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Analysis of the Impact of AI Driven Financial Security New Ecology and Green Finance on Industrial Development

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Abstract: This article deeply analyzes the role of green finance in promoting high-quality development of China's industry, and combines theoretical exploration and empirical research to reveal its complex mechanisms and significant effects in promoting industrial transformation and upgrading and achieving high-quality development. Through a multidimensional evaluation system and advanced measurement methods, this study systematically examines the multidimensional impact of green finance on industrial development, including its direct promotion of industrial green transformation and upgrading, as well as its differential positive effects between different regions and development levels, thereby strengthening the coordinated development of regional industries. In addition, this article innovatively explores the enormous potential of the integration of green finance and AI technology, especially its important role in building a new ecosystem of financial security. Driven by AI technology, the construction of a new ecosystem for financial security provides strong technical support and security guarantees for the deepening development of green finance. AI technology can accurately identify and evaluate environmental risks in enterprises, optimize the design and innovation of green financial products, enhance the intelligence and personalization level of financial services, and thus more effectively promote the transformation of industrial greening and intelligence. At the same time, AI technology can assist policymakers in monitoring the dynamic changes of the green finance market in real time, identifying and responding to potential risks promptly, and maintaining the stability and security of the financial market. Based on the above analysis, this article proposes comprehensive countermeasures and suggestions for China's green finance and high-quality industrial development. To consolidate the foundation of green finance development and strengthen system construction, particularly with AI technology's support, it is crucial to improve the legal framework, management systems, and data transparency related to green finance. Promoting innovation and advancement in green finance products is also essential.

1. Introduction

The introduction of AI into financial services has not only transformed their efficiency and accuracy but has also constructed a formidable barrier that fortifies the stability and security of the entire financial ecosystem. Leveraging its capabilities in real-time risk monitoring, exceptionally precise fraud detection, and automated compliance management, AI has established a nearly unbreachable defense against potential threats, thereby ensuring the resilience and continuity of the financial system. Moreover, this technological advancement has sparked a profound revolution in green finance, driving industrial sectors toward unparalleled levels of quality and sustainability. As a pivotal force in green finance, AI charts a clear course toward sustainable development, offering a beacon of hope for a future that is both economically prosperous and environmentally conscious. Through AI's sophisticated and meticulous approach, the process of identifying and investing in eco-friendly initiatives has reached a level of accuracy that was once beyond imagination. By doing so, it establishes a strong foundation for achieving a harmonious balance between economic progress and environmental preservation technology has ushered in groundbreaking innovations in risk management [1] and performance appraisal of green finance. This paradigm shift empowers us to navigate the intricate landscape of green finance with greater confidence, steering towards a future where economic growth and environmental sustainability dance in perfect harmony. AI technology can also monitor and evaluate the implementation effectiveness of green projects in real-time, ensuring transparency and efficiency in the use of funds, and further enhancing the support effect of green finance. In summary, the deep integration of the new ecosystem of financial security driven by AI technology and green finance not only provides strong financial support and security guarantees for high-quality industrial development but also promotes the development of the global economy towards a greener and more sustainable direction.

2. Correlation Theory

2.1. Definition of Related Concepts

Green finance [2], as an important regulatory measure proposed by the financial sector to address the deterioration of the ecological environment, has evolved in both its connotation and form with the development of society. In the early stages, the concepts of green finance and environmental finance were similar, aimed at promoting ecological and environmental protection; China has clarified the definition and direction of green finance by issuing documents such as the "Guiding Opinions on Building a Green Financial System", promoting it as an important force in promoting high-quality industrial development. The high-quality development of industry emphasizes quality first and efficiency first, aiming to achieve harmonious coexistence between economic development and ecological protection through optimizing industrial structure, improving production efficiency, and widely applying green technologies. Green finance promotes the optimization of industrial structure and green transformation by optimizing resource allocation, guiding capital flow to green industries, and raising financing thresholds for high-polluting industries, reflecting the practical application of sustainable development theory, financial function theory [3], spatial interaction theory [4], and externalities theory. These theories together form the theoretical basis for green finance to promote high-quality industrial development, providing strong support for building a green, efficient, and sustainable industrial system.

