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Fiscal Decentralization, Environmental Expenditure and Unbalanced Development of Social Welfare Level: Evidence of China

Nan Pan[1,2*], Jin-fa Jiang [1]

[1] PhD Candidate, School of Public Finance and Administration, Jiangxi University of Finance and Economics, Nanchang, China
[2] PhD Candidate, School of Economics and Management, Nanjing Institute of Technology, Nanjing, China
* **Corresponding Author:** nanpan2022@163.com

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ABSTRACT

Based on the panel data of 30 provinces in China from 2007 to 2017 and the theory of feasible ability, this paper uses the principal component method to measure the social welfare level of China's provincial level and observes its spatial distribution by Moran index and spatial panel. The paper analyzes the influence of financial decentralization, environmental decentralization and local environmental protection fiscal expenditure on social welfare level by using System GMM and differential GMM and through threshold model analysis the threshold effect of decentralization on social welfare level. The results show that: The level of social welfare in China presents the characteristics of spatial aggregation, and the imbalance still exists. Fiscal decentralization, environmental fiscal expenditure and technological innovation have significantly improved the level of social welfare, while environmental decentralization weakens the level of social welfare, and there is an opposite curve feature between environmental fiscal expenditure and foreign investment projects. Therefore, we need to optimize the structure of fiscal expenditure, improve the performance of fiscal expenditure, improve the incentive mechanism of environmental fiscal expenditure. Following the notion of green development realize the Pareto improvement of economic and non-economic welfare in different regions.

Keywords: Environmental Fiscal Expenditure, Social Welfare, Decentralization, Green Development

INTRODUCTION

Global climate change and environmental pollution impel people to find new ways for sustainable development. In 2004, the UN published the first report of the "Millennium Ecosystem Assessment" (MA/MEA) project "Ecosystems and Human Well-being: An Assessment Framework". The core issues of the project are ecosystems and humans. Interrelationships between welfare. Zhu and Zhang (2014a, 2014b) discussed the performance of ecological welfare (Daly, 1974) from the perspective of promoting economic growth and deepening sustainable development.

Over the past 40 years, China's urbanization and industrialization have progressed rapidly. Simultaneously, this intensive economic development has caused serious environmental pollution. Water and air pollution have seriously affected people's quality of life and the rephrasing of sustainable regional development. As the foundation and important pillar of modern national governance, fiscal should be integrated into various fields such as politics, economy, culture, social governance, and ecological civilization within the scope of modern national governance. The basic function of the government and its finances is to provide equalized public services to citizens and correct externalities. Among them, ecological environmental protection is an important responsibility of the government and its finances, and environmental protection is important to promote the construction of main functional areas and the equalization of basic public services (López et al., 2011). The improvement of the ecological environment reflects the level of social welfare that best reflects the requirements for harmony between man and nature. The state also needs to coordinate the financial investment of the

ecological environment to meet the need for different regions and different classes to gradually enjoy basically equal public services.

Before China introduced the most stringent environmental protection policy, the promotion of local governments focused on economic growth. Fiscal decentralization and fiscal expenditure structure did not improve the ecological environment but worsened the quality of the ecological environment. Under the "five-in-one" overall layout and the requirements of ecological civilization construction, governments at all levels attach importance to green development, clarify the central and local powers and expenditure responsibilities in the ecological environment, and provide strict environmental regulations and measures to significantly improve the quality of the ecological environment. effect. This article compares the impact of environmental regulation and fiscal decentralization on the welfare of social residents from the perspective of welfare economics, uses the SEN welfare index to measure the level of social welfare, and uses Moran's I to observe the temporal and spatial changes of the social welfare index. Development and welfare in the region from the perspective of improvement, examine the governance path and policy direction of green sustainable development from the perspective of fiscal decentralization and environmental decentralization, broaden the fiscal perspective of the ecological environment, and enhance the pertinence and feasibility of policy recommendations.

The remainder of this study proceeds as follows. Literature review and hypothesis development, the measurement of social welfare level, the empirical strategy and data, and results, result and the policy suggestions.

RELATED WORKS

Environment and Social Welfare

Development policy or public policy priority is normative, it is the behavior of serving the people and the whole society through the rational operation of public policy and the system of ensuring social fairness and justice. Economic growth is not the only goal of the government. If economic growth is at the expense of the ecological environment and excessive consumption of natural resources as the cost, such growth is "uneconomic growth." The improvement of the level of social welfare is not limited to macroeconomic growth and the rise of residents' consumption levels. It should be constructed in accordance with a governance system that focuses on the role of the government and enhances the people's self-capacity, aims at the people, and takes the people as the fundamental consideration.

The fundamental purpose of the government is to provide welfare to citizens and improve people's livelihood and well-being for the purpose of development. Welfare, well-being and happiness are one of the core issues of economic and social development in the world today. McGillivray and Clarke (2006) believe in concepts such as quality of life, welfare, good living, standard of living, life satisfaction, prosperity, progress, demand satisfaction, human poverty, development, empowerment, capacity expansion, etc. Happiness has been used in relation to well-being without a clear distinction (Stevenson & Wolfers, 2008). Although the concepts of Welfare and Well-Being are still unable to reach a consensus among scholars of different disciplines, this does not prevent it from being a development goal pursued by governments of various countries.

An early study of the economics of happiness is Easterlin (1974). Later contributions examine the relationship between income distribution and self-rated happiness (Morawetz et al., 1977) and between unemployment and happiness (Clark & Oswald, 1994, 1996; L.Winkelmann & R. Winkelmann, 1998). Though there is by now a considerable literature on the economics of happiness, applications to environmental economics are rare. Van Praag and Baarsma (2005) have examined the effect of airport noise on subjective well-being, and Rehdanz and Maddison (2005) have studied the relationship between climate and happiness. The linkage between air pollution and happiness has been examined by Welsch (2002), Welsch(2006), Levinson(2012), Yerema and Managi(2021) etc.

As a public goods, the non-exclusive and non-competitive nature of the environment makes it difficult for market allocation to function. The tragedy of "public land" is most likely to occur in ecological system. For the market is difficult to constrain, government intervention is inevitable. For governments, this translates into a move towards a decentralized fiscal system to improve the efficiency of providing environmentally friendly public goods because local governments can better satisfy residents' demands for such public goods (Carley & Konisky, 2020).

Hypothesis 1 (H1). Financial expenditure for environmental protection is conducive to the improvement of social welfare

Fiscal Policy and Social Welfare

To understand from the ethical perspective of economic welfare, fiscal public expenditure on environmental protection and the government's regulatory policies on environmental protection are in line with the people's needs for a better life. It is a development policy that enhances people's capabilities and a public policy that protects people's freedom.

