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Induced Agricultural Production Organizations under the Transition of Rural Land Market: Evidence from China

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Abstract: This paper focuses on the impact of a new rural land reform, the Separation of Three Rights Reform, on changes in China's agricultural production organizations. We illustrate the impact of market and nonmarket mechanisms on allocating agricultural production factors under the new rural land market transition through a land system and factor allocation model. Based on the expansion paths of different types of factors in the model, we classify the development of Chinese agricultural production entities into "extensional expansion," "labor-intensive expansion," "land-intensive expansion," and "exit of agricultural production." These agricultural production paths correspond to agricultural enterprises, family farms, agricultural cooperatives, and small farmers' exit. Further, empirical and economic geography analysis results show that the interaction of market and nonmarket mechanisms is the main drive that induces the current diversified organizations in rural China. Thus, this paper provides a comprehensive explanation of changing patterns of an agricultural production organization under the transition of the rural land market.

Keywords: China's rural land reform; agricultural production organizations; land-use rights



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1. Introduction

Compared with rural product markets, the process of factor marketization in rural China has been slow. Although China has roughly 7% of the global agricultural land (approximately 167.5 million hectares), it serves over one-fifth of the global population [1,2]. The pressure of the vast population scale and limited rural land makes poorly efficient small rural households unable to support China's sustainable agricultural development. Therefore, China needs a more efficient organization of agricultural production. Gershon et al. (1992) argue that as the rural labor market's constraints gradually disappear, China will likely generate market-driven land transfer and large-scale agricultural production [3]. Over the past two decades, the household registration system's reform has largely removed institutional barriers to rural labor marketization. However, rural land markets are underdeveloped due to the constraints of the rural land system [4–7]. Lin studied the "induced" resource allocation with Chinese characteristics [8]: the relative marginal productivity of land and labor replaces the price mechanism to influence farmers' decision on resource allocation and choice of technology in agricultural production given incomplete rural factors market.

Under a system in which lands are prohibited from being traded, the scale of a production organization cannot be expanded, and scattered small household production is almost the only form of agricultural production organization in China. However, with the continuous deregulation of land transactions, rural land factor trading has appeared in China. Furthermore, in 2014, China began a new rural land system reform called the "Separation of Three Rights Reform (STRR)." As a result, the price mechanism began to play a role in allocating agricultural production factors, and various types of large-scale agricultural production organizations gradually emerged. Nevertheless, little research systematically explores the induced impact of the STRR on an agricultural production organization in China and its mechanism.

Under the STRR, the contractual right to apply for free land allocation from collectives still belongs to villagers within the collectives, as it did under the household contract responsibility system (HCRS). However, independent land-use rights can be freely transferred in sale, lease, mortgage, and equity investment. Moreover, the transaction is no longer restricted to farmers in the same village. After a 3-year nationwide trial, this institutional arrangement was finally adopted by the Land Administration Law 2018 Amendment (see Figure 1). The core purpose of the current round of reform is to accelerate the marketization of rural land allocation to promote efficient modern agricultural production organizations. However, it is still controversial whether the STRR has affected changing agricultural production organizations [9,10]. This paper attempts to respond to this controversy through theoretical and practical case studies.

