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Research on the Adjustment of Commercial Bank Credit Allocation Strategies under Green Finance Policies

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Abstract. Green finance provides an effective tool for sustainable development. As the center of capital allocation, the credit behavior of commercial banks directly determines the effectiveness of the green implementation policy. Based on the institutional environment of China, this study chooses three types of banks as the research samples: large state-owned banks, joint-stock commercial banks, and city commercial banks. Focusing on the micro perspective, this paper analyzes the adjustments in credit strategies, divergences in implementation practices, and existing barriers among these three categories of banks under the construction of green finance policies. It finds that these three categories generally take a shift in credit structure, retreating from "two-high" industries and enhancing green support as a tendency. Large state-owned banks, taking advantage of scale, stand out in total green credit volume. The joint-stock banks have developed a head start in green loan ratios and product innovativeness with international standards; city commercial banks suffer from small absolute scale and low system infrastructure, so they follow a "weak foundation, catch-up development" pattern. At the same time, all these categories encounter common difficulties in developing green finance. Internationally, there exist widespread issues of risk-return imbalance, a shortage of interdisciplinary professionals, and insufficient data system support. Externally, imperfect policy incentives, lack of uniformity in green standards, and immaturity in the development of the carbon trading market lead to long-lasting bottlenecks. This research provides references for policymakers in increasing the differentiated institutional design and for various banks to improve the green credit operations.

Keywords: Green Finance, Commercial Banks, Credit Allocation, Green Credit, Sustainable Banking

1. Introduction

Climate change-associated ecological degradation negatively impacts financial stability at a systemic level, prompting countries around the globe to seek to establish robust green finance institutional spaces [1]. Green credit plays a pivotal part in this agenda as commercial banks stand in the nucleus of credit allocation, thus emerging as a major channel in translating green finance policies into tangible results.

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China has acted on a path of being cutting-edge in green finance transformation. Since 2007, Chinese regulators have issued a series of policy guidelines to guide commercial bank lending towards green areas and industries [2]. The 2012 deployment of *the Green Credit Guidelines* led further in mandating banks to implement environmental risk management systems [3], indicating a paradigm shift from pure profit-chasing to synergistic balance of financial returns with environmental responsibility and accountability [4].

A wide body of current literature focuses on the macro-level impacts of policies. However, the micro-level picture of how individual banks adjust their credit strategies, what practical challenges they face, and how they resolve these controversies has been much overlooked [5].

The purpose of this paper is to bridge the research void through investigating the ways in which three categories of banks respond to green finance policies to adapt their credit allocation strategies when fine-tuning their activities, what potential internal and external barriers they encounter in the process, and what methodological innovations are possible to improve the performance of green credit in practice. This study, with a multi-case qualitative research design, takes as the research samples ICBC, Industrial Bank, and Bank of Ningbo, which cover large state-owned, joint-stock and small-to-medium-sized institutions, offering a clear gradient on both asset size and green credit capability. With integrated policy analysis combined with a comparative case study, the study is expected to offer a useful reference for policymakers to improve the incentive mechanisms of green finance and for banking practitioners to operate green credit optimally.

2. Development and current status of green finance policies

2.1. Construction of the green finance system

Green finance pushes institutions to incorporate environmental factors in credit decisions and the management of risks, from a marginalized idea to a mainstream policy framework [1].

China's green finance system took its final form successively through three phases. In the period of 2007-2011, environmental factors finally penetrated into credit policy. In the period of 2012-2015, the Green Credit Guidelines established the regulatory framework [6]. After the year of 2016, some instruments, such as the Green Bond Endorsed Project Catalogue, sped the transformation with a diverse system.

The green finance system rests on three core pillars: policy frameworks, regulatory standards, and market mechanisms. Specifically, policy frameworks serve as the guiding foundation, providing strategic guidelines, evaluation metrics, and incentive mechanisms to identify projects eligible for green finance support. Regulatory standards focus on defining criteria for green project qualification and establishing robust environmental risk management rules. Market mechanisms—encompassing green bonds, green funds, and carbon trading systems—are designed to broaden funding channels and enhance the efficiency of capital allocation [7].

