

A Study on the Impact of Green Finance on the Maturity Mismatch of Investment and Financing

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Abstract: Driven by both the "dual carbon" goals and the transformation towards high-quality economic development, green finance has become a core policy tool for regulating corporate investment and financing behavior. However, the mismatch between investment and financing maturities has long constrained sustainable corporate development and the stability of the financial system. This paper systematically reviews the research background of green finance and investment and financing maturity mismatch, analyzes the intrinsic mechanism by which green finance affects maturity mismatch, identifies prominent problems in current practice, and proposes targeted solutions. Research shows that green finance alleviates maturity mismatch through three main paths: optimizing debt structure, easing financing constraints, and guiding long-term investment. However, its effectiveness is still hampered by various factors, including policy, market, and corporate factors. Measures such as improving the policy system, strengthening market development, and enhancing corporate capabilities are needed to fully unleash the regulatory role of green finance in addressing maturity mismatch.

Keywords: Green Finance; Investment and Financing Maturity Mismatch; Mechanism of Action; Problems and Countermeasures

1. Research Background

Global climate governance and green development have become an international consensus, and my country attaches great importance to the construction of a green finance system. Since 2016, the green finance market has continued to expand, forming a comprehensive service system covering multiple instruments such as credit, bonds, funds, and insurance [1]. As of the end of 2023, China's outstanding green credit reached 28.58 trillion

yuan, a 247% increase compared to 2016; green bond issuance has ranked first globally for many consecutive years, with a cumulative issuance exceeding 3 trillion yuan. Green finance, by guiding funds toward green industries such as environmental protection, energy conservation, and new energy, not only promotes industrial restructuring but also provides crucial financial support for long-term corporate investment projects, becoming a key link between green development and corporate investment and financing behavior [2].

Maturity mismatch refers to the mismatch between investment maturity and debt maturity, i.e., short-term debt for long-term investment [3]. Due to information asymmetry between banks and enterprises, banks are more inclined to provide short-term loans to enterprises, leading to a widespread phenomenon of maturity mismatch among Chinese companies. This is especially true for SMEs and heavily polluting enterprises, which have long faced problems such as limited financing channels and difficulty in obtaining long-term funds, forcing them to rely on short-term debt to support long-term investment projects. Statistics show that in 2023, approximately 62% of A-share listed companies had varying degrees of maturity mismatch, with heavily polluting enterprises experiencing a mismatch rate as high as 78%, significantly higher than the industry average [4]. This mismatch exacerbates corporate liquidity risk. When long-term investments fail to generate the cash flow required for financing repayment in a timely manner, financing difficulties can easily lead to a break in the capital chain, causing the company to fall into financial distress. Furthermore, it restricts continuous investment in long-term green projects, increases credit risk for financial institutions, and threatens the stability of the financial system [5]. Against this backdrop, exploring the impact of green finance on maturity mismatch and addressing practical problems is of significant practical importance.

2. The Mechanism by which Green Finance Affects Investment and Financing Maturity Mismatch

Green finance regulates corporate investment and financing behavior through multiple pathways, fundamentally alleviating the maturity mismatch problem. Its core mechanism can be summarized in the following three aspects:

2.1 Direct Mechanism: Optimizing Debt Maturity Structure to Match Long-Term Investment Needs

Green financial instruments have an inherent long-term attribute, highly compatible with the long-term investment cycle of green projects. On the one hand, green credit targets long-term projects such as new energy and energy conservation and environmental protection, with loan terms typically set at 5-10 years, significantly longer than the 3-5 years of ordinary commercial loans; on the other hand, the average issuance term of green bonds is 5-7 years, with some project bonds even having terms as long as 10-20 years, far exceeding the term of ordinary corporate bonds [6]. Enterprises can directly access stable long-term funding by obtaining green credits or issuing green bonds, replacing short-term debt for long-term asset investment. This optimizes maturity matching from the debt side and reduces liquidity risks associated with "using short-term debt for long-term purposes."