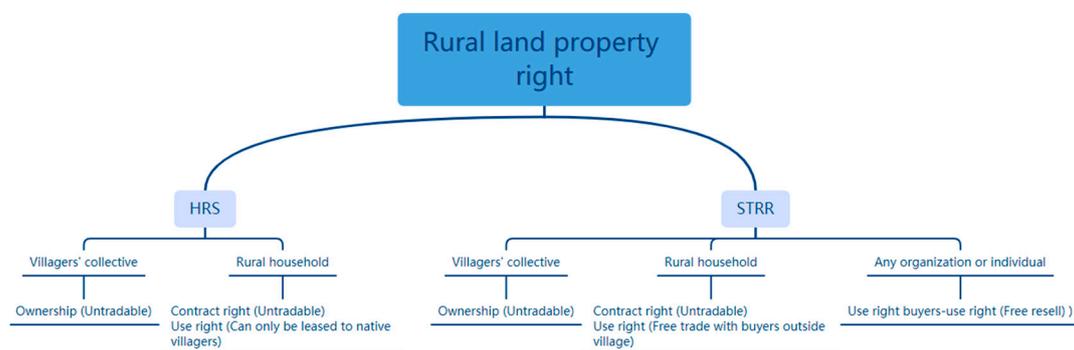


Figure 1. Different arrangements for agricultural land property rights under the HCRS and STRR (compiled by the author according to the Law of the People’s Republic of China on Land Administration, http://www.gov.cn/premier/2021-07/30/content_5628485.htm) (21 July 2021).

At the later stages of the HCRS, various types of large-scale agricultural production organizations, such as family farms, farmers’ cooperatives, and agricultural enterprises, already existed. However, due to rural land transaction restrictions, large-scale agricultural production organizations could not obtain large rural land and proliferate [11,12]. After implementing the STRR, there has been a rapid expansion of all types of large-scale agricultural organizations. The development level of different large-scale agricultural organizations varies across China. Studies [13–17] have found the relationship between the market-oriented STRR and the development of large-scale agricultural organizations. However, there is a lack of systematic analysis of the mechanisms underlying the impact of the STRR on large-scale agricultural organizations. Furthermore, few studies touch on the heterogeneous development of various types of agricultural production organizations across different regions.

China’s rural economy is in the market-oriented transformation stage and has a character of “semimarketization.” On the one hand, China’s rural land resource allocation is in the process of shifting from “policy coercion” to marketization, and the relative prices of land and labor are beginning to influence the decision-making behavior of different types of agricultural producers. Different types of agricultural producers react differently to the relative prices of land and labor, thus inducing a diversity of forms of agricultural production organization. On the other hand, China’s rural land market is still incomplete. Policy factors and the nonmarket mechanism proposed by Lin still have an impact on agricultural production, and the “inducements” of the nonprice mechanism still exist. In the transition process, both kinds of inducements coexist. There are differences in the role of the two mechanisms in different regions, which eventually leads to heterogeneity in agricultural production in different regions of China. However, little research comprehensively discusses how the two types of mechanisms affect the agricultural organization in China’s rural market-oriented transition stage. Our study attempts to fill this gap in existing research.

Therefore, this paper mainly attempts to answer two questions: (1) What are the mechanisms of the impact of China's land system on agricultural production organizations? (2) Why have different regions in China chosen different forms of agricultural production organization? The research investigates how both market and nonmarket mechanisms simultaneously induce changes in a Chinese agricultural production organization, explaining the impact of a gradual factor market transition on changes in the form of production organization. In the following sections, the influence of these two mechanisms on the change of a rural production organization in China will be explained in detail through theoretical, case, empirical analyses and an economic geographical approach. Thus, this article will enrich insights into the changing of an agricultural production organization in transitional economies.

Section 2 is materials and methods: We set up a theoretical economics model to explain the mechanism of the market transition of Chinese rural land reform in agricultural production organizations, reviewing the rural land reform since 1978 as the policy background. Section 3 is the case study to demonstrate the theoretical model based on cases from different regions of China. Finally, Section 4 is further discussion, and Section 5 draws the conclusion and policy implications.

2. Materials and Methods

2.1. Policy Background

Land, as the most fundamental factor in agricultural production, and different arrangements of rural land property rights will lead to different resource allocations of labor, technology, and capital in agricultural production, thus changing the mode of an agricultural business organization. Since the founding of the People's Republic of China, except for a short period of land privatization from 1949 to 1952, between 1949 and 1977, China was in long-term public ownership of land and collectivization of agriculture. The government allocated a certain amount of land and labor to each production team and prohibited market transactions of agricultural products and factors. During this period, production teams were virtually the only form of agricultural production organization in China. The collective agricultural production could not meet China's demand for food due to distorted incentives for workers and high regulatory costs [18–20]. Thus, China began to reform its rural land system, trying to reorganize agricultural production.

