Study on the Effects of Agricultural Land Transfer on Agricultural Economic Growth

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Abstract: This study aims to examine the impact of agricultural land transfer on agricultural economic growth by using annual time series data of Guangxi province of China over the period of 2003 to 2015. We employed ARDL-bound test to test the long-run and short-run relationship between dependent and independent variables. The empirical results show that there is no significant short-term impact on agricultural economic development, and the coefficient is 0.0399. In the long run, agricultural land transfer has a significant impact on agricultural economic growth, with a coefficient of 0.1857. Agricultural land transfer restraining the drag effect of rural surplus labour force on agricultural economic growth and did not increase the output effect of agricultural machinery. Our findings conclude that the adjustment caused by the transfer of agricultural land is beneficial to the development of agricultural economy for a long time, and plays an important role in the allocation of agricultural labour force but not in agricultural capital investment.

1. Introduction
Agricultural land transfer is an important way to activate rural land assets and optimize rural land resources, which plays a vital role in agricultural economic growth. Since the reform and opening up, China's rural land reform has been deepening. In 1984, document No. 1 of the Central Committee first proposed "encouraging the gradual centralization of land to skilled farmers", and document No. 5 of 1987 first proposed "adopting different forms of moderate scale operation" to open the door to the policy of agricultural land transfer after reform and opening up. Although the state restricts or encourages the circulation of rural contracted land in different stages, but the transfer of rural land mostly takes the form of invisible market. Farmers mostly rent, exchange and transfer according to their own needs by mutual agreement, oral or written agreement. In 2002, the rural land contract law (RLCL) formally brought the land transfer into the legal category, and encouraged farmers to carry out land transfer on the basis of equal consultation, voluntary and paid, so that the land transfer entered the stage of legalization. At the third plenary session of the seventeenth central committee in 2008, it was proposed to establish a unified land market for urban and rural areas in accordance with the principle of "the same price as the same land". Rural land reform has gradually moved towards standardization and marketization, which has greatly promoted the process of agricultural modernization. After the third plenary session of the eighteenth central committee of the communist party of China in 2013, a number of agricultural-related documents combined the transfer of agricultural land with the
development of moderate-scale operation, in order to increase the efficiency of the circulation of agricultural land, promote agricultural efficiency and increase farmers' income.

In recent years, with the acceleration of industrialization and urbanization, the process of agricultural land transfer in Guangxi has made remarkable achievements. With the large number of rural labour transferring to secondary and tertiary industries, the area of transferred agricultural land in Guangxi has increased from 9513.33 hectare in 2009 to 20466.67 hectare in 2012. In 2016, the certification of land ownership in the whole region reached 60 percent, and the total area of land transfer has reached 55844.16 hectare, accounting for over a quarter of the total contracted area. The circulation of agricultural land promotes the development of moderate scale operation, cultivates many new subjects such as large professional households, farmers' cooperatives, family farms and leading enterprises, and greatly promotes the development of traditional farmers. The total agricultural output value of Guangxi in 2009 was 145.90 billion Yuan, and increased to 150.10 billion Yuan in 2018. Agricultural land is the key resource and factor carrier of agricultural production, and plays a vital role in the development of agricultural economy.

So, what is the relationship between agricultural land transfer and agricultural economic growth? Is there a short-run or long-run relationship? How does agricultural land transfer allocate other resources to affect agricultural economic growth? Understanding the relationship between agricultural land transfer and agricultural economic growth is not only the bottleneck of current agricultural economic development, but also the key node to achieve rural economic prosperity and farmers' income growth. It is of great significance to narrow the gap between urban and rural areas, realize industrial integration and rural revitalization strategy.

