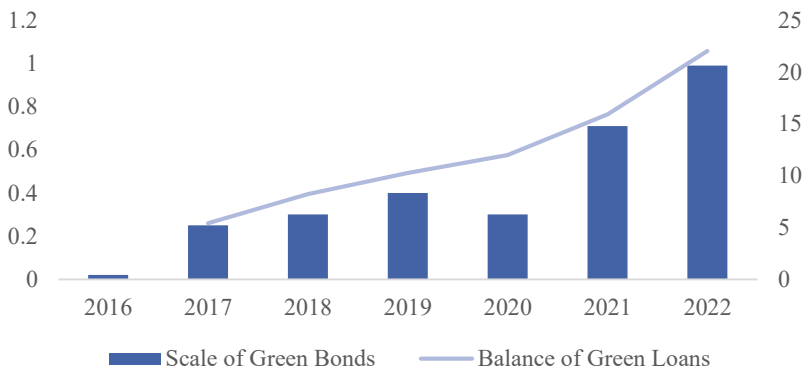


Fig.1. The Scale of Green Bonds and the Balance of Green Loans in China (Data Source: People's Bank of China)

Within the Chinese market, sustainable finance primarily manifests through three key instruments: environmentally friendly loans, climate-aligned securities, and ESG-focused exchange-traded funds. Among these, green bonds have gained prominence as an innovative funding solution, particularly drawing interest from global investors.

The Fig.1 examines the growth trajectory of China's green finance sector between 2016 and 2022, focusing on two key indicators: the issuance volume of green bonds in domestic and global markets and the outstanding balance of green loans denominated in both local and foreign currencies from 2017 to 2022. A dual-axis chart illustrates these trends, with bar graphs representing green bond issuance (measured in trillions of yuan, left axis) and a line graph depicting green loan balances (right axis). Data on green bonds were obtained from the Climate Bonds Initiative, while green loan statistics were sourced from the People's Bank of China. The analysis reveals a consistent upward trend in China's green bond market, fueled by strong domestic demand, underscoring its pivotal role in advancing the nation's sustainable finance framework [4].

Socially Responsible Index-Track Investment Funds (SRITIFs) constitute a distinct class of financial products that replicate the benchmarks of indices emphasizing sustainable development principles. These investment vehicles direct resources toward equity and debt instruments issued by entities meeting stringent ecological, societal, and organizational management standards. The emergence of SRITIFs has driven substantial progress in ethical financial products. In response to increasing market demand for conscientious capital allocation, financial institutions have developed various sustainability-aligned products, such as climate-conscious debt securities and environmentally optimized lending solutions, thus expanding the range of ethical investment alternatives. This interdependent dynamics between SRITIFs and ecological financial innovation fosters mutually reinforcing growth prospects. Specific conservation-oriented

projects obtain funding through specialized debt securities or tailored financial arrangements, which then become permissible holdings for SRITIF portfolios, consequently enlarging their scope of potential investments.

Listed investment funds, which track baskets of securities and trade on stock exchanges with real-time price updates, provide investors with diversified exposure to multiple asset classes. As depicted in Fig.2, the period from 2019 to 2020 saw a significant rise in the availability of sustainability-themed ETFs compared to 2018 levels. The pandemic unexpectedly accelerated growth in this segment, with domestic markets introducing 279 new ESG-aligned funds in 2021 alone—a substantial increase. While the pace of new fund creation slowed in 2022 and 2023, cumulative domestic figures surpassed 700, indicating continued institutional support for investments aligned with sustainability principles. The rise of sustainability-focused ETFs has significantly contributed to the expansion of environmentally conscious financial markets. These passively managed instruments offer benefits such as cost efficiency, clear disclosure practices, and ease of trading, making them attractive to a broader investor base. This, in turn, enhances capital inflows and market liquidity within the green finance sector. Furthermore, the growth of these investment vehicles stimulates progress in eco-friendly industries, facilitating structural economic shifts toward more sustainable models. Such developments strengthen the foundation for the ongoing evolution of green financial markets [5].

In recent years, the global investment amount in green finance has shown a remarkable growth trend. With the increasing global attention to environmental protection and sustainable development, a growing amount of capital is flowing into the field of green finance. For example, a large amount of investment has been attracted to renewable energy projects, energy efficiency improvement projects, and sustainable transportation and other areas. Taking China as an example, over the past decade, the investment amount in green finance has had a relatively high compound annual growth rate, and the investment in the installed capacity of renewable energy power generation has continued to increase, enabling China to occupy an important position in the global green energy field.