2.2. Analysis of Impact Mechanism

This technological evolution has not only ignited a revolutionary wave across the financial sector

but has also ushered in unprecedented levels of stability and security within the financial system by leveraging precise data analysis and intelligent decision-making capabilities. Through the integration of AI, green finance is now able to conduct more precise evaluations of enterprises' environmental performance and sustainable development potential, facilitating the advancement of green projects and accelerating the optimization, upgrading, and sustainable evolution of the entire industrial system. In addition, AI has significantly enhanced the efficiency and precision of services by refining the design and risk assessment models of green financial products. It has also fostered greater transparency in information sharing, thereby mitigating the risks associated with information asymmetry and bolstering investor confidence in green projects. With the ongoing enhancement of AI-driven intelligent monitoring and early warning systems, potential risks within green finance projects can be identified and mitigated promptly, ensuring their stable and sustainable operation. The deep integration of AI technology with green finance not only paves the way for expansive application opportunities within the financial sector but also establishes a solid foundation for the high-quality and sustainable development of industry, signifying a profound shift towards a future where economic growth and environmental stewardship are harmoniously aligned.

3. Research Method

3.1. The Profound Impact of AI Technology-Driven Green Finance on Industrial Green Transformation

The swift advancements in AI technology are significantly redefining the financial security landscape and are acting as a powerful catalyst for the expansion of green finance, offering substantial technological support that is essential for the high-quality transformation of industry. This technological evolution has not only ignited a revolutionary wave across the financial sector but has also ushered in unprecedented levels of stability and security within the financial system by leveraging precise data analysis and intelligent decision-making capabilities. In addition, AI has significantly enhanced the efficiency and precision of services by refining the design and risk assessment models of green financial products. It has also fostered greater transparency in information sharing, thereby mitigating the risks associated with information asymmetry and bolstering investor confidence in green projects. With the ongoing enhancement of AI-driven intelligent monitoring and early warning systems, potential risks within green finance projects can be identified and mitigated promptly, ensuring their stable and sustainable operation. The deep integration of AI technology with green finance not only paves the way for expansive application opportunities within the financial sector but also establishes a solid foundation for the high-quality and sustainable development of industry, signifying a profound shift towards a future where economic growth and environmental stewardship are harmoniously aligned. By constructing complex AI models, financial institutions can conduct in-depth analysis and accurate evaluation of the environmental and economic benefits of green projects, providing a scientific basis for the design of financial products such as green credit [4] and green bonds [5], greatly reducing the risk of green financing, and improving the success rate of green projects. This AI-based risk assessment and management mechanism not only enhances the market competitiveness of green finance products but also stimulates the innovative vitality of financial institutions in the field of green finance, promoting the prosperous development of the green finance market.

3.2. Analysis of the Spatial Correlation and Impact between AI-Driven Green Finance and High-quality Industrial Development

In today's global economic system, the integration of artificial intelligence (AI) and green

finance is leading an unprecedented transformation, intertwining and jointly driving the grand blueprint for sustainable economic development. AI technology, with its outstanding data processing capabilities, deep analysis capabilities, and highly automated decision-making mechanisms, has built an unbreakable defense line for the financial security system. This integration process demonstrates the profound connection and mutual promotion between technology and environmental protection, finance, and sustainable development, indicating that the future economy will pay more attention to eco-friendly and efficient resource utilization development models. In addition, the spatial interdependence and spatial correlation of error terms between green finance and high-quality industrial development were further validated through spatial lag models (SLM) [6] and spatial error models (SEM) [7]. The empirical research, which examines green finance and high-quality industrial development across 30 provinces, integrates various control variables and employs an individual time double fixed-effects regression model to investigate the linear effects and variations of green finance on high-quality industrial development.

4. Results and Discussion

4.1. Model Building

To investigate the impact of green finance on high-quality industrial development, the role of green finance was examined using individual time fixed effects regression models and threshold effect models [8], with a detailed analysis of the regression outcomes. Subsequently, this chapter delves into the spatial spillover effects of green finance on high-quality industrial development from a spatial perspective. Drawing on spatial economics theory, the study first employs exploratory spatial data analysis methods to assess the spatial clustering characteristics of green finance and high-quality industrial development, followed by the construction of an appropriate spatial econometric model to thoroughly examine the spatial spillover effects.