Academic has a relatively consistent view when they discussed on the resources allocation effect of agricultural land transfer, that is agricultural land transfer affects the allocation of agricultural factors. Agricultural land transfer makes the land elements transfer from the agricultural producers with lower operating efficiency to higher operating efficiency, and produces positive economic behaviour and promotes agricultural economic growth [1]-[2]. The typical characteristics of agricultural land fragmentation and small-scale production are important factors that hinder the mechanization and large-scale production of agricultural production. The transfer of agricultural land is an important means to solve the shortcomings of agricultural land fragmentation and small-scale production. Agricultural land transfer has reallocated labour resources, improved the economic benefits of land, improved the efficiency of agricultural production, brought more job opportunities [3] and increased farmers' income [4]. At the same time, it has promoted rural collectives and farmers to form modern agricultural management consciousness, and improved farmers' ability to avoid agricultural risks [5]. Agricultural land transfer promotes farmers' poverty reduction through the dual roles of productive and non-productive benefits [6], and meets the needs of agricultural modernization and sustainable development.

However, due to the vague property rights of rural land, the imperfect system of agricultural land transfer and the irregular management, the implementation effect of agricultural land transfer is not very satisfactory. The phenomenon of "rent stratification" in the circulation of agricultural land indicates that the effective allocation of agricultural land resources has not been realized [7]. Agricultural land exchange among farmers is difficult to solve the problem of agricultural land fragmentation [8]. Blindly expanding the scale of agricultural land will lead to the decline of agricultural production technology efficiency, which has no obvious effect on agricultural economic development [9], and may also lead to non-grain tendency [10]. In the process of analysing the benefit of agricultural land transfer, scholars use many methods such as propensity score matching method [11], PSM-DID [12], multivariate statistical method [13], Heckman selection model [14], Logistic and Quantile regression model [15], Probit, Tobit model and so on. It can be seen that most scholars are concerned about the factors affecting land transfer, or economic benefits based on a certain period. Few scholars analyse the short-run and long-run effects of land transfer. Many scholars mention that agricultural land transfer affects economic benefits by affecting labour allocation and asset investment, but lack in-depth analysis. Therefore, based on the analysis of many scholars, this paper pays close
attention to the dynamic effect of agricultural land transfer, uses ARDL method to analyse the long-run and short-run effects of agricultural land transfer on agricultural economic growth, and explores the path and effect of agricultural land transfer on agricultural economic growth by allocating other resources.

2. Model Construction and Data Explanation

2.1 Model Construction

This study uses the endogenous growth model in the form of incremental production function to model and analyse the impact of agricultural land transfer on agricultural economic growth. The general form of the model is:

\[ Y_t = f(TRANS, FIRL, POWER, FERT) \]  

\[ Y \] represents the actual agricultural output value (converted to the constant output value based on 2013), and represents the economic effect of agricultural land transfer. Referring to the research of Xia Yulian et al. (2016), the amount of land transfer is expressed by the change of cultivated land area per household, which reflects the degree of agricultural land transfer. This method has been widely used in the field of agricultural land transfer. TRANS represents agricultural land transfer. The number of agricultural labour force in primary industry is represented by FIRL, the total power of agricultural machinery and the amount of fertilizer applied in agriculture are represented by FERT, and the time is represented by t.

In order to calculate the elasticity of the influence of explanatory variables on the explained variables, this paper deals with the data with logarithm and rewrites the above formula as follows:

\[ \ln Y_t = \beta_0 + \beta_1 \ln TRANS_t + \beta_2 \ln FIRL_t + \beta_3 \ln POWER_t + \beta_4 \ln FERT_t + \mu_t \]  

\( \beta \) represents the elastic coefficients of each variable. \( \mu_t \) represents the random perturbation term and other influencing factors.

2.2 Variable Selection and Description

The time series data of 2013-2015 were used in this study. The data of farmland area per household (its change indicates the degree of agricultural land transfer), primary industry labour force, total power of agricultural machinery and fertilizer application amount were collected from Chinese statistical yearbook.