2.2. Current status of green credit development

Green credit has emerged as a prevailing force dominating the green finance sector of China. By the end of 2022, China's green loan balance exceeded 20 trillion yuan, making it one of the largest green loan balances in the world [8]. Large and medium-sized state-owned commercial banks have established dedicated green finance departments and complete management mechanisms, such as ICBC.

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Banks have implemented environmental risk rating systems, incorporating environmental factors into all aspects of the credit approval process [5]. Some of the best banks have adopted mechanisms, such as the Equator Principles, adhering to international standards.

Table 1. Comparison of green credit indicators among three banks in 2022

Dimension	Industrial and Commercial Bank of China	Industrial Bank	Bank of Ningbo
Green Loan Balance (100 million yuan)	39,800	6,370	237
Green Loan Growth Rate	37.7%	40.3%	49.74%
Green Loan Ratio	Approximately 15%	Approximately 13%	Approximately 3%

Data Source: 2022 Annual Reports and Sustainability Reports of respective banks

The great difference in the implementation of green credit among different categories of banks seriously affects the balanced development. Large state-owned banks (represented by the ICBC) are ahead in terms of both balance and ratio; joint-stock banks (represented by the Industrial Bank) perform well in terms of ratio, whereas city commercial banks (represented by the Bank of Ningbo) lagged far behind in both measures (Table 1). The imbalance between the scale of large state-owned banks and the gap in green credit ratio indicates that large state-owned banks have quickly moved forward from their own policy implementation strengths and resource advantages, while smaller institutions lack more difficulty in establishing professional expertise and systems [2].

3. Toward the strategic adjustment of commercial bank credit allocation

On addressing environmental challenges, commercial banks restructure their credit portfolios on two parallel tracks, progressively tightening financing to polluting industries and increasing credit flows to green sectors [7].

3.1. Credit structure adjustment

The great state-owned banks restrict lending to "high-energy-consumption and high-pollution" companies by adopting a standard environment risk rating system with tight entry barriers where the environmental impact is a key point of assessment [9]. The green loan balance of ICBC is reaching 3.98 trillion yuan. The joint-stock bank mainly uses the Equator Principles framework to control the risk in the negative list and arrange a range of pricing [5]; the industrial bank is a typical example, with a ratio of green that is about 13%, exceeding that of the large state-owned banks. The common city commercial banks, restrained by capital volume and system of platform, have developed the initial screening mechanism but are still lagging in the field of risk identification. The green loan of Bank of Ningbo is showing a rate growth of 49.74%; however, its overall volume is only 23.7 billion yuan.

Meanwhile, the great state-owned banks have comprehensively implemented renewable energy and pollution control with the promotion of credit, allocating the specific target and conducive policy, conditions and funds for large-scale infrastructure by using the syndicated loans [10]. The joint-stock bank emphasizes the comprehensive nature of environmental risk assessment in the credit process. The common city commercial banks concentrate on the unification of inclusive and green finance, but the overall volume is still limited by the capital [7].

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3.2. Innovating products and services

Large state-owned banks take advantage of their size to develop a diversified green financial product line that includes green mortgages, green loans for consumers, and green supply chain finance [10]. The system of products built by ICBC covers various areas of green development. Joint-stock banks offer all-encompassing services, including green bond issuance and green investment advisory and wealth management [6], and Industrial Bank offers group systems at all levels in the market in areas such as credit, leasing, trust and wealth management. The innovation of city commercial banks focuses on basic green loans, while the mixture of green and inclusive finance is the major characteristic.

Project financing is developed in the form of green infrastructure in combinations with government guarantees and risk-sharing mechanisms by large state-owned and joint-stock banks [10]. City commercial banks still have begun to take part, mainly in the early exploratory steps, in such challenging arrangement.

4. Challenges and barriers in commercial bank credit strategy adjustment

4.1. Profitability concerns and risk pricing dilemmas

Green projects often come with long payback periods and high technological uncertainty, and coupled with regulatory constraints on interest rate setting, green loans naturally appear less commercially appealing than conventional ones. Banks struggle to accurately identify environmental risks, and, without effective pricing models, they face problems of overpricing, which quashes demand, or underpricing, which destroys potential losses. Industrial Bank's ratio of green loans non-performing remains just 0.025%, deep below its total ratio of 0.0192%; yet the bank is unable to convert its exceptional asset, turning this exceptional asset quality into differentiated pricing advantages, implying a lack of robust risk models.