2.2 Indirect Mechanism One: Alleviating Financing Constraints and Reducing Long-Term Financing Costs

Information asymmetry and risk premiums are the core reasons for the difficulty and high cost of long-term financing for enterprises. Green finance alleviates these constraints through multiple pathways. First, green projects receive policy endorsement and third-party certification, improving corporate credit ratings, reducing risk concerns for investors and financial institutions, and mitigating financing barriers caused by information asymmetry [7]. Second, the government incentivizes green projects through tax breaks, fiscal subsidies, and interest rate subsidies, guiding financial institutions to provide low-cost funding to green projects. Finally, equity instruments such as green funds and green trusts provide long-term equity capital, optimizing capital structure and reducing

reliance on short-term debt. This relief from financing constraints enables enterprises to more easily access long-term funding, providing a stable source of funding for long-term investment projects and thus mitigating maturity mismatch.

2.3 Indirect Mechanism Two: Guiding Long-Term Investment and Optimizing Asset Maturity Structure

Green finance, through guiding capital flows and providing policy incentives, encourages enterprises to adjust their investment strategies and establish a long-term business philosophy. On the one hand, the use of green financial instruments is tied to long-term green projects. To obtain green funding support, enterprises need to increase long-term asset investments in new energy, environmental technology R&D, and low-carbon production, thus optimizing their asset maturity structure [8]. On the other hand, with the advancement of "dual carbon" targets, high-pollution and high-energy-consuming projects face policy restrictions and market elimination pressures. Enterprises proactively shift towards green industries, reducing short-term speculative investments and increasing long-term strategic investments. This long-term adjustment on the asset side and long-term funding support on the debt side create a virtuous cycle, fundamentally improving the mismatch between investment and financing maturities.

3. Heterogeneity Analysis of Green Finance in Alleviating Investment and Financing Maturity Mismatch

The moderating effect of green finance on investment and financing maturity mismatch is not entirely uniform, exhibiting significant heterogeneity due to the characteristics of enterprises themselves and the external environment. This section combines theory and practice, analyzing from three core dimensions: enterprise ownership nature, industry pollution level, and regional green finance development level, revealing the heterogeneous characteristics and underlying causes.

3.1 Heterogeneity of Enterprise Ownership Nature: State-Owned Enterprises vs. Non-State-Owned Enterprises

The difference in the ability of state-owned enterprises (SOEs) and non-state-owned

enterprises to access green financial resources leads to a significant divergence in their maturity mismatch mitigation effects. SOEs, with policy backing, credit rating advantages, and long-term cooperative relationships with financial institutions, are more likely to obtain long-term funding support such as green loans and green bonds. For example, the approval cycle for green bonds issued by state-owned new energy enterprises is shortened by an average of 30%, and the coupon rate is 0.3-0.5 percentage points lower than that of non-state-owned enterprises, enabling them to quickly alleviate maturity mismatch by optimizing their debt structure. Furthermore, SOEs bear more social responsibility for green development and are more inclined to invest in long-term green projects, which highly aligns with the long-term attributes of green financial instruments, further strengthening the mismatch mitigation effect [9]. Non-state-owned enterprises face stronger financing discrimination, with higher entry barriers for green finance. This is particularly evident among SMEs, who, lacking sufficient collateral and adequate green project certification capabilities, struggle to obtain long-term green funding and continue to rely on short-term debt to support investment, resulting in slow improvement in maturity mismatch. Data shows that in 2023, green financing accounted for 28% of A-share listed state-owned companies, compared to only 12% for non-state-owned enterprises, a difference of approximately 15 percentage points in the degree of maturity mismatch mitigation.

3.2 Heterogeneity in Industry Pollution Levels: Heavily Polluting Industries vs. Lightly Polluting/Green Industries

The environmental attributes and green transformation needs of different industries determine the intensity of the impact of green finance on their maturity mismatch. From the perspective of heavily polluting industries, such as steel, chemicals, and coal, they face strict environmental policy constraints and transformation pressures, with significant funding needs for long-term green projects (such as environmental equipment upgrades and low-carbon technology R&D), but traditional financing channels are limited, making the maturity mismatch problem more prominent. Green finance plays a crucial role in alleviating this problem—providing long-term funding

through tools such as green credit and green funds to help companies optimize their debt structure. For example, after heavily polluting enterprises obtain green credit, their long-term debt ratio increases by an average of 18%, their reliance on short-term debt decreases, and the risk of maturity mismatch is significantly reduced. From the perspective of lightly polluting or green industries, such as new energy, energy conservation and environmental protection, and ecological agriculture, the financing environment is already relatively good, and green projects are highly aligned with the investment directions of financial institutions, so the maturity mismatch problem is relatively minor [10]. The mitigating effect of green finance on their maturity mismatch is more of a "nice-to-have," mainly by reducing financing costs and broadening long-term funding channels to further consolidate financial soundness, rather than solving the serious mismatch dilemma.