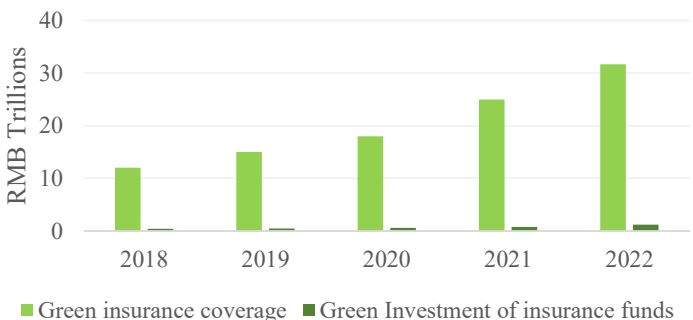


Fig.2. Green Insurance Growth and Investments (Data Source: China Insurance)

The availability of comparable statistical information for 2023 is significantly limited following the introduction of multiple policy updates. However, fragmentary evi-

dence indicates that by Q4 2023, cumulative premium income had attained 229.7 billion RMB (equivalent to 32.5 billion USD), while capital allocated to sustainable projects by insurance institutions totaled 1.67 trillion RMB (approximately 236.3 billion USD) during Q2 of the same year [6].

Significant disparities exist in capital distribution patterns across different industries within green financial systems. Particularly in the energy sector, which represents a primary target for environmental finance initiatives, considerable resources are being deployed toward renewable energy generation schemes such as photovoltaic, wind turbine, and hydroelectric installations. Illustratively, major energy corporations have systematically elevated their financial commitments to offshore wind farm developments, pursuing both sustainable energy security and competitive economic returns.

The transportation sector is also a popular direction for green finance investment, mainly concentrated in the manufacturing of electric vehicles, the construction of charging infrastructure, and the electrification transformation of public transportation. Many countries and regions have introduced relevant policies to encourage investors to participate in the electric vehicle industry and promote the green transformation of the transportation sector. In addition, in the construction field, green finance investment is used to support the construction of energy-efficient buildings and the energy-saving renovation of existing buildings, so as to reduce building energy consumption and improve energy utilization efficiency.

3 The development trends of green finance in China

Since 2017, the People's Bank of China (PBC), in collaboration with financial regulators and industry stakeholders, has published an annual assessment titled China's Green Finance Development Report to document the nation's progress and insights in advancing sustainable financial practices. The 2018 edition provides an in-depth review of key milestones, highlighting efforts to establish environmental finance policy frameworks, develop the 2019 Green Industry Guidance Catalogue, evaluate banking institutions' sustainable lending practices, and enhance sectoral governance through voluntary compliance initiatives. These measures aim to accelerate the transition toward a carbon-neutral economy while supporting broader ecological sustainability objectives [7].

During 2018, China pursued a dual strategy combining centralized policy implementation with localized pilot programs to systematically advance its green finance framework. This approach yielded significant outcomes in policy innovation, market reforms, and cross-border collaboration. The rapid growth of green finance in China has not only expanded financial markets but also delivered substantial environmental and societal co-benefits. As the country enters a new phase of deeper green finance integration, ongoing initiatives will focus on strengthening theoretical foundations, optimizing regulatory standards, expanding policy toolkits, fostering financial innovation, and increasing engagement in international sustainable finance governance. These efforts are expected to further enhance the long-term, high-quality growth of China's green finance sector.

A four - quadrant analysis chart regarding relevant initiatives in the financial field. The horizontal axis represents the potential impact (from low to high), and the vertical axis represents the complexity level (from low to high). Quadrant I (High potential impact, High complexity level): Include leveraging piloting work for replication and promotion, enlarging the green finance market and diversifying green finance products, accelerating the advancement of transition finance, and expanding the carbon market and boosting trading liquidity. These initiatives have a significant impact on the financial market and sustainable development, but their implementation is difficult and involves many factors. For example, expanding the carbon market requires coordinating the interests of multiple parties and improving trading rules. Quadrant II (Low potential impact, High complexity level) Initiatives: Involve enhancing capacity - building for financial institutions and providing risk - adjusted and policy - adjusted incentive schemes for financial institution employees. Interpretation: Although they do not have a significant direct impact on the market in the short term, from the long - term perspective and the internal improvement of financial institutions, they are important and complex tasks. For example, capacity - building requires a large investment of resources and time. Quadrant III (Low potential impact, Low complexity level) Initiatives: It is advisable to foster government - driven ESG investment programs to stimulate market expansion. Regarding this approach, while its implementation is fairly straightforward, its direct impact on market growth remains somewhat restricted. Nevertheless, it serves as foundational work that can progressively steer the market towards greater focus on ESG investment. In Quadrant IV (characterized by high potential impact and low complexity), the following initiatives are proposed. These include formulating and mandating unified ESG disclosure standards, broadening the evaluation criteria applicable to financial institutions, enhancing ESG risk management practices for Chinese enterprises in the "new three" sectors, and facilitating the growth of third - party certification bodies. This set of initiatives is expected to significantly propel the development of ESG within the financial market, and the challenges associated with their implementation are relatively modest. For instance, the establishment of standardized disclosure norms can bring order to market information dissemination and enhance overall transparency [8].