First, increasing fiscal spending on environmental may stimulate the environment improvement and affect social welfare. Greiner (2005) and Gupta and Barman (2010) built an endogenous growth model with public capital and pollution based on the government expenditure model of Barro (1990), revealing that environmental improvement will increase the efficiency of public expenditure. López et al. (2011) proved that increasing fiscal expenditures for environmental protection and adjusting the structure of fiscal expenditures can effectively reduce pollution from both theory and practice. Some studies indicated that government public expenditures have external effects on production activities and that there is a positive correlation with pollutant emissions (Bernauer & Koubi, 2006; G. I. Galinato, & S. P. Galinato, 2016). Some other studies have found a negative correlation between government public expenditures and environmental pollution (Lin et al., 2012; Islam & López 2013; López & Palacios, 2014).

Boadway and Marchand (1995) believe that under the optimal tax system, the government's beneficial allocation of public expenditure resources will crowd out private expenditures, thereby improving residents' social welfare. Groneck (2011) under the steady-state public expenditure level based on endogenous growth, changes in the structure and scale of public expenditure have a positive effect on the level of social welfare. But there are also opposing views. Ueshina (2018) also discusses the impact of government debt and public expenditure on welfare from the endogenous growth theory and believes that under the requirement of a long-term balanced budget, in order to repay debts, the tax rate will increase faster than the level of social welfare. The required growth rate is not conducive to the improvement of social welfare. Davis (2014) pointed out in his research that in 2012, global motor vehicle fuel consumption subsidies amounted to 110 billion U.S. dollars. In addition to causing a large number of fiscal subsidies in various countries, fiscal subsidies can also cause serious economic distortions that are not conducive to social welfare.

Second, fiscal decentralization is detrimental to the improvement of environmental quality. In the early days, Chinese local governments ignored the protection of the ecological environment while pursuing the goal of economic growth, and the pollution of the ecological environment caused the spillover of negative externalities between regions. Principal-agent local governments have the enthusiasm to maximize their own interests. Chinese-style decentralization is at the middle level of the two mechanisms. Political centralization constantly adjusts the competitive impulse brought by economic decentralization to local governments. The politically centralized decentralized fiscal and taxation system ultimately obeys the reform intentions of the central government. It is also destined to comprehensively deepen the reform as a top-down reform. The central government bears the cost of inclusive growth and is also responsible for the direction of reform. The government has shifted from the single goal of pursuing economic growth in the past to diversified goals such as ecological civilization, people's well-being, and national governance.

In theory, fiscal decentralization and environmental expenditure have a certain relate to welfare. According to first-generation fiscal federalism (FGFF), fiscal decentralization is conducive to the improvement of environmental quality. Classical theory indicates that public decision-makers are benevolent maximisers of social welfare and public goods and services are provided uniformly (Musgrave, 1959; Oates, 1972; Rubinfeld, 1987). Thus, fiscal decentralization helps improve the delivery of public goods and services to environmental quality. Although basing on FGFF, second-generation fiscal federalism (SGFF) assumes that public officials' goals are induced by political institutions that often diverge from maximizing citizen welfare (Qian & Weingast, 1997; Garzarelli, 2004; Oates, 2005).

Considering that fiscal decentralization influences the process of economic growth, fiscal decentralization can have an implicit effect on environmental sustainability, as investigators state that there is an interconnection between economic developments and environmental degradation. G. Li & Zhou (2019) and G. Li and Zong (2021) believed that environmental decentralization and government competition have an interactive effect on green development, and a reasonable division of central and local powers and management in ecological and environmental protection contributes to green development. Zheng (2020) used provincial panel data to adopt a threshold model from the perspective of environmental regulation and environmental decentralization and fiscal decentralization to obtain an inverted U-shaped relationship between China's environmental protection and economic growth. Only by intervention can the efficiency of ecological and environmental protection be improved.

Hypothesis 2 (H2). Fiscal decentralization is conducive to the improvement of social welfare.

The Effect of Environmental Decentralization and Social Welfare

Environmental decentralization is the division of environmental protection responsibilities between the central and local governments. There is also competition in environmental assessment between local governments (Sigman, 2007). On the one hand, the pressure of competition comes from top-down performance assessment requirements, and on the other hand, it comes from the parallel intergovernmental policy implementation degree of sticky pressure. With the gradual deepening of emphasis on ecological and environmental issues, the level of environmental decentralization has also continued to increase, and local governments have greater powers in the formulation of regional environmental protection policies and have a promoting role in improving the regional environment.

However, under the governance model of political centralization and fiscal decentralization in China, the scale of local government depends on transfer payments and local fiscal revenues, and the focus on performance evaluation is different. The local environmental protection department has to face both the higher-level environmental protection department and the leadership of the local government. Its independence is restricted, but its administrative nature is relatively prominent. While expanding the direct expenditures of environmental protection departments for environmental governance, administrative expenditures have also been expanded. Expenses have shifted more toward wage costs and other directions, and expenditures are sticky. Under strict environmental control policies, the output of high-polluting and high-energy-consuming enterprises is restricted or transferred to other regions. Environmental problems are more manifested in spatial transfer, resulting in uneven development of local welfare.

Hypothesis 3 (H3). Environmental revenue decentralization is not evident in improving social welfare.

METHODOLOGY

Measurement of the Level of Social Welfare

SEN Welfare Index Based on Capability Theory

Traditional welfare economics uses utility functions to measure social welfare, equates income and consumption to personal welfare, uses economic growth data to measure social welfare, and generally uses GDP or expanded value based on GDP accounting as an indicator. However, with the deepening of the concept of social welfare and the expansion of the scope, GDP has been difficult to adapt to the content of measuring social welfare. Sen critically reconstructed traditional welfare economics. According to people’s feelings of happiness or fulfillment of desires or requirements for primary commodities It is not enough to evaluate welfare. He focuses on studying the essence of life and creatively put forward "capability theory" and "partial ordinal theory". The core of Sen’s capability theory lies in Since people pursue the freedom of life that they cherish, they can adopt them according to their own abilities, take valuable actions and reach a valuable state in life (Sen & Nussbaum, 1993). Some research stared from housing, health, education, social, psychological, labor Measure personal or social welfare indexes in aspects such as dynamics and family economics and use the model to Fuzzy Mathematics Theory and Principal Component Factor Analysis (PCA)Method Synthesize Welfare Index (Martinetti, 2000; Balestrino & Sciclone, 2001; Robeyns, 2003; Bérenger & Verdier-Chouchane 2007). This paper will use the PCA method to obtain the measurement value of China’s social welfare level to represent the social welfare level.

Index Choice

1. Economic factors: Economic conditions are to a large extent an important factor affecting the level of welfare. According to Wagner's law, economic growth will increase people's demand for the environment, health, education, etc. As a basic factor, this article intends to use three indicators of per capita GDP, average wages and per capita urban disposable income.

2. Economic structure: Economic structure can reflect the composition and structure of a country's national economy. This paper selects industrial structure ratio, per capita energy consumption, and fiscal technology expenditure ratio to reflect my country's industrial changes in the process of economic transformation. Economic factors reflect the functional freedom of SEN's feasible capability theory, and economic structure reflects the freedom of capability.

