

Innovation and Lessons Learned in Financing Models of Chinese and Foreign Banks under the Green Development Concept: A Case Study of Deutsche Bank and Weihai Bank

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Abstract: By contrasting Deutsche Bank's international experience with Weihai Bank's localization practices in China, this paper employs micro-level case studies to illuminate macro-level phenomena. It reveals the driving logic and evolutionary pathways of green financing behavior under differing institutional environments, while offering practical insights for localizing international expertise within China's banking sector during its green transition. The discussion will separately analyze the green financing strategies and existing challenges of Deutsche Bank and Weihai Bank within their respective institutional contexts, identifying complementary strengths and weaknesses for mutual enhancement. Employing SWOT analysis, this paper will conduct detailed examinations of both institutions, highlighting divergences in green financing philosophies and strategies between Chinese and international banks. This provides insights for innovative financing model development under green development principles.

Keywords: Green Finance; Green Financing; Green Regulation

1. Introduction

Amidst the prevailing trend of rapid economic development, environmental challenges have increasingly become a paramount issue requiring human resolution, with addressing environmental concerns now an indispensable component. Green sustainable development has progressively emerged as an international consensus and a strategic priority for banks. Financial institutions play a pivotal role in this process. Governments worldwide have introduced diverse policies to encourage banks in pursuing green sustainable development practices, whose financing activities exert profound influence on resource allocation and

the transition towards a green economy. In developing nations such as China, enterprises often possess relatively outdated pollutant treatment technologies at the technical level. Moreover, these businesses rely heavily on government subsidies, low-interest bank loans, and even international aid to implement technological upgrades. Without sustained financial backing and robust regulatory frameworks, achieving green development objectives would prove challenging. Nevertheless, despite green development remaining in its nascent stages across many developing countries, some regional banks have already commenced issuing green bonds and updated their ESG rating systems. Leveraging their local knowledge, these institutions have achieved notable success in deepening green financing processes within their regions. Furthermore, developing nations like China benefit from more unified national strategies and higher implementation efficiency. Under state guidance, green credit policies enable banks to concentrate resources for rapid response – an approach developed nations could learn from. For developed economies, green development has reached an 'advanced stage', establishing ecological restoration as a core developmental focus. Strict institutional frameworks govern carbon emissions, with governments mandating carbon taxes (CBMA) on high-carbon products. Since 2007, European nations have issued substantial green bonds, playing a pivotal role in driving global green investment while elevating the euro's standing in international financial markets. Moreover, in environmental risk assessment, European banks pioneered green lending earlier than others, demonstrating clear advantages over developing nations in conceptual frameworks, product offerings, and data accounting. However, certain European banks engage in green-washing practices, deceiving environmentally conscious investors

and making it difficult for genuinely sustainable enterprises to secure financing for green projects. This misleading promotion is the fundamental reason behind the widespread skepticism surrounding European banks' green credentials. Among existing research findings, the vast majority of studies focus on the role and outcomes of large banks in guiding green financing for smaller institutions. Perspectives on mutual reference and learning are notably scarce. For Chinese small and medium-sized banks, their financing scale presents a significant disadvantage compared to large banks, necessitating the adoption of methods employed by large foreign banks to expand green financing. Regarding the green financing models of large foreign banks, numerous details-such as integrity data disclosure-present certain issues. These very issues are often handled relatively well by small and medium-sized banks. Consequently, this study proposes an innovative approach of complementary learning between Chinese small banks and large foreign banks.

2. Case Subjects

2.1 Weihai Bank

In accordance with the relevant requirements of the Green Finance Guidelines for the Banking and Insurance Industries and the relevant standards of the International Sustainability Standards Board (ISSB), Weihai Bank has formulated the Three-Year Action Plan for Green Finance and the Annual Green Finance Brand Building Campaign Plan. These initiatives aim to enhance green finance services across the entire bank, clarify development objectives for green finance, and establish a systematic framework for the bank's green finance development. By the end of 2024, the bank's green loan balance stood at RMB 37.713 billion, representing an increase of RMB 11.692 billion since the beginning of the year, with green loans accounting for 17.93%[6].