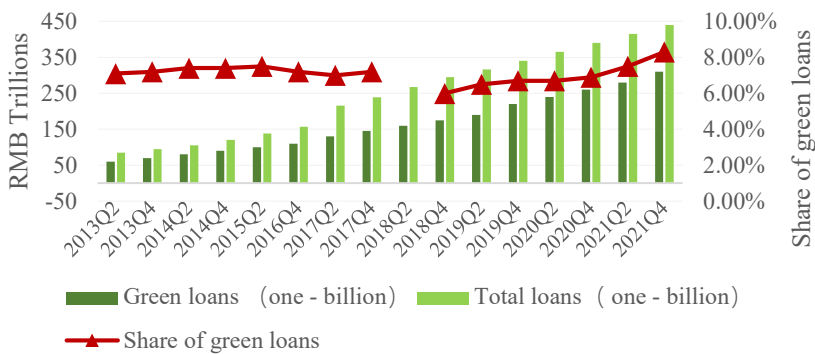


Fig.3. Green Loans and Total Loans Issued by 21 Major Financial Institutions⁷² in China (Data Source: PBOC)

In recent years, green finance has become a vital tool in supporting China's economic transformation and sustainable development. According to Fig.3, it has gradually increased from 2013Q2 to 2021Q4, showing that financial institutions are continuously increasing their financial support for green projects. During the period from 2013Q2 to 2016Q2, the proportion fluctuated between 7.10% and 7.50%; it decreased from 2016Q4 to 2018Q2, reaching a minimum of 7.00%; starting from 2018Q4, it has continued to rise, reaching 8.30% by 2021Q4. This indicates that the share of green loans in total loans is gradually increasing, and financial institutions are paying more attention to green finance business. It is not difficult to find that the impact mechanism of China's green finance on GDP can be divided into the following three types. First, Resource Allocation Mechanism which guide funds to flow into green industries: Through financial instruments such as green credit, green bonds, and green funds, green finance channels funds from traditional high-pollution and high-energy-consuming industries to green industries such as energy conservation and environmental protection, new energy, green transportation, and sustainable agriculture. For example, banks provide preferential interest rate loans for projects that meet green standards, and enterprises raise funds for green project construction by issuing green bonds. After funds flow into green industries, they drive investment, production, and expansion in these industries, directly boosting the output value of related industries and thus promoting GDP growth. Optimize the industrial structure: Under the constraints and incentives of green finance, traditional industries will undergo green transformation and upgrading, such as increasing investment in energy conservation and emission reduction technological transformation. This helps improve the overall resource utilization efficiency of the industry, reduce environmental pollution, and make the economic structure develop in a greener and more efficient direction. It enhances the sustainable growth ability of the economy and has a positive impact on the stable growth of GDP in the long run[9].

Second, Innovation-driven Mechanism which motivate enterprises' innovation investment: Green finance provides financial support for green technology research and development and innovative projects, reducing the financing costs and risks of enterprise innovation. For example, venture capital funds, guided by green finance policies, increase investment in green technology start-ups; green credit supports enterprises in carrying out research and development of clean production technologies. After obtaining funds, enterprises increase their research and development efforts and develop more efficient energy conservation and emission reduction technologies, renewable energy utilization technologies, etc., improving production efficiency and product competitiveness, promoting the growth and expansion of enterprises, driving the growth of related industries, and pushing up GDP.

Third, Employment and Consumption Stimulation Mechanism which create job opportunities: The development of green industries requires a large number of labor forces of different types, creating new job opportunities in various links from research and development, production to operation and management. For example, the construction and operation of a wind power plant require engineers, technical workers, operation and maintenance personnel, etc. The increase in job opportunities leads to an increase in residents' income, thereby enhancing residents' consumption ability and promoting

the prosperity of the consumer market. The growth of consumption will drive the development of related industries, stimulating GDP growth. Upgrade the quality and scale of consumption: Green industries supported by green finance provide more environmentally friendly, healthy, and high-quality products and services, meeting consumers' needs for a better life and stimulating consumption upgrading. Examples include green buildings, new energy vehicles, and organic agricultural products. The upgrading of the consumption structure prompts enterprises to adjust their production structures, further promoting industrial development, expanding the economic scale, and pushing up GDP[10].

4 Conclusion

This study examines the development and impact of green finance in China, with particular emphasis on its key components: green credit, green bonds, and ESG-themed exchange-traded funds (ESGETFs). In recent years, China's green bond market has exhibited consistent growth, while ESGETFs have also advanced steadily, driving innovation in sustainable financial instruments.

Globally, green finance investments have been increasing, with China demonstrating remarkable expansion in both volume and pace. The majority of these investments are directed toward critical sectors such as renewable energy, transportation infrastructure, and sustainable construction. Since 2017, the People's Bank of China has systematically documented the progress of green finance in its annual China Green Finance Development Report. The country has adopted a dual approach, combining policy-driven initiatives with grassroots experimentation, to establish a robust green finance framework. Future efforts will focus on advancing theoretical research, refining regulatory standards, and fostering financial product innovation.

The proportion of green loans in overall lending has shown a gradual yet consistent rise. These loans contribute to economic growth (GDP) through three primary mechanisms: optimizing resource allocation, promoting technological innovation, and boosting employment and consumer demand. China has implemented numerous pioneering policies in green finance, yielding measurable benefits for economic expansion. However, challenges remain, including insufficient regulatory oversight, heightened market volatility, and limited consumer participation in sustainable investments. To address these issues, policymakers should strengthen enforcement mechanisms and refine existing regulations to ensure the stable and sustainable growth of green finance.

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