In spatial analysis, proximity between entities was assessed using three distinct spatial weight matrices. The 0-1 adjacency matrix, based on geographical contiguity, measures direct neighbors among provinces. The spatial geographic weight matrix considers distances between provincial capitals. Finally, economic disparities among provinces are captured by the economic distance spatial weight matrix.

To evaluate the spatial proximity between entities, three spatial weight matrices were employed. The 0-1 adjacency spatial weight matrix, designed with a focus on geographical contiguity, identifies neighboring provinces. Spatial distances between provincial capitals were accounted for using the spatial geographic weight matrix, while the economic distance spatial weight matrix was constructed to reflect economic disparities among provinces.

4.2. Build Effect

Through the global and local Moran's index analysis, it was observed that green finance and high-quality industrial development exhibit positive spatial autocorrelation. The global Moran index of green finance from 2010 to 2020 indicates an increasing agglomeration effect, particularly in the rapidly developing eastern coastal areas, while the western regions exhibit lower levels of green finance development. The global Moran index for high-quality industrial development consistently shows a significant positive trend, reflecting a strong spatial agglomeration effect. In the construction of spatial econometric models, spatial error models, spatial lag models, and spatial Durbin models were examined. After conducting the LM test, Hausman test, and LR test, the Spatial Durbin Model (SDM) was identified as the most suitable for analyzing the spatial spillover effects of green finance on high-quality industrial development. The empirical findings reveal that

green finance significantly promotes high-quality industrial development, and the spatial lag coefficient indicates the presence of spatial spillover effects. A comprehensive analysis suggests that provinces with advanced development can catalyze the high-quality industrial development of neighboring provinces through spillover effects in areas such as technology, talent, policies, industrial chains, and markets.

4.3. Optimization Measures

To further enhance the positive impact of green finance on high-quality industrial development, and considering the current state of green finance development in China, several countermeasures and suggestions are proposed. Strengthening the foundation and building a robust green finance system is essential. At the national level, improving the legal and regulatory framework for green finance, addressing gaps in environmental protection laws, and promoting the comprehensive implementation of green finance are necessary steps. Establishing a unified standard for green finance and a data disclosure system will also enhance transparency and regulatory efficiency. To effectively reduce the potential risks of green investment, financial institutions not only need to make expanding and enriching their green finance product system a top priority, but also need to be committed to developing and launching innovative financial products that are more in line with China's special national conditions and market needs, and further enhance their capabilities in environmental risk identification and monitoring. In the process of promoting sustainable financial practices nationwide, the economically developed eastern regions should play a leading role and actively undertake the pioneering task of green financial product innovation; At the same time, the central, western, and northeastern regions should flexibly adjust and improve their green finance product systems based on their respective regional characteristics and economic conditions, and promote the integrated development of green finance nationwide through close experience exchange with the eastern region. Through such coordinated efforts, not only can we effectively address China's diverse geographical and economic challenges, but we will also lay a solid foundation for promoting the country toward a greener and more sustainable development path.

5. Conclusion

The research initially devised a comprehensive index assessment framework grounded in the essence of regional green finance and high-quality industrial progress, allowing for the quantification of both these domains across diverse regions. Employing these metrics, the study then proceeds to depict and scrutinize the prevailing landscape, as well as the spatial and temporal dynamics, of regional green finance initiatives and the advancement towards high-quality industrial development. Furthermore, this article adopts an individual time double fixed effects model to explore the linear impact of green finance on high-quality industrial development and constructs a threshold effect model with the level of green finance development as the threshold variable to explore its phased impact on high-quality industrial development. Research has shown that although there is some volatility in the development of green finance in China, it generally shows an upward trend and has a significant promoting effect on high-quality industrial development. The analysis of spatial dimensions reveals the imbalance in the level of green finance and high-quality industrial development among different regions, with the eastern region showing outstanding performance, followed by the central and northeastern regions, and the western region relatively lower. In addition, through empirical analysis of the spatial Durbin model, this article found that green finance has a significant positive spatial spillover effect on high-quality industrial development.

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