Green Finance in Promoting Regional Environmental Protection: A Case Study of Beijing-Tianjin-Hebei Region

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Abstract. This study takes the Beijing-Tianjin-Hebei region as an example to explore the role and practice path of green finance in regional environmental protection. Green finance has promoted the development of regional environmental protection industries, facilitated the development of green buildings and housing projects, enhanced the scale and quality of green investment, and also led to the improvement of air quality and water quality in the three regions through various tools such as green credit, green investment and carbon finance. However, there are also deficiencies in the development of green finance in the Beijing-Tianjin-Hebei region, such as policy differences among them, non-uniformity of information disclosure platforms and barriers to integration with traditional industries. In response to these problems, the study proposes policy recommendations to improve institutional construction, market mechanisms and platforms as well as to promote the integration of industry and finance, in order to promote the further development of green finance in the three regions and help regional environmental protection and high-quality development.

Keywords: Green finance, Beijing-Tianjin-Hebei region, environmental protection.

1. Introduction

The environmental level of the Beijing-Tianjin-Hebei region has been significantly improved in recent years. The three regions has significantly improved air quality through the implementation of strict air pollution control measures. In 2024, for example, the average PM2.5 concentration in the “2+36” cities in the Beijing-Tianjin-Hebei and neighboring regions was 42.2μg/m3, a year-on-year decrease of 0.9%; the average O3 concentration was 179μg/m3, a year-on-year increase of 0.6%. And the average number of good days ratio was 68.3%, up 3.9 percentage points year-on-year; the average ratio of days with heavy and above pollution was 1.7%, down 2.0 percentage points year-on-year. The average proportion of days exceeding the standard caused by dusty weather was 1.7%, of which the proportion of days with heavy and above pollution was 0.1%. In terms of water quality, the Beijing-Tianjin-Hebei region achieved certain results in water pollution prevention and control, and the water quality of major rivers and lakes improved. In terms of water quality, the Beijing-Tianjin-Hebei region achieved certain results in water pollution prevention and control, and the water quality of major rivers and lakes improved. The construction of sewage treatment facilities has been accelerated, and the urban sewage treatment rate has increased significantly. For instance, Beijing has accelerated the implementation of the Tongzhou District and the “Three Northern Counties” coordinated development plan, worked with Hebei Province to study the water resources of the urban sub-center and the three northern counties of Hebei Province, and assisted in promoting the construction of Langfang's water supply pipeline network to the three northern counties, so as to improve the overall resilience of the region's water resources, and to promote coordinated development of the water and the economy [1]. The three places also strengthen the construction of ecological protection zones. The afforestation of 106,000 mu of stony mountains in the Sehamba Forest Farm in Hebei Province has been completed, with the afforestation survival rate and preservation rate reaching 98.9% and 92.2% respectively. Compared with the early stage of construction, the forest coverage rate of the forest has increased from 11.4% to 82%, and the area of forested land in the forest has increased to 1.151 million mu.

The improvement of the environmental level in the Beijing-Tianjin-Hebei region has benefited from the support of green financial policies [2-3]. The improvement of the ecological environment in the Beijing-Tianjin-Hebei region provides a reference for other regions and is becoming a hotspot of the current environmental finance research. Therefore, this study starts from the concept and tools of green finance, then deeply analyzes the development of environmental protection-related industries in the Beijing-Tianjin-Hebei region, the current problems, and puts forward targeted recommendations, trying to provide useful reference for the development of other regions.

2. Concept of Green Finance and Financial Instruments

The outstanding achievements of environmental protection in the Beijing-Tianjin-Hebei region are inseparable from the development of green finance. Green finance refers to the financial services provided for project investment and financing, project operation and risk management in the fields of environmental protection, energy conservation, clean energy, green transportation and green building.

