



Study on the Problems and Countermeasures of E-Commerce Development of Agricultural Products in China

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Abstract. In the 21st century, e-commerce as a new business model provides a lot of convenience for product sales, while rural e-commerce has emerged. The development of rural e-commerce cannot only improve the quality of life of farmers, but also promote social and economic development. This paper establishes a simple linear regression model and estimates its parameters for China's rural network retail sales and agricultural product network retail sales from 2016 to 2020. It is concluded that there is a strong linear relationship between the two, so the development of rural e-commerce must focus on the development of agricultural e-commerce. Based on this result, this paper thinks about the existing problems of agricultural products e-commerce, and provides some useful targeted measures to help the development of agricultural products and rural e-commerce.

Keywords: E-commerce · Agricultural Products · Linear Regression

1 Introduction

The rapid development of rural e-commerce provides a convenient channel for rural production, circulation and consumption. With the implementation of the national rural revitalization strategy, the improvement of rural infrastructure, the development of rural online merchants and platforms, rural e-commerce has broad prospects for development. In addition, China, as a big producer and consumer of agricultural products, to solve the sales problem of agricultural products is of great significance to promote farmers' income and ensure national economic and social stability, especially in the context of the normalization of epidemic prevention and control.

For rural e-commerce and agricultural e-commerce related issues, domestic and foreign scholars have done some research. Wang (2016) analyzed the situation and problems of rural e-commerce in China at that time, and proposed measures such as strengthening personnel training, increasing investment and changing development concepts to promote the development of rural e-commerce in China [7]. Lai (2016) proposed countermeasures and suggestions to guide farmers to participate in agricultural e-commerce and to cultivate e-commerce talent team in response to the problems of developing agricultural e-commerce in China at that time [5]. A. deJanvry and E. Sadoulet (2001) believed

that farmers' poverty was directly and indirectly affected by agricultural technology, and they advocated the application of advanced technology to solve rural poverty [1]. L. Lancieri and NDurand (2005) analyzed their use of the Internet by tracking the behavior of Internet users, providing some theoretical support for e-commerce [6]. J.Jahng et al. (2006) believe that product characteristics and e-commerce integration will affect consumer purchase intention and attitude. Foreign countries attach importance to the food safety of agricultural products [3]. Thomas Kelepouris (2007) [4] and F. Gandino (2007) [2] used FRID information technology to study the supply section of agricultural products.

Most scholars study the development of rural e-commerce using literature analysis. This paper establishes a simple linear regression model and estimates its parameters for China's rural network retail sales and agricultural product network retail sales from 2016 to 2020, and draws a strong linear relationship between the two. This has certain research significance, which can infer that the development of rural e-commerce is mainly to develop good agricultural e-commerce. Therefore, based on the existing literature, this paper analyzes the problems in the development of e-commerce of agricultural products in China and provides some countermeasures to help the development of e-commerce of rural and agricultural products. This is extremely important for the development of rural e-commerce in the context of rural revitalization and epidemic prevention and control normalization.

2 Simple Linear Regression Model and Results

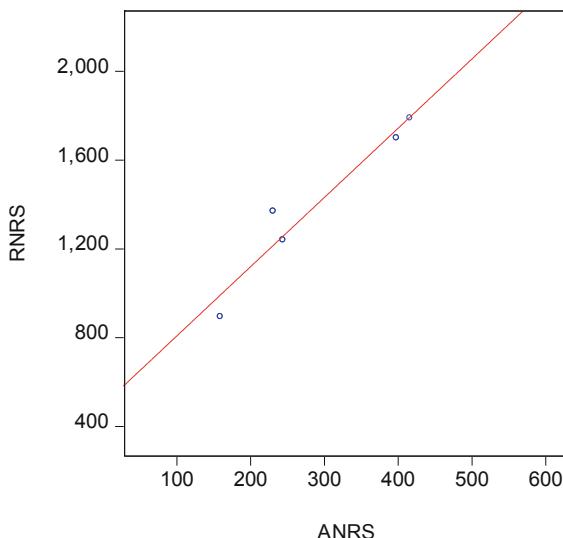
The simple linear regression analysis model, namely the one-variable linear regression model, is a model to study the linear relationship between the two measurable variables. It is one of the most basic and important models in statistics. In order to find out the key points for the development of rural e-commerce, simple linear regression analysis can be used to analyze the data and find out some links between rural e-commerce and agricultural e-commerce. The results can provide some constructive basis for possible future policy implementation.

