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Green Investment and its Impact on High-quality Economic Development

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Abstract

In response to the call of the 19th National Congress of the Communist Party of China on green investment and promoting High-quality economic development, the article focuses on green investment and its impact on High-quality economic development, combined with relevant authoritative literature, and studies the High-quality economic development levels of provinces and cities from 2011 to 2020. Object, collect data, evaluate from five dimensions of innovation, coordination, green, openness, and sharing, build an evaluation index system for High-quality economic development, and use panel data to measure and empirically analyze the impact of my country's green investment on economic growth in combination with the spatial Durbin model. The spatial effect of the impact of quality development provides policy recommendations for High-quality economic development in my country.

Keywords

Green Investment; Economic Development; Spatial Measurement.

1. Literature Review and Mechanism Analysis

In recent years, with the progress of green investment technology playing an increasingly important role in solving economic development and the continuous expansion of my country's investment market, scholars have been paying more attention to the two, and their research mainly focuses on the following aspects:

First, measure the level of High-quality economic development.

Zhang Minglong (2020) based on the Dubin model test concluded that green investment in the process of marketization can promote High-quality economic development and has a significant effect. INGA (2021) uses employment, income and investment in 19 industries as a measure of High-quality economic development. ANGELOS (2021) uses business and consumer sentiment in the US systemic risk as a criterion for judging the level of High-quality economic development.

Second, the definition and realization of green investment.

Miao Junwei et al. (2020) started from the mesoscopic level, and took three aspects: structural optimization, industrial innovation and upgrading, and industrial environment development as the standard for defining the level of High-quality economic development.

DANIEL (2019) believes that green investment refers to investment in green technologies such as energy conservation and emission reduction. DATTA (2020) believes that green technology investment is an important development direction of green investment in the future. KRISTINA (2018) pointed out that green city investment will be a new direction for the development of green investment.

Third, the impact of green investment on High-quality economic development.

ANA (2018) took the incident of insufficient power supply in sub-Saharan Africa as an example, and analyzed that green investment has a positive impact on High-quality economic

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development. SHAHANI (2020) mentioned that the European Union announced the European Green Investment Agreement of 1 billion euros, and concluded that green investment has a positive effect on High-quality economic development.

Based on this, compared with the existing literature, the contribution of this paper is mainly reflected in the following three aspects. First, this paper studies the relationship between green investment and High-quality economic development using panel data from 2011 to 2020 in my country's provinces, cities and prefectures as the research medium, providing new ideas and methods for follow-up research; second, this paper uses computer programs (Python) used the keyword extraction method for the annual government work report of each city to measure the intensity of environmental regulation, effectively extending the depth of measurement; thirdly, this paper uses two types of prefecture-level city spatial weight matrices to construct a corresponding spatial panel model to strengthen the model reliability of results.

2. Econometric Model Construction

From the literature review, it can be seen that due to the possible spatial agglomeration characteristics of green investment and High-quality economic development and progress, the ordinary panel model is prone to estimation bias because it cannot measure the lag effect. estimated effect.

2.1. Common Panel Model Formula

First, the formula for constructing a common panel model is shown in (1).

$$Y_{it} = \beta_0 + \sum_{\varphi=1}^{n} \alpha_\varphi X_{\varphi,it} + \varepsilon_{it} \tag{1}$$

Among them, $i$represents the region, and$t$ represents the year; Y_{it}includes EEC_{it} and IEC_{it}, which respectively indicate the progress of green investment and High-quality economic development in year t in region i; β_0 represents a constant term, $X_{\varphi,it}$ Represents the φ influencing factor in year t in the i region, α_φ represents the regression coefficient of the φ influencing factor, and ε_{it} is the random disturbance term.