(1) Actual agricultural output value (Y). It is an important index to measure agricultural economic growth. In order to eliminate nominal growth caused by price changes, this paper converts nominal agricultural output value into real output value at constant price based on 2003. Taking the actual agricultural output value as the dependent variable, this paper evaluates the impact of various factors on agricultural economic growth.

(2) Agricultural land transfer (TRANS). When analysing the factors of agricultural land transfer, in view of the fact that all kinds of statistical yearbooks do not have statistical data on agricultural land transfer, the author refers to the practice of Xia Yulian (2016) and many scholars, and reflects the degree of agricultural land transfer by the change of farmer's per capita cultivated land area. The specific calculation method is: per capita arable land area of peasant households be equal to per capita number of peasant households multiply per capita arable land area.

(3) Input of Agricultural Labour Force (FIRL). The number of primary industry labour force is used to represent the input of agricultural labour force. As a traditional factor of production, labour force is generally considered to play a positive role in agricultural economic growth.

(4) Agricultural capital input. The input of agricultural capital in this paper is measured by two indicators: One is the total power of agricultural machinery, represented by POWER, which represents the level of agricultural mechanization, and is also an important input object of agricultural capital; the other is FERT, represented the amount of fertilizer used in agriculture, which also requires a large amount of investment in agricultural production.
3. Results of Long-run and Short-run analysis

From the results of model I, as an independent factor, agricultural land transfer has no short-run relationship with agricultural economic growth, but has a significant long-run relationship. The above table shows that the long-run coefficient of 0.19 means that the adjustment of average household area has a positive effect on agricultural economic growth. There is a reverse relationship between agricultural labour force and agricultural output value. The short-run and long-run relationships are significant. The coefficient distribution is -1.32 and -1.38. It shows that the outflow of agricultural labour force contributes to promoting agricultural economic growth, transferring surplus rural labour force, optimizing the allocation of agricultural land resources and thus has a positive impact on agricultural economic growth. There is a positive relationship between the total power input of agricultural machinery and agricultural economic growth in the short-run and long-run, and the long-run and short-run effects are close, the coefficients are 0.19 and 0.20 respectively. There is no significant short-run relationship between the amount of agricultural chemical fertilizer and agricultural economic growth, but there is a large correlation in the long run. The correction coefficient of perturbation error of the equation is -0.95, which indicates that the adjustment model achieves faster equilibrium than expected in the table.

Model II examines the allocation effect of agricultural land transfer on agricultural labour resources. From the results of the above table, we can see that the short-run transfer of agricultural land has close to a significant level of allocation of agricultural labour resources. When the endogenous effect of agricultural land transfer on agricultural labour capital, the long-run promotion effect of agricultural land transfer on agricultural output value is higher than the short-run effect (From the table, we can see: 0.39 > 0.01). The transfer of agricultural land not only affects the output of agricultural labour force, but also prevents the large-scale abandonment of agricultural land, guarantees agricultural production and increases agricultural income. We can also see that the endogenous effect of agricultural land transfer is also higher in the long run than in the short run (1.77 > 1.33). The endogenous effect of agricultural land transfer on labour capital changes the restraint effect of surplus rural labour on agricultural output. This further validates Xia Yulian's view that the long-run reduction of the restraint effect on the surplus labour force is greater than the short-run restraint reduction effect. In addition, the transfer of agricultural land is conducive to the formation of new agricultural forms such as family farms, and to attracting new managers to go to the countryside to invest in agricultural scale operation, so as to promote agricultural economic growth.

Model III tests the allocation effect of agricultural land transfer on the total power of agricultural machinery. From the above table results, when the endogenous effect of agricultural land transfer on agricultural mechanization level, the short-run effect of agricultural land transfer on agricultural economic growth is not significant (t value is 0.55), but the long-run effect on agricultural economic growth is more obvious (coefficient is 0.04, t value is 4.19). However, the endogenous effect of agricultural land transfer on agricultural machinery input is negative both in the long run and in the short run (short-run is -0.19, long-run is -0.17). That means agricultural land transfer cannot increase the output effect of agricultural machinery input. The reason is that it is very difficult to carry out mechanization even if the land scale is adjusted in Guangxi province, where there are many mountains and few lands. Although agricultural mechanization plays a great role in promoting agricultural economic growth, adjusting the land scale through the circulation of agricultural land cannot greatly increase the production efficiency of agricultural machinery.