3. Living factors: Living factors are an important welfare index to measure the basic living security of residents. From the perspective of the changes in the main contradictions in our society, "backward social production" has transformed into "unbalanced and inadequate development", and the increasing "material and cultural needs" of the people have transformed into "needs for a better life", both on the demand side and on the supply side. All have undergone fundamental changes, which is the root cause of the transformation of the main contradiction. Whether measured from the level of demand or from the scope of demand, the urban-rural duality,

basic living consumption, and basic public provision are still important for residents' psychological well-being perception. The basic national conditions in the primary stage of socialism have not changed. Select the indicator.

4. Social protection: Social protection is the promotion of social policy concepts and a comprehensive manifestation of responding to social risks. Social protection is a broader extension of social security. The World Bank's concept of social protection is very broad, covering the accessibility of macro policies, public governance, and good governance to the people's livelihood. According to my country's national conditions, after building a moderately prosperous society in an all-round way, we are faced with relative poverty and accelerated aging of the population. Therefore, this paper chooses health, social security, unemployment and food security as indicators.

5. Education level: Education reflects a country's development potential and an important basic factor for sustainable development, it is a basic right and basic welfare enjoyed by citizens. Only when the power of education is guaranteed, the quality of education is improved, and the level of education is raised, can we continue to provide the country with sufficient talents and social welfare can continue to grow. Therefore, the text selected some indicators with reference to most documents.

6. Environmental factors: The environment reflects the appearance of productivity between humans and nature through labor practices. The expansion of human demand for economic growth and the limited capacity of natural of demand is increasing. The suppression of environmental pollution and the requirements for green development in economic development have become the focus of national governance in the modernization process of various countries, and have become the path support for sustainable development. This paper selects the main environmental variables from a large number of literatures as welfare measurement indicators.

All Data sources cite from "China Statistical Yearbook", "Fiscal Statistical Yearbook", "Environmental Yearbook", "Health Statistical Yearbook", "China Regional Statistical Yearbook", from 2007 to 2017.

Table 1. Social Welfare Level Measurement Index

Project	Index
Economic Factors	GDP per (+), average Wage (+), Urban disposable income per (+)
Economic Structure	Primary industry ratio(+), Secondary industry ratio (+), Tertiary industry ratio (+), Energy consumption per (-), Technology expenditure ratio(+)
Life Factors	Urban-rural consumption expenditure ratio(+), Road per(+), Water per(+), Mobile phone(+), Price of house(-), City drainage pipe length(+), Urban and rural affairs financial expenditure ratio(+)
Social Protect	Number of beds per thousand(+), Number of health per 10,000 people(+), Unemployment rate(-), food possession per(+), Number of people participating in medical insurance/old-age insurance(-)
Education Level	Primary school teacher-student ratio(+), Junior high school teacher ratio(+), Books per(+), Proportion of 15-year-old illiterate and semi-illiterate(-), Education investment per(+), education fiscal expenditure ratio(+)
Environment Factors	Industrial wastewater discharge(-), SO2 discharge(-),Hazardous waste discharge(-) 、 Per garbage disposal rate(+),green space per(+)

SEN Welfare Index Measurement

This paper uses the data of 30 provinces and cities in China (the data of Tibet, Hong Kong, Macau, and Taiwan are excluded due to too many omissions), after the original data is dimensionless standardized by the range method.

Standardize the original pollutant data:

$$K_{ij}^{*} = \frac{Z_{ij} - \min(Z_{ij})}{\max(Z_{ij}) - \min(Z_{ij})} \tag{1}$$

where Z_{ij} represent the value of pollutant indicator j of province i, $i \in [1, n]$, and $j \in [1, m]$.

The index variables are extracted by PCA, and the coefficients are calculated by the rotation matrix to obtain the original solution value. The KMO values in the past years are all greater than 0.6, and the P values are all 0.000, indicating that it is suitable for principal component analysis. Finally, the transfer normalization process is carried out to obtain the measured value of the SEN welfare level index.

Table 2. 2007-2017 SEN Welfare Measurement Index by Province

Province	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Beijing	0.560	0.821	0.674	0.625	0.764	0.769	0.388	0.915	0.805	0.709	0.820
Tianjin	0.399	0.562	0.524	0.417	0.371	0.419	0.396	0.294	0.514	0.558	0.479
Hebei	0.239	0.203	0.275	0.276	0.417	0.269	0.380	0.348	0.212	0.318	0.244
Shanxi	0.224	0.256	0.249	0.262	0.379	0.219	0.337	0.340	0.180	0.145	0.185
Nei menggol	0.097	0.253	0.251	0.308	0.417	0.313	0.371	0.424	0.349	0.340	0.289
Liaoning	0.265	0.273	0.406	0.463	0.495	0.364	0.425	0.512	0.405	0.315	0.298
Jilin	0.073	0.090	0.130	0.196	0.119	0.169	0.262	0.221	0.261	0.260	0.217
Heilongjiang	0.113	0.082	0.138	0.219	0.134	0.140	0.220	0.274	0.197	0.174	0.139
Shanghai	0.675	0.779	0.917	0.918	0.746	0.658	0.529	0.689	0.777	0.836	0.709
Jiangsu	0.600	0.456	0.565	0.491	0.419	0.572	0.447	0.498	0.583	0.533	0.595
Zhejiang	0.665	0.527	0.593	0.456	0.491	0.555	0.453	0.479	0.565	0.570	0.624
Anhui	0.272	0.257	0.240	0.230	0.215	0.281	0.321	0.177	0.250	0.284	0.278
Fujian	0.400	0.294	0.337	0.246	0.259	0.322	0.353	0.253	0.349	0.406	0.392
Jiangxi	0.267	0.197	0.246	0.192	0.152	0.217	0.281	0.143	0.171	0.228	0.220
Shandong	0.427	0.356	0.469	0.414	0.506	0.468	0.432	0.497	0.419	0.426	0.440
Henan	0.386	0.296	0.299	0.274	0.381	0.243	0.343	0.278	0.161	0.152	0.218
Hubei	0.247	0.177	0.258	0.318	0.254	0.300	0.315	0.304	0.341	0.270	0.331
Hunan	0.237	0.218	0.279	0.303	0.212	0.243	0.305	0.223	0.272	0.292	0.235
Guangdong	0.765	0.561	0.549	0.493	0.658	0.631	0.450	0.502	0.476	0.493	0.565
Guangxi	0.371	0.321	0.350	0.258	0.199	0.266	0.275	0.156	0.227	0.222	0.271
Hainan	0.139	0.128	0.184	0.102	0.021	0.201	0.128	0.223	0.252	0.233	0.265
Chongqing	0.337	0.300	0.340	0.325	0.411	0.420	0.338	0.343	0.322	0.368	0.320
Sichuan	0.339	0.216	0.351	0.370	0.309	0.296	0.349	0.308	0.340	0.354	0.311
Guizhou	0.389	0.487	0.201	0.250	0.355	0.261	0.272	0.263	0.185	0.209	0.233
Yunnan	0.262	0.347	0.179	0.192	0.244	0.159	0.276	0.204	0.167	0.169	0.174
Shaanxi	0.288	0.291	0.222	0.422	0.249	0.237	0.277	0.222	0.231	0.200	0.251
Gansu	0.237	0.304	0.090	0.189	0.155	0.171	0.201	0.197	0.103	0.067	0.104
Qinghai	0.231	0.334	0.256	0.135	0.201	0.272	0.317	0.186	0.287	0.267	0.235
Ningxia	0.324	0.374	0.224	0.293	0.317	0.365	0.328	0.232	0.340	0.416	0.330
Xinjiang	0.172	0.239	0.202	0.364	0.153	0.201	0.232	0.293	0.259	0.187	0.227

