Hindawi
Mathematical Problems in Engineering
Volume 2022, Article ID 6000948, 11 pages
https://doi.org/10.1155/2022/6000948

Research Article

Analysis of the Impact of Energy Factor Allocation Efficiency on Green Total Point Productivity from a Low-Carbon Perspective

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Received 24 July 2022; Revised 25 August 2022; Accepted 29 August 2022; Published 16 September 2022

Academic Editor: Dinesh Kumar Saini

The high consumption of energy resources but low utilization, low factor allocation, and unreasonable economic structure affect the sustainability of economic development. Based on the energy factor theory from a low-carbon perspective, this paper constructs an impact model of green total point productivity and conducts a detailed analysis of the resource mismatch in the energy industry. Under the premise of efficient resource allocation, the factor input of an enterprise is positively correlated with total point productivity. Second, the model adds environmental constraints, considers the undesired output of carbon dioxide, and considers the input of energy factors, and reduces the undesired output as much as possible while increasing the expected output. The model realizes the update estimation of each component of the stationary part of a class of nonstationary stochastic processes and can use the information at a certain time and its previous time in a cycle to forecast all subsequent times. In the simulation process, in order to make the results more objective and accurate, this paper calculates the index and its decomposition results under two conditions, and uses MaxDEA 6.0 professional software to measure the regional industry total point productivity index. The experimental results show that the effective factor of low-carbon data is 0.91, and the relative error is less than 3.11%, which meets the test threshold and effectively improves the robustness of the model.

1. Introduction

At present, some regions blindly follow the economic development concept of GDP (gross domestic product), which greatly reduces the quality and efficiency of regional economic development [1]. The resulting problems such as large consumption of energy resources but low utilization, low factor allocation, unreasonable economic structure, and serious ecosystem damage have affected the sustainability of regional economic development [2]. Nowadays, the traditional factor-driven economic growth mode is unsustainable. As another important engine driving economic growth, total point productivity has begun to become the main force of economic growth [3], and the contribution of factor accumulation and total point productivity to output growth. This change has become the main basis for judging the transformation of economic growth mode [4–6]. The main connotation of the transformation of regional economic development mode is the transformation from factor accumulation-driven to total point productivity-driven [7].

The free flow of economic factors between regions, the diffusion of innovation, and the spillover of technology have strengthened the interregional economic development [8]. In terms of linkage, traditional theories regard different regions as closed economic entities [9–11], which cannot fully understand the impact mechanism of green productivity and the micromechanism of improving green productivity [12]. To ensure the healthy, green, and sustainable development of the national economy [13], focusing on the green economic development model, green total point productivity (GTFP) with energy and environmental constraints is added, which can reflect the comprehensive competitiveness of regional green economy and the essential connotation of green development [14].

Based on the theory of energy factors from a low-carbon perspective, this paper constructs an impact model of green total point productivity. Focusing on the main line of regional GTFP, based on the theoretical basis of new economic geography and spatial measurement, this paper empirically studies the effect of interprovincial GTFP from the perspective of spatial spillover estimation and its influencing factors. First, the index was used to estimate the GTFP and its sources of 30 regions in the region, and the country was divided into different regions according to different spatial scale division standards, and the regional regions were analyzed and compared from the horizontal cross-sectional dimension and the vertical time dimension. Second, we use spatial statistical methods to test whether there is spatial autocorrelation and spatial dependence of GTFP in each region. During the survey period of the sample, the national GTFP showed an overall growth trend, showing obvious periodic characteristics. Among them, the contribution of green technology efficiency is 10.7%, while the contribution of green technology progress is 3.1%. Since the growth rate is greater than the reduction rate of green technology efficiency, the overall performance is the growth of green productivity.

2. Related Work

The research objects are the differences in TFP growth between regions and the characteristics of TFP growth in different industries [15]. Some scholars incorporate spatial factors into the research framework when studying regional economic growth [16]. Some algorithms search for the pitch period with the most predicted delay corresponding to the minimum value of the difference function within the frame. In the difference function, the change of the amplitude will cause the corresponding difference value at all time delay m to change synchronously, thus weakening the influence of the amplitude change on the peak value. Through scientific and technological investment, the establishment of a modern agricultural system will update the current industrial structure, realize the modern and intelligent development of the primary industry, improve the effective utilization of resources, increase the rationalization of the industrial structure, and drive the internal transformation of the economy in an all-round way.

From the traditional estimation method of TFP, it can be mainly referred to: the first category is the growth kernel algorithm. The residual calculated according to the neoclassical theory can be regarded as a component of a special formal function. Chen et al. [17] proposed it to describe the relationship between input and output, which became the earliest method to quantify and systematically study the relationship between productivity and economic growth. Hou et al. [18] introduced the time trend term into production function, which represents the changing level of efficiency, according to which the production function is used to estimate productivity growth. Zafar et al. [19] are the first to incorporate technological progress into the production function and separate the impact from per capita output growth, and this technological progress is called "Solo residual value." Wang and Feng [20] used translog production function to measure productivity from two levels of sector and total. It is a very good precondition, but there are problems such as low energy utilization rate and relatively backward environmental protection technology in the development process, which leads to aggravation of energy depletion and deterioration of the ecological environment, and ultimately leads to negative growth of green productivity. However, when m takes a small value, that is, a small period, the function will have a zero value. For this reason, the cumulative average normalized difference function is used to replace the difference function in the subsequent improvement.

