

Green Finance and Green Transformation: The Roles of Financing Constraints and Resource Allocation

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Abstract. As China's economy moves to a high-quality development stage, promoting listed companies to achieve green transformation has become a key task to achieve sustainable development. As a bridge connecting financial capital and green industries, green finance not only strengthens the service function of the financial system to the ecological environment, but also gradually becomes an important driving force for the green transformation of enterprises. This paper systematically analyzes the driving path and mechanism of green finance on the green transformation of listed companies from the two perspectives of "financing constraint mechanism" and "resource optimization allocation". The study points out that the financing constraint mechanism imposes incentives and constraints on enterprises externally through financial instruments such as green credit and green bonds, guides capital to flow into the green field, and encourages enterprises to make green investments and environmental innovations. The resource optimization allocation mechanism realizes the inclination of resources to the direction of green innovation through the strategic reconstruction and flow adjustment of human, capital, technology and other resources within the enterprise, and promotes enterprises to deepen green transformation from an endogenous perspective. The two cooperate with each other in actual operation, forming a transformation path from "external promotion-internal response" to "internal and external linkage-coordinated upgrading", and jointly constructing a virtuous cycle mechanism for the green development of enterprises.

Keywords: green finance; financing constraints; optimal resource allocation; green transformation.

1. Introduction

With the rapid development of China's market economy since the reform and opening up, the number and scale of listed companies have continued to expand, greatly promoting the growth of the national economy. However, in the process of pursuing rapid economic development, it has also brought about a series of ecological problems such as resource waste and environmental pollution. At present, the stage of China's economic development is evolving from fast-paced expansion to an emphasis on quality and sustainability. Achieving sustainable development of enterprises has become a new core goal. Against this background, it is particularly important to promote the green transformation of listed companies [1].

As a financial model, green finance not only strengthens the service function of the financial system for the ecological environment, but also retains the basic attributes of traditional finance to a certain extent. It is gradually becoming an important force to support the green transformation of enterprises [2]. Moreover, energy conservation and emission reduction are promoted by green finance. The industrial structure is rationalized and optimized through the intermediary role of banks and other financial institutions. Government funding and policy support are also provided. In recent years, the People's Bank of China and relevant regulatory agencies have successively issued a number of green finance policies. They are aimed to reduce the cost of green financing for enterprises and guide enterprises to increase environmental protection investment, thereby accelerating the pace of green transformation [3]. Therefore, green finance has important strategic significance in promoting corporate transformation and helping to achieve sustainable development goals.

This study is aimed to explore how green finance can promote the green transformation of listed companies through the two dimensions of "financing constraint mechanism" and "resource optimization allocation", enhancing the overall sustainable development capabilities of enterprises. At the same time, this paper also makes a certain marginal contribution to the mechanism research of

green finance. 1. Summarize the current research progress on the financing constraint mechanism and resource optimization allocation mechanism in green finance. 2. Compare and analyze the role of the two mechanisms, which will provide help for future research on green finance.

This paper will first review the main driving factors of the green transformation of listed companies, and then conduct in-depth analysis from the two perspectives of financing constraint mechanism and resource optimization allocation. Comparing and discussing the two mechanisms in the fifth part. Finally, the research findings are summarized and possible directions for future research are proposed

2. Driving factors of green transformation

The motivation for green transformation of listed companies not only comes from the strong guidance of national policies, but also is driven by market pressure and the internal needs of the company's own development. From the perspective of policies and regulations, the high attention paid by the state to the development of green economy provides direction and institutional guarantee for the transformation of enterprises. In 2024, the Opinions on Playing the Role of Green Finance in Serving the Construction of Beautiful China was issued, proposing that ecological civilization should be promoted through financial means. As early as 2017, the State Council established the "Green Finance Reform and Innovation Pilot Zone" to encourage social capital to enter the environmental protection industry while restricting the development of high-pollution industries. In addition, the regulatory mechanism has been continuously strengthened, such as forcing enterprises to implement environmental protection measures such as energy conservation and emission reduction through fines [4]. Local governments have also responded positively. Many provinces and cities have established green financial reform pilot zones and actively explored the innovation of green financial products and services, providing an institutional innovation platform for green transformation.

