Economic Development, Fiscal Compensation, and Ecological Environment Quality

Subjects: Others

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There is a nonlinear, N-shaped relationship between economic development and the ecological environment in China. Fiscal ecological compensation has a direct governance effect on the ecological environment of deterring ecological damage and providing financial compensation. Fiscal ecological compensation has an indirect impact on the ecological management of different regions by influencing economic development. Therefore, while focusing on transforming the economic development model, local governments should adopt policy instruments such as expanding the coverage of financial ecological compensation, deepening the design of the financial ecological compensation system, and systematically evaluating the effects of financial ecological compensation policies. The government should further improve and optimize the fiscal eco-compensation system in order to help China's green and high-quality development.

Keywords: economic development ; fiscal ecological compensation ; ecological environment

1. Introduction

Since the reform and opening in 1978, Chinese economy has experienced rapid growth, and its development targets have been achieved. Past practice shows that excessive consumption of resources and environmental degradation are the main problems facing countries at the stage of rapid economic development. Many studies have revealed that there may be a non-linear relationship between economic growth and the ecological environment [1][2][3][4][5]. Among them, the EKC (Environmental Kuznets curve: Panayotou first called this relationship between environmental quality and per capita income the Environmental Kuznets Curve (EKC) in 1993, based on the Kuznets curve proposed by American economist Simon Smith Kuznets in 1955. When a country has a low level of economic development, the level of environmental pollution is less. However, as per capita income increases, environmental pollution tends to increase from low to high, and environmental degradation increases with economic growth. When economic development reaches a certain level, that is, after reaching a certain critical point or "inflection point", with the further increase in per capita income, environmental pollution tends to decrease from high to low, and the degree of environmental pollution gradually slows down, and the quality of the environment gradually improves. However, this definition needs to be further studied and deepened.) theory illustrates that environmental pollution initially shows an upward and downward trend with economic development. Currently, rapid "broad" economic growth has exacerbated resource consumption and the deterioration of the ecological environment, limiting the sustainable development of the Chinese economy and society. Consequently, it is urgent to look for a method of green development.

The three-dimensional co-management framework, "government-corporate-individual", is considered an ideal model to achieve green development. However, due to the externals of the ecological environment and the limitations of the stage of social development, society and individuals have failed to play an effective role in China's existing ecological and environmental governance system. The government serves as the most important role in the current eco-environmental governance system. The government directly addresses the ecological environment through energy conservation and environmental protection expenditure and environmental protection taxes on both the fiscal and revenue sides. At the same time, the government also regulates ecological harm administratively through a series of legal systems. In addition, government policies also indirectly impact environmental management by influencing economic development.

Among the many ecological and environmental management measures taken by the government, financial ecological compensation, which regulates the main body of ecological and environmental relations by economic means, has been favored by the government. Fiscal ecological compensation focuses on the ecosystem itself with corresponding fiscal instruments, such as transfers and subsidies. It compensates ecological providers by paying for the additional protection, associated construction costs, and the opportunity costs of development foregone. In addition, this policy tool internalizes the externality involved from the standpoint of the royalties of the beneficiaries in order to promote green development.

The tax-sharing system based on Ecological Value-Added Tax and Service Tax, first established by the Parana State in Brazil in 1992, can be regarded as the specific application of fiscal ecological compensation in practice. Similarly, the transfer payment system for national key ecological functional areas that China began to pilot in 2008 is also the most important attempt of vertical fiscal ecological compensation in China's reality. By 2022, more than 800 counties in China will have received ecological transfer payments, with the total size of the transfer payments exceeding CNY 600 billion. According to the corresponding county ecological and environmental governance assessments, national transfer payments to key ecological function areas have had a significant impact on China's ecological and environmental governance and economic and social development [6].

2. Economic Development and Ecological Environment

The relationship between economic development and environmental sustainability began with Grossman and Krueger. Grossman and Krueger discovered that there is an inverse U-shaped relationship between SO_2 and soot emissions and economic growth [1]. Panayotou performed a detailed analysis of the inverse U-relationship between economic development and environmental pollution. Then, Panayotou suggested naming the inverted U-curve between the two as "Kuznets Environmental Curve" [2]. Subsequently, studies using different types of pollution discharge indicators, such as air pollution, water pollution, and solid waste pollution, as proxy variables of environmental pollution confirmed the nonlinear relationship between the two [3][4]. Grossman and Krueger presented the mechanism for the impact of economic development on the quality of the environment in terms of scale, technology, and structure [5].

Rapid economic development has led to excessive consumption of natural resources, and predatory exploitation of resources has put severe strain on the ecological environment [7][8]. Based on the research of Grossman and Krueger [1], the (inverted) U-shaped relationship between economic development and resources and ecology is supported by some studies, that is, in line with the traditional EKC hypothesis [9][10][11]. For instance, Madhusudan and Michael used the deforestation rate as a measure of the ecological environment, confirming that there is a strong EKC relationship between the income rate and the deforestation rate [9]. Based on the ecological footprint data of 22 European countries, Saqib and Benhmad empirically tested the quadratic relationship between income growth and ecological footprint [11]; that is, the hypothesis of ecological EKC is supported. At the same time, a large body of literature has found that the relationship between economic development and the ecological environment is not a simple quadratic one. Economic development and ecological environment show a cubic (inverse) N-shaped correlation [12][13][14][15][16]. For example, research results from Zhou et al. show a non-linear, N-shaped relationship between economic development and environmental pollution [13][14]. The empirical results of Kang et al. demonstrate a non-linear, inverted N-shaped relationship between economic development and carbon dioxide emissions [15]. Moreover, some studies do not think that there is a non-linear relationship between the two [17]. Different empirical results may be linked to differences in sample time intervals, substitution variables, and selection of econometric models [18].