Green finance includes tools such as green credit, green investment and carbon finance.Green credit can guide the flow of funds, so that financial resources are fully utilized to support the development of low-carbon and environmentally friendly enterprises. Meanwhile, it increases the production costs of such enterprises by raising the lending threshold of high-pollution and high-emission enterprises, thus realizing high-quality economic development. And carbon finance incorporates carbon intensity into the construction system of green finance indicators measured by the ratio of local and foreign currency loan balances to carbon emissions. Through the combined application of the above financial instruments, green finance in the Beijing-Tianjin-Hebei region succeeds the “win-win” of industrial transformation and environmental protection.

3. Green Finance Promotes Environmental Protection Industry in Beijing-Tianjin-Hebei Region

Green finance in the Beijing-Tianjin-Hebei region has promoted the development of mortgage and real estate-related industries, environmental protection enterprises, green investment and other industries, leading to endogenous growth of the regional economy.

3.1. Mortgage and Real Estate Related Industry

Financial institutions provide low-interest loans or preferential loan lines for green building projects to lower the financing costs of developers, encouraging them to develop more green housing projects. Meanwhile, developers can raise funds for green building development by issuing green bonds which are favored by investors for their coherence to the current green development concept of sustainable development [4]. Additionally, the government effectively reduces the development cost and increases the attractiveness of the project by providing financial subsidies or tax breaks for green building projects.

As people's awareness of environmental protection increases, consumer demand for green housing is not only limited to basic space and cost-effective needs, but also pays more attention to energy saving and environmental protection. Green housing employs energy-saving materials and technologies to reduce energy consumption and operating costs to provide a healthier and more comfortable living environment. And financial institutions, guided by green financial policies, develop specialized green mortgage products to meet the needs of the green housing market. For housing that meets green standards, they can provide higher loan commitment to support home buyers to purchase higher-value green housing [5]. Thay can also extend the repayment period of green housing loans to reduce the repayment pressure of home buyers. Hese innovative products will attract more home buyers to choose green housing, thus promoting the growth of the mortgage business.

Green finance effectively enhances the supply of environmentally friendly housing projects and stimulates the demand for people's housing in the Beijing-Tianjin-Hebei region. And the organic combination of the two factors promotes the development and green transformation of mortgage and real estate-related industries.

3.2. Green Investment

Banks and governments in the Beijing-Tianjin-Hebei region have promoted the scale and quality of green investment by formulating policies, providing green credit, and building a carbon trading market to guide capital out of highly polluting enterprises and restrict their development.

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Tianjin, together with Beijing, has supported the green transformation of the industrial sector through the establishment of a green industry fund. In 2024, Tianjin took the lead in setting up a soil pollution prevention fund in the country, which is complementary and synergistic with the local Haihe Industry Fund and is committed to “importing projects with the fund, attracting capital with the projects, and boosting the industry with the capital”, helping the construction of a waste recycling system and the development of a green and low-carbon economy [6]. Simultaneously, Tianjin also supported Binhai New Area and Wuqing District which successfully declared the first batch of national manufacturing new technology reform and the second batch of small and medium-sized enterprise digital transformation pilot city qualification, driving a number of high-quality technology reform projects in the city, and vigorously promoting the enterprise equipment renewal, process upgrading, digital empowerment.

Hebei Province has launched the environmental pollution liability insurance as well, which reduces the environmental risks of enterprises while increasing the operating costs of highly polluting enterprises and attracting investors to put funds into the green industry.

Through different investment policies, the three places have made investors attach more importance to the environmental effects of their investment projects, guiding the healthy flow of capital and promoted the development of green investment.