Because retail sales is an important measure of industry development, so the data of this experiment is China's rural network retail sales (rnrs, billion yuan) and agricultural network retail sales (anrs, billion yuan) from 2016 to 2020, as shown in Table 1. The data in this section are from China E-commerce Report.

First of all, we need to understand the relationship between the two variables before making a specific regression model. The correlation analysis can be done by Eviews10.0 software. For the correlation coefficient, the result is about 0.97, which shows that their correlation coefficient is very high, very close to 1, with a strong positive correlation. In addition, the scatter plot of data is drawn by Eviews10.0 software, and the results are shown in Fig. 1. By observing its distribution law, it can be seen that all points are basically fitted with straight lines. In summary, there is a very strong linear relationship between rural network retail sales and agricultural network retail sales. We can establish a linear regression model.

Table 1. CHINA'S RURAL NETWORK RETAIL SALES AND AGRICULTURAL NETWORK RETAIL SALES FROM 2016 TO 2020

year	rnrss	anrs
2016	894.54	158.9
2017	1240	243.66
2018	1370	230.5
2019	1700	397.5
2020	1790	415.89

**Fig. 1.** Scatter diagram

A linear retail sales model is established as follows. The dependent variable is rnrss and the independent variable is anrs.

$$\text{rnrss} = c(1) + c(2) * \text{anrs} \quad (1)$$

Next, the least square method is used to estimate the parameters of the above model, and the results are shown in Table 2.

From the estimation results of the explanatory variables of the model, it can be seen that the corresponding probability values of the T statistics of the regression coefficient are less than the test level of 0.05. We can think that the constant term and the coefficient estimation of anrs are significantly non-zero. In addition, for the overall analysis results of the model, the sample's determination coefficient R-squared and the modified sample's determination coefficient Adjusted R-squared are close to 1, indicating that the fitting effect of the regression equation is very good, and it can also represent the authenticity of

Table 2. Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	496.6421	147.5199	3.366611	0.0435
ANRS	3.118898	0.481813	6.473250	0.0075
R-squared	0.933189			
Adjusted R-squared	0.910919			

the regression model. Then, according to the estimation results of the main explanatory variables, we can list the final equation:

$$\text{RNRS} = 496.6421 + 3.118898 * \text{ANRS} \quad (2)$$

From the regression model can be drawn: when the agricultural network retail sales increase a unit, the rural network retail sales will increase 3.118898 units.

In summary, there is a certain linear relationship between rural network retail sales and agricultural network retail sales, and it is a positive correlation. When the agricultural network retail sales increase, it will promote the increase of rural network retail sales. At the same time, because of the availability of data, the data used in this empirical is less, and the accuracy of linear regression has room for improvement. However, the empirical results also provide some reference for the direction of developing rural e-commerce. The focus of developing rural e-commerce is to develop agricultural e-commerce, and in order to develop agricultural e-commerce, it is necessary to first solve some problems in the development of agricultural e-commerce.

3 Problems in the Development of Agricultural E-Commerce

3.1 Low Standardization of Agricultural Products

The low degree of standardization of agricultural products is an important problem faced by the development of e-commerce in China, and it is also one of the important factors restricting the development of rural e-commerce in China. On the one hand, due to the dispersion of agricultural production and the small scale of farmers' planting and operation, there is a lack of unified standards and norms in the cultivation and harvesting of agricultural products, and the product quality is also very different. The quality of agricultural products varies in different regions and even deteriorates. And many agricultural products, especially local specialties, lack uniform standards, which will lead to the failure to achieve online sales. On the other hand, because there is no unified standardized management and standards, it will lead to information asymmetry between buyers and sellers in the transaction process, lack of market supervision and other issues. These problems often lead to adverse effects, such as the fact that some criminals use loopholes in laws and regulations to swindle and affect farmers' income, which is due to the lack of a standardized system. Agricultural e-commerce standardization is necessary for the development of rural e-commerce. Only when these standards are improved can agricultural e-commerce develop healthily.