Policy incentives, however, cannot make up for this. Preferential rediscounting and re-lending windows are too small, and tax incentives are underdeveloped, but no assistance is provided for banks in covering extra costs for training and system innovation [11]. With insufficient returns from green loans, banks position them as a compliance responsibility instead of a strategic priority, diminishing the effect of policy in capital allocation.

4.2. Expertise deficits and talent shortages

Evaluating environmental risks requires knowledge of intricate regulations, pollution control technologies and industry-specific impacts, areas where conventionally educated credit officers rarely hold expertise [9]. Such shortcomings, as indicated by the survey, are not confined to a specific category of bank, as even leading players experience a shortage of talent due to Industrial Bank's 2022 initiation of its "Ten Thousand Talent Program" further attesting to an industry-wide shortage. Indeed, the City commercial banks, even with dedicated departments, are weak with regard to the assessment of environmental risk. Also, the product development and clients' management stand at a similar level of weakness, and the challenge of hiring and retaining professionals with a combination of finances and environmental science continues to be a tough one [7].

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4.3. Data infrastructure and information system gaps

Severely compromised data infrastructure still accompanies the successful implementation of green credit. Access to reliable environmental information is crucial to evaluating a borrower's compliance, yet banks have not developed the capability to access such information [1]. Surveys indicate that the demand for small and medium-sized enterprises' green finance is difficult to determine; low and vague prolonged approval criteria of the system are imposed on all lenders' work. Bank systems haven't been taken out by large banks only since 2022—products like "Rong'an e-Credit", developed by ICBC and Bank of China's green finance management system—to show the underinvestment prior to that. The problems of small banks are equally severe—data barriers here are especially acute because of the difficulty of access to environmental information and underdeveloped credit systems.

4.4. External institutional constraints

Green projects include different definitions according to various authorities. Standards vary from one region to another and from industry to industry, causing widespread confusion [12]. The 2022 release of Banking and Insurance Industry Green Finance Guidelines reflected how long a unified standard has been lacking. Because of the lack of standardized indicators, performance comparison in different banks is difficult, which weakens both transparency and accountability [6]. Carbon trading markets are immature; thus, the pricing of environmental risks can't be determined, green certification services are insufficient, and benefits are difficult to certify; and secondary markets are underdeveloped, posing potential liquidity risks [12]. The prevailing opinion assumes that "green finance is not inclusive enough" – small and micro enterprises are facing poor evaluation standards and a lack of digitalization, and policy incentives fail to reach small and medium-sized banks or small and micro clients.

4.5. Structural divergence across bank categories and policy responses

A multiplicity of factors contributes to these disparities. Economies of scale benefit big banks, allowing easy amortization of fixed costs over wide operations, while city commercial banks encounter greatly increased unit costs. Economies of scale benefit big banks, allowing easy amortization of fixed costs over wide operations, while city commercial banks encounter greatly increased unit costs. ICBC's green loan balance reaches 3.98 trillion yuan, while Bank of Ningbo's is just 23.7 billion yuan; this stark difference directly limits the cost of amortization. Policy resources are uneven, with preferential treatments largely focusing on large institutions. Interdisciplinary talent is also skewed towards large banks—Industrial Bank's extensive recruitment through the "Ten Thousand Talent Program" serves as a good example of the competitive disadvantage suffered by small regional banks.

Small- and medium-sized banks are in danger of being marginalized in the green credit field, leading to a structurally unbalanced distribution. Bank of Ningbo's 2.7 million yuan in 2022 penalty for "lack of sufficient implementation of green credit policies" succinctly captures the deep execution and capacity weaknesses facing some city commercial banks. Thus, policymakers need to take into account providing differentiated technical assistance, including collaborative shared data platforms and increased green re-lending quotas.

