Hindawi
Mathematical Problems in Engineering
Volume 2022, Article ID 4971437, 10 pages
https://doi.org/10.1155/2022/4971437

Research Article

The Relationship between Symbolic Agricultural Products and Agricultural Economic Development Based on Numerical Analysis

Hui Wen

School of Economics and Management, Yan'an University, Yan'an, Shaanxi 716000, China

Correspondence should be addressed to Hui Wen; ydwh@yau.edu.cn

Received 29 April 2022; Accepted 7 June 2022; Published 31 July 2022

Academic Editor: Sagheer Abbas

The development of geographically indicative (GI) agricultural products can effectively promote the development of local rural residents' per capita net income (PCNI) and the gross output value of agriculture, forestry, animal husbandry, and fishery (GOV-AFAHF). This paper takes agricultural products with geographical indications in Anhui Province as the object of study and uses numerical analysis to analyze their application, geographical distribution, and various distribution in detail. By comparing it with the central region, this paper conducts an empirical study on its impact on agricultural economic development, analyzes its related variables and data, draws its effect on farmers' PCNI, and on this basis puts forward some countermeasures. In order to make the agricultural products with GI in Anhui Province develop better, according to the results of comparative analysis and empirical analysis, it puts forward suggestions for regulating the development of management industry associations, implementing the regional branding strategy of GI agricultural products, and increasing the construction of rural infrastructure. In addition, the experiment shows that under the condition of controlling other influencing factors unchanged, for every 1% increase in GI agricultural products, the average increase of PCNI of rural residents is 0.08%, which further confirms the conclusion that GI agricultural products can promote the development of GOV-AFAHF.

1. Introduction

Anhui Province is an important agricultural province in China. It is rich in animal and plant resources, a wide variety, and rich in agricultural resources, which has created many GI agricultural products with regional characteristics. Anhui Province has achieved excellent results in the development of GI products for more than ten years, and the income of farmers has increased significantly. However, compared with the development of GI products in other provinces in China, there is still a certain gap. Therefore, studying the development of agricultural products with GI in Anhui Province under this background can find the deficiencies in the process of developing agricultural products with GI in Anhui Province. This has a certain guiding role for Anhui Province in the process of developing GI agricultural products in the future. This paper analyzes the development between the GI agricultural products and the regional agricultural economy in Anhui Province. The conclusions drawn from these analyses will be helpful for the local governments in Anhui Province to provide a basis for decision-making in formulating the development strategies of agricultural products with GI. It has certain practical guiding significance and reference significance for realizing the coordinated development of GI agricultural products and the regional agricultural economy in Anhui Province.

On the research of developmental relationship, many scholars have provided a lot of references. Han et al. examined the interaction between agricultural carbon emissions and agricultural economic growth from multiple perspectives [1]. Marica and Piras conducted an empirical literature review on the relationship between government size and economic growth and showed how the empirical results follow a contrasting pattern [2]. Alattabier et al. aimed to empirically analyze the causal relationship between Iraqi agricultural imports and agricultural products from 1991 to 2018 based on the causal relationship proposed by Toda Yamamoto [3]. Reyes et al. analyzed the relationship

between agricultural frontier and production in Ecuador, 1985–2015 [4]. Dada et al. studied the relationship between Nigeria's agricultural budget allocation and economic growth [5]. Tsvetanov identified parameters to study the relationship between income and direct payments to agricultural producers. He presented the results of indicators studied to analyze the relationship between income and direct payments to producers [6]. Most of these studies on developmental relationships remain at the theoretical level and lack data support, so they need to integrate numerical values for analysis.

Regarding the research on fusion numerical analysis, many scholars have provided a lot of references. Olcese and Barbano presented the results of a comprehensive numerical thermohydrodynamic analysis of the ITER cryostat space chamber (CSR) [7]. Chen et al. proposed a method to calculate the formula of state for porous materials and used the data obtained for porous W-Cu composites for numerical simulations [8]. Shahabad et al. proposed an effective numerical experimental method for the calibration of a 3D conical Gaussian motion laser heat source model [9]. Holfelder acombined multiphase and directional fields for describing the microscopic evolution of laser-matter interactions [10]. Saho et al. proposed a distance/acceleration sensor-based such as radar and accelerometer performance analysis of a fixed gain motion target tracking filter for detection systems [11]. Yang et al. used the eigenstrain method to numerically simulate different geometries of a smart phone [12]. These studies on fusion numerical methods are not comprehensive enough, and the data obtained lacks empirical evidence. Therefore, it is necessary to study the relationship between the development of agricultural products and the agricultural economy based on the fusion numerical analysis method.

In order to determine the validity of the impact of GI agricultural products on the PCNI of rural residents and the GOV-AFAHF, it conducts unit root and cointegration tests on the data, respectively, and finally determines model one and model two. During model estimation, it uses FGLS estimation to perform regression estimation on the model, and the estimation software is Eviews10.0. The results show that for every 1% increase in GI agricultural products, the PCNI of rural residents increases by 0.17%. For every 1% increase in GI agricultural products, the GOV-AFAHF increases by an average of 0.08%.