Weihai Bank has deepened its engagement in local green financing, leveraging its geographical advantages and understanding of regional characteristics to vigorously advance marine ecological conservation and ocean-related initiatives. On June 24, 2022, China Life Property & Casualty Insurance signed a shellfish carbon sink index insurance contract with the Wendeng District Oyster Cultivation Association in Weihai. This policy

provides RMB 1 million in carbon sink loss risk coverage for 500 mu (approximately 33 hectares) of oysters cultivated by Runfutang Marine Technology Co., Ltd., marking China's inaugural fishery carbon sink index insurance policy. As a green insurance product, this policy uses the economic value of oysters' carbon sequestration (oysters act as "marine filters", which absorb carbon dioxide from seawater to form calcium carbonate shells during growth, thereby exhibiting significant carbon sequestration capabilities). It covers events where oyster carbon sequestration weakens due to specific marine environmental changes, filling a gap in carbon sequestration index insurance for marine aquaculture. This provides the green industry of shellfish farming with dual risk protection for both marine carbon sequestration and operational production. However, due to the impact of the pandemic and market factors, Runfutang Marine Technology Co., Ltd. encountered a funding bottleneck in expanding production scale and daily operations. Moreover, multiple banks declined the loan application as oyster farming could not be used as collateral. Subsequently, with support and coordination from the People's Bank of China's Wendeng Sub-branch and the Wendeng Supervision Group of the Weihai Banking and Insurance Regulatory Bureau, the company engaged in discussions with multiple commercial banks. Following thorough deliberation, an agreement was reached with the Wendeng Sub-branch of Weihai Commercial Bank. This model utilizes carbon sink index insurance policies as collateral. Should marine disasters such as storm surges or red tides damage oyster stocks and diminish carbon sequestration, thereby compromising the borrower's repayment capacity, the bank may prioritize loan repayment using insurance claims from the pledged policies. Ultimately, Runfutang Marine Technology Co., Ltd. successfully secured a ¥1 million loan through this innovative approach, resolving the company's immediate financial crisis.

Additionally, Weihai Bank has conducted thorough investigations into further relevant marine industries. Among these, a Rongcheng-based marine aquaculture company stands as one of the city's largest kelp farms, specializing in kelp cultivation with the nation's foremost cultivation area and yield. Given kelp farming's pivotal role in marine carbon sequestration systems, Weihai Bank tailored its

approach to the company's operational characteristics. Utilizing the enterprise's anticipated marine carbon sink revenue rights from kelp cultivation as collateral enhancement, the bank registered and disclosed the pledge rights through the People's Bank of China's Unified Registration and Disclosure System for Movable Property Financing. This was combined with a mortgage on the company's maritime usage rights to extend a RMB 30 million loan secured against marine carbon sink revenue rights. This effectively revitalized the enterprise's capital. The pledge registration and public notice were processed through the People's Bank of China's Unified Registration and Publicity System for Movable Property Financing. Combined with a mortgage on the marine area usage rights, the bank granted the enterprise a 30 million yuan marine carbon sink revenue rights pledge loan. This effectively revitalized the enterprise's dormant green assets and pioneered new financing channels for marine enterprises.

2.2 Deutsche Bank

Commencing in 2020, Deutsche Bank announced for the first time that it would incorporate ESG criteria into its executive remuneration framework as part of its green development incentive mechanisms. The bank also updated its Long-Term Incentive plan for board members, linking a portion of their remuneration to the decarbonization of the bank's corporate loan portfolio for the first time. According to the new annual report, the ESG component now constitutes one-third of the long-term incentive remuneration for the Management Board. The 2023 Annual Report [4] further highlights a new structure for the long-term component of executive variable remuneration, under which financial and ESG targets will form core objectives over a three-year period. The environmental Key Performance Indicators (KPIs) within the ESG remuneration component will focus entirely on the bank's disclosed emissions reduction targets for financing carbon-intensive industries, aligned with its published net-zero pathway.

