

Analysis on the Impact of Digital Finance on Carbon Emissions under the Background of “Double Carbon”

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Abstract: Under the background of frequent global extreme climate problems, achieving the goal of peak carbon dioxide emissions and carbon neutrality has become the main policy to promote the process of carbon emission reduction. At the same time, as a new financial form, digital finance has gradually increased its impact on carbon emissions. Through in-depth analysis of the multiple influence mechanisms between digital finance and carbon emissions, this paper discusses the direct and indirect roles of digital finance in promoting the development of low-carbon economy. However, digital finance also faces many challenges in the process of carbon emission application, such as the lagging digital system of carbon finance market, insufficient innovation of digital products of carbon finance, and insufficient understanding and participation of all parties. Therefore, in order to give full play to the positive role of digital finance in reducing carbon emissions, it is necessary to strengthen the construction of digital system of carbon finance market, speed up the design of digital products of carbon finance and improve the understanding and participation of all parties. This paper has important theoretical and practical significance for understanding and using digital finance to promote the development of low-carbon economy.

Keywords: “Double Carbon” Target; Digital Finance; Carbon Emissions; Carbon Finance

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1.Introduction

Destructive human activities such as industrialization and the extensive use of fossil fuels have caused frequent global extreme climate problems. Among them, a large number of greenhouse gas emissions pose a serious threat to the global ecosystem and human survival. Therefore, achieving the goal of carbon emission reduction is not only the need to protect the earth's ecological environment, but also the inevitable requirement to achieve sustainable development^[1]. As one of the largest emitters of greenhouse gases in the world, China bears an important responsibility in tackling climate change. In order to promote the process of carbon emission reduction, it has become an important strategy for China to achieve the “double carbon” goal of peak carbon dioxide emissions and carbon neutrality, which will promote the adjustment of China's industrial structure and energy structure, promote the research and development and application of green low-carbon technologies, improve energy utilization efficiency and reduce greenhouse gas emissions^[2]. As a new model of modern financial services, digital finance provides new solutions and financial support for carbon emission reduction and gradually plays an important role in the process of carbon emission reduction^[3]. Based on the goal of “double carbon”, this paper explores the mechanism of the impact of digital finance on carbon emission reduction from both direct and indirect perspectives, deeply analyzes the challenges faced by digital finance in carbon emission application, and finally puts forward relevant suggestions on enabling

carbon emission by digital finance, with a view to providing theoretical support and practical guidance for the realization of the goal of “double carbon”.

2.The multiple impact mechanism of digital finance on carbon emissions

2.1 Direct influence

First, innovative investment and financing channels. By providing innovative investment and financing channels for green and low-carbon projects, digital finance enables enterprises and consumers to obtain green financial products and services more conveniently, helps investors better understand and invest in green technology projects, evaluates and screens green technology projects, and guides funds to flow to low-carbon and environmentally-friendly carbon emission projects and gather in the field of green technology. It can not only give priority to providing financial support for projects or enterprises with low carbon emissions, but also provide investors with green investment choices, thus promoting the transformation of the whole society into a low-carbon economy. Second, reduce the intensity of energy consumption. Digital finance reduces the use of paper documents and physical bank outlets by optimizing financial services and improving financial efficiency, and through digital means such as Internet payment and mobile payment, thus reducing the energy consumption intensity of financial activities^[4]. Third, improve efficiency and reduce costs. Digital financial platform has Internet financial platform and intelligent investment. Through intelligent service means, traditional financial transactions and financial service processes are simplified, green financial products can be traded and transferred more conveniently, the financing efficiency of green financial market is improved, and the cost of financial transactions involved in carbon emission projects is reduced, so as to accelerate the process of carbon emission reduction.

2.2 Indirect effects

From the perspective of consumption patterns. Digital finance can reduce carbon emissions by promoting greener consumption patterns. The convenient payment method provided by digital finance can reduce dependence on traditional physical currency and bank cards, thus reducing resource consumption and environmental pollution related to these physical media. In addition, convenient payment methods such as mobile payment accelerate customer decision-making, drive customer demand and improve customer consumption patterns. Some payment platforms have also launched a green point system to encourage users to use green travel modes or buy environmentally-friendly products, and promote green consumption through the point reward mechanism^[5]. From the perspective of industrial structure. By supporting green technology innovation, digital finance can accurately assess the environmental impact of projects, effectively integrate various information resources into production decisions, promote the restructuring of industrial systems, and promote the transfer of labor-intensive industries to environmentally friendly technology-intensive industries, and improve the efficiency of resource allocation. Technological progress can not only improve energy efficiency, but also reduce energy consumption and carbon emission intensity during manufacturing^[6].