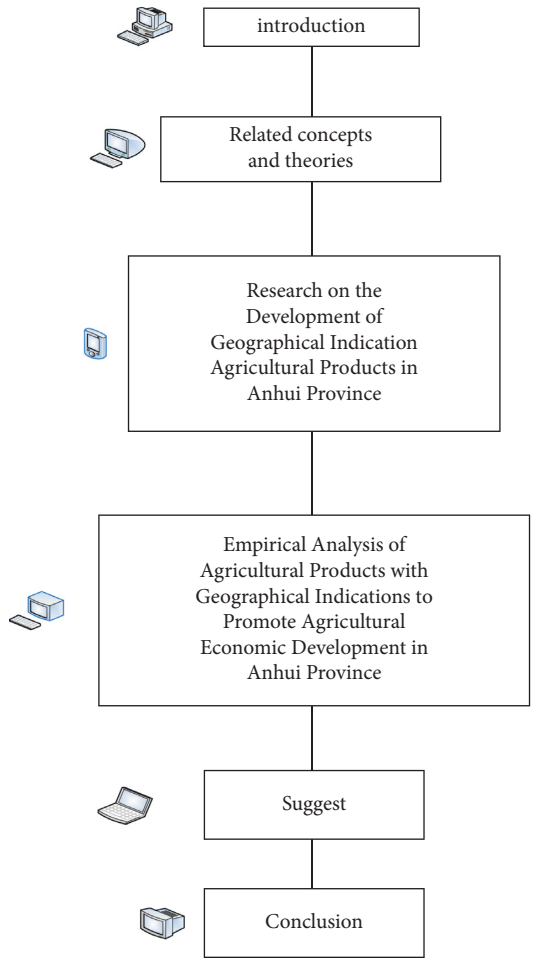

Figure 1: Architecture of the article.

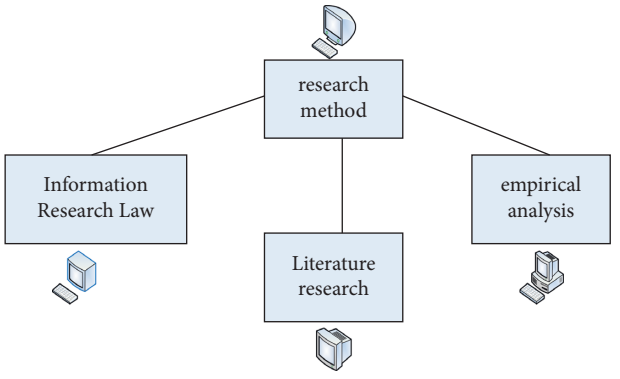

Figure 2: Methodology of the study.

2. Methodology

2.1. The Relationship between Agricultural Products and Agricultural Economic Development. The framework of the article is shown in Figure 1. The article mainly takes Anhui Province as the research object and studies the relationship between the GI agricultural products and agricultural economic development in Anhui Province [13, 14].

The methods of this research include literature research, information research, and empirical analysis, as shown in Figure 2 [15].

It generally includes industrial organization theory, industrial structure theory, industrial development theory, and industrial policy research. The subject areas of industrial economics are shown in Figure 3.

There are three characteristics of the regional brand of agricultural products: first, it must generally be established on the basis of unique natural resources or industrial resources in the region. It needs to rely on the advantages of agricultural resources in the region. Second, brand equity is not owned by a certain enterprise, group, or individual but is jointly owned by relevant institutions, enterprises, and

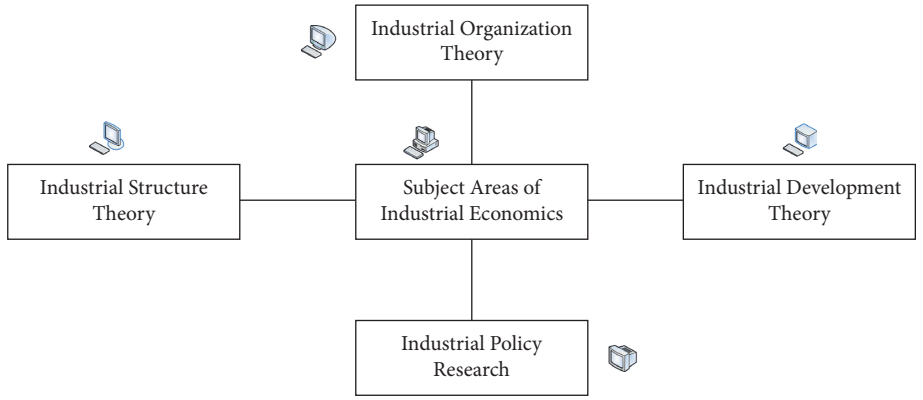

Figure 3: Disciplinary areas of industrial economics.

individuals in the region. Third, it has regional representational meaning and value as shown in Figure 4.

The essential attribute of the regional brand of agricultural products is "the inseparability of the region and the product." This inseparability is manifested in three levels (Figure 5): first, the product must be attached to a fixed area. The second is that "regions" cannot be migrated and copied. Third, the core competitiveness of the brand is the product characteristics formed based on regional characteristics.

The economic characteristics of regional brands of agricultural products are shown in Figure 6. One is the attributes of public goods, that is, nonexclusivity and nonrivalry. The second is external effects, including positive external effects and negative external effects.

At present, some GI products will be registered in one department. Some GI products are registered in the two departments at the same time. Some even register in three departments at the same time. Based on the product names, this article summarizes and analyzes the same, and similar GI product names registered in the three departments. It thus draws the basic situation of the current GI products in Anhui Province. On this basis, it removes the nonagricultural GI products registered in the three departments and then obtains the basic situation of the current GI agricultural products in Anhui Province.

According to the above method, it excludes nonagricultural GI products from SAIC and AQSIQ. There are 9 nonagricultural GI products excluded from SAIC. There are 21 nonagricultural GI products of the AQSIQ that were excluded. Through the above method, it is concluded that the total number of registered GI agricultural products in Anhui Province is 172.

The regional distribution of GI agricultural products in Anhui Province is shown in Figure 7(a). The distribution of product types of GI agricultural products is shown in Figure 7(b).