From **Table 2**, the welfare levels of different provinces vary greatly in the same year, and the index changes also show irregular fluctuations. From the horizontal comparison between regions, it can be observed that the welfare level measurement index of the eastern coastal areas is significantly higher than that of other regions in the country, and the Yangtze River Delta, the Pearl River Delta and the Beijing-Tianjin region have always maintained a relatively high level of welfare. Through the longitudinal comparison of years, it is found that the index changes in various regions are irregular and do not show a linear trend. The changes in welfare levels in the central and western regions have a tendency to converge, this is also related to the selection of indicators.

Due to the advantages of geographical transportation, preferential policies and the opening of modern history, the coastal areas have taken the lead in economic development, and capital accumulation, human capital and technological innovation are all in a leading position. Under the guarantee of relatively abundant local financial resources, expenditures on public services, environmental protection and pollution control in coastal areas can go hand in hand with investment in economic construction, and economic development and social welfare are in the optimization stage, so they can continue to maintain a high level of social welfare. Although the central region has maintained a certain economic growth rate, social welfare has not seen substantial growth in recent years. The main reason is that the investment in people's livelihood has increased rapidly, but the scale and structural ratio have not been effectively adjusted. In the process of transformation to green and sustainable development, the industries in the central region are still in the adjustment stage due to the limitations of capital accumulation, human capital and technological innovation and other factors, so there is a situation of slow improvement in the welfare index. The western region is a key area for transfer payment, and the requirements for industrial development take priority over the development of people's livelihood. The basis of various elements is still in a weak position. The factors such as capital accumulation, human capital and technological innovation rely on the support of the central government and the transfer of the eastern and central regions. The relationship is still in the stage of straightening out the relationship, so there is a partial decline in the welfare index.

Spatial Clustering Trends of Social Welfare Levels

Figures 1 can give a preliminary judgment. With the passage of time, the equalization effect of public policies is gradually reflected, the imbalance between regions in my country has been alleviated, and the level of

social welfare among regions also has a spatial agglomeration effect.

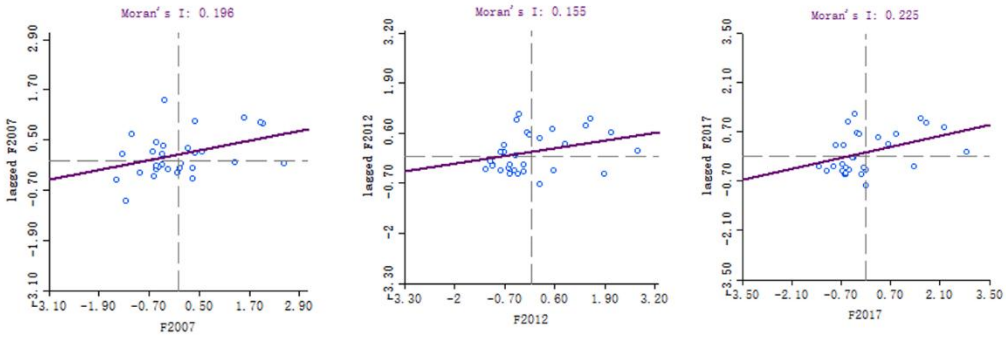
Table 3 shows the Moran's index of spatial geographic weight for measuring the level of social welfare. The P value of the Moran's index over the years is lower than 5%, and has a significant positive correlation, which means that there is a positive spatial dependence on the level of social welfare between provinces in my country, which proves that my country's social welfare There is a clustering effect at the level.

Table 3. Spatial Geographic Weight Matrix Moran Index

Year	Moran's I	SD	Z-Value	P-Value
2007	0.1963***	0.0939	2.4559	0.01
2008	0.0378***	0.0892	0.8028	0.01
2009	0.2399***	0.0997	2.6955	0.01
2010	0.0651***	0.1077	0.9272	0.02
2011	0.1261***	0.0981	1.7016	0.01
2012	0.1552***	0.0972	1.9793	0.05
2013	0.2823***	0.1095	2.9458	0.01
2014	0.1640***	0.1037	1.9518	0.02
2015	0.1825***	0.1065	2.0857	0.01
2016	0.2677***	0.1077	2.7984	0.01
2017	0.2249***	0.0987	2.6134	0.01

Figure 1. 2007, 2012, 2017 SEN Welfare Index Spatial Distribution

The improvement of the level of social welfare is inextricably linked to the equalized public provision by the government, and the spillover of the provision of public goods also promotes the regional balance of the level of social welfare in the spatial expression of the level of social welfare. From the scatter plot analysis of Moran's index in **Figure 2**, the distribution of social welfare levels in 2007 was relatively scattered. In 2012, the low-welfare areas moved closer to the center, and the sparse first-quadrant high-welfare areas also showed an increasing trend. The level of social welfare in the regions is more balanced, and the number of regions in the high welfare quadrant has increased more.



Figures 2. 2007, 2012, 2017 Social Welfare Moran's Index Scatter Plot

According to the feasible ability proposed by Sen, whether it is function or ability, welfare is a "set" rather than a single-dimensional variable, which includes very complex economic, social, environmental and other factors. The government's financial expenditure and control of the ecological environment is a kind of social

welfare. Each local government can formulate appropriate environmental protection policies according to the differences in the preferences of residents in their jurisdictions on environmental needs and the actual situation of environmental governance in their jurisdictions to promote environmental quality. to improve the level of social welfare. It should also be noted that in the initial stage of improvement of unbalanced development, the growth rate of administrative expenditures of environmental protection departments will exceed that of pollution control expenditures, and environmental governance regulations cannot get the actual response of local governments in the initial stage, and the structure of environmental protection fiscal expenditures will shift to the administrative level. On the contrary, management tilt inhibits welfare improvement.

Model Setting and Data Description

Model Setting

There are multiple factors affecting the level of social welfare. First, a benchmark model is established to test the impact of environmental fiscal expenditure, fiscal decentralization and environmental governance decentralization on social welfare effects. (SENINDEX) is the explained variables use the SEN welfare index.

$$senindex_{i,t} = \alpha + \beta_1 X_{i,t}^{j} + \gamma_1 j_{i,t} + \sigma_{i,t} + \lambda_{i,i} + \varepsilon_{i,t} \tag{2}$$

where i represents the province, t denotes time, $X_{i,t}^{j}$ is the Core explanatory variables, $j_{i,t}$ represents other control variables, $\sigma_{i,t}$ represents time effect, $\lambda_{i,t}$ represents regional effect and $\varepsilon_{i,t}$ is a random error term.