In its accounting methodology, Deutsche Bank employs the PCAF standard [5] to assess transition risks within its investment portfolio and discloses the financed emissions of its European residential real estate loan portfolio. Its carbon accounting primarily relies on

client-reported Scope 1 and 2 data [5], supplemented by internally calculated sectoral emission factors. In 2023, the bank's corporate lending portfolio received a financing emissions data quality score of 4.3 (where 5 represents the lowest data quality rating), reflecting its reliance on and limitations of this data. To enhance accounting accuracy, Deutsche Bank continuously optimizes its methodology through multi-party verification to ensure data reliability and maintain alignment with international standards. Deutsche Bank regards carbon accounting as a vital component of its risk management framework, integrating the transition of carbon-intensive industries with its banking strategy through the establishment of medium- and long-term objectives. The bank discloses its financed emissions targets, progress and action plans in detail within its annual and sustainability reports, enhancing transparency and traceability. Concurrently, Deutsche Bank employs a limited assurance audit approach to bolster disclosure transparency, thereby providing stakeholders with a degree of confidence in the reported data.

Naturally, Deutsche Bank has also taken a detour in its disclosure and promotion of green financing information. In June 2022, Deutsche Bank's German investment banking arm (DWS) was implicated in greenwashing, which led to asset valuations being significantly inflated beyond their true worth, thereby misleading investors into making erroneous judgements. The bank was ultimately fined €25 million. However, since CEO Stefan Hoops took the helm, a series of reforms have been implemented to address integrity issues and future green transition. These include enhancing ESG disclosure mechanisms, accepting stricter EU green finance scrutiny, abolishing the previous ESG rating system, and acknowledging the overstatement of ESG assets in the 2021 annual report.

Following its greenwashing incident, Deutsche Bank released its inaugural transformation plan in October 2023, outlining its decarbonization strategy and actions across three dimensions: its own operations, supply chains, and financing services provided to clients. The plan has been approved by the Group Sustainability Committee. The document explains how Deutsche Bank integrates sustainable financing and ESG investment objectives into its strategic planning process, detailing how sustainability principles

have been embedded within client dialog mechanisms since 2020. Concurrent with the plan's release, the bank established additional emissions reduction targets for shipping, cement and coal mining within its corporate lending portfolio. This follows last year's announcement of pathway targets for the oil and gas, automotive, power generation and steel sectors. Consequently, net-zero targets for the seven most carbon-intensive sectors now cover 54.4% of the bank's corporate lending portfolio's financed emissions (as of end-2023). Furthermore, Deutsche Bank proposes that from 2026 onwards, at least 90% of high-emission clients entering new corporate lending transactions with the bank within the most carbon-intensive sectors should have established net-zero commitments.

3. Case Study: SWOT Analysis of Green Financing by Deutsche Bank and Weihai Bank

3.1 Weihai Bank

3.1.1 Strengths

Firstly, through the pledge of carbon sink index insurance policies, Weihai Bank has transferred credit risk to the bank, restructured its pledge business processes, and to some extent alleviated the financing difficulties faced by small and micro enterprises. In advancing the 'carbon peak and carbon neutrality' process, marine carbon sink index insurance, as a vital carbon sequestration vehicle, holds promising development prospects. The 'marine carbon sink insurance plus credit' model addresses not only the funding difficulties of individual enterprises but also represents a significant innovation in banking-insurance collaboration. With ongoing refinement and wider adoption, it will undoubtedly foster mutual benefits for banks and insurers.

This initiative demonstrates multiple benefits: fostering the sustainable development of green finance operations, safeguarding the achievement of dual carbon targets, and resolving corporate financing challenges. It aligns profoundly with local green development requirements, leveraging precise understanding of regional marine ecosystems and industrial characteristics to establish differentiated competitiveness within marine carbon sink finance. This approach effectively mobilizes local marine green assets, reflecting Weihai

Bank's commitment to deepening localized green investment and financing. Secondly, Weihai Bank demonstrated efficient policy responsiveness and coordination, swiftly formulating its Three-Year Action Plan for Green Finance in alignment with China's dual carbon goals and policy requirements such as the Green Finance Guidelines for the Banking and Insurance Industries. By the end of 2024, green loans had grown by 44.93%, indicating substantial expansion in this area. Throughout this process, the bank has garnered multiple accolades within the green finance sector. Moreover, during a critical phase of green financing, Weihai Bank collaborated with the People's Bank of China and the Banking and Insurance Regulatory Bureau to pioneer the "Marine Carbon Sink Insurance + Credit" model. This approach mitigates credit risk through carbon sink index policy pledges, restructuring collateralization procedures. It simultaneously addresses SME financing collateral challenges and expands green finance service scenarios, establishing an innovative business model. Finally, demonstrating strong risk awareness, Weihai Bank balanced the societal nature of green lending with its own operational security by employing carbon sink index insurance as a 'safety net'.