4. Deficiencies

Although green finance in the Beijing-Tianjin-Hebei region has promoted the development of environmental protection and its related industries , there are still several issues. Some differences in green finance policies in the three regions lead to inconsistent policy implementation, affecting the overall development of regional green finance [7]. For example, the green bond approval process in Beijing tend to focus more on the project's environmental benefit assessment and technological innovation, while these in Tianjin may pay more attention to the project's economic benefits and social impact.Such differences contribute to the need for enterprises to prepare different application materials and assessment criteria according to the policy requirements of different regions when applying for green bonds, increasing the operational difficulties and market operation costs for enterprises. Moreover, differences in subsidy policies might have an influence on firms' decisions. Beijing tend to offer higher financial subsidies or tax incentives for green bond issuance, while Tianjin offers relatively smaller subsidies, which makes enterprises face uncertainty in choosing the region to issue green bonds, further affecting the unity and efficiency of the green financial market. The policy inconsistency not only increases compliance costs for enterprises, but also reduces the synergy and coherence of the overall development of green finance in the region.

Even though diversified financial instruments are already available in the three places, the lack of a unified information disclosure platform has led to fragmentation of information and made it difficult for investors to obtain comprehensive information. For example, information on green bond projects in Beijing may be mainly focused on the official websites of the Beijing Municipal Bureau of Financial Supervision or relevant financial institutions, while that in Tianjin is published on financial platforms or corporate announcements in Tianjin, and that in Hebei Province may be scattered across different platforms of various local government departments, financial institutions, and corporations. Investors who want to have a comprehensive understanding of green financial projects in the Beijing-Tianjin-Hebei region need to search and screen on multiple platforms separately, which greatly increases the time cost and energy consumption for information acquisition. The green financial policies and projects in Beijing, Tianjin and Hebei have their own characteristics, and the lack of a unified information disclosure platform makes it difficult to form effective synergies among the green financial projects in each place [8]. The green finance in Beijing projects may have strengths in technological innovation and high-end services and those in Tianjin may excel in green transformation of the manufacturing sector, while those in Hebei Province may focus more on ecological restoration and green agricultural development. Due to the lack of information harmonization, the complementary advantages and synergistic development between projects around the region are limited, and the overall synergy of green finance in the Beijing-Tianjin-Hebei region cannot be brought into full play, which affects the process of regional green finance integration.

On top of that, there are still large integration barriers between green finance and traditional industries, which fails to provide sufficient financial support for industrial green transformation. Some of the highly polluting enterprises in Hebei Province have limited funds of their own and can hardly afford the high costs required for green transformation. Despite the financial support that green finance provides, financial institutions will be more cautious in providing funds because these enterprises often have high environmental risks and uncertainties [9]. Some traditional iron, steel and chemical enterprises need to carry out equipment renewal and technological upgrading to achieve energy saving and emission reduction, but due to the lack of sufficient collateral or low credit rating, it is difficult to obtain sufficient green credit support from financial institutions. Because of the existence of the above barriers to integration, the application of green finance in some highly polluting enterprises in Hebei Province is much less effective [10]. It is difficult for these enterprises to obtain sufficient financial and technical support to complete their green transformation, resulting in green finance not being able to give full play to its role in promoting the green transformation of industries, and some enterprises may not be able to implement energy-saving and emission reduction projects due to insufficient funds, thus failing to realize the expected environmental and economic benefits.

5. Policy Recommendations

Based on the above issues, the study puts forward some suggestions for the further enhancement of green finance in the Beijing-Tianjin-Hebei region.

5.1. Improve System Construction

The Beijing-Tianjin-Hebei Green Finance Development Guideline, jointly issued by Beijing, Tianjin and Hebei Province, provides policy guidelines for the development of green finance in the region. Based on this, there is a need to further harmonize policy formulation among the three regions through regional cooperation mechanisms to ensure policy consistency and coherence. The development of green finance in the three places has been fruitful, but a unified financial market has yet to be formed currently. Therefore, the three regions ought to join hands with the ecological and environmental sectors and financial regulators to formulate green financial standards and guide financial institutions and enterprises to follow these standards through policies [11]. It is also important to ensure that green financial activities are legally enforceable through local legislation and policy revisions.