Second, use the first-order lag term of the explained variable to establish the system GMM and differential GMM models.

$$senindex_{i,t} = \alpha + \beta_1 senindex_{i,t-1} + \beta_2 X_{i,t}^{j} + \gamma_1 j_{i,t} + \sigma_{i,t} + \lambda_{i,i} + \varepsilon_{i,t} \tag{3}$$

Finally, because the traditional regression model will flicker the interaction between regions, a spatial econometric model is adopted to test the dependence of inter-provincial social welfare levels. This article uses the spatial autoregressive model (SAR), the spatial error model (SEM) and the spatial Dubin model (SDM) (Anselin,1996). The SDM model is the most widely used, and its model is as follows:

$$senindex_{i,t} = \delta W senindex_{i,t} + \alpha I_N + \beta X_{i,t} j_{i,t} + \chi W X_{i,t} + \mu + \zeta_t I_N + \varepsilon_{i,t} \tag{4}$$

Among them, W is the geographical adjacency matrix, χ , δ are the endogenous and exogenous interaction coefficients. If the exogenous interaction effects are ignored, the model changes to SAR.

$$senindex_{i,t} = \delta W senindex_{i,t} + \alpha I_N + \beta X_{i,t} j_{i,t} + \mu + \zeta_t I_N + \varepsilon_{i,t} \tag{5}$$

If endogenous interaction effects are not considered, the model changes to SEM.

$$senindex_{i,t} = \alpha I_N + \beta X_{i,t} j_{i,t} + \chi W X_{i,t} + \mu + \zeta_t I_N + \varepsilon_{i,t} \tag{6}$$

In empirical research, which model is most suitable should be selected through methods such as LR test. And it is also necessary to use Hausman's test to choose between fixed effects and random effects.

Variable Selection

Core Explanatory Variables

Three indicators, per capita environmental governance fiscal expenditure (PEN), fiscal decentralization index (FIS), and environmental governance decentralization index (WAGEENFI) are selected as explanatory variables for the level of social welfare.

Per capita fiscal expenditure for environmental in areas with greater population density, the impact of residents' social life on environmental pollution will also increase, and the resulting externalities will also affect each other. Therefore, the per capita fiscal expenditure on environmental governance is selected as the explanation for the government's environmental public policy on social welfare. Factors affecting the level.

Fiscal decentralization index. At present, there are many calculation methods for the choice of fiscal decentralization index. This article takes the ratio of provincial fiscal revenue per capita budget to fiscal expenditure per capita as the fiscal decentralization index to explain the ability of local governments to bear public policy expenditure responsibilities.

Environmental decentralization index. Environmental decentralization is the division of environmental governance powers and expenditure responsibilities between different levels of government based on

decentralization. Qi Yu et al. (2014) used the dynamic changes in the scale of the environmental protection system and the number of personnel to measure environmental decentralization. On this basis, this paper chooses to use the dynamic change of the average salary of environmental protection personnel to describe environmental decentralization. Compared with environmental law enforcement and monitoring indicators, this indicator is more inclined to the fiscal category, which can reflect the structural problem of environmental fiscal expenditure from another perspective. The specific calculation formula is:

$$wageenfi_{i,t} = \left[\frac{Lwage_{i,t} / wage_{i,t}}{Nwage_t / wage_t}\right] \times \left[1 - GDP_{i,t} / GDP_t\right] \quad (7)$$

Among them, $wageenfi_{i,t}$ is the decentralization of environmental income, $Lwage_{i,t}$, $wage_{i,t}$ and $GDP_{i,t}$ are the annual average wages of environmental protection personnel, the average wages of state-owned enterprises and the GDP in the province. $Nwage_t$, $wage_t$ and GDP_t, are the annual national average wages of environmental personnel, the national average wages of state-owned enterprises and GDP.

Control Variables

Based on the existing literature and robustness considerations, considering the multiple factors that affect the level of social welfare and the ecological environment, this paper selects: (1) Consumption factors. Per capita consumption (PCOM) is used as a measure of the impact of economic factors on the social welfare level index, using the total amount of local social retail goods per capita to reflect the current direct consumption capacity. (2) Technical factors. The number of patents granted per thousand people (TEC) is used as an indicator to measure technical factors. (3) Investment factors. Mainly consider the promotion effect of investment on the economy, using three factors: foreign direct investment ratio (FDI), environmental investment ratio (ENGDP) and residential investment ratio (FI). With reference to the existing literature, the foreign direct investment ratio (FDI) is measured as the ratio of foreign direct investment in RMB converted into RMB at the current exchange rate to the local GDP; the environmental investment ratio (ENGDP) is measured according to the ratio of local environmental pollution control investment to the local GDP; The proportion of residential investment (FI) is measured by the proportion of local residential investment in the total investment expenditure of the local society. (4) Institutional factors. The main consideration is the government's ability and pressure to implement public policies, and the tax burden index (TAXGDP) and fiscal expenditure index (FEGDP) are used to reflect the impact of public policies on the level of social welfare. The tax burden index (TAXGDP) is measured by the ratio of local tax revenue to local GDP, and the fiscal expenditure index (FEGDP) is measured by the ratio of total local fiscal expenditure to local GDP.

This article selects 30 provincial panel data from 2007 to 2017 in my country (consider the availability and completeness of the data, excluding the Tibet Autonomous Region and China's Hong Kong, Macao, and Taiwan regions). The selected data are all from the "China Statistical Yearbook" over the years, "China Fiscal Yearbook", "China Environmental Statistical Yearbook", "China Environmental Yearbook" and statistical yearbooks of various provinces and cities, as well as China's regional economic database provided by the EPS database.

RESULTS AND DISCUSSION

Empirical Analysis

Panel Regression Analysis

First, establish a benchmark panel model and use Hausman test to determine the fixed effect. Model 1 examines the relationship between social welfare and environmental protection fiscal expenditure, fiscal decentralization and environmental regulation. Model 2 and Model 3 control regional fixed effects and time, respectively. Fixed effects. In order to further analyze the intertemporal effects of the social welfare index, a first-order lag dynamic panel model is adopted. Model 4 and Model 5 are system GMM and differential GMM methods respectively. The Sargan test and AR(2) statistics indicate that the model used does not exist. For over-identification and second-order random error term autocorrelation problems, the model is effective using estimation methods. The empirical results are shown in **Table 4**.