Some researchers have constructed an input-output model to study the effect of intermediate input mismatch on total point productivity. It shows that the progress of green technology, which represents technological innovation, has a significant "growth effect," while the "horizontal effect" of green technology efficiency, which represents the optimal allocation of resources, is obviously insufficient [21]. It is necessary to increase the introduction and investment of modern technology in agriculture, including its own technology innovation, replication innovation introduced, and new sales methods brought by various publicity channels and sales channels, help the sales development of agriculture, forestry, animal husbandry, and fishery. Scholars first used the model to examine the loss of productivity caused by the misallocation of intermediate inputs. When the distortion of intermediate products is considered, the room for improvement is 551%; when the distortion of intermediate products is ignored, the room for improvement is 61% [22]. It can be seen that when studying the efficiency loss of resource mismatch, it is necessary to consider the role of intermediate products [23]. This paper will introduce intermediate inputs on the basis of predecessors and analyze the efficiency loss caused by resource mismatch under the expanded theoretical framework [24].

3. Model Construction of the Impact of Energy Factor Allocation Efficiency on Green Total Point Productivity from a Low-Carbon Perspective

3.1. Low-Carbon Vision Space. Under the low-carbon vision space, "intensional resource mismatch" refers to the situation where the marginal output of factors is not equal in cross section. According to the basic theory, under the premise of efficient allocation of resources, if the production technology of enterprises is convex, then the marginal product of factors of all enterprises should be equal. When in an efficient allocation state, the marginal capital output (MPK) curves of the two firms should intersect at point A, so the amount of capital acquired by firm 1 is OA1, and the amount of capital acquired by firm 2 is OA2. The total output $w(i, j)$ in the economy $x(i)$ is the sum of the areas of the two curved trapezoids. However, due to some distortion $I(i, j)$, firm 2 only gets OE2 units of capital, while firm 1 gets OE1 units of capital $e(i, j-1)$.

$$\sum_{i,j=1,2,\ldots,n} w(s,t) - \frac{1}{n-s} w(t) = \frac{1-s}{w(x(s)-x(t))},$$
$$I(i,j) - \sum e(i,i-1) - e(i,j-1) - 1 - i < 0. \quad (1)$$

In the formula, the capital-labor substitution elasticity is var $(x, i) = 1/(1+P)$, x and P represent the technological progress parameter, the distribution coefficient, and the factor substitution elasticity parameter, respectively. The capital-labor elasticity of substitution is $t = 1/(1-P)$. When producers are in equilibrium, according to the necessary conditions of producer equilibrium var $(x-1)$, the following can be obtained. The parameterization method is mainly donated.

$$\sqrt{\frac{\operatorname{var}(x,i) - \operatorname{var}(x)}{\operatorname{var}(x-1) - r(xi)}} > 1 - x,$$
$$\frac{q(s)q(t,t-1)}{d(s)d(s-1)} = \begin{cases} \dfrac{1}{d(s)}, & s \neq t, \\ \dfrac{1+dt}{ds}, & s = t. \end{cases} \quad (2)$$

The concept of environmental technical efficiency $d(i)$ is closely linked to the production environment frontier. When the directional distance function value $q(i)$ is 0, it means that the observation point is at the frontier of the production environment, and the environmental technical efficiency value $d(i-1)$ is 1. The larger the value of environmental technical efficiency x $(t, t-1)$, the closer the observation point is to the frontier of the production environment; that is, for a given resource input, the greater the gap between the actual expected output and the maximum expected output dt/si, the actual undesired output and the minimum undesired output $y(i)$.

$$x(i) - \frac{x(t,t-1)}{s(t)-1} = -\frac{1}{(i+dt/si)},$$
$$y(i) - y(t) = \begin{cases} p(i)w(i) - w(n), \\ \exp(w(n) - w(n))). \end{cases} \quad (3)$$

The directional distance function is different under different model conditions. The calculation of each productivity index $P(i)w(i)$ requires the solution using the mixed directional distance function and the input-output value in period $t+l$. In this paper, the sequential method is used to reduce the phenomenon of linearity $w(x, y)$ and no misunderstanding when computing mixed directional distance functions.

$$\begin{cases} \sum c(w(u,y), y(u-t, y-t)) = 1, \\ \sum c(w(u,y) - u - 1) = 1, \end{cases} \quad (4)$$
$$y(i) = x(i = 1,2,3,\ldots,n-1,n \mid t = 1-n).$$

The research background of this paper points out that this paper expresses the transformation performance of regional economic development mode $y(x-t, y-t)$ from the perspective of total point productivity, measuring the transformation performance of economic development mode is to measure total point productivity. Therefore, this article will discuss the measurement method based on total point productivity.

During the survey period of the sample in Figure 1, the spatial distribution pattern of GTFP in each region has significant fluctuation characteristics. According to the principle of statistical grouping, the GTFP data of each province in each year are divided into four grades, and the quartile map is drawn accordingly. At the same time, compared with the traditional analysis method, the method is real-time and recursive, and can perform real-time dynamic estimation and analysis of the energy monitoring network flow in the time domain. And it has the characteristics of high coincidence with the real control network traffic and small prediction error, which can achieve good tracking and prediction performance; at the same time, using the panel data of 36 industries, the calculation takes into account foreign capital and the environment. Compared with the traditional nonlinear prediction model, its complexity is lower and it is convenient for real-time prediction.