2.1.1. The Household Contract Responsibility System (1978–2014)

In 1978, China launched the world-famous reform of the household contract responsibility system. One of the most important features of the HCRS is that, while maintaining collective land ownership, it abolishes collective production arrangements and opens up land-use rights to individual farmers. The degree of openness of land-use rights is related to the changes in farming operations. From the perspective of the changes in the organization of farming operations, the HCRS can be divided into two stages: "stable land-use rights (1978–1997)" and "liberalize land-use rights (1998–2014)".

(1) Stabilize land-use right (1978–1997). In 1978, farmers in Xiaogang Village in Anhui Province first experimented with the HCRS. The village committee handed over communal land to an individual villager, and farmers could apply for a piece of land for free within the village. After turning in a certain amount of agricultural products based on the plan, an individual household can keep the surplus of crops. From 1978 to 1981, the HCRS was gradually implemented nationwide and has been stabilized since then [21,22]. However, land trading is still strictly forbidden at this stage, preventing any agricultural producers from expanding the production scale. Simultaneously, the household registration system (*hukou*) still does not allow the free mobility of rural labor during this stage [23–25]. Rural labor cannot work for wages, and farm households have only a limited number of labor inputs in the agricultural production sector. As a result, the allocation of agricultural production factors was constrained by the endowments owned by households. Small farmers replaced large-scale production teams, gradually

becoming almost the only agricultural production organization in China at that stage. This change in the organization of production was reflected in the use of agricultural production factors. The labor input became the main driving force behind the growth of Chinese agriculture. The demand for small tractors, fertilizers, and agricultural machinery suitable for household farming increased substantially. However, sizeable agricultural machinery increased slowly, and the area under mechanized cultivation even declined between 1980 and 1983.

(2) Liberalize land-use rights (1998–2014). More rural laborers move to cities with industrialization and urbanization, leaving farming lands idle in some rural areas. To address the problems posed by a declining rural labor force and land loss, grassroots organizations in China have embarked on various experiments in adjusting land-use rights. For example, the Law of the People's Republic of China on Land Management (1998), which formally permits farmers to transfer their land-use rights, is intended to facilitate rural land transactions institutionally. As a result, about two-thirds of China's rural land-use rights have been redistributed, with more productive farmers receiving access to larger areas of land [26,27].

However, there are two significant restrictions on the transfer of land-use rights at this stage: first, the transfer of rural land-use rights is limited to the village community, which means that only farmers in the same village have the right to acquire land use-rights through trade; and second, rural land-use rights can only be traded through leasing, and more complex forms of transfer such as equity investment, mortgages, and cooperatives partnership are not permitted by law. Therefore, large-scale agricultural organizations develop slowly under an incomplete market. In addition, free trading of land factors is severely restricted, which has brought about problems, such as a decline in total agricultural output and a widening income gap between farmers [28–30].

The liberalization of land-use rights trading under the HCRS created conditions for the emergence of large-scale agricultural business organizations. However, the relative land and labor prices still do not fully determine resource allocation due to institutional constraints, such as household registration, village collective leadership, and local government intervention. Incomplete markets have hindered agricultural productivity improvement in three major ways. First, the immigration of many rural labor forces to urban non-agricultural industries led to the phenomenon of "hollowing out," leaving rural land not being put into agricultural production. Second, with the market's opening up for agricultural products, some more efficient farming organizations have emerged. However, these farming organizations have difficulty acquiring larger land areas, while inefficient production organizations cannot exit. Third, rural land transactions are limited to leasing, making it difficult to realize the value of land attributes as agricultural production capital. The problems mentioned above are a kind of systemic mismatch of agricultural production factors.