3.challenges faced by digital finance in the application of carbon emissions

3.1 carbon financial market digital system lags behind

Compared with developed countries, China's low-carbon financial system has been formed slowly, and the development of low-carbon finance faces many challenges. Moreover, the lag of the digital system of carbon finance market also reflects that the impact of digital finance on carbon emissions is still weak. First of all, low-carbon finance is a new financial development mode, and commercial financial institutions are cautious about economic needs such as loans involving low-carbon economy, which makes the digital development of low-carbon finance lack the support of financial institutions, resulting in a poor financing environment for digital low-carbon finance and a lack of sufficient development momentum. Secondly, the digital system of carbon finance market in China is relatively backward, and the relevant rules and mechanisms for the application of digital finance have not been fully established, and there are problems such as regulatory gaps and overlapping, which limit the development of carbon finance and the application of digital finance in carbon emissions to some extent. At the same time, because the price of carbon emission rights is affected by the relationship between market supply and demand, there will be corresponding fluctuations, which makes it difficult for all parties involved in carbon finance to plan and predict the benefits

and risks of carbon finance business. It may lead to market chaos and risk events. Therefore, although digital technology provides convenience for the collection and processing of carbon emission data, in practice, the application of digital finance in carbon emission still faces some challenges.

3.2 carbon finance digital product innovation is insufficient

Due to the late start of carbon financial market, domestic enterprises and financial institutions lack a deep understanding of low-carbon economic operation mode, social benefits and other aspects, and lack awareness of carbon resources trading. To a certain extent, domestic enterprises, commercial banks or financial institutions have a single category of digital financial products in carbon emission reduction, and the types and quantities are relatively small, and there is still a lack of characteristic digital financial products for carbon emission projects, which cannot meet the diversified needs of the market. Although some financial institutions have initially developed digital financial products for carbon emission reduction, compared with diversified digital financial products around the world, China's carbon financial products are difficult to meet the market demand in terms of quantity and function, which leads to insufficient activity of the carbon financial market and affects its attractiveness and influence. Moreover, in terms of innovation, digital financial products aimed at carbon emission reduction are weak in innovation and lack new carbon financial products with high added value and market competitiveness. In addition, the government's support for the innovation of carbon financial products is insufficient, and the incentive measures are insufficient, which leads to the lack of sufficient motivation for financial institutions and enterprises to promote the digital innovation of carbon financial products.

3.3 insufficient understanding and participation of all parties.

For a long time, environmental education has not penetrated into all levels of society, and the popularity of carbon finance market is not high. As a result, most domestic financial institutions have limited understanding of low-carbon financial business with carbon emissions and its impact on climate change, which makes enterprises and the public have limited awareness and acceptance of carbon financial products. It takes time and patience to change the long-term consumption habits with high energy consumption and high carbon emissions. Friction and resistance in the process of transformation make it difficult for the public to practice a low-carbon lifestyle. At the same time, low-carbon lifestyles and green financial products require the public and all participants to bear additional economic costs in the short term. Because buying energy-saving appliances or choosing green products means increasing additional initial investment, and the research and development and promotion of high-end green technologies need a long period, it is difficult for enterprises to fully realize the transformation of production mode in a short period of time. Due to the contradiction between personal interests and environmental protection objectives, all participants will give priority to traditional products or production modes with lower costs when facing economic pressure. In addition, the potential risks of digital financial products and green financial products also deter some participants. Digital financial products and green financial products, as the products of new national policies, belong to emerging fields. In addition, the lack of financial knowledge and limited understanding of new digital green financial products lead to low awareness and participation, and all participants prefer traditional and familiar financial products in investment selection.

4.digital finance to enable carbon emission reduction countermeasures and suggestions

4.1 Digital system construction of carbon financial market

At the production level, improve the energy efficiency of digital financial infrastructure. The green transformation of digital financial data center is the key step, and the data center should adopt the latest energy-saving equipment and advanced cooling technology. At the same time, the intelligent management system is introduced into the production enterprises, the energy efficiency evaluation and certification system is established, and through real-time monitoring and dynamic adjustment of the running state and working mode of equipment, excessive cooling and waste of resources are avoided, refined energy consumption control is realized, and energy consumption is further reduced. In addition, we will optimize the allocation of credit resources through digital technology, improve the technology and finance system, promote the development of green and low-carbon technology enterprises, and then promote carbon emission reduction. At the consumption level, establish a comprehensive carbon market database to promote the digital transformation of the carbon financial market. Use big data,

