Research on the Performance of Farmers’ Participation in the New Agricultural Management Model

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Abstract. Based on the data of the third national agricultural census, this paper makes an empirical analysis on the influencing factors of farmers’ participation in the new agricultural management model. The results show that the willingness of farmers to participate in the new agricultural business model is affected by the gender of the head of household, the education level of the head of household, the number of labor force, the number of computers, the degree of mechanization, whether the agricultural products are sold through e-commerce, whether the agricultural products are certified, whether the farmers' families are family farms, whether they participate in agricultural insurance, the year-end loan, and the degree of concurrent operation.

1. Introduction

Since the Third Plenary Session of the Eleventh Central Committee of the Communist Party of China, the rural reform with the family contract system as the core has achieved remarkable policy results. Since then, the double-layer management system based on the family contract operation and the combination of unification and division has been established, which has also laid a long-standing agricultural production and management mode of small-scale family management in China. The "collective ownership, equal field contract, family management" has also been completed It is the basic characteristic and development pattern of agricultural management system in China. However, with the deepening of industrialization and urbanization and the rapid flow of rural labor, the phenomenon of farmers' land fragmentation, farmers' part-time employment, agricultural sideline, production non grain, rural labor aging and feminization is becoming more and more serious. These outstanding " three rural issues " have posed severe challenges and tests for my country's agricultural management pattern of "collective ownership, land equalization, and family management". Issues related to national food security such as "who will farm the land" and "how to farm the land" have become the focus of general attention by the government and society. In this context, China proposes to build a new agricultural management system.

In the past decade, the new agricultural management model has gradually become popular in China. The central government has 18 important documents focusing on the new agricultural management system. The No. 1 central document in 2007 clearly put forward the development and cultivation of modern agricultural management entities; in 2012, the party's "Eighteen big" report first put forward the connotation of the new agricultural management system; in 2013, "No.1 central document" put forward the new production and operation main body scope for the first time. In 2020, "No.1 central
document” pointed out that we should play a leading role in various forms of appropriate scale operation of agriculture and adhere to the management of farmers' families as the basis for supporting the new agricultural management entities and the new agricultural service entities. With the support of government policies, the new agricultural business model has increased rapidly. Taking agricultural cooperatives as an example, according to the report of the Ministry of agriculture, by the end of 2018, the number of farmers’ cooperatives in China has reached 2.173 million, with more than 100 million households joining the cooperatives, accounting for 49.1% of the total number of farmers. The development of the new type of agricultural management has become the focus of attention from all walks of life. Obviously, under this background, it is of great theoretical and practical significance to study the impact of the new type of agricultural management mode on Farmers’ income.

From the existing literature, scholars have carried out a lot of research on the issues related to the new agricultural business model, but most of the literature is only for a single business model. This paper uses the data of the third agricultural census and the quantitative analysis method to analyze the influencing factors and the overall economic performance of farmers’ participation in the new agricultural business model. Compared with the existing research, the innovation of this paper lies in the following two aspects. First, this paper makes an empirical analysis of the factors that affect the participation of farmers in the new agricultural business model, and then gives the policy recommendations for the implementation of the new agricultural business model, which will help the further promotion of the new agricultural business model in the whole country. Secondly, based on the third agricultural census data, the data coverage is wider and the results are more representative. In the past, most of the empirical analysis of the new agricultural business model driving the increase of farmers' income was based on qualitative analysis, while the quantitative analysis was only on a certain region, with narrow data coverage. Based on the data of the third agricultural census, this paper covers the basic situation of agriculture, rural areas and farmers in China, and the results are more universal.

2. Data
This paper uses the data of the third agricultural census of the National Bureau of statistics. The third agricultural census surveyed 230 million farmers and 600000 Village Units. The contents of the survey include agricultural production capacity and output, rural infrastructure and basic social services, farmers' living conditions and other information. The general survey of large-scale agricultural operators is a part of the general survey of agriculture. The sample includes the income of large-scale agricultural operators, the participation of new agricultural management mode, crop planting and other indicators.

3. Model
Taking the number of types of farmers actually participating in the new agricultural business model as the dependent variable, the fixed effects model is used to analyze the specific factors that affect the participation of farmers. The specific function expression is as follows:

\[ Y_i = \beta_0 + \sum_{k=1}^{15} \beta_k X_{ki} + \beta_{17} D_i + \mu_i \] (1)

Among them, the explained variable \( Y_i \) is the number of the i-th farmer household participating in the new type of agricultural management organization or type; \( \beta_0 \) is a constant term; \( \beta_k \) (k=1,2,...15) is the explanatory variable coefficient; the explanatory variable \( X_{ki} \) includes the gender of the head of the household, the age of the head of the household, the educational level of the head of the household, whether the head of the household has received professional technical training, the number of people in the family who have received professional technical training, the number of family members, the number of family labor, the number of computers, the number of connected mobile phones, the per capita agricultural area, and the degree of mechanization, operation method, whether to sell agricultural products through e-commerce, whether agricultural products are certified, year-end loan balance, degree of part-time business, whether to participate in agricultural insurance; \( D_i \) represents a virtual variable of the region; \( \mu_i \) is a random error term.
Table 1. Selection variables of the model.