2.1.2. "Separation of Three Rights" Rural Land Reform (2014–Present)

The STRR has accelerated the marketization of China's rural land market. The new reform allows members outside of village collectives and urban citizens to enter the rural land market while giving rural land more asset attributes. As of 2018, China has established 11 provincial-level rural land rights exchanges and several online land transfer platforms and generated financial products derived from agricultural land use rights (e.g., "land tickets" in Chengdu and Chongqing). The new round of land system reform has allowed multiple rural land transfer participants and diverse land-use rights transaction methods. Since the STRR, the amount of arable land traded in China has increased by 20.63% from 2015 to 2018. The participation rate of land transfer has increased from 14.7% in 2010 to 34% in 2018, making the marketization of land use-right transactions very rapid. The percentage of the land area traded to large-scale agricultural production organizations is increasing, while the percentage of land purchased by individual small farmers is gradually

decreasing, which also indicates the impact of the rural land market reform on the choice of agricultural production organizations (see Table 1).

Table 1. Changes in the participants and modes of rural land transactions after the STRR (source: Ministry of Agriculture of the People’s Republic of China, China Rural Management Statistics Annual Report (2015–2018). “—” in the table indicates that data are missing).

Year	2015	2016	2017	2018
Area of farmland transferred (mu)	446,833,625	479,208,068	512,113,203	539,020,347
Percentage of area transferred by each type of participants				
To small farmers	58.65%	58.38%	57.50%	57.17%
To family farms	7.13%	8.38%	9.50%	—
To cooperatives	21.79%	21.58%	22.70%	22.47%
To agricultural businesses	9.47%	9.68%	9.83%	10.31%
Proportion of land transaction by type				
Transfer	2.79%	2.69%	2.82%	2.74%
Swap	5.39%	5.36%	5.79%	5.79%
Lease	81.33%	82.22%	80.88%	81.09%
Equity investment	6.08%	5.10%	5.81%	5.47%
Others	4.41%	4.63%	4.70%	4.90%

Observing Table 1, we find that, although the proportion of land area transferred to small farmers is gradually declining, small farmers are still the main component of China’s agricultural production organizations. The market for rural land in China under the STRR is still imperfect, in which market-based” and “non-market-based” land allocation mechanisms coexist. The two mechanisms are different across regions, which will affect the development of various types of agricultural production organizations. The comparative advantages between market and nonmarket mechanisms induce the emergence of different agricultural production organizations.

2.2. Organizations of Agricultural Production under the STRR

2.2.1. Family Farms

Family farms were the first large-scale agricultural production organizations to emerge after the family contract responsibility system, and they developed from small farmers with high productivity. During the period of the HCRS, when members outside the collective could not transfer land, family farms had a positive role in ensuring national food security and improving technology [31–33].

On the one hand, family farm owners are usually local economic elites with good social networks in the village, and local villagers are more willing to transfer their land to family farms at lower prices. This lower-than-market price stems from incomplete land property rights and the trust among farmers in the same village. On the other hand, family farms have an advantage in cash liquidity, as the labor force comes mainly from the family, and labor costs can be “internalized” by family members. According to a 2017 survey by China’s Ministry of Agriculture, the average (full-time) labor force on a family farm in China is 6.6 people. About 4.7 people come from family members, which means that family farms pay less cash wages than other large-scale agricultural production organizations. Therefore, family farms tend to invest more in labor per unit of land and achieve “labor-intensive” organizational expansion.

In the process of transforming China’s rural land factor market, a family farm is a type of traditional large-scale farming organization that still relies on non-market-based

resource allocation. As a result, the family farm is more suitable for regions with more family-owned assets and higher population density.

2.2.2. Agricultural Cooperatives

In China, agricultural cooperatives are the most complex and controversial type of agricultural production organization. Studies have found that agricultural cooperatives positively protect the ecological environment, improve technology, and increase welfare levels [34–36]. However, other studies argue that cooperatives are inefficient and even have problems cheating government subsidies and wasting agricultural resources [37,38].

Contributing to this controversy is the peculiar growth pattern of agricultural cooperatives in China. In the early 21st century, the success of farmers' self-organizing agricultural cooperatives inspired local agricultural officials. Local governments are enthusiastic about farmers' cooperatives, providing large-scale government subsidies for agricultural cooperatives. Some local agricultural officials regard the promotion of agricultural cooperatives as a political achievement. Under subsidy incentives, the number of agricultural cooperatives in China grew to 910,000 in 2016, while this number was zero a decade ago.