Figure 7(a) shows that GI agricultural products in Anhui Province are distributed in 16 cities in the province. It is mainly distributed in the southern part of Anhui Province. Among them, there are 7 cities in Huaibei Plain, accounting for 24% of the total. There are 6 cities in the Jianghuai hills, accounting for 52% of the total. There are 3 cities in the mountainous area of southern Anhui, accounting for 24% of

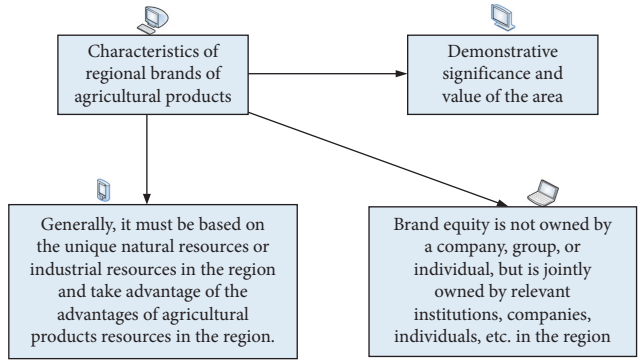

Figure 4: Characteristics of regional brands of agricultural products.

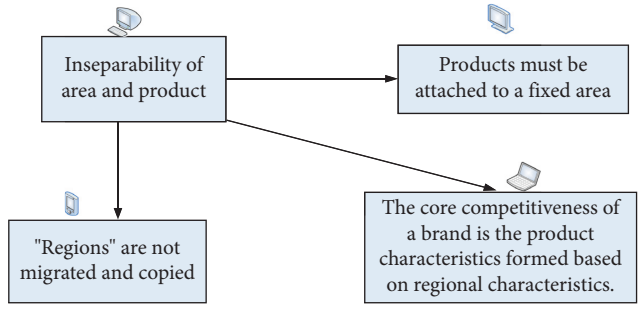

Figure 5: Inseparability of regions and products.

the total. Figure 7(b) shows that among the agricultural products with GI in Anhui Province, the proportion of tea is the highest, and the proportion of oil is the lowest. There are 18 aquatic animals, accounting for 10% of the total. There are 10 food categories, accounting for 6% of the total. There are 7 other categories, accounting for 4% of the total.

Figures 8(a) and 8(b) show the changes in PCNI and GI agricultural products of rural residents in Anhui Province from 2012 to 2017. Figure 9 shows the fixed asset investment of GOV-AFAHF in Anhui Province from 2012 to 2017.

From 2012 to 2017 (as Figures 9(a) and 9(b)), the agricultural economy of Anhui Province increased year by year.

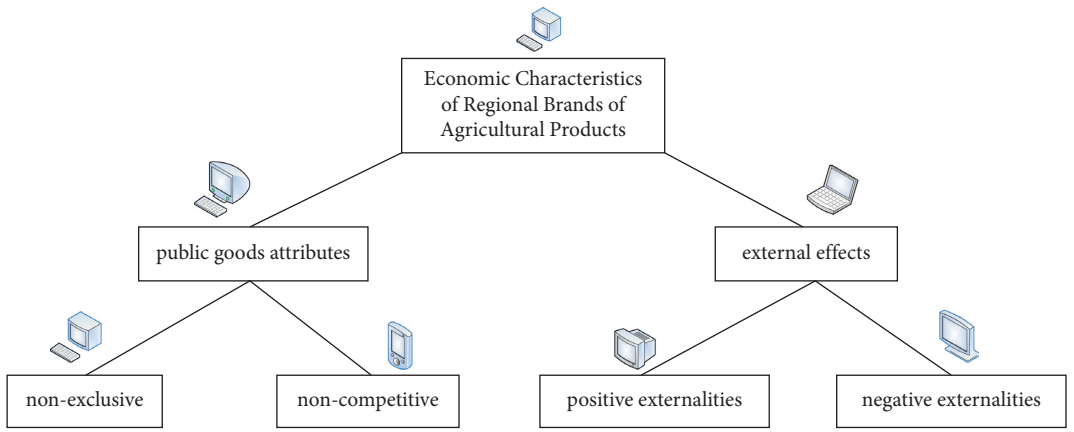

Figure 6: Economic characteristics of regional brands of agricultural products.

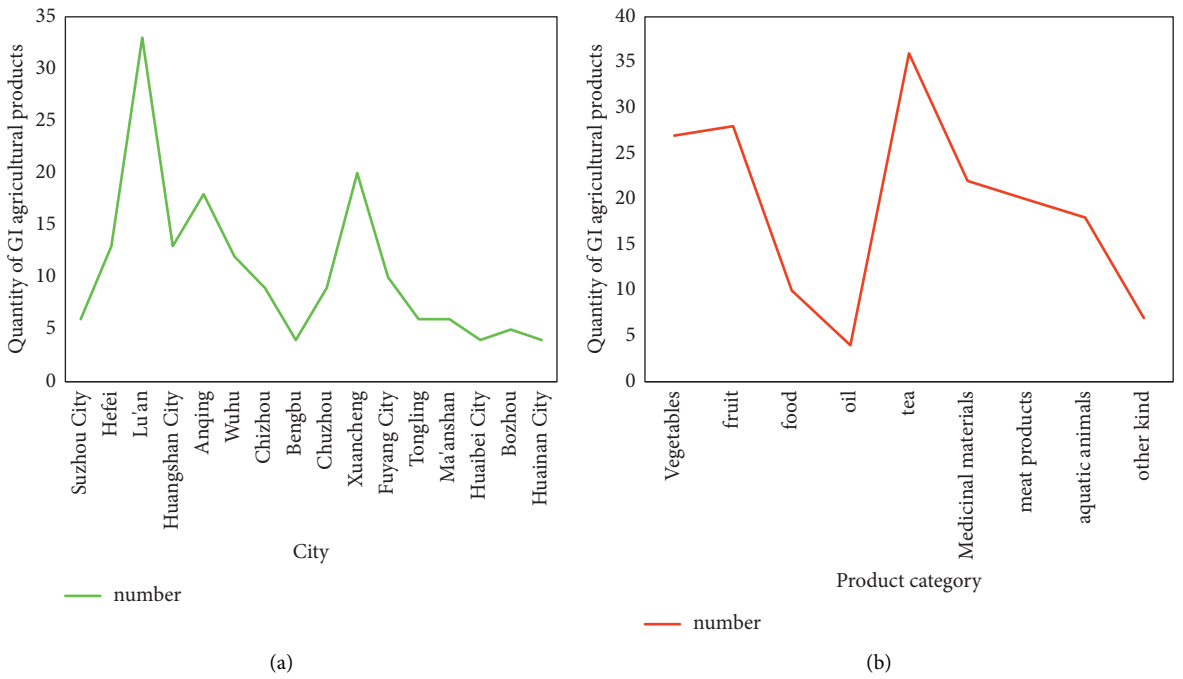

Figure 7: Regional and product type distribution of GI agricultural products in Anhui province.