| Variable Symbol | Variable Meaning                                                                 |
|-----------------|----------------------------------------------------------------------------------|
| $Y$             | The number of types of farmers actually participating in the new agricultural business model |
| $X_1$           | Gender of head of household                                                      |
| $X_2$           | Age of head of household                                                          |
| $X_3$           | Educational level of head of household                                             |
| $X_4$           | Whether the head of the household has received agricultural professional technical training |
| $X_5$           | The number of households who have received agricultural professional technical training |
| $X_6$           | Family population                                                                |
| $X_7$           | Number of family labor                                                            |
| $X_8$           | Number of computers                                                               |
| $X_9$           | Number of connected mobile phones                                                 |
| $X_{10}$        | Per capita agricultural area                                                      |
| $X_{11}$        | Degree of mechanization                                                           |
| $X_{12}$        | Mode of operation                                                                 |
| $X_{13}$        | Whether to sell agricultural products through e-commerce                          |
| $X_{14}$        | Whether the agricultural product certified                                        |
| $X_{15}$        | Year-end loan balance                                                             |
| $X_{16}$        | Part-time degree                                                                  |
| $X_{17}$        | Whether the farmer has participated in agricultural insurance                     |

4. Empirical analysis results

As far as the national situation is concerned, it can be seen from the table 2 that the gender of the head of the household, the age of the head of the household, the education level of the head of the household, whether the head of the household has received agricultural professional technical training, the number of computers, the actual area of farming (confirmed), the degree of mechanization, whether the household is a family farm, the balance of loans at the end of the year, and part-time operation All levels have a significant positive impact on farmers’ income. The number of people who have received agricultural professional and technical training, the number of laborers, and whether they have participated in agricultural insurance have a significant negative impact on the income of farmers.

As far as the situation in the east is concerned, it can be seen from the above table that whether or not to participate in a new type of agricultural management organization has a negative impact on the income of farmers, but the impact is not significant. The education level of the head of the household, whether the head of the household has received professional agricultural technical training, the number of computers, the actual agricultural area of operation (confirmation of rights), the degree of mechanization, whether the household is a family farm, the balance of the loan at the end of the year, and the degree of part-time work all have the significant positive impact on family income. The number of people who have received agricultural professional and technical training, the number of laborers, and whether they have participated in agricultural insurance have a significant negative impact on the income of farmers.

As far as the situation in central China is concerned, it can be seen from the above table that whether to participate in a new type of agricultural management organization and obtain a form has a significant positive impact on the income of farmers. The age of the head of the household, the education level of the head of the household, whether the head of the household has received agricultural professional technical training, the number of computers, the actual agricultural area of the operation (confirmed), whether the agricultural products are sold through e-commerce, whether the household is a family farm, the loan balance at the end of the year, and part-time work, the degree of urbanization have a significant positive impact on farmers’ income. The number of people who have received agricultural professional technical training, the number of labors, the degree of mechanization,
whether agricultural products are certified, and whether they have participated in agricultural insurance have a significant negative impact on the income of farmers.

Table 2. Empirical analysis results.

| Explanatory Variables | National Region | East Region | Central Region | Western Region |
|-----------------------|-----------------|-------------|----------------|---------------|
| 𝑋₁                    | 7.143∗          | 1.278∗      | 1.278∗         | -4.003        |
| 𝑋₂                    | -1.250          | -4.095∗     | 1.864          | -4.084        |
| 𝑋₃                    | 7.008***        | 1.454***    | 6.974          | -1.112        |
| 𝑋₄                    | 1.215           | 9.191       | 1.829          | 1.033         |
| 𝑋₅                    | 3.470           | 1.707**     | -1.081         | -4.285        |
| 𝑋₆                    | 3.643∗          | 3.603       | 5.959          | 7.719         |
| 𝑋₇                    | 1.895***        | 6.191       | 2.924***       | 3.122***      |
| 𝑋₈                    | -1.591          | -3.441      | 4.762          | -7.735        |
| 𝑋₉                    | -3.384          | -2.444      | 5.574          | -6.464        |
| 𝑋₁₀                   | 7.145***        | 5.271***    | 6.736***       | 1.213***      |
| 𝑋₁₁                   | -3.891          | 2.204**     | -4.756***      | 2.615***      |
| 𝑋₁₂                   | 1.189***        | 9.811***    | 8.308**        | 1.934***      |
| 𝑋₁₃                   | 2.022***        | 2.217***    | 3.107***       | 9.321***      |
| 𝑋₁₄                   | 3.681***        | 3.290***    | 3.877***       | 4.784***      |
| 𝑋₁₅                   | 6.460***        | 2.856       | 1.218***       | 1.627***      |
| 𝑋₁₆                   | 9.077           | -1.589      | 5.332***       | -2.471*       |
| 𝑋₁₇                   | 3.133***        | 3.886***    | 2.868***       | 2.264***      |
| Constant              | -7.179*         | -9.267*     | -9.109         | 2.140         |
| 𝑅²                    | 0.1369          | 0.131       | 0.1632         | 0.0989        |

As far as the situation in the west is concerned, the above table shows the number of computers, the degree of mechanization, the mode of operation, whether the agricultural products are sold through e-commerce, whether the agricultural products are certified, whether the household is a family farm, whether it has participated in agricultural insurance, and the loan balance at the end of the year. Both have a significant positive impact on the extent to which farmers participate in new agricultural management organizations or forms. The degree of part-time employment has a significant negative impact on the degree to which farmers participate in new agricultural management organizations or forms.

5. Conclusion

Based on the data of the third national agricultural census, this paper conducts an empirical analysis of the factors affecting farmers’ participation in the new agricultural business model. The research results show that the willingness of farmers to participate in the new agricultural business model is affected by whether the agricultural products are sold through e-commerce, whether the agricultural products are certified, whether they have carried out new business activities, whether the farmer’s family is a family farm, whether it has participated in agricultural insurance, the loan balance at the end of the year, and the degree of part-time employment.

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