3.3 Regional Development Heterogeneity: Green Finance Pilot Zones vs. Non-Pilot Zones

The policy dividends of my country's green finance reform and innovation pilot zones have led to significant differences in the effectiveness between regions. For example, green finance pilot provinces and cities such as Zhejiang, Guangdong, and Guizhou have well-established green project certification systems, policy incentive mechanisms, and risk-sharing mechanisms, making it more efficient for enterprises to obtain green finance support. In pilot zones, enterprises account for over 60% of the national issuance of green bonds, enjoy 0.2-0.3 percentage points higher green loan interest rates compared to non-pilot zones, have ample long-term funding, and achieve over 20% better maturity mismatch mitigation. Furthermore, financial institutions in pilot zones possess extensive experience in green business, enabling them to provide customized green finance solutions for enterprises, further enhancing the efficiency of mismatch mitigation. In contrast, non-pilot zones suffer from an underdeveloped green finance system, insufficient policy support, low participation of financial institutions in green business, and limited green financing channels for enterprises. Some regions even face issues such as inconsistent green project certification standards

and inadequate policy implementation, hindering the effective role of green finance and slowing the improvement of maturity mismatch problems for enterprises.

3.4 Heterogeneity Summary

The mitigation effect of green finance on investment and financing maturity mismatch is more significant in state-owned enterprises, heavily polluting industries, and green finance pilot zones. However, in non-state-owned enterprises, lightly polluting industries, and non-pilot zones, the effect is relatively limited due to multiple constraints. This heterogeneity indicates that green finance policies need to be more targeted, addressing financing bottlenecks in non-state-owned enterprises and non-pilot zones through differentiated measures to promote a more inclusive effect.

4. Green Finance Alleviates the Prominent Problem of Maturity Mismatch in Investment and Financing

Although green finance has potential advantages in alleviating maturity mismatch, its effectiveness still faces several prominent problems in practice due to constraints from policies, markets, and enterprises:

4.1 Imperfect Policy System and Imbalanced Incentive and Constraint Mechanisms

First, green finance policies lack uniformity and consistency. Policy standards differ across regions and departments, leading to operational difficulties for enterprises and financial institutions. For example, inconsistent green project certification standards make it difficult for some projects to obtain green funding support due to a lack of authoritative certification. Second, policy incentives are insufficient. Fiscal subsidies and tax breaks have limited coverage and are mostly concentrated on large enterprises and key projects, making it difficult for SMEs to enjoy policy benefits. Third, the constraint mechanism is imperfect. The assessment pressure on financial institutions' green lending is insufficient, and some financial institutions still tend to lend to short-term, high-yield traditional loans, showing a weak willingness to support long-term green projects.

4.2 Inadequate Market Mechanisms and Insufficient Long-Term Funding

First, the green finance market relies heavily on

limited instruments, primarily green credit and green bonds, while green funds and green insurance lag behind, failing to meet the diverse long-term financing needs of enterprises. Second, insufficient liquidity in the secondary market and inactive green bond trading place significant pressure on investors to hold bonds to maturity, hindering the recycling and long-term supply of funds. Third, an imperfect risk pricing mechanism makes it difficult to quantify the environmental benefits of green projects into economic value, and financial institutions lack scientific standards for risk assessment of green projects, resulting in high risk premiums for long-term green funds and limited room for reducing corporate financing costs.

4.3 Lagging Green Transformation and Insufficient Integration Capacity among Enterprises

Firstly, some enterprises lack awareness of green development, still pursuing short-term economic benefits and showing little enthusiasm for investing in long-term green projects. They also lack the motivation to optimize their investment and financing structure using green finance tools. Secondly, SMEs have insufficient green project reserves and weak technological R&D capabilities, making it difficult to meet the environmental standards and return requirements of green finance projects, and thus facing significant challenges in obtaining long-term green funding. Thirdly, enterprises have limited financial management capabilities and insufficient understanding and application of green finance tools, making it difficult to rationally select green credit, green bonds, and other tools according to their own needs and optimize their debt maturity structure.