Market pressure is also an important external factor driving corporate transformation. As investors pay more and more attention to environmental, social and governance (ESG) performance, listed companies are required to disclose relevant reports, and third-party evaluation mechanisms such as ESG ratings have also prompted companies to strengthen green innovation. Consumers' preference for environmentally friendly products is increasing, and green-labeled products have stronger appeal and competitive advantages in the market. In addition, supply chain pressure is also increasing. The supply instability caused by traditional energy dependence has forced companies to optimize their energy structure and strengthen green innovation to improve supply chain resilience and sustainability [5].

From the perspective of the company itself, green transformation has become an inevitable choice for it to break through development bottlenecks and enhance its comprehensive competitiveness. The widespread overcapacity problem in traditional industries requires green transformation to achieve the transformation of new and old kinetic energy and industrial upgrading [6]. At the same time, in order to maintain core competitiveness, companies urgently need to promote technological innovation in green technology, clean production, energy conservation and emission reduction. The management of corporate image and brand reputation is becoming increasingly important. Greening not only helps to establish a positive corporate image, enhance social responsibility and public trust, but also helps to enhance customer stickiness and brand loyalty, and occupy a favorable position in the highly competitive market environment.

3. Financing constraint mechanism and green transformation

As an important part of green finance, the financing constraint mechanism mainly guides capital to flow into green and environmental protection fields by regulating corporate financing channels. Its core mechanism is to provide financing convenience for green enterprises and impose financing restrictions on highly polluting enterprises, thereby promoting the green transformation of enterprises under the logic of "rewarding the good and punishing the bad" [7].

The financing constraint mechanism uses a series of financial tools to promote the green transformation of listed companies, such as green credit and green bonds, which provide enterprises with the financial support needed during the transformation period and effectively alleviate the pressure of capital turnover [8]. Driven by the green credit policy, some heavily polluting enterprises have begun to actively increase green investment to obtain credit qualifications. By carrying out green innovation projects, these enterprises have not only obtained green capital, but also improved their overall financing capabilities.

The financing constraint mechanism also helps to reduce various risks of enterprises. In terms of bankruptcy risk, green credit policies encourage banks to strengthen supervision of highly polluting enterprises, thereby reducing the opportunistic behavior of corporate management and reducing the possibility of corporate financial deterioration and bankruptcy. In terms of environmental compliance, the incentive effect of financing mechanisms encourages enterprises to strengthen green innovation, thereby reducing the risk of fines and reputation loss due to illegal emissions. In addition, the initial stage of green transformation is often accompanied by high investment costs, and some enterprises face greater cost risks due to insufficient self-owned funds. Green financial policies guide social capital to flow to environmental protection industries and lower the threshold for corporate capital acquisition, thereby alleviating financial pressure during the transformation process [9].

While helping listed companies obtain financing to promote green transformation, the financing constraint mechanism also has certain limitations [10]. Excessively high green financing thresholds may limit the short-term capital liquidity of enterprises, especially for heavily polluting enterprises. Studies have found that financing restrictions have reduced the financing capacity of such enterprises, which has led to a weakening of their investment level and production capacity, indirectly inhibiting their motivation for normal operations and industrial renewal.

The strict review standards for green credit have also made it difficult for some enterprises with strong transformation intentions but unqualified to obtain the required financial support, which has weakened their enthusiasm and confidence in green transformation.

4. Optimal allocation of resources and green transformation

Resource optimization is the endogenous mechanism of green transformation of listed companies. Through the rational scheduling and strategic allocation of internal resources of listed companies, the input of resources to traditional pollution can be reduced, and the input to green innovation projects can be increased to promote green transformation. Through the green optimization of resources in the transformation process, listed companies can realize a two-way mechanism of support and feedback for green development, that is, drive the green transformation of enterprises with resource optimization, and the green results will also improve the production efficiency and resource utilization rate of enterprises, thereby better realizing green transformation. This enables listed companies to continuously deepen the degree of greening and obtain green results in the cycle of resource optimization.