Observing the core explanatory variables of the static panel, in Model 1 and Model 2, fiscal decentralization, environmental decentralization, and per capita fiscal expenditure on environmental governance are all significant. After fixed time effect, although environmental decentralization (WAGEENFI) is not significant, in the three static panel models, the social welfare effects are all negatively correlated, indicating that in the process of environmental protection governance, local environmental distribution based on wages Rights did not increase

the level of social welfare. It is found from the original sample that the wages of environmental protection departments have increased year by year, and the rate of increase has exceeded the growth rate of the average wage of state-owned enterprises, and far exceeds the growth rate of the average social wage and has also exceeded the growth rate of fiscal expenditures for environmental governance. The reason may be that the excessively high administrative expenditure of the environmental protection department has squeezed out the environmental protection expenditure. At the same time, the salary change of the environmental protection department has a weak impact on the income of the whole society. The role of social welfare effects verifies Hypothesis 3.

The significance of fiscal decentralization (FIS) on the social welfare index shows that through fiscal decentralization, the governance capacity and level of local governments have been gradually improved. Under the concept of high-quality development and sustainable development, local governments are not blindly pursuing GDP growth, but more Considering people's livelihood and well-being, governance orientation more embodies people's nature, governance policies more embody fairness, and governance methods more embody efficiency, which validates Hypothesis 2.

Table 4. Panel Model Regression Results

	Static Panel			**Dynamic Panel**	
ExplanatoryVariables	Model 1 nonF	Model 2 AF	Model 3 TF	Model 4 GMM	Model 5 GMM
L.senindex	-	-	-	0.481* (0.247)	0.348** (0.134)
Fis	0.298** (0.129)	0.454** (0.179)	0.447** (0.199)	0.316*** (0.121)	-0.375 (0.329)
Wageenfi	-0.025** (0.012)	-0.043** (0.018)	-0.049 (0.045)	-0.032* (0.018)	-0.032 (0.020)
Pen	1.024*** (0.201)	1.107*** (0.394)	1.704*** (0.407)	0.660 (0.826)	-1.129 (1.159)
Pcom	-	0.042** (0.017)	0.143*** (0.034)	0.011 (0.033)	0.002 (0.031)
Tec	-	-0.842* (0.426)	-1.885*** (0.453)	-0.550 (1.095)	-1.226 (1.447)
Fdi	-	0.004 (0.004)	0.003 (0.006)	0.009 (0.007)	0.026** (0.010)
Fi	-	0.068 (0.235)	-0.093 (0.211)	-0.020 (0.314)	0.023 (0.538)
Engdp	-	0.005 (0.011)	0.007 (0.011)	0.011 (0.024)	0.075* (0.043)
fegdp	-	0.087 (0.759)	0.021 (0.931)	-0.595 (1.150)	0.257 (1.341)
taxgdp	-	-1.120 (1.307)	-0.243 (1.388)	0.796 (2.155)	2.525 (2.533)
_cons	0.164** (0.069)	0.092 (0.104)	-0.003* (0.112)	0.018* (0.123)	
R-squared	0.044	0.069	0.132	-	-
Regional fixed	-	是	是	-	-
Time fixed	-	-	是	-	-
AR(1)P V	-	-	-	0.066	0.001
AR(2)P V	-	-	-	0.539	0.115
Hansen P V	-	-	-	0.903	0.276
Sargan P V	-	-	-	0.004	0.001

Note: *, **, and *** indicate that significance tests at the 10, 5, and 1% levels were passed, respectively.

The significance of per capita environmental fiscal expenditure (PEN) to the social welfare index shows that under the strictest environmental protection system requirements, local fiscal expenditures have gradually normalized support for ecological environment governance, and fiscal expenditures on ecological protection, ecological compensation, and ecological restoration have indeed improved. The state of the ecological environment has improved the level of basic public services and the livelihood and well-being of all citizens, verifying Hypothesis 1.

Using the lagging first-order term of the social welfare index (SENindex), the system GMM and differential

GMM dynamic panel models are established. The measurement results show that the lagging terms of the two models are both significant, indicating that the social welfare index has an "additive" effect, which can also explain the aforementioned Moran's index agglomeration shown. Compared with the static panel, the fiscal decentralization item of the system GMM model is significant, which proves that the social welfare improvement effect of the local government in the construction of the country's modern governance capacity has been continuously improved. The results of the differential GMM model are not significant. The only significant variables are foreign investment and environmental governance investment. This and the per capita social retail sales in the static panel explain the effect of consumption and investment on economic growth, thereby enhancing the social welfare effect.

Regional Heterogeneity Test of Social Welfare Effects

In view of the long-term objective differences between regions in China, and the uneven economic development and income levels among regions, in the process of continuously strengthening the construction of ecological civilization, local governments also have a certain ability to coordinate cognition and governance of environmental protection and economic development. Based on the regional grouping perspective, this paper examines the distribution trend of Moran's index and the impact mechanism of regional heterogeneity.

Table 5. Regional Division and Spatial Panel Model Results

Variables	SAR	SEM	Coastal	Non-coastal	West and Northeast
Fis	0.503***	0.511***	0.067	0.676***	0.707***
	(0.064)	(0.065)	(0.323)	(0.176)	(0.209)
Wageenfi	-0.062***	-0.059***	-0.020	-0.044**	-0.055**
	(0.016)	(0.015)	(0.030)	(0.019)	(0.023)
Pen	0.898**	0.889**	2.080**	1.045***	0.866**
	(0.367)	(0.364)	(0.896)	(0.300)	(0.334)
Pcom	0.027*	0.025*	0.029	0.094**	0.122***
	(0.015)	(0.015)	(0.021)	(0.035)	(0.032)
Tec	-0.330	-0.297	-1.470*	-3.293	-4.482*
	(0.439)	(0.439)	(0.696)	(1.942)	(2.339)
Fdi	0.006*	0.006*	0.004	-0.026	-0.023
	(0.004)	(0.004)	(0.004)	(0.017)	(0.022)
Fi	-0.109	-0.106	-0.045	0.181	0.192
	(0.155)	(0.154)	(0.569)	(0.202)	(0.254)
Engdp	0.003	0.002	-0.026	0.016	0.022*
	(0.009)	(0.009)	(0.023)	(0.010)	(0.010)
Fegdp	-0.274	-0.307	-1.911	0.706	0.488
	(0.455)	(0.452)	(1.486)	(0.948)	(1.141)
Taxgdp	0.861	0.842	1.836	-3.073*	-2.857
	(0.830)	(0.827)	(1.891)	(1.609)	(2.037)
_Cons	0.046*	0.025*	0.542*	-0.027*	-0.031
	(0.051)	(0.047)	(0.245)	(0.076)	(0.085)
Rho	-2.081***	-	-	-	-
	(0.240)				
Lambda	-	-2.068***	-	-	-
		(0.278)			
Sigma2_e	0.005***	0.005***	-	-	-
	(0.000)	(0.000)			
Obs.	330	330	110	220	154
R-Squared	0.715	0.719	0.100	0.156	0.205

Note: *, **, and *** indicate that significance tests at the 10, 5, and 1% levels were passed, respectively.