3.2. Distribution of Energy Elements. The energy factor is a consideration in data selection. The following is a brief description of the specific process of data processing. In general, data processing involves two aspects, one is to construct panel data, and the other is to deflate nominal indicators. When constructing the panel data, considering the problems of duplication and wrong entry of the enterprise code in the database, following Brandt's idea, we first use the enterprise code to identify the same enterprise, and then use the legal person name, registration information, start year, main products, etc. Indicators are further matched.

$$H(u,k) \in \text{least}\{u(1), u(2), u(3); x(k-1), x(k), \ldots, x(n)\},$$
$$\frac{y(i,t)}{e(j=1-p) - w(i,1)e(i) - v} = x(i \mid t-n) - \frac{u(i)}{u(t)}. \quad (5)$$

The endogenous economic growth model shows that technological progress has an important impact on total point productivity, and human capital GFT (i, j), which is closely related to technological progress, has an important impact logs $(i-1)$, which reflects an important variable in the technological content of economic growth. Therefore, when studying the input index of total point productivity ed (i), it is necessary to consider the input of human capital, that is, to estimate its stock.

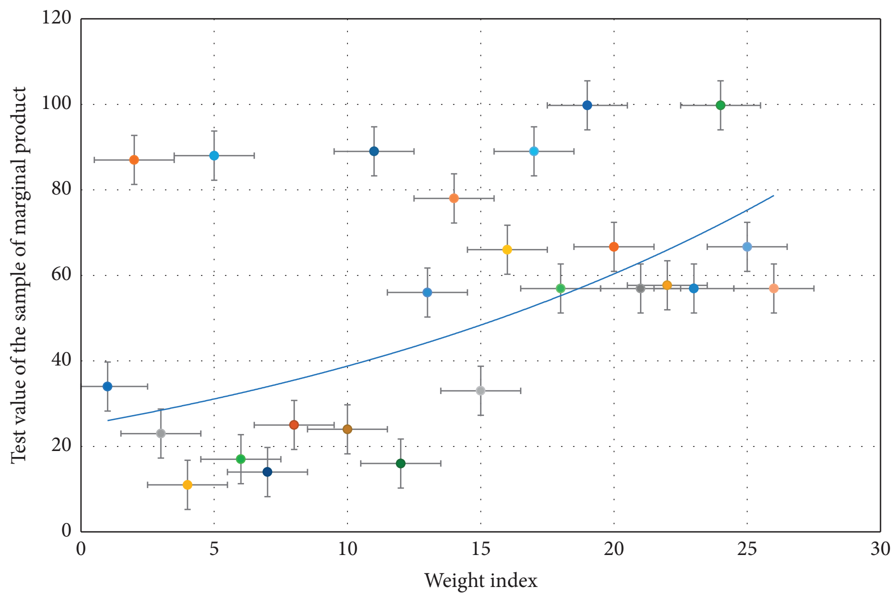

Figure 1: Sample inspection distribution of marginal product.

$$\log GFT(i, j) = \begin{cases} a + b \log \dfrac{ED(i)}{ed(i)}, \\ a - b \log \dfrac{ED(i-1)}{ed(i-1)}, \end{cases} \qquad (6)$$

$$\frac{\alpha + \beta \log Es(i) - \log s(i)}{\log s(i-1)} \ll 1.$$

Since GDP is an added value, energy $s(i)$ is generally not taken into account in traditional TFP calculations as an intermediate input. In recent years, some scholars have taken resource inputs such as energy into account in productivity calculations because they are assumed to be the main source of undesired output ec $(i, i-1)$. The energy input in this paper takes the energy consumption converted into standard coal as the energy input index $COF(i-1, j)$.

$$\begin{aligned} &CF(x, i) - \frac{CC(i-1, j-1)}{COF(i-1, j)} \in C, \\ &CO(x, y) = \sum \frac{ec(i, i-1) - ce(i, j-1)}{1 - ec(i, i-1) - ce(i, j-1)}. \end{aligned} \qquad (7)$$

The function shows that GTFP is a function of the above five variables. Due to the large value $ce(i, j-1)$ selected in this paper, the logarithmic form can be used to better explain the degree of correlation between variables, and the heteroscedasticity caused by the data itself will also be to an extent. The explanatory relationship between the variables is changed, which makes the difference between variables become a percentage to explain the concept. This feature is also in line with the economic interpretation method at the macro level. When the data indicators are too large, the percentage change between the data is often used to find a certain relationship between them.

After the operation in Table 1, the matching success rate of this paper is 85.12%, which is almost the same as the result of Brandt. When deflating nominal indicators, this paper sets 2018 as the base period, deflates the gross industrial output value with the industrial ex-factory price index, and deflates the total industrial output with the consumer price index. The index deflates gross wages.

3.3. Configuration Efficiency Calculation. In order to study the changes in the allocation efficiency of each province and explore the source of the changes, this chapter calculates the Malmquist–Luenberger index of each province without considering environmental factors, considering one pollutant, and considering two pollutants simultaneously, and calculates its geometrical values. From the results in the above table, it can be seen that whether energy and environmental factors are considered or not directly affects the calculation results of the TFP index, which in turn affects the scientificity of the performance measurement of the transformation of the regional economic development mode. After the above processing, we have obtained 89135 records, and now, the basic statistical results are summarized. It can be seen that the standard deviation of capital input is the largest, which is 1.98, and the data fluctuation is the most obvious.

It can be clearly seen from Figure 2 that during the sample investigation period, the global Moran's I index showed an upward trend with the passage of time, indicating that the spatial dependence of GTFP in each region has gradually increased. In 2020, the order of efficiency loss from high to low is oil and gas extraction, and electricity. Among them, coal mining and selection industry have the lowest resource mismatch, at 21.96%, while oil and natural gas mining industry has the most serious resource mismatch, which is as high as 82.93%, which is 3.78 times that of the former. There are two ways to assemble a program from modules: one is to test each module separately, and then put all the modules together

Table 1: Distribution of energy elements.