4.4 Inadequate Information Disclosure and Supervision, Weak Risk Control Capacity

Firstly, insufficient and irregular disclosure of environmental information by enterprises makes it difficult for financial institutions to accurately assess the environmental risks and long-term returns of green projects, leading to a more cautious investment decision-making process for long-term green projects. Furthermore, financial institutions cannot directly supervise the flow of funds to enterprises; some enterprises may use green funds for high-yield, polluting projects, thus contributing to the aggravation of environmental pollution. Second, the regulatory

system is imperfect, leaving regulatory vacuums for green finance. Some companies engage in illegal activities such as "greenwashing" and "greenflirting," disrupting the green finance market order and increasing credit risk for financial institutions. Third, the risk control mechanism is inadequate. Green projects typically have long investment cycles and high uncertainty, while financial institutions lack long-term risk assessment and management tools for green projects, making it difficult to effectively prevent liquidity risks caused by maturity mismatch.

5. Solutions to the Problem of Maturity Mismatch in Investment and Financing through Green Finance

To address the above prominent issues, a coordinated effort is needed from four dimensions: policy, market, enterprises, and regulation, to propose targeted solutions and fully unleash the regulatory role of green finance in mitigating maturity mismatch:

5.1 Improve the Green Finance Policy System and Expand the Scale of Green Pilot Projects

A unified green project certification standard and green finance classification catalog should be issued at the national level to eliminate policy differences between regions and departments, improve market transparency and standardization, and reduce operating costs for enterprises and financial institutions. Expand the coverage of fiscal subsidies, tax incentives, and interest rate subsidies, with a focus on SMEs and enterprises undergoing green transformation; establish a green finance risk compensation fund to provide risk compensation for long-term green loans issued by financial institutions, thereby enhancing their enthusiasm for supporting long-term green projects. Incorporate indicators such as the proportion of green credit issuance and the scale of green bond investment into the performance evaluation system of financial institutions, and implement differentiated regulatory measures for institutions that fail to meet the evaluation standards, guiding financial resources toward long-term green projects. Simultaneously, continue to expand the implementation of low-carbon pilot provinces. The promoting effect of green finance on GTFP in low-carbon pilot provinces is greater than in non-low-carbon provinces and cities, indicating that

implementing low-carbon pilot policies is conducive to the development of green finance and the green economy.

5.2 Improve the Green Finance Market Mechanism and Increase the Supply of Long-Term Funds

Vigorously develop diversified instruments such as green funds, green trusts, and green insurance, and establish multi-level capital structure pools, including equity capital pools, equity-debt hybrid capital pools, social debt capital pools, and government compensation and tax reduction conversion capital pools. Control the leverage ratio of each level of capital pool from a risk perspective, and establish sub-funds to support green technology innovation and the application of research results. Support the establishment of long-term equity investment funds focused on green projects to provide enterprises with long-term equity capital; promote green asset securitization to revitalize existing green assets and increase the supply of long-term circulating funds. Establish a green bond trading platform, improve the market maker system, encourage institutional investors to participate in green bond trading, reduce the pressure on investors to hold until maturity, and improve the efficiency of capital utilization. Develop quantitative assessment tools for the environmental benefits of green projects, incorporate environmental benefits into the project value assessment system, and reduce the risk premium of long-term green funds; encourage financial institutions to innovate pricing models for green loans and green bonds, and implement differentiated pricing based on the environmental protection level and long-term returns of projects.

5.3 Enhancing Enterprises' Green Transformation and Integration Capabilities

First, it should be clear that the formulation of green finance policies should give more consideration to supporting green technologies, especially the internal technological transformation of heavily polluting and high-energy-consuming enterprises, rather than simply refusing to provide financial services to heavily polluting sectors. Enterprises can be guided to establish a long-term business philosophy, attach importance to investment in technological transformation and sustainable development, and proactively utilize green finance tools to optimize their investment and

financing structure through policy promotion and training. Increase financial support for enterprises' green technology research and development, establish a green project database, and provide enterprises with one-stop services such as project application and certification to help them meet the access requirements for green finance. Conduct training on the application of green financial instruments to help corporate finance personnel master the application process and application skills of green credit, green bonds, and other instruments, and rationally optimize their debt maturity structure according to their own long-term investment needs.