The comparative analysis of the total output value of GI is shown in Tables 1–3.

From Tables 1–3, it can be concluded that regardless of the number of geographical indications, the total output value of geographical indications, and the percentage of the total output value of geographical indications in the total output value of agriculture, forestry, animal husbandry, and fishery, Anhui Province ranks relatively low when it is compared with other provinces in central and eastern China.

Most of the agricultural products with GI come from counties (cities, districts). In Anhui Province, an agricultural product with a GI can bring nearly 400 million yuan of economic income to the county economy. This greatly promotes the development of the county economy. In addition, it can not only drive the development of the county agricultural economy but also drive the development of secondary and tertiary industries and related industries. The special requirements of GI agricultural products are that their production and processing must come from a certain area. This will promote the development of local agricultural product processing enterprises, thereby providing more jobs for local farmers. Agricultural products with GI have very high requirements on the local ecological environment. A good ecological environment not only guarantees high-quality GI agricultural products but also promotes the development of local rural tourism. In addition, it can also drive the development of the local agricultural product logistics industry.

In today's society with developed network information, the amount of network information can reflect the society's attention to everything and the degree of influence of a thing on society. GI information can also be obtained and

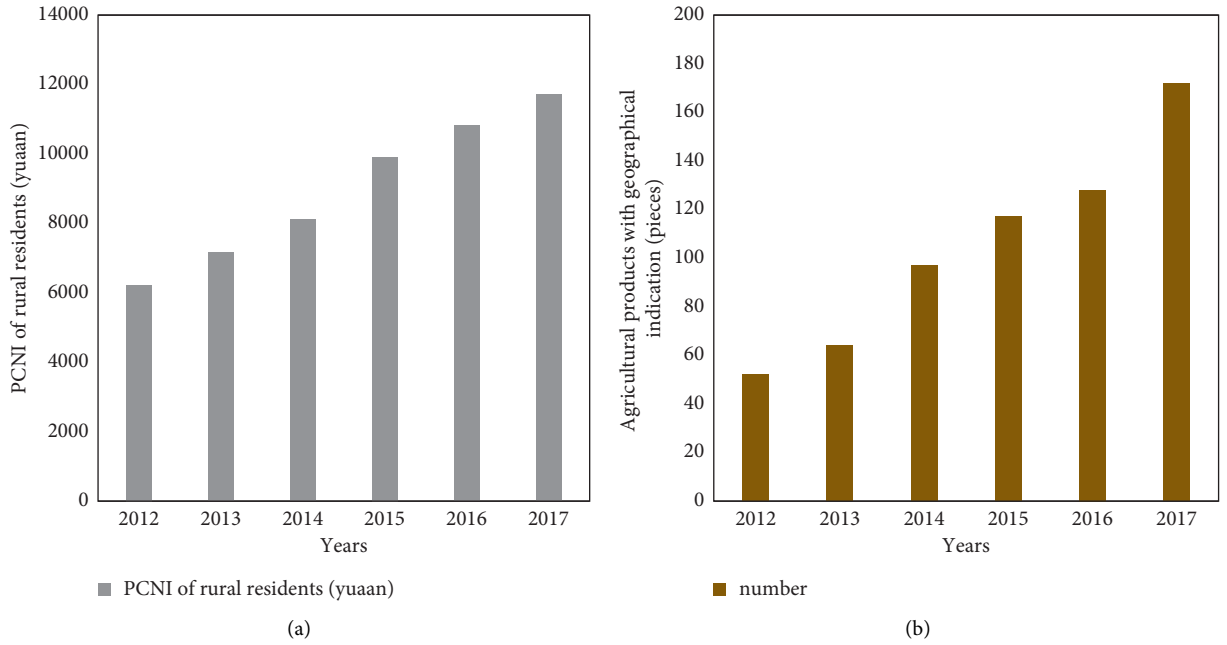

Figure 8: Changes in PCNI of rural residents and agricultural products with GI in Anhui province from 2012 to 2017.