3.2 Lack of E-Commerce Professionals in Agricultural Products

E-commerce is based on network technology, so agricultural e-commerce must have relevant professional compound talents. Rural professionals are relatively lacking. On the one hand, for rural residents themselves, most rural residents have low education level, limited knowledge level, and have not received systematic training and learning. At the same time, they may not have a deep understanding of the Internet, and they may have little knowledge of e-commerce. In addition, with the possible conservative concepts in rural areas, they may have low acceptance of online transactions such as e-commerce. Second, for some professional talents of e-commerce, they may be more inclined to work in cities and choose a better working environment with a better overall development level, let alone those professionals who understand both e-commerce knowledge and agricultural management. Third, the teaching and practice of some relevant professional colleges and universities are separated, so that talents cannot meet the needs of the development of agricultural e-commerce.

3.3 Weak Rural Modern Logistics System

Logistics distribution is an important part of the business process of agricultural e-commerce enterprises, especially in rural areas of China. Compared with urban areas, most rural areas in China are geographically remote and residential areas are scattered, which makes express delivery outlets scattered and scarce, and the rural distribution system of logistics companies is imperfect. The backward rural logistics system has become a major problem restricting the development of agricultural e-commerce. In addition, due to the particularity of agricultural products, some agricultural products have high requirements for timeliness and seasonality. In the process of transportation, if the refrigeration technology cannot meet, it will face the risk of return. However, if the rural areas want to achieve a complete cold chain logistics and transportation technology, there is a need for great costs, which greatly reduces the popularity and application of agricultural e-commerce.

3.4 Lack of Brand Awareness of Agricultural Products

Agricultural products brand is the symbol of agricultural products. That is to say, when a product is sold in the market, consumers approve of the product to some extent and can generate purchase desire. A good brand can give sellers higher returns. Although China has a variety of agricultural products, there are still relatively few high-quality agricultural brands. First of all, from the rural sellers, many farmers' understanding of the brand is shallow, perhaps they do not attach importance to brand building. Perhaps they think they can sell all over the country as long as they produce quality and cheap agricultural products. Secondly, the imperfect quality detection system of agricultural products, the lack of unified standards and the backward construction of relevant information networks lead to the flooding of counterfeit and inferior products, which is not conducive to the construction of agricultural products brands.

4 Countermeasures for the Development of Agricultural E-Commerce

4.1 Improving the Standardization System of Agricultural Products

Agricultural product standardization is the premise to further promote the development of agricultural e-commerce. On the one hand, the government should improve the standard requirements of agricultural production and processing through the strong support of policies, and gradually establish a reasonable standard system of agricultural products to ensure the quality of agricultural products. On the other hand, communication between farmers or agricultural producers should be strengthened. Rural areas can improve farmers' concept of agricultural product standardization by carrying out some activities such as lectures on agricultural product standardization, and encourage farmers to establish specialized cooperatives and other organizations for unified management of agricultural products, which helps to promote the pace of agricultural product standardization and further promote the development of agricultural e-commerce.

4.2 Expanding Agricultural E-Commerce Talent Groups

Talent is the soul of an industry, especially for the e-commerce industry, which has a large demand for talent. First, the government can establish agricultural e-commerce personnel training base. At the same time, the government should encourage universities to set up more relevant courses and strengthen the cultivation of the application ability of e-commerce in agricultural products, so as to provide a large number of high-quality e-commerce talents for the e-commerce industry of agricultural products. Secondly, the government should train and guide farmers, and carry out some network knowledge lectures, so as to eliminate farmers' unfamiliarity with e-commerce. At the same time, some e-commerce enterprises should be encouraged to train the relevant knowledge of farmers, and gradually improve the e-commerce application ability of rural residents, so that the initiative of e-commerce application of agricultural products can be attributed to farmers. Finally, rural infrastructure construction should be strengthened to provide a good working and learning environment for agricultural e-commerce practitioners. This can attract college graduates, migrant workers return home entrepreneurship, while avoiding the brain drain. Only in this way can rural e-commerce develop continuously under the condition of stable human resources.