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5. Optimization recommendations for commercial bank green credit strategies

5.1. Refinement of policy support and incentive mechanisms

Governments ought to increase fiscal interest subsidies and better allocate resources towards environmental data infrastructure and formal green certification systems [9]. Tax exemption of green loan provisions would enhance economic incentives. Subsidy designs that attach disbursements to substantiated environmental outcomes should be taken more seriously [6]. More stringent disclosure requirements apply to large banks. City commercial banks should be given higher technical support and phased transition prescriptions.

Differentiated regulation like lowering risk weights on green loans while calculating capital adequacy, should be implemented without delay [13]. Alleviating capital restraints would be significantly eased by appropriately lowered thresholds for city commercial banks. Central banks can consider the acceptance of green loans within preferential terms for the purpose of refinancing collateral and establishing dedicated windows of refinance to reduce the costs of the funding, especially focusing on small- and medium-sized banks.

5.2. Enhancing product innovation and risk management

Banks should be keen on the expansion of green bonds, green assets, green investments, and green insurance [7]. Big banks may provide diversified product matrices and joint-stock banks can develop integrated products. City commercial banks can focus on the "green + inclusive" finance overlap to develop basic loan products for small and micro borrowers.

Risk management ability should be refined via analyzing and stress testing environmental risks to assess portfolio resilience [1]. Large banks should make superior progress in developing more sophisticated measurement tools; city commercial banks may have the advantage of leveraging shared platforms within the industry to reduce expenses. Banks should establish dedicated information-sharing channels with environmental regulators to enhance clients' operational performance through targeted capacity-building initiatives [7]. Collaborating in the development of green projects can make lending opportunities to ensure compliance.

5.3. Advancing digital transformation and talent development

Fin-tech can also optimize green credit from the following aspects: big data analytics strengthens the precision of risk assessment; the application of artificial intelligence can improve the efficiency of screening and monitoring [1]; and blockchain can enhance the level of transparency and traceability. Large banks can leverage their technological advantage to construct smart platforms; city commercial banks can refer to shared digital tools or cloud services to reduce the cost and admission barriers.

As for talent, large banks can take advantage of brand attraction to hire interdisciplinary talents; joint-stock banks could draw some inspiration from the "Ten Thousand Talent Program" to build expertise in an organized way; city commercial banks should cooperate with universities and industry associations to train talents. The hiring should focus on hiring with dual expertise in both finance and environmental science; meanwhile, banks need to invest in the training of the professional dissemination of environmental knowledge on the credit officers' side.

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6. Conclusion

This study selects Industrial and Commercial Bank of China (ICBC), Industrial Bank, and Bank of Ningbo as representative cases of large state-owned banks, joint-stock commercial banks, and city commercial banks, respectively, to examine the credit strategy adjustments and challenges faced by these three types of banks from a micro-level perspective.

The findings point to a clear gradient in how the three categories of banks approach credit strategy. Tapping into their scale, large state-owned banks lead on aggregate green credit volume; ICBC, for example, posted a green loan balance of RMB 3.98 trillion by the end of 2022, clearly pointing to a "scale-driven" orientation. Joint-stock commercial banks are carving out a different niche. As China's first Equator Principles bank, Industrial Bank commands a green loan ratio of roughly 20%, beating the major state-owned banks, which signals a "quality-first" strategic posture. City commercial banks, held back by their capital base, show a catch-up dynamic of "high growth yet weak foundation". Bank of Ningbo, for instance, notched a green loan growth rate of 49.74%, yet its absolute volume stood at just RMB 23.7 billion.

The challenges all three bank types face have much in common. Inside the organization, the mismatch between risk and return, the shortfall in specialized know-how, and patchy data systems are shared and nagging headaches. Outside, persistent problems like the absence of unified green credit standards, the underdeveloped carbon trading market, and scarce green certification services continue to drag on real progress. Tackling these issues calls for joint action from policymakers and bankers alike: regulators should roll out differentiated rules, while banks themselves must push ahead with tailored product development and digital upgrades suited well to their own resource bases.

This study has three limitations: it does not employ primary interview data, it covers only three case banks, and it does not use econometric methods to verify causal effects. Future research may further test these findings through questionnaire surveys or panel data models.

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