Secondly, a spatial panel model is constructed, and the following benchmark regression model (2) is constructed to analyze the impact of spatial characteristics on the technological progress of green investment.

$$Y_{it} = \beta_0 + \sum_{\varphi=1}^{n} \beta_\varphi X_{\varphi,it} + \rho_1 * \tau w_{ij} * Y_{it} + \rho_2 * \tau w_{ij} * \varepsilon_{it} + \varepsilon_{it} \tag{2}$$

(1): When ρ_1=1, ρ_2=0, the benchmark regression model is converted into a spatial lag model (SLM), which reflects the direction and extent of the influence of the observable values in the adjacent areas of the i region on the green investment in this region;

(2): When ρ_1=0, ρ_2=1, the benchmark regression model is converted into a spatial error model (SEM), which reflects the direction and degree of influence of unobservable influencing factors or random shocks in the vicinity of the i region on the green investment in this region;

Among them, w_{ij} is the spatial weight matrix, $w_{ij} * Y_{it}$ is the spatial lag variable of the dependent variable, $w_{ij} * \varepsilon_{it}$ is the spatial lag error term, and τ is the spatial regression coefficient.

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2.2. Spatial Weight Matrix

The spatial weight matrix is the premise of spatial econometric analysis. In order to prevent a priori errors caused by the construction of the spatial weight matrix, this paper will construct and analyze the empirical results of two types of spatial weight matrices, namely the geographic distance matrix(WD_{ij})and Economic matrix (WE_{ij}). The following is the specific calculation formula of each matrix:

The geographic distance matrix WD. s_ij is the geographic distance between cities i and j, measured by the latitude and longitude distance of the corresponding cities.

$$WD_{ij} = (1/s_{ij}) / \left[\sum_{j=1}^{N} (1/s_{ij})\right]$$

Economic matrix WE. $\overline{pgdp_j}$ is the average per capita GDP of region i during the sample period, in which the GDP data is obtained after deflating prices in 2000.

$$WE_{ij} = \left(1/\left|\overline{pgdp_\iota} - \overline{pgdp_j}\right|\right) / \left[\sum_{j=1}^{N} \left(1/\left|\overline{pgdp_\iota} - \overline{pgdp_J}\right|\right)\right]$$

The econometric model will use the Economic Matrix (WE) matrix, while the robustness test will use the Geographic Distance Matrix (WD) matrix.

3. Empirical Research

3.1. Variable Selection and Descriptive Statistics

3.1.1. Explained Variables

The level of High-quality economic development is selected as the explained variable. From 2011 to 2020, the comprehensive score of the High-quality economic development level of each province and city in my country has been obtained by the principal component analysis method.

3.1.2. Explanatory Variables

Taking green investment as an explanatory variable

Green investment (GI) in previous studies is generally measured as the initial investment capital, the number and amount of green investment projects. Referring to the research of Yao Li (2018), Jia Jun (2014) and others, based on the availability of data and the accuracy of the model, this paper adopts the ratio of the number of green investment projects (pieces) in each region to the number (pieces) of green investment projects in the country during the same period as a measure.

3.1.3. Control Variables

The selection of control variables should include variables that can affect the High-quality development and progress of the economy through a certain path. Referring to the research of DATTA et al., five factors such as the level of technology investment, the level of government intervention, the level of education investment, the level of opening to the outside world, and the intensity of environmental regulation are selected. a control variable. Among them, since scientific expenditure is the core of technological progress and has a strong guiding role in technological innovation, this paper measures the level of technological investment by the ratio of scientific expenditure (ten thousand yuan, the same below) in each region to the GDP of the same period; The degree of dominance of the economy and the competition system of local governments lead to government behaviors that will inevitably have an important impact on

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the direction and development of technological innovation. It is measured by the ratio of government general budget expenditure to GDP in the same period; the level of opening to the outside world can be affected by potential external effects such as technology diffusion. Regional technological innovation, using the proportion of the actual use of foreign capital to GDP in the same period to describe the level of opening to the outside world; environmental regulation, reflecting the government's intensity of environmental supervision, this intensity prompts the society to invest in environmental protection and technological innovation and other activities.