According to the static panel fixed effects, the model is divided into coastal areas, inland areas, and regional analysis of the western and northeastern areas. In order to further study the spatial heterogeneity of fiscal decentralization and environmental fiscal expenditures, as well as the impact of environmental decentralization on social welfare levels, this paper uses a spatial-geographical adjacency matrix to establish a spatial panel. The LLC test panel data has no unit root, and the P value is 0.0000. The Hausman test is used to determine the use of fixed effects. The LM, LR, and Wald tests show that the spatial proximity matrix is more suitable for the SEM and SAR models. The regression results are shown in **Table 5**.

The model results once again verify the correctness of the assumptions. Fiscal decentralization and environmental fiscal expenditure have spatial spillover effects on the level of social welfare and produce positive externalities to social welfare. However, the environmental decentralization of wages has regional stickiness, which leads to social welfare. The negative impact of welfare levels. However, most control variables are not significant in the analysis of spatial heterogeneity.

1. The results of fiscal decentralization are regionally significant. Especially for non-coastal areas, it further proves that under the fiscal framework with clearer powers and expenditure responsibilities, local governments have made significant progress in governance capabilities, and have a significant effect on improving people's livelihood and well-being. It shows that local governments have implemented the requirements of fiscal and taxation system reforms, and conscientiously implemented the requirements for optimizing the division of government powers and financial powers since the 19th National Congress of the Communist Party of China. The fiscal decentralization in coastal areas is not significant, mainly because the development of coastal areas is relatively balanced, and economic welfare and Non-economic welfare can be developed in a balanced way. Therefore, scientific and reasonable fiscal decentralization has a positive incentive effect for local governments to improve the level of social welfare and has a certain promoting effect on alleviating regional differences.

2. The negative results of the environmental decentralization panel are consistent with the regression results. The western and northeastern regions are more significant. The reason is that the environmental protection departments in the western and northeastern regions have stronger wage stickiness, and the overall investment environment of environmental fiscal expenditures is dragged down by the lagging economic development. Affecting the social welfare of the western and northeastern regions.

3. At the level of regional groupings, environmental expenditures show complete significance, indicating that environmental fiscal expenditures have a certain impact on regional social welfare. From a numerical observation, environmental fiscal expenditures in coastal areas have a greater impact on social welfare than non-coastal areas. The improvement of the level is more effective. Not only the central government has increased the general transfer payments and special transfer payments to the ecological environment, but also the environmental fiscal expenditures of local governments and the effect of policy implementation influence improving the level of social welfare.

In summary, the spatial impact of fiscal decentralization (FIS) and environmental fiscal expenditures (PEN) on the level of social welfare verified the results of the Moran’s Index, and the results of the level of regional social welfare meet the national regional development policy requirements.

Threshold Effect Test

According to the above empirical analysis, under the influence of local government competition, the decentralization of environmental revenue weakens the level of local social welfare, and on the scale of different levels of fiscal expenditure, there may be a “threshold effect” in the degree of local government governance of environmental regulation. Therefore, in further analysis, the panel threshold model is used to explore the impact of environmental revenue decentralization on social welfare under the scale of environmental protection fiscal expenditure. Firstly, the existence of the threshold of the model is discussed, and the hypotheses of no threshold, single threshold, double threshold and multiple thresholds are tested in turn, and the corresponding threshold value of each variable is estimated by repeatedly sampling 300 times through the self-sampling method.

Taking the decentralization of environmental income (WAGEENFI) as the main explanatory variable, when considering the per capita environmental protection financial expenditure as the threshold variable, the test results show that there is a significant single threshold of 1% per capita environmental protection financial expenditure, and the threshold value is 320 RMB per capita environmental protection financial expenditure, 95% The confidence interval is [0.030, 0.036] (Ten thousand). As the scale of environmental protection fiscal expenditure continues to increase, the level and capacity of local governments in ecological and environmental governance will be significantly improved, which will improve local social welfare. When taking per capita FDI as the threshold variable, there is also a significant single threshold effect of 1%, the threshold value is 110, 261 RMB per capita FDI, and the 95% confidence interval is [9.8356, 11.3666] (Ten thousand). Local governments still give priority to economic growth and continue to expand the scale of investment promotion. The deterioration of the local environment in the process of local economic growth has a greater impact on the level of local social welfare than the local government's efforts to protect the environment.

Table 6. Threshold Identification Test

Main Variables	Threshold Variables	Model	F	P	10%	5%	1%	Threshold
Wageenfi	Pen	Single	14.25*	0.05**	12.1638	14.2411	16.9119	0.032
		Double	8.43	0.1867	11.0215	14.8760	28.4291	-
Wageenfi	Fdi	Single	13.30**	0.0367*	10.3761	12.2010	15.0685	11.0261
		Double	8.98	0.2167	13.9812	20.3238	28.3920	-

Note: *, **, and *** indicate that significance tests at the 10, 5, and 1% levels were passed, respectively, the 95% confidence interval is based on the Bootstrap method 300 times.

In the estimation equations of the two sets of threshold variables, the impact of fiscal decentralization and per capita social retail expenditure (consumption) on social welfare shows positive significance consistent with the above analysis, indicating that the effective promotion of power and the fiscal decentralization of expenditure responsibility division The trend of "race to the bottom" has been reduced, and the increasing public spending has also improved residents' consumption, thereby improving social welfare. The growth of foreign investment has a significant inverted "L" relationship on social welfare. The negative effect of technological innovation on social welfare indicates that the Potter effect based on the welfare level has not yet occurred. On the contrary, the "pollution refuge" generated by foreign investment The "all" effect results in a flat inverted "U" relationship, see **Table 7**.

Table 7. Panel Threshold Regression Result Estimation

Variables	Fdi-Threshold	Variables	PEN-Threshold
	Model 6		Model 7
Fis	0.434***	Fis	0.358**
	(0.142)		(0.143)
Pen	1.210***	Pen	-
	(0.418)		
Pcom	0.033**	Pcom	0.054***
	(0.017)		(0.017)
Tec	-0.836*	Tec	-0.895*
	(0.475)		(0.476)
Fdi	-	Fdi	0.006
			(0.005)
Fi	0.064	Fi	0.034
	(0.173)		(0.170)
Engdp	0.008	Engdp	0.004
	(0.010)		(0.010)
Fegdp	0.521	Fegdp	0.463
	(0.598)		(0.597)
Taxgdp	-1.020	Taxgdp	-1.118
	(1.049)		(1.059)
Wageenfi Fdi<11.0261	1.522***	Wageenfi Pen<0.032	-0.044**
	(0.503)		(0.018)
Wageenfi Fdi>11.0261	-0.040**	Wageenfi Pen>0.032	0.069*
	(0.018)		(0.038)
_Cons	0.019*	_Cons	0.096*
	(0.081)		(0.079)
R-Squared	0.125	R-Squared	0.103

Note: *, **, and *** indicate that significance tests at the 10, 5, and 1% levels were passed, respectively.