Model IV tests the allocation effect of agricultural chemical fertilizer application amount on agricultural land transfer land. From the results of the above table, it can be seen that no matter in the long-run or short-run, when the endogenous effect of agricultural land transfer on the input of agricultural fertilizer application, there is no significant effect on agricultural economic growth. Moreover, the effect of agricultural land transfer on agricultural fertilizer input is negatively correlated, with short-run and long-run effects being -0.25 and -0.68, respectively. This reflects that agricultural land transfer does not increase the input of agricultural fertilizer application in the long-run or short-run, and the endogenous effect is weaker in the long-run than in the short-run.
Table 1 Short-run and long-run results of ARDL estimates

|                      | Model I | Model II | Model III | Model IV |
|----------------------|---------|----------|-----------|----------|
|                      | Short-Run | Long-Run | Short-Run | Long-Run | Short-Run | Long-Run |
| lnTRANS              | 0.04    | 0.19***  | -0.94***  | -1.54*** | -0.07     | -0.21    |
|                      | (-0.62) | (3.56)   | (-3.99)   | (-5.87)  | (-0.34)   | (-0.36)  |
| lnFIRL               | -1.31***| -1.38*** | 0.07      | 0.21     | 0.39      | 0.76***  |
|                      | (-4.44) | (-8.07)  | (-1.48)   | (13.05)  | (-0.34)   | (-0.36)  |
| lnPOWER              | 0.19**  | 0.20***  | -0.36     | 0.49*    | -0.39     | 0.76***  |
|                      | (-2.29) | (3.01)   | (-1.50)   | (1.97)   | (-1.48)   | (13.05)  |
| lnFERT               | 0.26    | 0.71***  | 0.54***   | 0.89***  |
|                      | (-1.53) | (8.65)   | (-6.04)   | (35.96)  |
| lnTRANS*l of lnFIRL | 0.01*   | 0.39*    |
|                      | (-1.84) | (1.86)   |
| lnTRANS*l of lnPOWER| 0.01    | 0.04***  |
|                      | (-0.55) | (4.19)   |
| lnTRANS*l of lnFERT  | 0.01    |          |
|                      | (-0.78) | (0.02)   |
| CointEq(-1)          | -0.95***| -0.36*** | -0.61***  | -0.35*   |
|                      | (-4.98) | (-3.71)  | (-6.03)   | (-3.02)  |
| C                    | 18.96***| 8.51***  | 20.58***  | 10.11**  |
|                      | (14.66) | (28.42)  | (10.68)   | (2.35)   |

Note: the ***, ** and * indicates significant at 1%, 5% and 10% levels respectively.

4. Conclusion and Policy implications

This study attempts to explore the impact of agricultural land transfer on agricultural economic growth and its resource allocation effect. The empirical results are as follows:

In long-run, the circulation of agricultural land, the total power of agricultural machinery and the amount of fertilizer applied have a positive impact on agricultural economic growth. The long-run effect of agricultural land circulation is significant. The increase of agricultural labour force has a negative impact on agricultural economic growth. The urban circulation of rural surplus labour force contributes to agricultural economic growth. In short-run, there is no significant correlation between agricultural land transfer and agricultural economic growth, and the short-run effect of agricultural land transfer is not significant. Only the total power of agricultural machinery has a significant positive relationship with agricultural economic growth, and there is a significant negative relationship between labour force and agricultural economic growth.