Currently, Chinese enterprises face significant green financing constraints, with the market placing considerable financial pressure on polluting firms [11]. In this regard, listed companies should start with their own green innovation. In optimizing resource allocation, listed companies can align ESG performance requirements with their development goals and resource plans. They can adopt green and innovative production methods. Green principles should be integrated across the entire production chain. This allows companies to take on more environmental and social responsibilities. As a result, the uncertainty of business development is reduced. Their ability to manage green risks is also improved.

With better ESG performance, companies can achieve higher green credit ratings. This helps enhance their reputation and brand influence. It also expands their financing channels and lowers financing costs. As financial capital flows in, the pressure from green financing constraints is eased. This creates a solid foundation for companies to further invest in green innovation.

The optimal allocation of resources by enterprises can be linked with industrial structure upgrading. Through this linkage, production factors such as natural resources, human resources, and capital costs can be distributed more reasonably and efficiently. As a result, the growth rate of economic development can be increased. Meanwhile, the green transformation of the economic structure can be further promoted [12].

5. Comparative Analysis

In terms of the mechanism of action, the financing constraint mechanism mainly affects the ability of enterprises to obtain funds through the guiding role of external financial instruments and financial policies [13]. Its core logic is "rewarding the good and punishing the bad", that is, providing green enterprises with policy conveniences such as credit support and tax incentives, while implementing financing restrictions on high-polluting enterprises, thereby guiding capital to flow to environmental protection and low-carbon projects, constraining corporate behavior from the outside and promoting its green transformation [14]. In contrast, optimal resource allocation is an autonomous behavior within the enterprise, emphasizing the use of strategic resource scheduling and redistribution to achieve the green direction of factors such as human resources, capital, and technology. It relies more on the decision-making efficiency and organizational capabilities of the enterprise itself. It is a mechanism based on "endogenous incentives", focusing on improving resource utilization efficiency and resource inclination in the green field of the enterprise, and promoting the green transformation of the enterprise from the inside out.

In terms of applicable conditions, the financing constraint mechanism is more applicable in heavily polluting industries or areas with serious resource allocation distortion. In these industries, enterprises face high external regulatory pressure, traditional financing is difficult, and the need for green transformation is urgent [15]. In this case, the financing constraint mechanism can provide preferential financing conditions for the long-term green innovation projects of these enterprises and attract external funds to help such enterprises transform. Resource optimization allocation is more suitable for enterprises with relatively sound governance structures and strong strategic management capabilities, such as CATL and BYD. These enterprises usually have high independent innovation capabilities and capital allocation space, and can adjust the direction of internal resources in a timely manner according to market and policy changes, thereby more effectively promoting green upgrades.

During the green transformation of listed companies, the financing constraint mechanism and resource optimization allocation do not operate in isolation, but work synergistically to help listed companies continuously deepen the results of green transformation and gradually build up systematic green capabilities [16]. In terms of function, the financing constraint mechanism can indirectly promote the optimization of internal resources of enterprises by intervening in the allocation of external resources, guiding enterprises to make strategic adjustments in the green direction to obtain green financing convenience [17]. At the same time, after implementing internal resource optimization, enterprises are more likely to meet the evaluation standards of green finance and obtain more financing support.

In practical applications, enterprises can further green their production systems according to ESG performance requirements, thereby obtaining higher ESG ratings, and obtain more external capital through financing constraint mechanisms to promote the total capital flow of enterprises, thereby further continuing green resource allocation within enterprises to promote the greening of enterprises and improve ESG performance. Accelerate green transformation in the cycle of improvement .

At the same time, the ESG performance of enterprises can be improved through green resource allocation. The "black swan" risk caused by environmental issues and poor self-governance can be reduced. Future uncertainties for long-term investors can also be minimized. As a result, investor confidence can be enhanced. More capital can be attracted to listed companies. The ability of listed companies to absorb external funds can thus be improved.