Element node	Sample number	Variables range	Mean value	Covariance value	Mean square error
Level a	60	−0.29	0.66	0.74	0.06
Level b	46	1.01	0.32	0.34	0.07
Level c	52	1.52	0.01	0.09	0.85
Level d	25	−0.29	0.81	0.52	0.86
Level e	76	−0.97	0.48	0.44	0.02

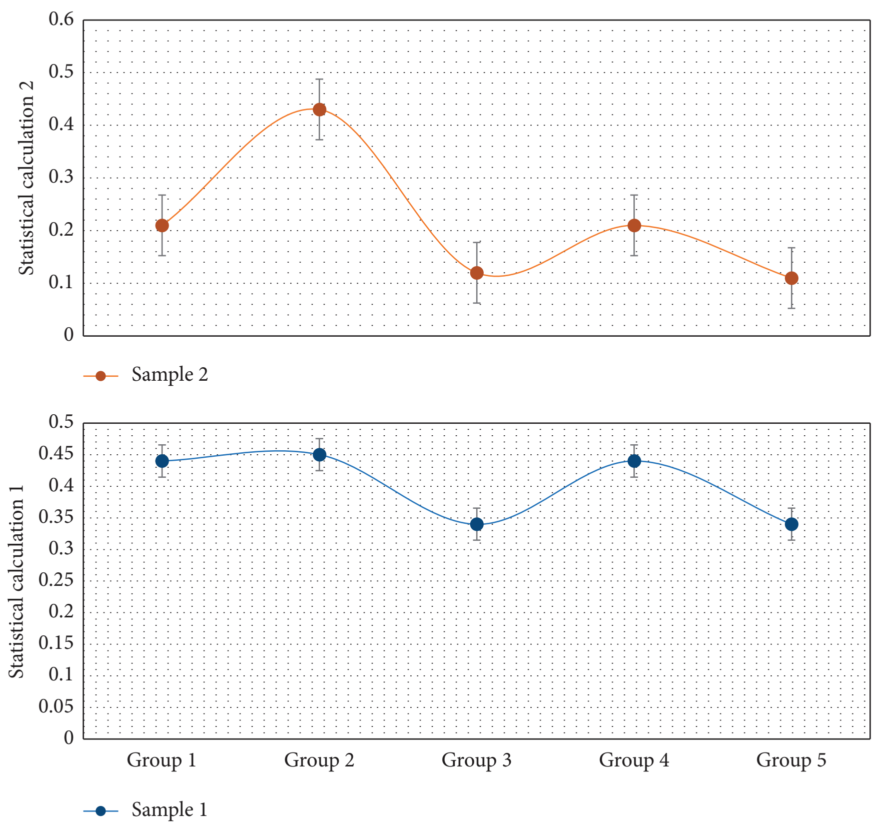

Figure 2: Statistical calculation of configuration efficiency.

according to the design requirements to form the desired program. This method is called a nonincremental test method; the next module to be tested is combined with those modules that have already been tested for testing. After the test is completed, the next module that should be tested is combined for testing. This method of adding one module at a time is called incremental testing. This approach actually does both unit testing and integration testing at the same time, and introduces the indicators involved in the green growth evaluation system under this theory into the influencing factor indicators of green total factor productivity.

3.4. Green Total Factor Indicators. The average growth rate of economic development mode transformation performance based on energy and environmental total point productivity is 0.1%, which is significantly lower than 2.7% without considering energy and environmental factors. This is mainly because the TFP value of most provinces in the region will be greatly reduced after considering energy and environmental factors. The numerical value shows the characteristic of gradually decreasing in the east, middle, and west. The average milliliter values were 1.047, 1.003, and 0.985, respectively, and there were large differences in the transformation performance among regions. The growth trend of green productivity index in economically developed regions is obvious. When using the ML index to study regional environmental total point productivity, it is found that the “u”-shaped relationship between per capita GDP and TFP growth rate is similar. This conclusion also proves to a certain extent that green total point productivity supports the “environmental Kuznets curve” hypothesis; that is, if there is no policy intervention in the environment, a country’s overall energy efficiency and environmental quality level will first deteriorate and then improve along with economic growth.

It can be seen from Figure 3 that the elasticity of intermediate inputs is relatively large, all above 0.7, which indicates that the regional energy industry is highly dependent on intermediate inputs, and ignoring the impact of intermediate inputs will bring a large deviation to the

