

Mechanism Analysis of the Influence of Two-Way FDI on Spatial Spillover of Carbon Emissions

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Abstract: China's carbon emissions are systematic and complex, which affects the effectiveness of carbon emission reduction. Therefore, by combing relevant literature, this paper analyzes the mechanism of two-way FDI affecting carbon emissions in China, in order to explore a new path of emission reduction and provide reference suggestions for realizing China's "dual carbon goal".

Keywords: Two-Carbon Target; Two-Way FDI; Space Overflow

1. Introduction

The "two-carbon goal" means to achieve carbon peaking by 2030 and carbon neutrality by 2060. This is a solemn commitment China, as a responsible major country, has made to people around the world. It is also an inherent requirement for China to promote high-quality economic development. At present, China's carbon emissions are still on the rise, and there is still a long way to go to achieve the goal of reaching the carbon peak by 2030. Therefore, how to improve China's carbon emission reduction capacity and explore new emission reduction paths has important practical and theoretical significance. In recent years, with the acceleration of China's opening to the outside world, China's two-way FDI scale has been in the forefront of the world. With the increasing scale of China's international direct investment, two-way FDI plays an increasingly important role in China's carbon emission reduction.

In this paper, the possible mechanism of two-way FDI affecting carbon emissions is sorted out, in order to provide suggestions for rational use of international direct investment to promote China's carbon emission reduction.

2. The impact of two-way FDI on carbon emissions

FDI can improve the production technology level of enterprises and reduce pollution costs through "technology spillover effect". At the same time, enterprises investing in green space also have advanced management mode and higher environmental regulations, which is of reference significance for local enterprises to improve environmental protection standards, so as to curb carbon emissions. However, according to the Kuznet environmental curve theory, the inflow of foreign capital increases household consumption at the demand end and expands production scale at the supply end, thus accelerating energy consumption and leading to the increase of carbon emissions in the host country. Therefore, the final impact of FDI on carbon emissions in host countries is uncertain.

OFDI has "reverse technology spillover effect". Effective reverse technology spillover can promote carbon emission reduction, but reverse technology spillover is limited by the absorption capacity of human capital in the home country. In addition, the outflow of capital will have a "crowding out effect" on technological research and development of enterprises, reducing the innovation ability of enterprises, which is not conducive to curbing corporate pollution emissions. China's economy has entered the transition period from high-speed growth to high-quality growth. The government attaches great

importance to the protection of "green mountains and clear waters", strictly controls the quality of foreign investment, guides foreign investment into new and high-tech industries, and exchanges technology with market.

3. Influence mechanism of two-way FDI on spatial spillover of carbon emissions

Compared with western China, eastern China is more open to the outside world and international capital flows are more concentrated. Therefore, spatial location factors must be taken into account in studying the impact of two-way FDI on carbon emissions in China. Based on empirical analysis and existing studies, this paper summarizes a variety of mechanisms affecting the spatial spillover effect of two-way FDI on carbon emissions, including the "environmental regulation effect" and "profit-seeking effect of capital" caused by FDI on carbon emissions, and the "technology transmission effect" and "human capital effect" caused by OFDI on carbon emissions.

3.1 Influence mechanism of FDI on spatial spillover of carbon emissions

Some scholars have carried out causal identification between environmental regulation and the nearby transfer of pollution, and found that the increase of environmental regulation intensity will lead to the transfer of pollution to surrounding cities, and this environmental regulation effect has obvious nearby characteristics and will peak at 150 kilometers away from this area. On the one hand, pollution transfer will lead to the deterioration of the industrial structure and the deepening of pollution degree in the destination area; on the other hand, it will enhance the industrial scale in the destination area. Therefore, environmental regulation effect has a strong spatial effect on pollution emission in the local and surrounding provinces. Theoretically, the difference of environmental regulation standards in different provinces will provide space for high-polluting enterprises to avoid pollution control through regional transfer. Therefore, the improvement of environmental regulation has a positive impact on the spatial spillover of carbon emissions. In order to develop the local economy, local governments have the internal power to compete for resources. In China, the flow of domestic capital is subject to strict financial regulation, so FDI and other liquidity production factors are the key to local government competition. Most studies believe that there is a "race to the bottom" behavior of local governments competing to lower environmental standards to attract foreign investment, and this game behavior will gradually escalate with the improvement of FDI level, thus causing differences in environmental regulation standards in different provinces. In order to attract foreign investment, local governments will reduce the intensity of local environmental regulation and reduce the transfer of local polluting enterprises to surrounding cities.