4.3 Improving Rural Logistics Distribution System

Logistics distribution is an important link in the development of agricultural e-commerce, and it is also a key factor affecting consumers' purchase experience of agricultural products. Improving rural logistics distribution system requires government and enterprises to play a role. First of all, the government should improve supporting facilities such as rural roads and waterways to solve the problem of information in rural areas in terms of transportation, so as to improve the transport efficiency of agricultural products and reduce costs. Secondly, the government should increase investment in cold chain logistics, and reduce the cost pressure of rural logistics through financial support to ensure

the quality of agricultural products in the transportation process, so as to provide basic guarantee for the development of e-commerce of agricultural products. Finally, relevant logistics companies can set up special distribution business. Some special agricultural products with timeliness can be transported through specialized logistics companies, and they can be delivered on time while ensuring the quality of agricultural products with the help of perfect distribution technology.

4.4 Strengthening Brand Building of Agricultural Products

Agricultural product brand is the consumer's awareness of the product, so it is necessary to strengthen the brand awareness of agricultural products in China. First of all, it is necessary to strictly control the production of products. The government and enterprises should strengthen the supervision of the quality and safety of agricultural products in planting, production and sales, so as to ensure the quality of agricultural products. This is the premise for consumers to increase their recognition of this brand, and it is also conducive to improving the brand awareness of agricultural products and increasing the added value of products. On this basis, agricultural product brands can be promoted through media advertising and other ways. Secondly, the government should improve the brand system of agricultural products and formulate systematic standards and regulations, which cannot only provide standards for the establishment of characteristic agricultural products brands, but also combat counterfeit and inferior products, so as to provide institutional guarantee for the construction of agricultural products brands.

5 Conclusion

In this paper, by establishing a simple linear regression model and estimating its parameters, it is concluded that there is a strong positive correlation between rural e-commerce retail sales and agricultural e-commerce retail sales, which refines the development of rural e-commerce into the development of agricultural e-commerce. Through the analysis and thinking of a large number of literature, this paper sorts out four key problems existing in the development of e-commerce of agricultural products in China, and provides corresponding countermeasures.

In recent years, China's rural e-commerce scale has steadily improved, and agricultural e-commerce has grown rapidly. Under the background of China's epidemic prevention and control normalization and rural revitalization, it is particularly important to study the development of e-commerce in rural areas. At the same time, the research method of this paper is also helpful to provide reference for related problems in other fields, so this paper has certain research significance.

This study still has room for further discussion. In the future, the data will become more perfect, and the author will also make more detailed discussions on the development of rural or agricultural e-commerce in future research. At the same time, in order to find out the targeted measures for the development of e-commerce in rural areas of China, the author may also discuss the particularity of a certain area in future research, so as to help the development of e-commerce in China.

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References

1. De Janvry A, Sadoulet E. World Poverty and the Role of Agricultural Technology: Direct and Indirect Effects [J]. Journal of Development Studies, 2001, 38(4):1–26.
2. Gandino F, Montrucchio B, Rebaudengo M, et al. Analysis of an RFID-based Information System for Tracking and Tracing in an Agri-Food chain [C]// Rfid Eurasia. IEEE, 2007.
3. Jahng J, Jain H K, Ramamurthy K. An Empirical Study of the Impact of Product Characteristics and Electronic Commerce Interface Richness on Consumer Attitude and Purchase Intentions [J]. IEEE Transactions on Systems Man and Cybernetics - Part A Systems and Humans, 2006, 36(6):1185–1201.
4. Kelepouris T, Pramatari K, Doukidis G. RFID-enabled traceability in the food supply chain [J]. Industrial Management & Data Systems, 2007, 107(2):183–200.
5. Lai X. PROBLEMS AND COUNTERMEASURES IN THE DEVELOPMENT OF AGRICULTURAL ELECTRONIC COMMERCE [J]. Chinese Journal of Agricultural Resources and Regional Planning, 2016.
6. Lancieri L, Durand N. Internet User Behavior: Compared Study of the Access Traces and Application to the Discovery of Communities [J]. IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans, 2005, 36(1):208–219.
7. Wang P. Problem and Strategy of Rural E-commerce in China [J]. Academic Journal of Zhongzhou, 2016.

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