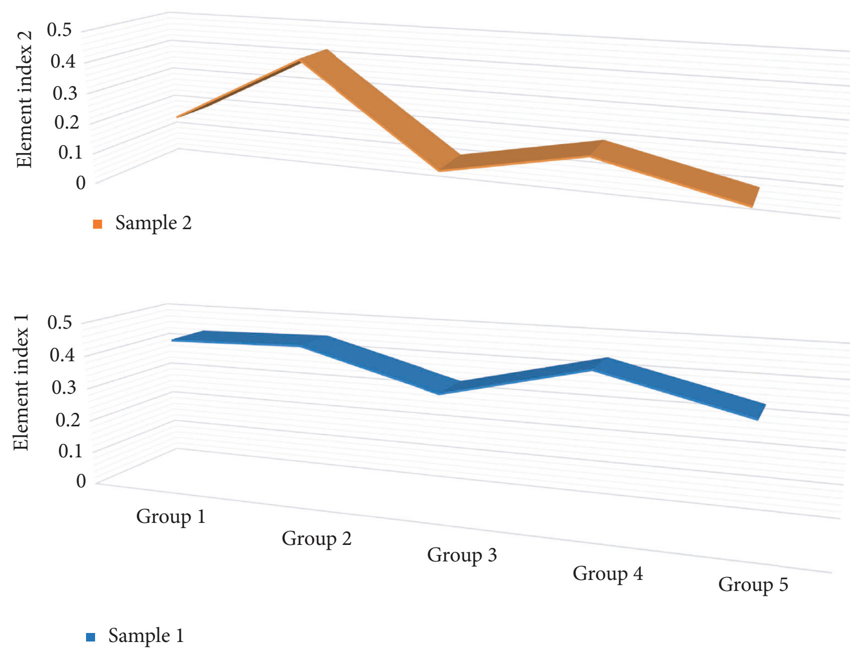

Figure 3: Distribution of green total factor indicators.

estimation of total point productivity. Multicollinearity is common in multiple regression linear models. It can be seen from the correlation coefficient between variables that there is a certain degree of collinearity between variables, but we are more concerned about the degree of multicollinearity. The test found that the value is 3.89, which is far less than the reasonable value of 10, indicating that the collinearity of the model is not serious, and the model has a greater impact after excluding an explanatory variable, so the existence of such collinearity can be accepted. At the same time, the estimation results of the fixed effect model are also given. It is not difficult to find that the labor elasticity under the improved method is lower than the estimation result of the fixed effect method, while the capital elasticity is relatively high, which indicates that the improved method is used. The results show that, except for the oil processing industry, the other three industries reject the null hypothesis of constant returns to scale, which prompts us in the subsequent theoretical model, and consider the situation of diminishing returns to scale.

4. Model Application and Analysis of the Impact of Energy Factor Allocation Efficiency on Green Total Point Productivity from a Low-Carbon Perspective

4.1. Data Processing of Energy Elements. In order to compare the fitting effects between various models, the general econometric regression analysis can be carried out regional GTFP. The choice of mixed OLS (ordinary least squares) regression, fixed-effect panel regression and random-effects panel regression can be determined for the results of LM (Lagrange multiplier) test and Hausman test. The main purpose of the LM test is to choose between mixed OLS regression and random effects. The statistic calculated using Statal 3.1 software is 1222.39, strongly rejecting the null hypothesis at the 1% significance level; therefore, between mixed regression and random effects, Figure 4 selects random effects. This approach is based on the same purpose of research on the connotation of green growth and green total factor productivity, that is, to achieve the sustainability of economic growth, so this approach has certain rationality.

There should be a significant correlation between the total point productivity of enterprises and factor input. It should be emphasized that the above conclusions are obtained under the premise of efficient allocation of resources. Therefore, by examining the correlation between factor input and the total point productivity of enterprises, we can infer the current situation of resource allocation in the energy industry. If the actual situation is consistent with the theory, we believe that the resource allocation efficiency of the energy industry is relatively high; on the contrary, if the actual situation is inconsistent with the theory, it can be judged that there is a serious distortion in the energy industry. The paper shows the correlation between capital input and total point productivity, which also shows similar characteristics. It can be seen from the previous analysis that the resource allocation of the energy industry has not reached the Pareto optimality, and the degree of resource mismatch is relatively deep.

4.2. Selection of Configuration Efficiency Variables. The above economic indicators are mainly obtained from the "Statistical Yearbook," which can reflect the real economic situation, and the data in the real economy often have a variety of influencing factors along with time, so in general, the data are often nonstationary, so this paper uses Stata software to analyze the nature of the data to prevent a large impact. In

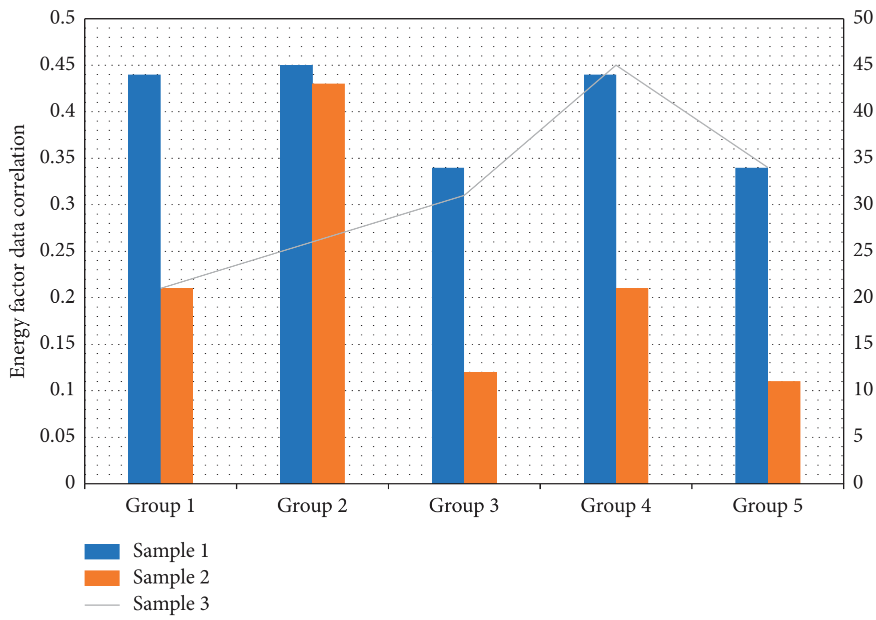

FIGURE 4: Correlation processing of energy factor data.

