

Green Finance and Commercial Bank Profitability in China: Evidence from Listed Banks

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Abstract. Against the backdrop of China's policy-driven low-carbon economic transition, green credit has evolved from a pilot initiative to a systemic strategic priority for commercial banks, with its scale expanding steadily—surpassing 30 trillion RMB by the end of 2023. However, academic debates persist regarding how green credit expansion affects bank profitability, with conflicting findings across existing studies. This study focuses on exploring the intrinsic link between green credit expansion and the profitability of Chinese commercial banks, identifying the core influencing mechanisms, and examining the moderating role of bank ownership heterogeneity. The findings reveal a temporal mismatch in the impact of green credit on profitability: while it exerts short-term pressure on earnings by increasing operating costs and narrowing net interest margins, it enhances long-term operational stability through risk mitigation and reputation building. Notably, ownership heterogeneity moderates this relationship significantly—state-owned banks bear heavier policy burdens and face greater short-term profitability constraints, whereas market-oriented joint-stock and city commercial banks can potentially gain green premiums. Addressing key challenges such as inconsistent disclosure standards and high operating costs, this study puts forward targeted policy suggestions to promote the high-quality development of green finance while maintaining the stability of the banking system.

Keywords: Green Finance, Commercial Banks, Profitability, Green Credit, Panel Data

1. Introduction

The transition toward a low-carbon economy has fundamentally altered the operating environment for financial institutions globally. In China, green finance has evolved from a voluntary corporate social responsibility initiative into a systemic requirement driven by top-down policy mandates. Following the establishment of green finance pilot zones and the formalization of the "Green Credit Guidelines," commercial banks have rapidly expanded their green portfolios. While the environmental benefits of directing capital toward sustainable projects are well-documented, the microeconomic implications for the banks themselves—specifically regarding profitability—remain a subject of intense debate.

Current research in this field presents mixed findings. Some scholars argue that green finance enhances profitability through improved risk management, lower cost of capital, and enhanced reputation [1]. Conversely, others suggest it imposes cost burdens—such as specialized due

diligence and lower interest margins—that erode short-term performance. A significant research gap exists in isolating the specific effects of green credit scaling on profitability after strictly controlling for unobserved bank heterogeneity in the Chinese context, where policy guidance often outweighs market pricing mechanisms.

The core theme of this study is to explore the internal relationship between green credit expansion and profit the ability of commercial banks in China, the core mechanism, and the regulatory effect of bank property heterogeneity.

The purpose of this study is to clarify the influence logic of the two, explain the existing research differences, and provide reference for the development of green credit, so as to promote the benign interaction between green finance and banking profitability.

2. Related theories

The profitability implications of green finance are theoretically indeterminate because green finance simultaneously changes banks' pricing, cost structure, and risk exposure. These effects do not necessarily materialize on the same timeline.

From a stakeholder perspective, banks operate under continuous pressure from regulators, investors, and communities. When environmental performance becomes a salient expectation, green finance may strengthen customer relationships and political legitimacy, thereby supporting long-run franchise value even if near-term accounting returns decline [2]. Legitimacy theory complements this view by emphasizing that organizations protect their "license to operate" by aligning with prevailing societal norms. In policy-driven contexts, credible green finance practices can reduce reputational risk and regulatory frictions, whereas superficial compliance may attract increased scrutiny [3].

Institutional theory further suggests that when regulation intensifies, banks may converge in behavior through coercive pressures. Banks may adopt green practices to avoid strategic disadvantage, which can accelerate adoption before business models are fully optimized for efficiency [4].

Conversely, banking efficiency research stresses that new strategic lines typically require fixed investments in staff, systems, and process redesign. Consequently, cost efficiency may deteriorate before economies of scale appear [5]. Environmental risk management arguments predict that incorporating environmental signals into credit screening can improve portfolio quality. However, these benefits tend to arrive with a delay because default outcomes unfold over multi-year horizons [6].