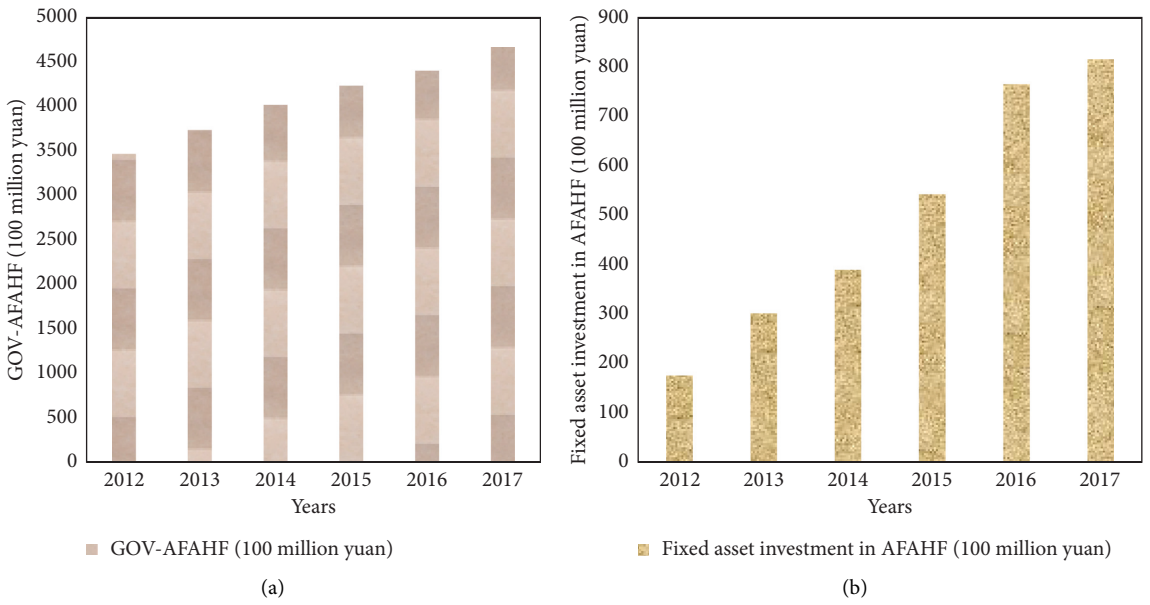

Figure 9: The total output value of AFAHF and the investment in fixed assets of AFAHF in Anhui province from 2012 to 2017.

Table 1: Number of GI in central and eastern China.

Province	Amount
Anhui	70
Fujian	203
Henan	139
Hubei	167
Jiangsu	120
Jiangxi	94
Shandong	392
Zhejiang	189

disseminated through the Internet. It uses the amount of network information to evaluate the society's attention to GI, as shown in Table 4.

As can be seen from Table 4, the average amount of information in Anhui Province reached 554,300 information units. Compared with other surrounding provinces, it is far ahead. It ranks second among Chinese provinces, more than 6 times that of Hubei province. It can be seen that the whole society is still very concerned about the GI of Anhui Province. On the other hand, this reflects that the GI of

Table 2: GOV-AFAHF in central and east China Table 1.

Province	GOV-AFAHF/100 million yuan	Total output value/100 million yuan	Average scale of output value/100 million yuan
Anhui	3728.3	275.31	3.93
Fujian	3007.4	679.17	3.35
Henan	6679.0	417.52	3.00
Hubei	4732.1	444.82	2.66

Table 3: GOV-AFAHF in central and east China Table 2.

Province	GOV-AFAHF/100 million yuan	Total output value/100 million yuan	Average scale of output value/100 million yuan
Jiangsu	5808.8	708.61	5.91
Jiangxi	2399.3	553.92	5.89
Shandong	7945.8	1810.76	4.62
Zhejiang	2658.7	482.27	2.55

Table 4: Social concerns of GI in central and eastern China.

Province	Average information volume/10,000 information units	National ranking
Anhui	55.43	2
Fujian	22.48	11
Henan	20.00	13
Hubei	8.80	23
Jiangsu	33.09	7
Jiangxi	13.79	18
Shandong	12.66	19
Zhejiang	27.85	9

Anhui Province has a high influence in the society and has a high reputation in the society.

Regarding the most comprehensive value GI, the comprehensive value of GI is not asset value, nor brand value. It cannot simply be calculated in monetary units of asset value, nor is it an asset appraisal. It is a situation analysis of the protection and development capabilities of GI and provides useful assistance for promoting the protection and development of GI. In addition, the 100 most comprehensive value GI are only 3.1% of the total number of GI in China, but their economic value is close to 20% of the total output value of China's GI. The 100 most comprehensive value GI in China is shown in Table 5.

Table 5 shows that the selected GI is all agricultural GI. Only 3 GI were selected in Anhui Province, which is relatively few compared to other provinces. It shows that there is still a lot of room for improvement in the relative index of economic value and the relative index of social influence of agricultural products with GI in Anhui Province.

2.2. Numerical Analysis. In the research, the progressive fusion algorithm is used in the fusion analysis of the data related to the marked agricultural products and agricultural economy in Anhui Province. As the name implies, progressive fusion is to process the collected data first and then perform the optimal state estimation of the target. The collection nodes can be classified according to the nodes of the same sensor type or evenly distributed according to the number of nodes.

Table 5: China's 100 most comprehensive value GI.

Province	Amount
Anhui	3
Fujian	7
Henan	3
Hubei	4
Jiangsu	11
Jiangxi	5
Shandong	13
Zhejiang	6

2.2.1. Point Estimation Recursion Theory. For the estimated parameter Z, the measurement formula is

$$\begin{bmatrix} z^{-} \\ z^{\omega} \end{bmatrix} = IZ + \begin{bmatrix} W^{-} \\ W^{\omega} \end{bmatrix}. \tag{1}$$

The coefficient matrix $I = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and z^{-} are the test results, z^{ω} is the consistency measurement data, and W^{-}, W^{ω} are the normal distribution measurement value. It sets the variance of z^{-} to be δ_{-}^{2} and the variance of z^{ω} to be δ_{ω}^{2}, and then, the covariance of the measurements is

$$\chi = E\left[W, W^{T}\right] = \begin{bmatrix} E\left[W_{-}^{2}\right] & E\left[W^{-}W^{\omega}\right] \\ E\left[W^{\omega}W^{-}\right] & E\left[W_{\omega}^{2}\right] \end{bmatrix}. \tag{2}$$

According to the point estimation theory in the statistical theory, the real-time consistent minimum variance unbiased estimate of the parameter Z can be obtained as

$$z^{+} = z^{-} + \delta^{2}\left[\delta_{-}^{2} + \delta_{\varpi}^{2}\right]^{-1}\left[z^{\varpi} - z^{-}\right]. \tag{3}$$

It estimates the variance of value z^{+} as

$$\delta_{+}^{2} = \frac{\delta_{-}^{2}\delta_{\varpi}^{2}}{\delta_{-}^{2} + \delta_{\varpi}^{2}}. \tag{4}$$

The formula of the data fusion algorithm for progressive estimation is

$$z^{+} = \frac{\delta_{-}^{2}}{\delta_{-}^{2} + \delta_{\varpi}^{2}} z^{\varpi} + \frac{\delta_{\varpi}^{2}}{\delta_{-}^{2} + \delta_{\varpi}^{2}} z^{-}. \tag{5}$$

2.2.2. Kalman Filter Theory. Assuming that the known nonrandom sequence error term of the observation system is zero, then the Kalman optimal filtering observation formula for discrete systems simplifies to

$$A(\varpi) = D(\varpi)Y(\varpi) + W(\varpi), \tag{6}$$

where $D(\varpi)$ is the state vector of the system, $Y(\varpi)$ is the vector with zero mean, and $A(\varpi)$ is the observation vector of the system.