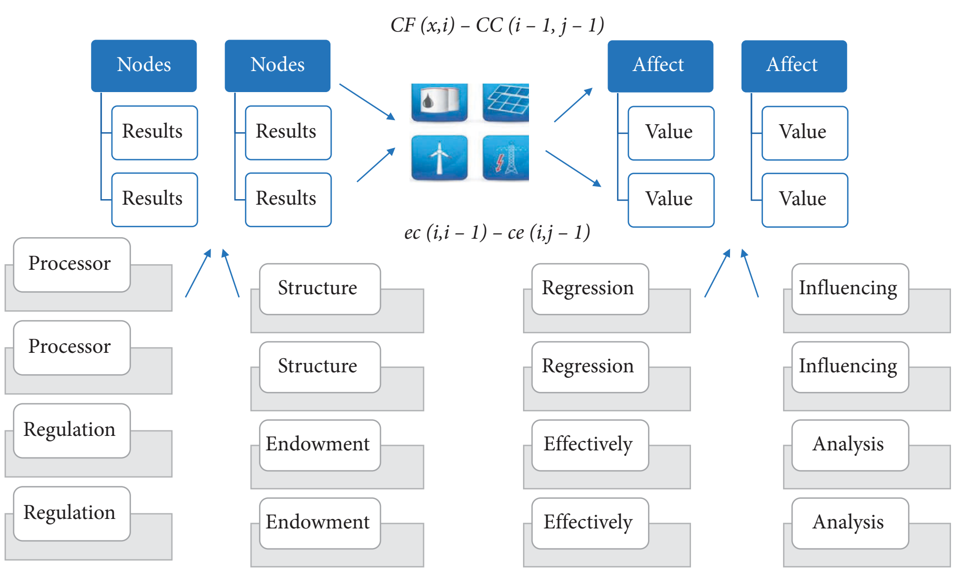

FIGURE 5: Process of configuring efficiency variables.

this paper, we use Stata software to perform unit root test, and use stationary*, stationary**, and stationary*** to indicate that they are stationary at the 10%, 5%, and 1% significant levels. The test results are shown below. The logical idea of the whole article is introduced in an orderly manner, indicating that the current economic growth is lagging behind, so it is extremely important to achieve green economic development and improve green total factor productivity.

The influencing factors of GTFP may have the problem that the model is set incorrectly. Therefore, next, the linkage effect of economic units in geographic space is introduced into the model, and the spatial panel econometric model is reconstructed to conduct empirical analysis on the influencing factors of GTFP. Incremental testing is the opposite of nonincremental testing. It divides the program into small sections to construct and test, so that errors can be easily located and corrected after they occur, and the interface can be tested more thoroughly. Therefore, the incremental integration test method is adopted in the digital-based multimedia information management system. When testing, the mixed method is used for testing. The subsystem with write operation in this software structure uses the top-down method, and the subsystem with read operation in this software is organized and tested from the bottom up to the root node module.

In order to ensure that the system has good flexibility and easy expansion during use, the following design is adopted in the design and development of the system in Figure 5: the system provides enough preset functions. Once new functions are added, we try not to program them, realize the expansion of functions, and add new functions through programming, as long as the interface can be used to expand and upgrade the system without modifying the existing functional modules; the sequence adjustment of each link of the process processing system is particularly flexible. In this multimedia information management system based on digital campus, according to the input, output conditions and logical structure of this system module, the test cases of white-box testing are the main, and the test cases of black-box testing are supplemented to identify unreasonable input or output in Table 2.

The authenticated user opens the browser, enters the system address, and enters the system login main interface. The user will initiate work orders, process work orders, and review work according to the permissions. The process administrator can also set process parameters, and the system administrator can also perform system management work such as system parameter setting, organizational adjustment, or system security work such as system backup. After logging in to the system, a user with relevant role permissions can select "Submit Work Order" and click "Create" to create a "Report Work Order." That is, we assign a unique work order serial number to the "report work order," and send a prompt message to the relevant processing personnel through the "message notification" module.

Table 2: Green total factor production algorithm.

Production algorithm codes	Green total factor information
#Include <iostream>	As of the system $a^2 + b^2$
#Include <math.h>	Program them $i - j$
#Include <time.h>	Following in the design
Int flavorsbox(flavors goods[]);	In order to $1 + i + j$
Int n, int cpu_num, int mem	Ensure that $\beta \log Es(i)$
Goods[], int n, int cpu_num	$\max(t, t - 1)$
Void distribution(flavors flavors[])	Try not to $CO(x, y)$
Psypsnum = flavorsbox(f, ecs.mem);	Design is adopted
Lavors, totalprenum, ecs.cpu	$i - 1 - x$ has good flexibility
Flavorsbox(flavors, totalprenum,	The system and easy $t(i - 1)$
Psypsnum = 56, 128);	Once new functions are added
Int flavorsbox(flavors, int mem)//	Preset functions $x(t)$

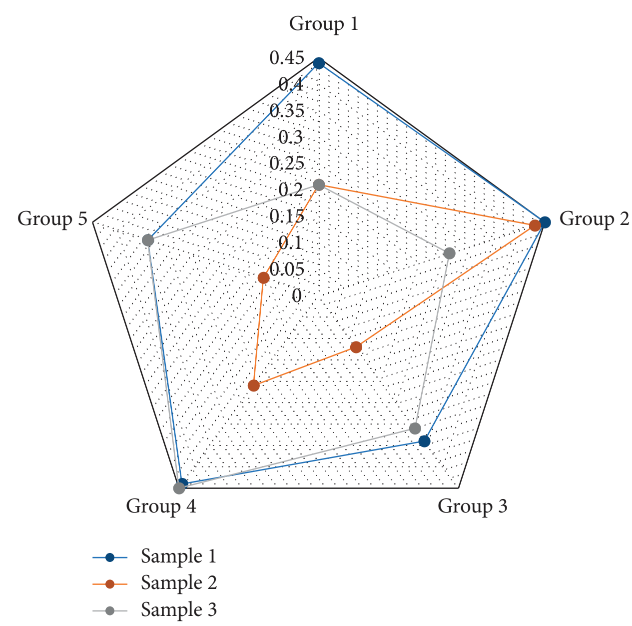

Figure 6: Fixed-effects simulation test results.