Sustainable finance research introduces a pricing tension: if markets value "green" attributes, borrowers may obtain cheaper financing, translating into narrower spreads for banks [7, 8]. Empirical studies focusing on China indicate that results are sensitive to specification, and green credit expansion can be associated with short-run profitability pressure during rapid scaling phases [9].

3. Development status of green finance in China's commercial banks

3.1. Green credit: Growth and disclosure caliber

Green credit is the most visible and data-tractable component of China's bank-led green finance. It has evolved from early pilot products into a systemwide strategic line supported by policy guidance and supervisory expectations. In practical banking terms, green credit can improve portfolio quality

by shifting exposure away from heavily polluting sectors and toward projects with stronger policy support and potentially better long-run cash-flow stability.

However, it also imposes higher due diligence and monitoring requirements since environmental performance and "use-of-proceeds" logic are not directly observable in the way as conventional collateral and financial statements. This operational reality matters for empirical work because the measurement of green credit is not fully standardized across banks. Disclosure caliber differs in classification boundaries and environmental-benefit computation methods, which introduces comparability problems.

Despite these measurement challenges, the aggregate growth trajectory remains robust and policy-driven. According to People's Bank of China (PBOC) statistics, the balance of green credit in China surpassed 30 trillion RMB by the end of 2023, accounting for over 30% of total corporate loans, with a compound annual growth rate significantly outpacing overall loan growth. This expansion is underpinned by regulatory frameworks such as the 2019 Green Industry Support Project Catalogue and the 2022 Green Finance Guidelines, which aim to harmonize classification standards across the banking sector. Nevertheless, academic literature cautions that self-reported bank data may still suffer from 'greenwashing' biases or classification heterogeneity, where borderline projects are categorized as green to meet regulatory quotas. Consequently, while the upward trend is undeniable, empirical analyses must account for disclosure heterogeneity.

3.2. Challenges in green bonds and intermediary services

Although the empirical section focuses on green credit, green bonds remain relevant to bank profitability. Banks participate as issuers to improve funding diversification and as underwriters to earn fees. However, the profitability of these activities is constrained by the complexity of verification. Unlike standard bonds, green bonds require third-party certification to prevent "greenwashing." The cost of coordinating external opinions and ensuring continuous disclosure can erode the fee income earned from underwriting [10].

Furthermore, when banks invest in green bonds, returns can be affected by "green" pricing dynamics, often framed as a yield discount (the "greenium") associated with investor preferences. This raises the practical question of whether lower yields are offset by liquidity or strategic benefits [8]. Evidence that certification and credibility influence market response suggests that banks may strengthen profitability indirectly by building high-trust green finance service capabilities rather than relying only on balance-sheet lending margins [11].

3.3. Structural mismatches in green projects

A critical operational challenge affecting profitability is the maturity mismatch inherent in green finance. Many green projects, such as renewable energy infrastructure or pollution control facilities, have long payback periods and high upfront capital requirements. Commercial banks, whose liabilities are primarily short-term deposits, face liquidity risks when aggressively expanding long-term green lending. To manage this Asset-Liability Management (ALM) pressure, banks may need to access interbank markets or issue specialized financial bonds, which often come at a higher cost than customer deposits. This structural characteristic implies that as the Green Loan Ratio increases, the bank's internal cost of funds may rise marginally, suppressing the net interest margin unless subsidized by policy tools.

4. Mechanism analysis

4.1. Operating cost mechanism

The operating-cost mechanism is particularly important in the early scaling stage because green credit requires environmental information collection, taxonomy mapping, specialized due diligence, and post-loan monitoring routines. These are often more demanding than conventional lending, especially when corporate environmental data disclosure is incomplete. These requirements raise operating expenses and can temporarily worsen measured efficiency [5].

4.2. Business structure and pricing

On the asset side, shifting credit away from heavily polluting sectors can reduce transition risk exposure but may also crowd out historically high-spread lending. If green credit is extended at preferential rates under policy guidance or intense competition for high-quality green borrowers, margin compression can coincide with rising monitoring costs. On the revenue side, green finance can expand non-interest income through underwriting, advisory, and green investment distribution. However, whether this diversification supports profitability depends on whether banks build credible verification and scalable product design [12].