Furthermore, traditional polluting industries can be forced to introduce green labor and innovative technologies through financing constraints. Industrial green transformation and upgrading can be promoted. Internal and external funds can be guided through resource optimization. The implementation of green projects and the development of green industries can be accelerated. Economies of scale can be formed. Ultimately, high-quality economic development can be achieved [18].

There are certain stage characteristics in the synergy of the two mechanisms. In the early stages of green transformation, enterprises are faced with problems such as weak green awareness, insufficient resource scheduling capabilities, and less accumulation of green assets [19]. At this time, the government and financial institutions use financing constraint mechanisms such as green credit, green bonds, and carbon emission reduction incentives set financial thresholds for high-pollution and high-energy-consuming enterprises, while providing policy support and low-cost financing paths for green projects, forming an "external forced" mechanism. Under this pressure, enterprises start green transformation and reconfigure internal resources, such as cutting high-carbon business budgets and increasing investment in environmental protection equipment, to meet the threshold requirements of green finance. At this stage, the financing constraint mechanism shapes the driving force of transformation externally, and the resource optimization allocation undertakes the adjustment of the green allocation of internal resources. The two form a preliminary synergy of "external promotion and internal adjustment".

With the advancement of listed companies' green strategies and the growth of green project reserves, their internal resource allocation has gradually shown initiative and strategic nature. For example, enterprises will invest more funds in green research and development, green supply chain construction or green human resource management to form an endogenous green capability system [20]. These capabilities not only improve the performance of enterprises in environmental governance and sustainable management, but also significantly improve their performance in financing assessments such as ESG ratings and green certification, thereby obtaining more green financing resources. At this stage, resource optimization and allocation in turn strengthen the financing attractiveness of enterprises, and the financing constraint mechanism attracts more high-quality green financing to support the expansion of enterprises' green capabilities. The two present a strengthening path of "internal strength and external attraction". Enterprises improve the efficiency of obtaining external financing through good internal resource management and realize the positive cycle of transformation momentum.

When enterprises have accumulated relatively complete green asset reserves and governance capabilities, the relationship between financing constraint mechanisms and resource optimization and allocation gradually evolves from one-way promotion to deep integration and system interaction. At this point, listed companies are no longer just objects that passively respond to green financing policies, but actively embed green concepts into internal management and business activities, including product design, production process optimization, and energy structure adjustment, as well as key links such as green transformation of the supply chain, so as to build a relatively complete green operation system. In terms of internal resource allocation, enterprises pay more attention to the efficient scheduling and overall integration of green resources, such as setting up a special green investment department and strengthening the green performance assessment mechanism, so as to improve the organization and professional level of green capabilities. At the same time, financial institutions have gradually transformed from traditional "capital suppliers" to collaborative participants in green projects, embedding financial instruments such as green credit and green bonds into the construction of green projects of enterprises, and participating in the design and risk management of green projects to a certain extent [21]. This kind of internal and external coordination mechanism arrangement will help improve the implementation efficiency and scale development level of corporate green projects, strengthen the foundation of green governance, further promote the depth and breadth of green transformation of listed companies, and continuously improve the degree of green transformation of enterprises.

6. Conclusion

This paper systematically explores how green finance drives listed companies to achieve green transformation from the perspectives of financing constraint mechanism and resource optimization allocation. The study found that the financing constraint mechanism, through financial instruments such as green credit and green bonds, exerts incentives and constraints on enterprises at the external level, promoting enterprises to make green investments and environmental innovations; while resource optimization allocation guides human resources, capital, technology and other factors to flow in a green direction through strategic resource adjustments within the enterprise, promoting the deepening of green transformation from an endogenous perspective. The two mechanisms have their own advantages and complement each other. Through the coordinated allocation of internal and external resources, they jointly promote the green transformation of listed companies.

However, due to the limited studies on the endogenous mechanism of resource optimization allocation of listed companies, this article's discussion in this area is not comprehensive and lacks sufficient literature to support it.

Future research can further analyze the endogenous mechanism of listed companies promoting green transformation through internal resource optimization, and compare it with other mechanisms in green finance.

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