4.3. Green TFP Simulation. Therefore, the nonstationary economic variables are stabilized through differential processing, and the software running results are shown below, and the data after differential processing are stable. The P-values for LMLAG (lag test) and LMERR (error test) are 0.016 and 0.027, both of which passed the 5% significance level test, but LMLAG was more significant than LMERR. The P-values of LMLAG and R-LMERR were 0.006 and 0.403, respectively. R-LMLAG passed the 1% significance level test, while R-LMERR failed the statistical test. Therefore, the choice of SLM will be more in line with the model requirements, and the test shows that the model should use fixed effects for regression analysis. Based on the implementation method and whether to pay attention to the level of the internal structure of the software, it can be divided into three different types. Among them, white-box testing is to design test cases for the logical structure of the program and use logical coverage to measure the integrity of the test; black-box testing, also known as functional testing, is to test the internal structure of the program without knowing it.

Figure 6 uses the panel data from 2016 to 2020 and selects 9 indicators from 6 aspects as exogenous control variables. The vertical axis is set to a fixed maximum value of 1.1 and a fixed minimum value of 0.8, and the scale units are both 0.05. From the perspective of interprovincial green total point productivity, the regional distribution of green total point productivity index under the influence of comprehensive environmental factors shows a trend: the eastern provinces are the best, the central areas are also relatively good, and the western provinces are the worst. This may be because the central and western provinces have developed some traditional heavy industries such as coal, iron, and steel and chemical industries, which have caused some environmental pollution effects and urgently need to transform into green industries. The second chapter mainly introduces the theoretical basis and research review. Mainly based on the research of relevant domestic and foreign experts and scholars, drawing on the research content and ideas of well-known literature summarizes the current measurement methods and influencing factors of green total factor productivity, and obtains the mechanism and mechanism, which provides a theoretical basis for the entire article.

4.4. Example of Application and Analysis. The economic activities between them have significant spatial autocorrelation, which means that a region achieves positive growth of GTFP, which will drive the GTFP improvement of adjacent

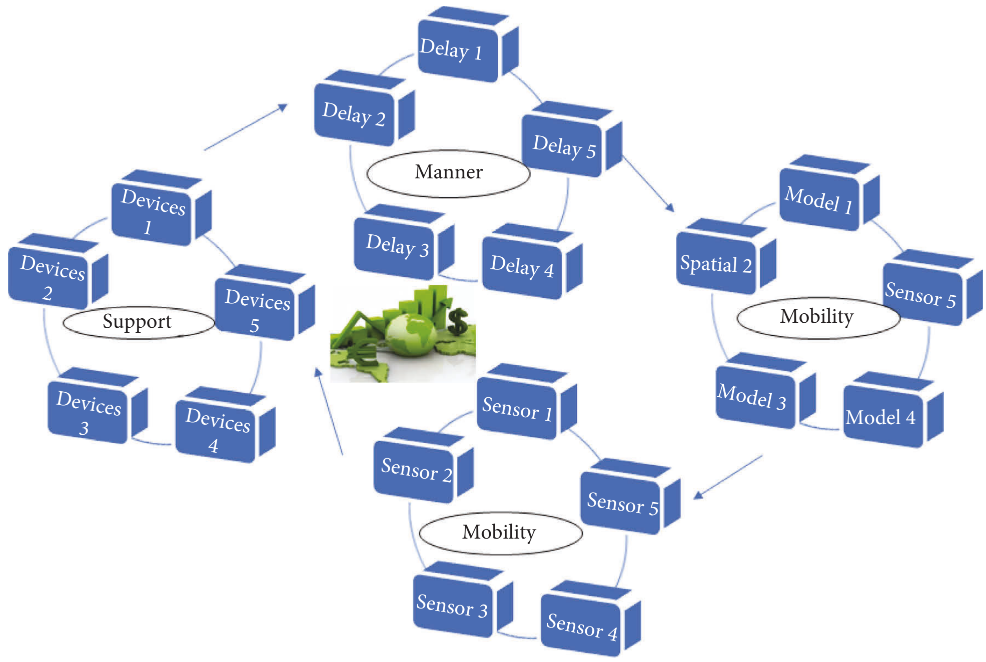

Figure 7: General metering topology for spatial factors.