A large number of studies have shown that the inflow of foreign capital will expand the capital scale of the host country, ease the credit constraint, bring more capital and technical support, which is conducive to the expansion of output and the promotion of local economic development. At the same time, it will expand energy consumption and increase the carbon emission of the region where the capital flows. According to the EKC theory, there is an inverted U-shaped relationship between environmental pollution and economic development, that is, in the early stage of economic development, environmental pollution will increase along with economic development, so the inflow of foreign capital will increase the carbon emission of the host country. Due to the "profit-seeking characteristics" of capital, international capital will not be fixed in specific enterprises and provinces after flowing into the host country, and part of the capital will continue to be transferred to enterprises with more promising development prospects and high profits. Provinces with geographical proximity and convenient transportation between them are more susceptible to the "profit-seeking effect", so FDI is more likely to flow between similar provinces. In this way, the scale effect will spread to the surrounding areas and increase the carbon emission level of neighboring provinces.

3.2 The influence mechanism of OFDI on spatial spillover of carbon emissions

Some scholars have explored the possible mechanism of OFDI to realize reverse technology spillover, and found that the technological innovation and technological R&D capability obtained by enterprises through foreign investment can benefit other enterprises in neighboring provinces through the connection between upstream and downstream industries and competition and learning between enterprises. Due to professional division of labor and industrial agglomeration, upstream and downstream enterprises are closely connected in space, so that the technology acquired by enterprises through foreign investment can be spread among enterprises in the form of patent transfer and outsourcing contract, so as to promote the progress of production efficiency of cooperative enterprises. Human capital is an important factor for the development and progress of enterprises. In order to improve the professional level of employees and improve the production efficiency of enterprises, enterprises have the internal motivation to train employees. The communication and learning of employees between enterprises enable the technologies and products acquired by enterprises through foreign investment to be passively transmitted to cooperative enterprises.

Some scholars believe that the absorption, imitation and innovation of foreign technologies are subject to human capital. On the one hand, the trans-regional flow of labor is an important channel for technology spillover. On the other hand, the local implementation of foreign advanced production technologies and pollution control technologies requires the support of certain human capital. When the accumulation of human capital is lower than the critical value, the effect of technology spillover absorption is not obvious. Only when the accumulation of human capital and its internal structure reach a certain degree, the local technology innovation ability can be obtained. Human capital is spillover, and the inter-regional flow and aggregation of human capital with private attributes is conducive to accelerating the accumulation of human capital and creating conditions for technological research and development.

4. Policy Suggestions

Based on the above analysis, the following suggestions are made:

Local governments should optimize the structure of outbound investment, guide funds to high-tech industries in developed countries, and exert the effect of reverse technology spillover on local carbon emissions. Strengthen the cultivation of human capital, pay attention to the accumulation of human capital, actively carry out talent exchange activities with the surrounding areas, promote the rational distribution of human capital in the region, and avoid the spillover of carbon emissions from the vicious competition of human capital to the surrounding areas. With human resources as the carrier, technology exchange and communication between provinces should be strengthened, so as to jointly achieve carbon emission reduction.

China's carbon emissions have a significant spatial spillover effect, and it is difficult to effectively reduce carbon emissions in their own provinces and their surrounding areas by independent pollution control. While promoting the top-level design of emission reduction, the government should strengthen the support at the bottom. It should not only formulate macro emission reduction strategies, but also strengthen the constraint and supervision on local governments, change the incentive mechanism based on GDP, correct the short-sighted behavior of local governments, and promote joint prevention and control of local governments and collaborative governance.

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