3.1.2 Weaknesses

Firstly, Weihai Bank faces certain disadvantages both in terms of its operational reach and capital scale. As a city commercial bank, its influence remains relatively limited due to a small number of branches in other regions (covering only Shandong Province and Tianjin Municipality, totaling 17 branches) and a modest branch network (126 branch institutions under its jurisdiction as of 2025). Its operations are primarily concentrated within the domestic regional market, with green financing initiatives constrained by geographical limitations. This hinders the bank's ability to engage in cross-regional and global green project collaborations akin to international banks, resulting in weaker economies of scale. The bank's green loan balance this year stands at RMB 37.713 billion. Compared to large state-owned or international banks, its capital replenishment channels are narrower and funding scale more limited. This may create funding pressures when supporting large-scale green projects (such as cross-regional new energy infrastructure), potentially severely

constraining business expansion speed. Finally, deficiencies exist in data processing capabilities and information disclosure. Compared to European banks, gaps persist in data collection and accounting methods for green risk assessment, with ESG rating systems being updated later. This may impact the accuracy and efficiency of identifying risks in green projects. Moreover, the case study presented in the annual report did not disclose the specific enterprise name (substituting it with "a certain aquatic company in Rongcheng"), which may foster investor skepticism regarding the enterprise and raise concerns about the bank's potential risks of "greenwashing" and "greenwashing".

3.1.3 Opportunities

Firstly, the Chinese government's emphasis on environmental protection has enabled the sustained release of policy dividends. The introduction of policies such as the Green Finance Guidelines for the Banking and Insurance Industries and the Implementation Plan for High-Quality Development of Green Finance in Banking and Insurance has standardized green development within the financial sector. The People's Bank of China also provides re-lending support for green investment and financing by financial institutions. Concurrently, local governments are advancing marine economies and green, low-carbon, high-quality development, offering policy support and project resources for Weihai Bank to further deepen its local green investment and financing activities. Secondly, China's carbon sink financial market holds substantial potential. This market extends beyond marine carbon sinks—a key focus for Weihai Bank—to encompass vast prospects in forest and wetland carbon sink sectors. Moreover, with growing market demand for innovative products such as carbon sink index insurance and carbon sink revenue rights pledging, Weihai Bank can accelerate business expansion to cultivate new profit growth points.

3.1.4 Threats

Firstly, intensifying industry competition, with major state-owned banks increasingly entering the green finance sector, may squeeze Weihai Bank's share of the regional green finance market. This is particularly evident in the heightened competitive pressure to secure high-quality green financing projects. Secondly, the green industry is significantly influenced by market supply and demand, raw material prices, and other factors. Fluctuations in oyster market

prices and shifts in market demand can also lead to reduced corporate profits, affecting loan repayment capacity. Concurrently, further standardization of China's green finance policies may increase business compliance costs and risk uncertainties. Additionally, unforeseen events such as natural disasters or conflicts can impact green development and investment financing. Most of the seafood (oyster) farming operations may suffer total destruction due to marine disasters (tsunamis, giant waves), leaving enterprises unable to repay loans. Despite banks holding carbon sink index policies as collateral, resolving such issues still demands considerable time and manpower. Finally, green projects typically feature extended timelines and high uncertainty. Moreover, technologies for carbon sink valuation and environmental risk quantification remain immature, potentially leading to the accumulation of credit and market risks. This places heightened demands on banks' risk management capabilities.