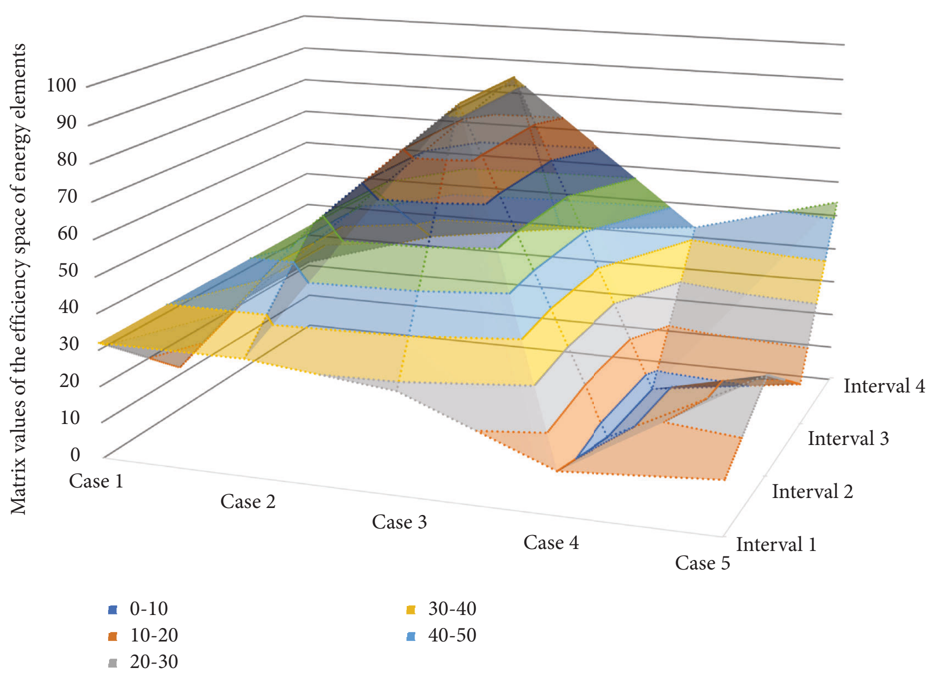

Figure 8: The allocation efficiency space matrix of energy elements.

regions through the "trickle-down effect" radiation. In the actual development of software, the software testing stage is of great significance, which can well test the software functions. By testing the software, the final review of software requirements analysis, design specifications, and coding can be well achieved to ensure that the software design is consistent with the requirements. The idea of linear programming is to construct a standard production frontier by setting decision-making units and then use the degree of deviation of the selected research decision-making units from the relative frontier to judge the effectiveness.

When the spatial econometric model in Figure 7 uses the geographic distance spatial matrix and the comprehensive spatial weighting matrix of economic scale and geographic distance, the estimated results of the robustness test are basically consistent with the empirical research results. The biggest difference lies in the estimated coefficients of some variables, and the spatial autocorrelation estimation coefficient and its significance level have been reduced or improved to different degrees. In order to further test the robustness of the model estimation results, the geographic distance spatial weight matrix and the economic scale and geographic distance re-examine the above empirical research results.

The chapter mainly introduces the empirical analysis of its specific influencing factors, which is also the core part of this article. With the support of data, building a model, and using appropriate indicators, a detailed analysis of the effects of different influencing factors is carried out, so as to provide the supporting role of quantitative research for the article, and echo the conclusions and suggestions in the following paragraphs. For the indicator, it represents the upgrading of the technical level, which will lead to the expansion of production efficiency, and is related to the possibility of production. If the value is greater than 1, it indicates that the technology has been upgraded and improved, while the value is less than 1, indicating that the technology is backward and needs to be improved.

Before performing differential GMM estimation on the model in Figure 8, Sargan and Arellano tests were performed first. The regression results show that $a = 36.07975$, t value is 32.5, and P value is 0.006, indicating that the coal-dominated energy structure has a hindering effect on the growth of total point productivity after considering environmental constraints. When its value is greater than 1, it means that the factor has improved and productivity has improved; when its value is less than 1, it means that GTFP has decreased compared with the previous year, and productivity has declined. For the factor, it represents the comprehensive economic and social benefits.

The cointegration test is used to analyze the relationship between variables. The degree of correlation and the rationality of the model also need to be judged by the cointegration test to a certain extent, especially when the trend effect of the time series data itself is significant, the original model is often constructed reasonably through the cointegration test, we test the residual sequence to determine whether there is a co-integration relationship between variables. The explained variable green total point productivity and the core explanatory variable are both at the 1% significant level, rejecting the null hypothesis that there is a unit root, and other control variables at 1%, 5%, and 1%.

5. Conclusion

This paper constructs an impact model of green total point productivity, based on the concept of total point productivity index of energy and environmental factors, and discusses the feasibility of using energy and environmental total point productivity to represent the transformation performance of regional economic development. Second, it introduces the method of total point productivity and the measurement method of the transformation performance of the regional economic development mode in this paper. Considering the continuity and availability of data, this paper selects the balance of loans from 21 major energy conservation and environmental protection projects multiplied by the proportion of the balance of institutions in different regions as a positive indicator. There is a certain influence between the performance of the expected results and the explanatory variables, and the core of the contrast between them can be divided into positive and negative influences. During the survey period of the sample, the national GTFP showed an overall growth trend, showing obvious periodic characteristics, with a rate of 2.4%. Among them, the contribution of green technology efficiency is. 0.7%, while the contribution of green technology progress is 3.1%. Since the growth rate is greater than the reduction of green technology efficiency, the overall performance is the growth of green productivity. Among them, it is extremely important to pay attention to the development of the ecological environment. Ecological and economic symbiosis and complementary, coordinated development is the only way to achieve economic sustainability in the future. Finally, according to the results of this paper, combined with the problems existing in the current economic transformation process in the region, a series of targeted policy recommendations are put forward, in order to make valuable contributions to the development of regional green economy.

Data Availability

The data used to support the findings of this study can be obtained from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

This work was supported by Shanxi University.

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