5.2. Improve Market Mechanisms and Platforms

The Beijing-Tianjin-Hebei region is supposed to work jointly to establish a unified green financial trading platform to improve market transparency and liquidity. At present, the three places have launched a variety of green financial instruments, such as he “Beijing Green Pass” special rediscounting directed to support green enterprise note financing, which makes the barriers of the green financial market of the three places gradually broken down and the market further unified. As adverse selection and moral hazard still exist in the green finance market, the three regions should also strengthen the disclosure of information on green projects through policy guidance to alleviate the problem of information asymmetry. There are also significant geographical differences in the effectiveness of green finance. Spatial Durbin Model (SDM) and Moran's Index demonstrates that the spatial distribution of the impact of green finance on the environment in Beijing-Tianjin-Hebei is characterized, i.e., Beijing and Tianjin are in the "high-high" agglomeration, while most of the cities in Hebei Province are in the "low-low" agglomeration. Meanwhile, environmental regulation has a positive spillover effect on neighboring cities under the geographic weight matrix, while it shows a negative spillover effect under the economic weight matrix and the economic-geographic weight matrix [12-13]. Therefore, it is wise for Hebei Province to emphasize the radiation-driven role of large cities, and drive the development of green finance and environmental protection industry in the surrounding small cities through the establishment of core environmental upgrading cities.

5.3. Promote the Integration of Industry and Finance

Green finance is the investment and financing of projects in the fields of environmental protection, energy conservation, clean energy, green transportation, green building, etc. Thus, only through the deep integration of finance and industry can exert its effect to a greater extent. At present, Beijing, Tianjin and Hebei have collectively organized green finance and industry docking sessions, which have facilitated the financing of green projects. The three regions should also take this opportunity to establish a docking mechanism between green finance and industry, promote cooperation between financial institutions and enterprises, and guide the flow of funds to green projects [14]. What's more, because the implementation of green finance in Beijing and Tianjin is better than in Hebei, the three regions should strengthen inter-regional industrial optimization and adjustment, and make the industrial structure of the three regions regionally coordinated through the evacuation of surplus industries in Beijing and Tianjin, so that the effect of green finance in the Beijing-Tianjin-Hebei region can be maximized.

6. Conclusion

Green finance has played a significantly positive role in environmental protection in the Beijing-Tianjin-Hebei region. With the help of tools such as green credit, green bonds and carbon finance, green finance has guided the flow of funds to low-carbon environmental protection projects and promoted the improvement of regional environmental quality. In terms of air quality, the Beijing-Tianjin-Hebei region has witnessed an evident decrease in the average PM2.5 concentration and an increase in the proportion of good days in 2024 through strict pollution control measures and green financial support. With regard to water quality, the construction of sewage treatment facilities has been accelerated and the water quality of major rivers and lakes has improved. Green finance has promoted the development of green buildings and housing projects as well, meeting consumer demand for environmentally friendly housing and facilitating the green transformation of the real estate sector.

However, there are differences in the implementation of green finance policies in Beijing, Tianjin and Hebei. Information disclosure platforms are not unified, and the integration with traditional industries still faces barriers, especially among some highly polluting enterprises in Hebei Province, where green transformation is difficult to promote due to financial and technological constraints. These issues deeply affect the overall effectiveness of green finance in the region. Based on the above deficiencies, in the future, in order to give full play to the role of green finance in environmental protection of the Beijing-Tianjin-Hebei region, and to promote the high-quality development of the region, it is necessary to further improve the system construction, unify the market mechanism and platform, and strengthen the in-depth integration of industry and finance.

Since other regions of the country have different industrial structures from Beijing-Tianjin-Hebei, green finance also shows different effects in other regions, and this study cannot summarize the role of green finance on regional environmental protection across the country by taking Beijing-Tianjin-Hebei as an example. So, when analyzing the role of green finance on environmental protection, the local economic level and industrial structure should be combined with local environmental laws and regulations, financial market size and other elements to refine the analysis.

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