3.2 Deutsche Bank

3.2.1 Strengths

Firstly, Deutsche Bank possesses a distinct advantage in its international footprint and resource capabilities. As a major global bank with worldwide operations, it can consolidate resources for cross-border green projects and undertake large-scale sustainable financing alongside ESG investments. According to current data, its portfolio reached €279 billion by the end of 2023, with a target of €500 billion by the end of 2025 [4], demonstrating significant influence in the global green finance market. Secondly, its green investment and financing philosophy and strategy are advanced. By linking ESG targets to executive remuneration, it compels senior management to prioritize medium-to-long-term projects such as sustainable financing and decarbonization support. This effectively prevents financing projects that sacrifice the present environment for short-term, high profits. In 2023, Deutsche Bank's executive leadership proactively expanded emissions reduction initiatives in sectors such as cement and shipping to meet ESG remuneration targets. This action effectively safeguarded the implementation of its green sustainability strategy, thereby clarifying and deepening its decarbonization roadmap. Furthermore, Deutsche Bank established a clear net-zero transition plan covering three

dimensions: its own operations, supply chain, and client financing services. It set emission reduction targets for seven carbon-intensive sectors, including oil and gas, automotive, and shipping, covering 54.4% of its financed emissions. Finally, the bank possesses robust capabilities in technology and risk assessment, having pioneered early entry into green risk environmental evaluation. Its data collection and accounting methodologies are mature, and it actively undergoes the EU's stringent green finance review (SRAD). Following incidents of greenwashing, Deutsche Bank has explicitly enhanced its ESG disclosure mechanisms, enabling more precise identification and management of green project risks.

3.2.2 Weaknesses

Firstly, Deutsche Bank's subsidiary DWS was fined €25 million in 2022 for alleged greenwashing in its financial communications, significantly impacting the bank's net profit for that year. As the parent company of Deutsche Bank, Germany's investment banking arm, bears primary regulatory responsibility. This directly eroded investor confidence in Deutsche Bank. In the short term, it not only fostered deep skepticism among existing investors but also severely hampered the expansion of green finance operations, inflicting significant damage to the brand's reputation. To address integrity concerns and advance its green transition, Deutsche Bank must abolish its outdated ESG rating system, enhance its disclosure mechanisms, and submit to stricter oversight. This necessitates establishing dedicated compliance teams to meet regulatory requirements, alongside substantial investments in data collection and disclosure efforts. Consequently, increased compliance and operational costs may exert short-term pressure on profitability. Finally, as a multinational bank, it must navigate divergent green finance policies and carbon pricing mechanisms across different countries and regions (such as the EU's CBMA carbon tax). The complexity of policy alignment may reduce the efficiency of advancing green business initiatives in certain sub-regions.

3.2.3 Opportunities

The global consensus on green and sustainable development continues to strengthen. As a developed nation in Europe, Germany has taken an early lead in advancing green finance. Many developing countries require financial resources and expertise from developed nations to support

green development, often due to funding shortages or technological gaps. Deutsche Bank can provide sustainable financing solutions and projects for local enterprises and governments. By advancing net-zero transition initiatives, it can further expand its operations in green lending, green bond issuance, and carbon derivatives. Concurrently, by participating in global green finance standard-setting and international cooperation initiatives, it can leverage its technological and resource advantages to facilitate the alignment of green finance standards across different regions. This approach enhances its influence within global green finance governance while expanding cross-border green business collaborations, thereby opening up substantial market opportunities for Deutsche Bank.

3.2.4 Threats

Firstly, regulatory oversight of green finance continues to intensify across the European Union and globally, with increasingly stringent requirements for ESG disclosure and the definition of green projects. For instance, the EU's Sustainable Finance Disclosure Regulation (SFDR) explicitly mandates comprehensive disclosure of sustainability-related information by financial institutions, aiming to enhance ESG transparency in financial products while rigorously combating greenwashing practices. Deutsche Bank, having failed to meet these regulatory standards, ultimately faced substantial fines. Secondly, mirroring the threats faced by Weihai Bank, other major international banks (such as HSBC and Citigroup) are intensifying their green finance initiatives, heightening competition. Concurrently, emerging green financial institutions (e.g., the European Hydrogen Bank) and sustainability funds may divert some ESG investors and project resources, posing substitution threats. Finally, transition risks remain relatively high in carbon-intensive sectors. Banks maintain substantial financing exposure to oil and gas extraction, coal mining, and other carbon-heavy industries. However, decarbonization progress in these sectors is slow due to technological constraints or funding shortages, while most conventional energy extraction faces policy restrictions (such as rising carbon taxes and capacity controls). This could elevate loan default risks, subsequently increasing banks' non-performing loan ratios.