3.1.4. Descriptive Statistics

This paper takes the data from 2011-2020 in my country's inland provinces, cities and prefecture-level cities as the research object, and analyzes the impact of my country's green investment on the progress of High-quality economic development regions. First of all, the corresponding descriptive statistical analysis of each variable in the model is carried out, as shown in Table 1.

Table 1. Descriptive statistics of variables

variable	Observations	Mean	standard deviation	Minimum	Maximum
green investment	4828	0.004	0.017	0.000	0.286
Technology investment level	4828	0.008	0.034	0.000	0.792
level of government intervention	4828	0.028	0.018	0.000	0.159
level of opening	4828	0.021	0.027	0.000	0.776
The intensity of environmental regulation	4828	0.004	0.003	0.000	0.023

3.2. Measurement Model

Table 2. Panel model regression results

Variables	OLS			SLM		
GI	-0.410*** (0.000)	-0.369*** (0.013)	SEM	OLS	SLM	SEM
SCI	0.366** (0.010)	0.310** (0.028)	-0.380*** (0.012)	0.269*** (0.002)	0.209** (0.016)	0.192** (0.030)
GOV	-0.135*** (0.000)	-0.076*** (0.001)	0.304** (0.034)	0.056 (0.632)	0.298** (0.015)	0.298** (0.017)
OPEN	0.072 (0.312)	-0.055 (0.403)	-0.075*** (0.001)	-0.083*** (0.000)	-0.070*** (0.000)	-0.069*** (0.000)
EI	-15.064*** (0.000)	-0.760 (0.373)	-0.062 (0.354)	0.494*** (0.000)	0.434*** (0.000)	0.425*** (0.000)
Constant	0.163*** (0.000)		-0.814 (0.341)	-1.009* (0.083)	2.404*** (0.001)	2.338*** (0.002)
Lambda				0.082*** (0.000)		
rho		0.112*** (0.000)	0.074*** (0.007)			0.137*** (0.000)
sigma2_e		0.014*** (0.000)			0.161*** (0.000)	
Observations	4828	4828	0.014*** (0.000)		0.010*** (0.000)	0.010*** (0.000)
R-squared	0.132	0.039	4828	4828	4828	4828
F-test	122.632		0.039	0.050	0.031	0.031
Prob > F	0.000			42.426		
Log-likelihood		3473.1590		0.000		

Remark: *** p<.01, ** p<.05, * p<.1

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It can be seen from Table 2 that the fitness of energy-saving or High-quality economic development and progress estimated by the ordinary panel model (OLS) is 0.132 and 0.050, respectively, and the overall significance test at the 1% level is passed. In order to further analyze the spatial effect produced by the two, a lag term will be introduced to construct a spatial panel model. The results show that the two types of biased technological progress estimated by SLM and SEM are not well fitted (see Table 2). Combining the Log- L et al., it can be concluded that the estimation effect of the spatial panel model is better. In the regression results, the rho or Lambda values of SLM and SEM are significantly positive, indicating that energy-saving or High-quality economic development progress has strong spatial dependence, that is, technological progress in the region will synergistically promote such technologies in surrounding areas. progress.

3.3. Robustness Check

Since this paper adopts the common panel model and the spatial panel model, the WE matrix will be used to test the spatial panel model in the robustness test. The economic weight matrix test uses data from 2011 to 2020 for analysis. It can be seen from the data results in Table 3 that green investment has a significant positive effect on High-quality economic development and progress, and the analysis of control variables such as the degree of government intervention presents similar conclusions to the above analysis. Therefore, it can be considered to pass the robustness test.