In view of the fact that there is no significant correlation between short-run agricultural land transfer and agricultural economic growth, but there is a long-run relationship, we should focus on the long-run between land transfer and agricultural economic growth. At present, we should strengthen the promotion of agricultural land transfer, strengthen the registration of agricultural land rights, protect farmers' rights and interests, and lay the property rights foundation for agricultural land transfer.

Acknowledgment

This research supported by fund Projects: Sichuan soft science project "Research on precision poverty alleviation and poverty alleviation in mountainous areas supported by industry" (no.18rkk0774), project of “Transformation of China's regional economic development strategy (1949-2019)” (No.2020QGRW033) and project (2017YJKY05.)

References

[1] Li, S. L. (2000) Efficiency Evaluation of Farmer Differentiation on Rural Land Scale Management.Contemporary Economic Research, (02):37-43.
[2] Xu, Y. T., Huang, X. J., Chen, Z. G. (2016) Does Farmland Transfer Scale Contribute to the Farmers’ Income? Based on the Empirical Study of Peasant Household Survey in the Five Provinces of Mid-China Journal of Natural Resources, (10):1624-1636.
[3] Lu, H., Xie, H. (2018) Impact of changes in labour resources and transfers of land use rights on agricultural non-point source pollution in Jiangsu Province, China. Journal of Environmental Management, 207:134-140.

[4] Xu, H. Z., Guo, Y. Y., Wu, G. C. (2012) The Impact of Farmer Differentiation on the Utilization Efficiency of Cultivated Land. Rural Economy of China, (6):31-40.

[5] Li, Z. (2014) Transfer of Rural Land and Farmers' Income: Based on the Tracking Research Data in Shaoyang, Hunan. Economic Geography, (5):2013.144-149.

[6] Xia, Y. L., Kuang, Y. P., Zeng, F. S. (2017) Farmland Transfer, Rural Labour Transfer and Poverty Reduction for Farmers [J]. Economic Survey, (5):32-37.

[7] Jiang, S. B., Su, Q. (2013) The Phenomenon of "Rent Hierarchy" in Agricultural Land Transfer and Its Root. Agricultural Economic Problems, (4):42-48.

[8] Zhong, F. N., Wang, X. W. (2010) Can the current agricultural land transfer market reduce the degree of land fragmentation? Preliminary evidence from Xinghua in Jiangsu Province and Binxian County in Heilongjiang Province. Agricultural economic problems, 31(1):23-32.

[9] Luo, B. L. (2000) Efficiency Decision of Agricultural Land Management Scale. Rural Observation in China, (5):18-24.

[10] Luo, B. L., Jiang, X. P., Li, S. P. (2018) Will farmland transfer lead to "non-grain" planting structure. Jianghai Science Journal, (2):94-101.

[11] Mao, J. Q., Jia, H. Y. (2018) Estimating the Effects of Rural Land Transfer on Farmers’Welfare:Using Propensity Score Weighting Based GBM and PSM[J]. Journal of Agro—Forestry Economics and Management, 17(6):717-726.

[12] Zhai, L. M., Xia, X. L., Wu, A. D. (2017) The Effects of Government Behaviour in Land Transfer on Farmers' Livelihood Capital: An Empirical Analysis Based on Differences-in-Differences Propensity Score Matching Approaches. Rural Economy of China, (2):2-15.

[13] Xia, Y.L., Zeng, F. S. (2014) Agricultural Land Transfer Efficiency, Agricultural Sustainability and Regional Differences. Journal of Huazhong Agricultural University (Social Sciences Edition), (2):100-106.

[14] Wen, C. C., Cui, Q., Wu, J. X. (2017) Farmer differentiation, farmland transfer and large-scale management. Rural economy, (2):32-37.

[15] Ji, H. L., CAI, Y. Y. (2017) Influence of Heterogeneous Livelihood Capital of Farm Households' Land Transfer Behaviour——A Case Study of 516 Respondents in Wuhan Suburb[J]. Resources and Environment in the Yangtze Basin, (2):220-226.