4. Optimization Recommendations

4.1 Weihai Bank

Firstly, to expand the scale of green financing, Weihai Bank must overcome geographical constraints by strengthening cross-regional cooperation[7]. This involves establishing collaborative partnerships with city commercial banks or major state-owned banks in other provinces for green projects, actively participating in cross-regional green financing initiatives beyond marine-related sectors-such as new energy construction and ecological restoration-while sharing resources and mitigating risks with other banks to progressively broaden its operational reach. Secondly, drawing upon Deutsche Bank's mature management experience, it should introduce specialized technical teams or collaborate with third-party data institutions to refine its green risk assessment data systems. Crucially, it must learn from Deutsche Bank's 'greenwashing' lessons by optimizing its ESG rating systems to enhance the precision and efficiency of identifying risks in green projects. Regarding disclosure, annual reports and green finance-related documentation should provide detailed information on partner enterprises, project specifics, and carbon sink valuation methodologies. This transparency will alleviate investor concerns about greenwashing and enhance market confidence. Finally, we must strengthen regional distinctive advantages by deepening engagement in marine carbon sink finance. This involves continuously innovating specialized products such as "marine carbon sink insurance plus credit facilities", expanding financial services related to forest and wetland carbon sinks, and establishing differentiated competitive strengths to consolidate our share in the regional green finance market.

4.2 Deutsche Bank

Firstly, Deutsche Bank should further enhance its brand credibility by continuously refining its ESG disclosure mechanisms, consistently monitoring the performance of ESG projects [1-2], and regularly publishing detailed green finance business reports to enable investors to clearly understand its operational status. Through concrete actions, it must rebuild investor trust and gradually mitigate the negative impact of greenwashing incidents. Additionally, Deutsche Bank should proactively submit to oversight by the EU's supervisory mechanisms,

closely monitor EU and global green finance regulatory developments, pre-emptively position itself to meet stricter green financing regulatory requirements, actively participate in establishing global green finance standards, enhance its influence in industry rule-making, and mitigate the impact of regulatory policy shifts. To adapt to markets with divergent global policies, Deutsche Bank must establish a dedicated policy research team to conduct in-depth analyzes of green finance policies and carbon pricing mechanisms across different countries and regions. Branches and even individual outlets should promptly report local policy changes to head office departments, enabling them to formulate targeted regional green financing strategies and thereby enhance competitiveness in green business across diverse regions.

5. Conclusion

This essay employs Chinese city commercial banks and foreign banks as case studies, utilizing the SWOT analysis methodology to visually illustrate the respective strengths and weaknesses of Weihai Bank and Deutsche Bank in green financing. This novel perspective, examining the micro to understand the macro, reveals the divergences and distinctive features in the green finance development trajectories between China and European nations. As a representative of Chinese city commercial banks, Weihai Bank leverages its regional market expertise to effectively address local SME financing challenges, promote green development strategies and technological innovation among small and medium-sized enterprises, and even revitalize local green assets [3-4,8]. This process enables foreign banks to draw lessons from Chinese SMEs' approaches to localizing green credit within their regionally focused operations, learning their strategies for establishing deep-rooted regional green finance initiatives to further advance sustainable development. Additionally, banks in developed nations must strengthen their own regulatory frameworks to ensure the authenticity and effectiveness of green investment and financing. Similarly, foreign banks can share their green transition philosophies, models, and methodologies with Chinese SMEs, while also appropriately assisting banks in developing countries to advance their green progress (through technical support, management expertise, etc.). Whilst adopting foreign banks'

philosophies, China's SMEs should actively assimilate their advanced concepts and technical tools to accelerate green investment and financing service capabilities alongside product innovation – constituting one of this study's innovative contributions. Consequently, as the global industry deepens its low-carbon transition, banks will increasingly play a pivotal role in green financing, propelling high-quality development across the world economy.

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