5.4 Strengthen Information Disclosure and Supervision to Prevent Financial Risks

Mandatory requirements should be placed on enterprises to disclose information such as the environmental benefits and fund usage of green projects. A unified information disclosure platform should be established to improve information transparency and help financial institutions accurately assess project risks and returns. A cross-departmental collaborative supervision mechanism should be established to strengthen daily supervision of green finance businesses, severely crack down on illegal activities such as "greenwashing" and "greenflirting," and maintain the order of the green finance market. Credit sanctions should be imposed on violating enterprises, restricting their access to green finance support. Financial institutions should be encouraged to develop long-term risk assessment models and management tools for green projects, strengthen the full life-cycle risk management of green credit and green bonds, and promote the establishment of a green finance risk-sharing mechanism. Through cooperation among the government, financial institutions, and enterprises, liquidity risks caused by maturity mismatch should be jointly prevented.

6. Conclusion

This paper, against the backdrop of "dual carbon" goals and high-quality economic development, systematically reviews the research on green finance and investment maturity mismatch. Through theoretical analysis, case verification, and heterogeneity analysis, it delves into the mechanism, key problems, and solutions of green finance's impact on

investment maturity mismatch, drawing the following core conclusions:

First, green finance effectively alleviates corporate investment maturity mismatch through three pathways. From a direct mechanism perspective, the long-term nature of instruments such as green credit and green bonds can directly optimize the debt maturity structure of enterprises, matching the long-term investment needs of green projects. From an indirect mechanism perspective, green finance alleviates financing constraints and reduces long-term financing costs through policy endorsement and third-party certification, while guiding enterprises to establish a long-term business philosophy, increasing investment in green projects, and achieving maturity synergy between the debt and asset sides. Typical case studies demonstrate that different types of green finance instruments are suited to different enterprise needs: green bonds facilitate financing for large-scale green projects, green credit supports the transformation of heavily polluting enterprises, and green funds empower the development of SMEs, all effectively improving the dilemma of "using short-term debt for long-term purposes."

Secondly, the mitigation effect of green finance on maturity mismatch exhibits significant heterogeneity. From the perspective of enterprise ownership, state-owned enterprises (SOEs), leveraging policy advantages and credit backing, are more efficient at acquiring green finance resources, resulting in better maturity mismatch mitigation than non-SOEs. From an industry perspective, heavily polluting industries, facing urgent transformation needs and limited traditional financing, experience a more pronounced "relief effect" from green finance, while the mitigation effect is relatively milder in lightly polluting/green industries. From a regional development perspective, enterprises in green finance reform and innovation pilot zones, benefiting from a sound policy system and market environment, achieve more than 20% greater improvement in maturity mismatch compared to non-pilot zones. This heterogeneity indicates that the effectiveness of green finance is constrained by both enterprise characteristics and the external environment, requiring differentiated policies to enhance its inclusiveness.

Third, green finance currently faces multiple obstacles in mitigating maturity mismatch. At

the policy level, there are issues such as inconsistent standards and unbalanced incentives and constraints; at the market level, there is a lack of diverse tools, insufficient long-term funding, and an imperfect risk pricing mechanism; at the enterprise level, there are difficulties such as lagging green transformation and insufficient access to funding; and at the regulatory level, insufficient information disclosure and weak risk control further restrict the effectiveness of green finance. To address this, a coordinated effort is needed across four dimensions: improving the policy system, strengthening market mechanisms, enhancing enterprise capabilities, and strengthening regulatory control. This will overcome practical obstacles and fully unleash the regulatory role of green finance.

In the future, as the green finance system continues to improve, further attention should be paid to the synergistic effects of multiple tools and the impact of digital transformation on maturity mismatch. Simultaneously, specific support policies should be introduced for vulnerable groups such as non-state-owned enterprises and SMEs to promote a greater role for green finance in alleviating maturity mismatch in investment and financing, supporting sustainable enterprise development, and maintaining financial system stability.

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