3. Influencing Factors of Nonlinear Relationship Changes

Economic and social factors are major shocks to the relationship between economic development and the ecological environment. Firstly, energy consumption patterns can alter the relationship between economic development and the ecological environment. With the development of the economy, the level of energy consumption of the population will change, initially increasing and then decreasing. When the level of economic development improves, people become more interested in the current and future environmental conditions. In addition, people are more willing to sacrifice energy consumption in return for a high-quality environmental environment. It shifts the inflection point of the non-linear curve between economic development and the ecological environment earlier and mitigates the negative impact of economic development on the ecological environment [19][20]. Secondly, financial development policies such as credit expansion have not only increased consumer demand for energy-intensive products but have also led to more environmental degradation. This in turn shifts the inverted U-shaped curve between economic development and the ecological environment [21][22]. Finally, the economic structure also affects the non-linear relationship between economic development and environmental protection. The modernization of the economic structure will change the "extensive" pattern of development of high pollution, high energy consumption, and high emissions at an early stage of economic development. This will reduce the pressure on the ecosystem caused by economic development and shift the EKC curve to the left [23].

The government's environment policy is a factor that cannot be ignored to change the curve. Panayotou stressed that improving environmental quality depends primarily on government policies, social systems, and market integrity and functioning rules [24]. When the government has enough information, it can set higher ecological standards and stricter environmental laws and regulations. At the same time, the market uses more technologically advanced technology to

produce its products. The second inflection point of the N-shaped curve means that the quality of the ecological environment will improve. The objective of regulating the relationship between economic development and the ecological environment could be achieved through commercial means. For example, carbon trading could reconcile supply and demand between those with a surplus of carbon credits and those with a shortage of carbon credits through market forces. This reduces the distance between the inflection points of the original N-type EKC curve and contributes significantly to the reduction of CO_2 emissions. A series of pollution-control policies developed by the government will also affect the relationship between economic development and the ecological environment [23]. In general, the use of coercive administrative regulation by the government can also shift the relationship between economic development and the ecological environment in a direction that is conducive to improving the ecological environment. For example, environmental regulations may have a significant impact on the peak and position of the EKC, which causes the EKC to move down to the left. However, the direction of government regulation of the relationship between economic development and the ecological environment through economic instruments such as green fiscal revenues and expenditures is uncertain. There are both positive and negative impacts. For example, green fiscal revenues and expenditures have a negative effect on carbon emissions. The cumulative effect of green finance on environmental protection has yet to be published, with China only recently involved in the economic sphere. In addition, there is a problem of moral hazard due to information asymmetry between enterprises and government. This has led some enterprises to increase their pollution emissions after obtaining green fiscal support. This ultimately leads to green budget receipts and expenditures that inhibit the role of economic development in improving the environmental environment [25]. On the contrary, the government will not only increase the cost of enterprises through green fiscal revenue and constrain enterprises' pollutant-discharge behavior but also encourage enterprises to invest in environmental protection and improve technology through green fiscal expenditure measures. As a result, reducing pollution emissions and making the EKC inflection point could come earlier [22][26].

4. Eco-Environmental Effects of Fiscal Ecological Compensation

Ecological compensation is an institutional arrangement that adjusts the interest relationship between ecological beneficiaries and ecological protectors through a market-oriented mechanism to realize the internalization of ecological protection externalities [27]. At present, due to the absence of relevant legal systems and property rights arrangements, government-led vertical financial transfers have become an important means of ecological compensation. In other words, fiscal ecological compensation is the most important expression of ecological compensation [6].

The policy practice of fiscal eco-compensation could be traced back to the value-added tax-based tax-sharing system of the Brazilian State of Parana in 1992. This scheme has a positive effect on the ecological protection of the State of Parana [28]. Since then, Ecological Value-Added Tax and Service Tax has been used as a benchmark by other regions and countries and has created a positive incentive for environmental governance [29]. China's fiscal ecological compensation system can be traced back to the returning farmland to the forest system in the 1990s. However, the formal fiscal ecological compensation system is the national key ecological function area transfer payment system, which was piloted and implemented in 2008. Similarly, due to the unclear subjects responsible for ecological environmental governance in China and the immature market mechanism, vertical ecological transfer payments that incorporate ecological protection indicators into the intergovernmental financial redistribution standards have become the main means of ecological compensation [6]. In Chinese practice, fiscal ecological compensation has played an important positive role in boosting the governance behavior of the local government's ecological environment through the effect of financial compensation. It also significantly improves the local ecological environment and the level of supply of public services for the livelihoods of populations [30][31][32][33][34].

According to the above research, ecological financial compensation has become an important means for the government to coordinate environmental governance among regions. However, the above studies not only fail to reach a consensus on China's green development path but also have not yet clarified the theoretical basis, influence, and mechanism of the realization path of ecological financial compensation to promote green development.

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