artificial intelligence and other technologies to improve the efficiency and convenience of financial services and develop an intelligent carbon financial trading platform. Moreover, it is necessary to establish a carbon pricing trading system, set up a carbon quota reservation mechanism and serve the carbon market stabilization fund, and use digital finance to improve the flexibility and efficiency of the carbon trading market. Through digital finance, we will continuously optimize the market transaction process, improve the flexibility and efficiency of the carbon trading market, reduce transaction costs, and improve the market competitiveness of carbon financial products. At the regulatory level, establish a sound regulatory system for the carbon financial market, and formulate and improve relevant laws and regulations to ensure fairness, transparency and standardization of the market. But also strengthen the supervision of carbon financial market, prevent the occurrence of improper behaviors such as market manipulation and insider trading, and protect the legitimate rights and interests of investors.

4.2 Accelerate the design of carbon finance digital products

First, many digital green financial products have complicated structures and asymmetric information, which makes investors feel confused when investing and choose traditional financial products with better understanding. Financial institutions can design more green bonds and funds similar to traditional products, which will lower the public's understanding threshold and enable investors to clearly understand the direction of capital use and environmental benefits. Second, strengthen top-level design and innovative ideas. Financial institutions should strengthen the top-level design, actively practice the ESG development concept, combine the design of carbon financial digital products with the national carbon neutrality goal, and clarify the strategic direction of product design. Third, promote the innovation of carbon financial products and services. Encourage financial institutions to develop more innovative carbon financial products and services, and provide data support for the design of carbon financial digital products. Research and develop innovative financial derivatives such as carbon futures and carbon options, and financing tools such as green credit and green bonds to meet the diversified needs of the market. Fourth, design the product line around the carbon trading market. Use blockchain technology to build the upstream and downstream connection of carbon trading, and take digital finance to empower the carbon trading market as a breakthrough to form a carbon financial product system with digital technology content. The product line constructed by fully displaying the carbon activity map as the underlying technology can completely match and support the operation of the carbon market.

4.3 Improve the awareness and participation of all parties.

The first is to enhance public awareness and participation. Strengthen publicity and education, publicize the important role of digital finance in carbon emission reduction through government, media, enterprises and other channels, and improve public awareness and acceptance of digital finance. By popularizing carbon finance knowledge, we will guide the public to actively participate in carbon trading and investment, and encourage enterprises and individuals to buy and sell carbon emission rights through carbon trading platforms, thus forming a good atmosphere for all people to participate in emission reduction. The second is to provide economic incentives. Most participants often face the pressure of economic cost when choosing green products. The government and enterprises can jointly launch a series of economic incentives. By providing direct financial subsidies, the purchase cost of green products can be reduced and the economic burden of the public can be reduced. The third is to enhance the acceptance of green financial products by all parties. Financial institutions should strengthen the transparency of digital finance, regularly disclose the operation of green financial products and environmental protection achievements, and enhance public trust and investment confidence through detailed reports and data. Fourth, the government can introduce relevant policies to encourage and support financial institutions to develop digital finance business, promote the application of digital finance in carbon emission projects or wider fields, and encourage all parties to practice low-carbon lifestyles. The fifth is to strengthen cooperation and sharing. Simplify the financial service process through digital means, reduce unnecessary links and time-consuming, and improve service efficiency. Financial institutions can also carry out cross-border cooperation with environmental protection departments and technology enterprises to jointly promote the application of digital finance in carbon emission reduction. Promote the popularization of green lifestyle, attract more investors to buy and use digital financial products, enhance public participation in environmental protection, and guide consumers to gradually

favor environmental protection consumption patterns.

5. Conclusion

Climate change has become a major challenge for all countries in the world, which has a profound impact on natural ecosystems and human living environment. There is a contradiction between environmental benefits and economic efficiency to a great extent, and the feasible solution at present is to ensure the development of green economy. Therefore, China has put forward the “double carbon” goal of achieving peak carbon dioxide emissions and carbon neutrality, and digital finance has important potential and role in the process of achieving the “double carbon” goal. By analyzing the direct and indirect mechanism of digital finance affecting carbon emission, it is found that digital finance plays a significant role in promoting carbon emission reduction and sustainable development. However, digital finance also faces certain challenges in the application of carbon emissions. In order to meet these challenges, this paper puts forward many measures, such as strengthening the construction of digital carbon finance market, speeding up the design of digital carbon finance products and improving the understanding and participation of all parties, which can effectively overcome the challenges of digital finance in carbon emission reduction application. It will not only help China achieve its climate goal and promote the coordinated development of economy and environment, but also provide useful experience and reference for the global response to climate change and achieve the goal of sustainable development.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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