Table 3. Robustness test results

X\Y	OLS	SLM	SEM
GI	-0.224** (0.016)	-0.369*** (0.000)	-0.376*** (0.000)
SCI	0.053 (0.592)	0.318** (0.025)	0.307** (0.034)
GOV	-0.054*** (0.001)	-0.078*** (0.001)	-0.076*** (0.001)
OPEN	0.028 (0.649)	-0.069 (0.297)	-0.097 (0.159)
EI	-4.959*** (0.000)	-0.867 (0.312)	-1.054 (0.222)
Constant	0.077*** (0.000)		
Lambda			0.275** (0.018)
rho		-0.020 (0.880)	
sigma2_e		0.014*** (0.000)	0.014*** (0.000)
Observations	2840	4828	4828
R-squared	0.136	0.039	0.040
F-test	74.037		
Prob > F	0.000		
Log-likelihood		3464.0658	3466.5565

Remark: *** p<.01, ** p<.05, * p<.1

4. Conclusion

4.1. Research Conclusions

The following conclusions can be drawn from the above analysis.

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On the whole, my country's High-quality economic development level is rising, and there are significant differences between provinces and cities, especially in the following aspects: First, the inter-provincial gap is large. The top five and the bottom five appear in the eastern and western regions, respectively, indicating that the development of the eastern and western regions is unbalanced and contradictory. Secondly, the spatial spillover effect of green investment level on the quality of economic development in surrounding areas is reflected in geographical location, showing a trend of spatial agglomeration. Third, the impact of green investment on High-quality economic development has a certain spatial correlation, but the impact of green investment on High-quality economic development has a spatial weight and a distance economic weight of 0.1. Fourth, local green investment has a positive impact on the High-quality economic development of provinces, cities and surrounding areas, and the direct and indirect impact of High-quality economic development is significant.

4.2. Policy Recommendations

First, local governments have taken effective measures to maintain stable economic growth. In order to maintain the momentum of sustained economic growth in my country, local governments should formulate reasonable and High-quality economic development measures according to local conditions. The second is to give full play to the advantages of the east and promote the development of the west. Make full use of the spatial spillover effect in the east. As the leader of my country's High-quality economic development, Beijing, Shanghai, Guangzhou and Shenzhen have not only improved the level of my country's High-quality economic development, but also gave full play to their respective advantages. These regional resources and policies are conducive to the development of the central and western regions and the High-quality development of the national economy. Third, optimize the green development environment and improve the green investment system. All provinces and cities should closely focus on the direction of green investment, deepen cooperation in green development and economic investment, and achieve mutual benefit and win-win results. Continuously improve the concept of green investment, strengthen the concept of green investment in provinces and cities, and form a green industry network system through cooperation with green investment enterprises and institutions to meet the needs of sustainable development of High-quality economy. Fourth, innovate green investment models to achieve efficient economic development. Increasing green investment plays an important role in economic development and quality. With the development of quality economy, the government can innovate green investment models. For example, cooperating with green investment institutions to jointly cultivate relevant talents, realize more effective investment, and promote High-quality economic development.

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References

[1] Wang Lei, Song Tianyang. Research on the impact of digital financial development on green technology innovation of enterprises: driven interpretation based on multi-agent intermediaries [J/OL]. Journal of Ocean University of China (Social Science Edition): 1-16.

[2] Bian Chen, Chu Zhaopeng, Sun Zhenglin, Wang Han. Evolutionary Game Analysis of Heterogeneous Environmental Regulation Policy Synergy and Enterprise Green Technology Innovation [J]. Industrial Technology Economy, 2022, 41(05): 12-21.

ISSN: 2710-0170

[3] Guo Li, Ji Shouqun. The impact of energy enterprise heterogeneity on green innovation capability: Based on the perspective of spatial spillover [J/OL]. Resource Development and Market: 1-12.

[4] Xing Hanwen. Research on the mechanism of green finance promoting green technology innovation [J]. Cooperative Economy and Technology, 2022(10):47-49.

[5] Yang Yanjun, Liu Mengxi. Green Technology Innovation, Industrial Agglomeration and Corporate Financing Constraints: An Empirical Analysis Based on China's Manufacturing Listed Companies [J/OL]. Journal of Natural Science of Hunan Normal University: 1-11.