Robustness Test

In order to ensure the robustness of the above results, this paper conducts robustness tests through two methods of core explanatory variable replacement and endogenous improvement:

1. Core variable measurement index replacement. The fiscal decentralization index selected in this paper is replaced by the fiscal autonomy decentralization index (FISOWN), which is measured by local income/local expenditure; the environmental income decentralization index based on wages is replaced by the number of workers The environmental revenue decentralization indicator (ENFI) compares the regulatory-based

environmental revenue decentralization with the administrative incentive-based environmental revenue decentralization.

2. Endogenous problem test. In order to avoid the endogeneity problem in the experimental research and reduce the impact as much as possible, learn from the practice of most literatures, use the first-order lag of environmental income decentralization as an instrumental variable, and use the two methods of LIML and GMM to overcome the problems of endogeneity and heteroscedasticity as much as possible. The regression in **Table 8** shows that after replacing the core explanatory variables, the coefficient of Model 8 has decreased compared with that of Model 3, but it is still highly significant. Environmental income decentralization (WAGEENFI) still has no effect on social welfare. Fiscal decentralization and environmental protection Fiscal spending always has the effect of improving social welfare. The results of LIML and GMM instrumental variables are highly consistent, consistent with the findings in **Table 4**, thus verifying the robustness of this study.

Table 8. Panel Regression Robustness Test

Variables	Replacement Variables Model 8	Instrumental Variable (LIML) Model 9	Instrumental Variable (GMM) Model 10
Fisown	0.355* (1.79)	-	-
Enfi	-0.023* (-1.86)	-	-
Fis	-	0.377** (2.22)	0.377** (2.22)
Wageenfi	-	-0.248* (-1.66)	-0.248* (-1.66)
Pen	1.092** (2.55)	1.261*** (2.74)	1.261*** (2.74)
Pcom	0.018 (1.01)	0.113*** (3.78)	0.113*** (3.78)
Tec	-0.558 (-1.28)	-1.331** (-2.39)	-1.331** (-2.39)
Fdi	0.004 (1.00)	0.006 (0.85)	0.006 (0.85)
Fi	0.080 (0.33)	-0.377* (-1.65)	-0.377* (-1.65)
Engdp	0.005 (0.45)	0.003 (0.30)	0.003 (0.30)
Fegdp	0.823 (1.02)	0.007 (0.01)	0.007 (0.01)
Taxgdp	-2.274 (-1.59)	0.358 (0.29)	0.358 (0.29)
_Cons	0.197* (1.76)	0.185* (0.85)	0.185* (0.85)
R-Squared	0.054	0.843	0.843

Note: *, **, and *** indicate that significance tests at the 10, 5, and 1% levels were passed, respectively.

CONCLUSION

Social welfare is the result of the combined effect of the economic-society-financial-environmental system. The inter-provincial social welfare index is calculated by selecting the feasible capacity welfare index from the panel data of 30 provinces and cities in China from 2007 to 2017, and the Moran of social welfare is calculated. space index. The empirical research covers the improvement of social welfare by the three departments of economy, finance and environment. From the perspective of local government fiscal policy, dynamic panel analysis is used to empirically study the relationship between social welfare. Considering the nonlinear characteristics of environmental revenue decentralization, the threshold model is used to analyze Nonlinear effects of environmental income decentralization on social welfare effects. Research indicates:

1. From 2007 to 2017, the provincial social welfare performance showed an overall upward trend, with obvious spatial disequilibrium characteristics. Among them, the western region has the greatest improvement in

social welfare, which tends to gather in the central region, but the improvement of social welfare in the central region is not obvious. The trend of social welfare improvement in the Northeast is slow, and the social welfare in the eastern coastal areas is ahead of other regions, but the regional advantages have not been radiated. Instead, social welfare is constrained by high fixed asset investment premiums. From a national perspective, regional social welfare does not show a spatial gradient.

2. Fiscal decentralization and eco-environmental fiscal expenditures have obvious effects on improving social welfare. Therefore, clarifying the powers and expenditure responsibilities of local governments, and appropriately strengthening centralization is beneficial to local governments in improving regional social welfare. Local governments are building a fiscal governance system. China, pay more attention to promoting people's livelihood policies and improving local social welfare. However, the impact of environmental fiscal expenditures on the improvement of social welfare comes more from the increase in expenditure scale rather than the change in expenditure structure.

3. The decentralization of environmental income based on wages has a weakening effect on social welfare. It faces the "threshold effect" of environmental and economic development and produces an inverted "U" effect of environmental protection fiscal expenditures, indicating the role of local governments in improving the ecological environment It is effective, but the structure of fiscal expenditure urgently needs to be optimized. In addition, social welfare is also facing the flat "inverted U" effect between economic growth and environmental income decentralization, indicating that the previous investment promotion has a significant impact on social welfare, reflecting the economic welfare effect of the SEN social welfare index. The resulting weakening of environmental regulations has reduced the non-economic welfare effects of the SEN welfare index. Only a few regions can achieve rapid economic growth while improving the ecological environment and enhancing social welfare.

Policy Implications

1. Continue to improve the reform of the financial system, implement the government's power and expenditure responsibilities in the field of ecological environment as soon as possible, and dynamically adjust and optimize the division of inter-governmental power and financial power. Establish inter-governmental financial relations with clear powers and responsibilities, coordination of financial resources, and regional balance, standardize the inter-governmental responsibility relationship for ecological and environmental protection, and form a stable system in which the powers, expenditure responsibilities and financial resources of governments at all levels are adapted. Pay attention to the timeliness and long-term nature of environmental policies, earnestly fulfill the responsibility of ecological environment fiscal expenditure, adjust and optimize the use direction of ecological environment fiscal funds, and improve the use performance of ecological environment fiscal funds. Give full play to the financial support for ecological and environmental governance, strengthen the support of central transfer payments for ecological and environmental governance, ensure that ecological and environmental funds are effectively used in environmental governance and restoration, and promote the balanced development of ecological and environmental responsibility and fiscal expenditure structure. And promote the orderly planning of financial funds, form a general budget for ecological environmental protection and transfer payment funds that match the scale and structure, improve the matching of financial resources and environmental governance between ecological and environmental fiscal expenditure policies in different regions, and coordinate fiscal policies and environmental policies. Consistency among them promotes Pareto improvement of local social non-economic welfare.

2. Improve the incentive mechanism for fiscal expenditure on the ecological environment and improve the growth mechanism for fiscal expenditure on environmental protection. Continue to gradually increase the budget input at all levels, steadily increase the scale of environmental financial funds, ensure the effective growth of environmental protection investment, and meet the needs of environmental governance. Build an effective ecological compensation mechanism to solve the contradiction between growth and protection. Clarify the responsibilities of local governments at all levels in the process of ecological fund transfer payment. Launch a unified GEP accounting standard system as soon as possible, clarify the vertical ecological transfer payment standards and compensation methods from the central government to local governments, and establish a long-term ecological compensation mechanism to ensure that local governments have sufficient incentives for ecological and environmental protection. Realize environmental financial policies to serve economic and social development, provide environment-friendly products, and provide social members with the most basic well-being.

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