Optimal linear prediction estimates

$$\widehat{Y}\left(\frac{\varpi}{\varpi - 1}\right) = B\left(\frac{\varpi}{\varpi - 1}\right)\widehat{Y}\left(\frac{\varpi - 1}{\varpi - 1}\right). \tag{7}$$

B is a constant.

$$\widehat{Y}\left(\frac{\varpi}{\varpi - 1}\right) = B\left(\frac{\varpi}{\varpi - 1}\right)\widehat{Y}\left(\frac{\varpi - 1}{\varpi - 1}\right) + L_{\varpi}\widehat{Y}\left(\frac{\varpi}{\varpi - 1}\right). \tag{8}$$

L_{ϖ} is the gain factor.

Kalman optimal filter gain matrix is as follows:

$$\begin{cases} L_{\varpi}D(\varpi) = \left[Q\left(\dfrac{\varpi}{\varpi - 1}\right) + D(\varpi)^{T}\right]^{-1} Q^{-1}\left(\dfrac{\varpi}{\varpi - 1}\right), \\ L_{\varpi} = Q\left(\dfrac{\varpi}{\varpi}\right)D(\varpi)^{T}. \end{cases} \tag{9}$$

Error covariance matrix is as follows:

$$Q\left(\frac{\varpi}{\varpi}\right) = \left[Q\left(\frac{\varpi}{\varpi - 1}\right) + D(\varpi)^{T}\right]^{-1}. \tag{10}$$

In the absence of prior knowledge of initial conditions,

$$Q(1, 0) \longrightarrow \infty. \tag{11}$$

It divides the observations ϖ collected by each sensor into two groups, and the ω th group is

$$\sum_{\omega=1}^{2} \varpi_{\omega} = \varpi. \tag{12}$$

Then, the average of the two sets of values is

$$\begin{aligned} \bar{T}_{1} &= \frac{1}{\varpi_{1}} \sum_{\mu=1}^{\varpi_{1}} T_{1\mu}, \\ \bar{T}_{2} &= \frac{1}{\varpi_{2}} \sum_{\mu=1}^{\varpi_{2}} T_{2\mu}. \end{aligned} \tag{13}$$

The corresponding variances are

$$\begin{aligned} \delta_{\bar{T}_{1}}^{2} &= \frac{\varphi_{1}^{2}}{\varpi_{1}}, \\ \delta_{\bar{T}_{2}}^{2} &= \frac{\varphi_{2}^{2}}{\varpi_{2}}. \end{aligned} \tag{14}$$

In

$$\begin{aligned} \varphi_{1}^{2} &= \frac{1}{\varpi_{1} - 1} \sum_{\mu=1}^{\varpi_{1}} \left(T_{1\mu} - \bar{T}_{1}\right)^{2} > 0, \\ \varphi_{2}^{2} &= \frac{1}{\varpi_{2} - 1} \sum_{\mu=1}^{\varpi_{2}} \left(T_{2\mu} - \bar{T}_{2}\right)^{2} > 0. \end{aligned} \tag{15}$$

Data fusion value is as follows:

$$Q^{+} = \frac{\delta_{\bar{T}_{1}}^{2}\delta_{\bar{T}_{2}}^{2}}{\delta_{\bar{T}_{1}}^{2} + \delta_{\bar{T}_{2}}^{2}}. \tag{16}$$

The asymptotically estimated data fusion value is

$$\widehat{T^{+}} = \frac{\delta_{\bar{T}_{1}}^{2}\bar{T}_{2} + \delta_{\bar{T}_{2}}^{2}\bar{T}_{1}}{\delta_{\bar{T}_{1}}^{2} + \delta_{\bar{T}_{2}}^{2}}. \tag{17}$$

The general formula for the progressive fusion of data with observations divided into ξ batch is

$$\widehat{T^{+}} = \left(\sum_{\mu=1}^{\xi} \frac{1}{\delta_{\bar{T}_{\mu}}^{2}}\bar{T}_{\mu}\right)\left(\sum_{\mu=1}^{\xi} \frac{1}{\delta_{\bar{T}_{\mu}}^{2}}\right)^{-1}. \tag{18}$$

In this study, the progressive fusion algorithm was used to carry out a fusion numerical analysis of the data involved in the research process of the relationship between the marked agricultural products and agricultural economic development in Anhui Province. This thus finds out where the associations between the data lie. It also analyzes the specific relationship between the marked agricultural products in Anhui Province and the development of the agricultural economy, so that the research can get the desired conclusion.