4.3. Reputation and risk

The reputation and risk mechanism ties these channels together over time. From the perspectives of stakeholder theory and legitimacy theory, credible green finance can enhance trust and reduce reputational exposure. Similarly, environmental risk management theory suggests that green credit can reduce long-run loss volatility by lowering exposure to physical and transition risks.. However, this creates a temporal mismatch: accounting profitability declines during the scaling phase due to upfront costs, while risk-adjusted performance improves only after the portfolio has matured and climate risks have been priced [6].

4.4. The moderating effect of bank ownership heterogeneity

In addition, the heterogeneity of bank ownership serves as a key moderating variable that explains the inconsistent findings in existing studies. As the main channel for policy transmission, large state-owned banks undertake stronger political responsibilities. In the early stage of green credit expansion, they are often required to take the lead in responding to policy calls and tilt funds toward major green infrastructure projects with long payback periods and preferential interest rates. Such "policy burdens" may narrow net interest margins and raise operating costs in the short run, thus exerting a restraining effect on financial performance. In contrast, joint-stock commercial banks and city commercial banks are more market-oriented, and their development of green finance is largely driven by differentiated competitive strategies. They tend to select high-quality green assets with stable cash flows or use green labels to attract ESG-preferred capital, which may help obtain green premiums or reduce liability costs. Therefore, without distinguishing bank ownership structures, the overall sample regression results tend to suffer from insufficient significance due to offsetting effects. This explains why some studies find a negative correlation while others reveal a positive one. This paper recommends introducing ownership interaction terms in subsequent empirical analyses to capture the nonlinear characteristics of such structural differences on profitability.

5. Policy implications

Based on the above mechanism analysis, this paper puts forward the following policy implications. First, in response to inconsistent disclosure standards for green credit, regulators should further unify the calculation criteria for environmental benefits. At present, different banks adopt varying accounting methods for indicators such as carbon dioxide emission reductions, which easily creates room for "greenwashing" and hinders the comparability of market data. It is suggested that competent authorities issue detailed guidelines on conversion coefficients and mandate the disclosure of calculation bases to improve data transparency, enabling investors to accurately price green risks. Second, in view of the high operating costs of green credit, an incentive-compatible mechanism should be improved. Given the high costs of due diligence and post-loan monitoring for green projects, reliance on administrative mandates alone is unsustainable. It is recommended to use tools such as fiscal interest discounts, risk compensation funds, or differentiated deposit reserve ratios to offset cost pressures during banks' transition period. Only when the risk-adjusted return of green assets becomes competitive can banks shift from "passive compliance" to "active management", ensuring that green finance not only serves the transformation of the real economy in the long run but also maintains stable profitability of the banking system, thereby promoting the high-quality development of the green financial system.

6. Conclusion

This study systematically explores the relationship between green credit expansion and the profitability of Chinese commercial banks, as well as the underlying mechanisms and moderating factors. The findings indicate that green credit exerts a time-mismatched impact on bank profitability: it imposes short-term pressure on earnings by increasing operating costs and compressing net interest margins, while it enhances long-term operational stability through risk mitigation and reputation building. Notably, the heterogeneity of bank ownership plays a critical moderating role—state-owned banks bear heavier policy burdens and thus face more significant short-term profitability constraints, whereas market-oriented joint-stock and city commercial banks can obtain potential green premiums through differentiated strategies. This explains the inconsistent conclusions in existing studies. Additionally, the study identifies key challenges including inconsistent green credit disclosure standards, high operational costs, and structural mismatches in green projects. To promote the high-quality development of green finance, regulators should unify environmental benefit measurement standards and improve incentive-compatible mechanisms. This will help banks transition from passive compliance to proactive management, thereby balancing environmental objectives with financial stability throughout the low-carbon transition.

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