3. Experiment and Analysis

The indicators that affect the development of the regional agricultural economy in Anhui Province include not only GI agricultural products but also other indicators that affect the development of the agricultural economy. Therefore, when selecting variables, not only a variable of GI agricultural

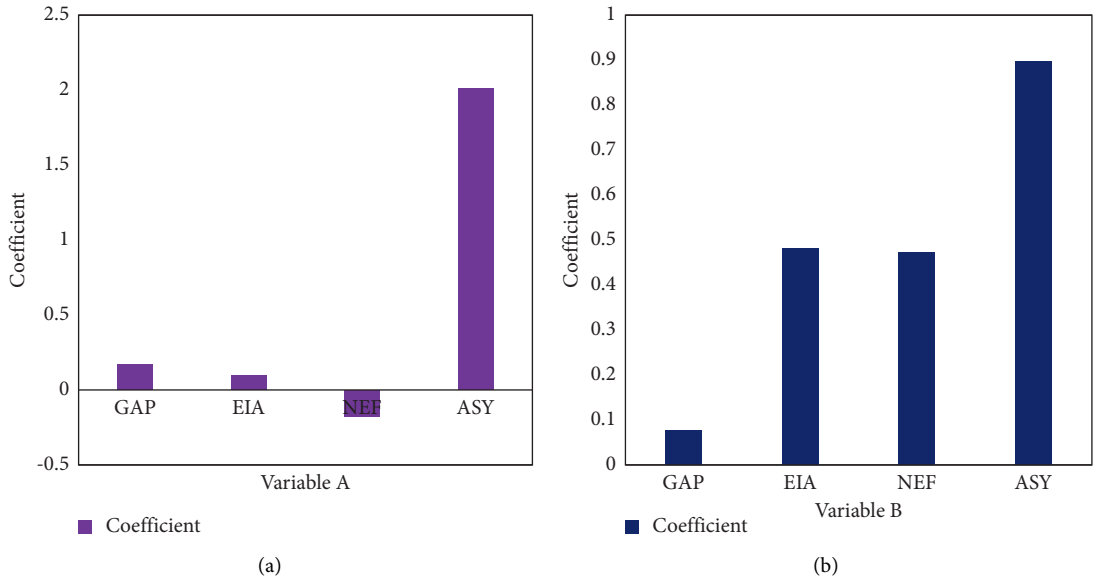

Figure 10: Model FGLS estimated regression results.

products is selected but also the effective irrigation area, the number of employees in the primary industry, and the per capita education years.

In order to determine the validity of the impact of GI agricultural products on the PCNI of rural residents and the GOV-AFAHF, it conducts unit root and cointegration tests on the data, respectively, and finally determines model one and model two. During model estimation, it uses FGLS estimation to perform regression estimation on the model, and the estimation software is Eviews10.0. The model estimation results are shown in Figure 10.

It can be seen from Figure 10(a) that the goodness of fit of model 1 is $R^2 = 0.83$, indicating that the fitting degree of model 1 is high. The P values are all less than 0.05, and at the 0.05 significance level, it means that the overall significance of model 1 is good. The coefficient of the effective irrigation area EIA of the control variable is 0.10 after taking the logarithm. The coefficient of the logarithm of the average years of education ASY is 2.01. It can be seen from Figure 10(b) that the coefficient of the logarithm of NEF of the primary industry employees is −0.18. The coefficient of the control variable effective irrigation area EIA after taking the logarithm is 0.48. The coefficient of the logarithm of the average years of education ASY is 0.90. The coefficient of the logarithm of NEF of the primary industry employees is 0.47. This is in line with our hypothesis that the application of GI agricultural products has a positive impact on the net income of rural residents and the total output value of agriculture, forestry, animal husbandry and fishery. It further confirms the conclusion that GI agricultural products can promote the development of the total output value of agriculture, forestry, animal husbandry, and fishery and increase the net income of rural residents.

It draws the following conclusions from the regression results of the established fixed-effect variable-intercept panel data model: (1) for every 1% increase in geographically indicated agricultural products, the PCNI of rural residents increases by 0.17%. (2) For every 1% increase in GI agricultural products, the GOV-AFAHF will increase by 0.08% on average. It is further confirmed that the development of agricultural products with GI can promote the agricultural economy. Its development can drive the development of local farmers, rural areas, and agricultural economy. (3) From the regression results, the effective irrigation area has a strong correlation with the PCNI of rural residents and the GOV-AFAHF. (4) Years of education per capita and employees in the primary industry also affect the development of the regional agricultural economy.

4. Discussion

Strengthening the Role of GI Agricultural Product Industry Associations and Promote the Standardization of Agriculture: GI industry association is a nonprofit, self-disciplined, and nongovernmental organization that can provide services, consulting, supervision, and other functions between the government, farmers, and enterprises. It is an important link in connecting farmers, enterprises, markets, and the government and plays a role in promoting the development of geographically indicated agricultural products. Industry associations have strong coordination ability. It can realize the standardized production and quality supervision of local GI agricultural products and effectively protect the market environment of GI agricultural products. In addition, it can increase the market visibility of local GI agricultural products and increase the income of local farmers. GI industry associations are relatively mature in other countries. Therefore, in the process of developing GI agricultural products, Anhui Province should pay attention to the construction of GI industry associations.

The government and relevant departments should strengthen the active guidance of industry associations, give necessary financial and policy support to industry associations, and provide financial support. It is necessary

to formulate corresponding rules and regulations of industry associations and gradually improve the responsibilities of industry associations, so that the corresponding work of industry associations can be implemented concretely. The government and relevant departments should strengthen the training and education of the relevant personnel of the industry association and cultivate a group of management talents of the industry association, so as to promote the development of the overall strength of the industry association and provide support for talents. In addition, government departments should coordinate the interests of farmers, industry associations, and enterprises and supervise the development process of industry associations.

From the Perspective of Industry Associations: on the one hand, industry associations should clarify their responsibilities, enhance service awareness, and improve service levels. It is necessary to release the relevant policies of GI agricultural products and the market information and price information of GI agricultural products to improve the sensitivity of the market. It is necessary to formulate industry rules and regulations to regulate and restrain their own behavior. On the other hand, industry associations must strictly control the quality and carry out strict quality and safety supervision and management in the standardized production process of agricultural cultivation and breeding. Efforts should be made to maintain and standardize the market, prevent some inferior agricultural products from disturbing the agricultural product market with GI, and maintain a fair competition environment and market order. In addition, industry associations should also strive to coordinate the interests of farmers and enterprises and ultimately achieve a win-win situation.

Seizing the Opportunity, Actively Explore the Market, and Promote the Influence of Agriculture: according to statistics, the social attention of GI in Anhui Province, the average amount of information is 554,300 information units, ranking second in China, indicating that GI in Anhui Province still has a relatively large advantage in the Chinese market. First of all, when Anhui Province sells geographically indicated agricultural products, it should formulate different marketing methods according to different consumer groups. For the elderly consumer groups, supermarkets, specialty stores, etc., it mainly has physical stores. For young people, online sales can be used, and online stores are the mainstay. Second, according to the consumer's spending power, the price should be adjusted accordingly. The price cannot be set too high, as it will scare off some consumers. At the same time, the price should not be too low. If the price is too low, GI agricultural products will lose their relative quality advantages. Third, it is necessary to continue to increase publicity efforts, with the help of modern Internet technology such as newspapers and television, to improve consumers' awareness of the agricultural products with GI in Anhui Province. Finally, it is necessary to actively participate in agricultural product exhibitions and expositions and strive to enhance its influence in the society.

5. Conclusion

The agricultural products with GI in Anhui Province have made remarkable achievements in the development process over the past ten years. The aim of this paper is to use data analysis to examine the relationship between iconic agricultural products and agricultural economic development in Anhui Province. First of all, the rising prices of agricultural products with GI can bring tens of thousands of income to local farmers every year. Second, various cities are also actively exploring the business model of the GI agricultural products industry, which is conducive to the development of local agricultural industrialization. In addition, local governments have paid more and more attention to the protection and development of agricultural products with GI. Local governments have implemented incentive mechanisms for this, encouraging local governments to actively declare and register GI agricultural products and promulgating relevant regulations to strengthen the protection of GI agricultural products. However, the agricultural products with geographical indications in Anhui Province still have a high degree of attention in the society. This shows that the agricultural products with geographical indications in Anhui Province have a good reputation in the society. The agricultural products with geographical indications in Anhui Province are still loved and welcomed by consumers in the society, and consumers are still full of expectations for agricultural products with geographical indications in Anhui Province.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] H. Han, Z. Zhong, Y. Guo, F. Xi, and S. Liu, "Coupling and decoupling effects of agricultural carbon emissions in China and their driving factors," *Environmental Science and Pollution Research*, vol. 25, no. 25, pp. 25280–25293, 2018.

[2] S. Marica and R. Piras, "The relationship between government spending and growth: a survey," *Rivista Internazionale di Scienze Sociali*, vol. 126, no. 2, pp. 123–151, 2018.

[3] H. A. Alattabier, B. H. Albadri, and A. Prof, "AN economic study of the relationship between agricultural imports and agricultural product in Iraq for the period 1991-2018 using toda-yamamoto causality test," *The Iraqi Journal of Agricultural Sciences*, vol. 51, no. 3, pp. 789–796, 2020.

[4] R. Reyes, W. S. Ochoa-Moreno, and L. R. Ojeda, "Economic growth and expansion of the agricultural frontier, case study: Ecuador (1985 - 2015)," *Journal of Scientific Agriculture*, vol. 4, no. 10, pp. 31–41, 2020.

[5] K. S. Dada, O. A. Kehinde, and A. L. Samad, "The link between agricultural budgetary allocation and economic growth in Nigeria," *International Journal of Business, Economics and Management*, vol. 4, no. 2, pp. 38–43, 2017.

[6] H. Tsvetanov, "Study on the relationship between income and direct payments of agricultural producers," *Trakia Journal of Sciences*, vol. 17, pp. 565–571, 2019.

[7] M. Olcese and F. Barbano, "Thermo-fluid dynamics analysis of ITER cryostat space room," *Fusion Engineering and Design*, vol. 135, pp. 183–195, 2018.

[8] X. Chen, W. Sun, and X. Li, X. Wang, H. Yan, K. Li, Experimental and numerical studies on W-Cu functionally graded materials produced by explosive compaction-welding sintering," *Fusion Engineering and Design*, vol. 137, pp. 349–357, 2018.

[9] S. I. Shahabad, Z. Zhang, and A. Keshavarzkermani, "Heat source model calibration for thermal analysis of laser powder-bed fusion," *International Journal of Advanced Manufacturing Technology*, vol. 106, pp. 1–13, 2020.

[10] P. Holfelder and A. Witte, "Simulation-assisted analysis of microstructural evolution of Ti-6Al-4V during laser powder bed fusion," *Progress in Additive Manufacturing*, vol. 5, no. 10, pp. 237–246, 2020.

[11] K. Saho, Y. Takahashi, and M. Masugi, "Performance analysis of fixed-gain moving object tracking filter based on fusion of range/acceleration sensors," *Transactions of the Institute of Systems, Control and Information Engineers*, vol. 30, no. 4, pp. 135–142, 2017.

[12] K. T. Yang, M. K. Kim, and T. Kim, J.-H. Kim, J. Suhr, Design optimization of smartphone camera housing fabricated by laser powder bed fusion using thermal analysis," *Journal of Mechanical Science and Technology*, vol. 36, no. 2, pp. 699–708, 2022.

[13] D. D. Lyu, W. Hu, and B. Ren, "Numerical prediction of residual deformation and failure for powder bed fusion additive manufacturing of metal parts," *JOURNAL OF MECHANICS*, vol. 36, no. 5, pp. 1–14, 2020.

[14] J. H. Yoo, S. Choi, and J. Nam, K. H. Ahn, J. S. Oh, Numerical analysis of the heat transfer and fluid flow in the butt-fusion welding process," *Korea-Australia Rheology Journal*, vol. 29, no. 1, pp. 37–49, 2017.

[15] Y. Zhang, Y. Tang, and Y. Xu, "Numerical simulation of a No-insulation BSCCO toroidal magnet applied in magnetic confinement fusion," *Science and technology of nuclear installation*, vol. 2018, Article ID 2914036, 10 pages, 2018.