Agricultural cooperatives are affected by both market and nonmarket allocations of resources. On the one hand, agricultural cooperatives have an active role in pooling production resources and exerting agricultural economies of scale, creating advantages in market competition. For example, individual farmers constrained by the limit of capital and production scale cannot bear the cost of purchasing some large production machinery alone. Moreover, individual farmers with fewer agricultural products will also face higher unit storage and transportation costs. To solve these difficulties, farmers will self-organize and jointly fund the establishment of cooperatives.

On the other hand, the development of agricultural cooperatives is also under strong political influence. After a few successful trials, the central and local governments have introduced a series of agricultural cooperative subsidies. Officials in some regions have subsidized or even provided free funding to cooperatives for performance reasons. Meantime, farmers and rural elites have established cooperatives to receive government subsidies, and such cooperatives account for a significant proportion of the total number of cooperatives in China. In short, the imperfect market in the transition and the simultaneous impact of the two ways of allocating resources have contributed to the complexity and controversy surrounding China's agricultural cooperatives. Cooperatives driven by two different forces, the market and the government, will face different fates in the transition to marketization. Especially for agricultural cooperatives induced by policy subsidies, the impact of the marketization on such organizations' size may be insignificant or even harmful.

2.2.3. Agribusiness

In China, large-scale agricultural enterprises are agribusinesses with more than RMB 5 million annual turnover. They are often referred to as "leading agribusinesses." Encouraging leading agribusinesses is an important way to rapidly promote rural commercialization and mechanization [39–42]. Before the STRR, most agricultural enterprises generally did not produce agricultural products directly due to institutional barriers. Instead, they often signed purchase contracts with farmers or village collectives and delegated the cultivation of raw materials to farmers. With the land-use rights market opening up, leading agribusinesses started to purchase long-term land-use rights, engaging in the production of agricultural raw materials themselves and establishing a vertical supply system.

Agribusinesses have more capital and more advanced technology to obtain large land areas for large-scale productions. Therefore, agribusinesses are more likely to emerge as a more desirable agricultural production organization in areas where land per capita is relatively large and the land-use rights market is developed.

Under the STRR, all types of large-scale agricultural production organizations have a chance to expand the area of land they operate. At the same time, farmers get an exit channel to migrate for work and leave their farmland. However, there are differences

between the various types of organizations regarding factor allocation and factor use characteristics. In addition, they are subject to two different resource allocation mechanisms: market-based and non-market-based. Therefore, we see heterogeneity in the development of agribusinesses across regions in China.

2.3. A Model of Land Market Transition and the Allocation of Agricultural Production Factors

The question to be analyzed in this chapter is how the system affects the allocation of agricultural production resources, leading to changes in an agricultural production organization during the transition of the rural land system to marketization. The different agricultural production organizations essentially reflect the allocation of the factors given a specific technology. Thus, our study provides a model to describe the changes in agricultural producers' economic decision-making behavior brought about by the market-oriented reform of China's land system to explain the reasons for the change in the agricultural production organization.

2.3.1. Basic Model

We construct the basic model under a competitive market. Agricultural production agents can freely enter or exit, and agricultural production factors can be freely moved. There are three types of factor inputs in agricultural production: land (s), labor (l), and capital (k). Agricultural output is a monotonically nondecreasing function of these three factors, and when any one of the factor inputs is zero, the agricultural output is zero. The technology of agricultural production A is a nondecreasing function of l and s , according to Lin (1991). The fundamental purpose of choosing new technologies is to increase the yield per unit of land or reduce the labor per unit of output (i.e., "land-intensive" and "labor-saving" in actual agricultural production) so that technology choice can be described as a function of land and labor.

$$A = A(s, l) \quad (1)$$

Assuming that the cost of all resources available to a single agricultural operator for input into agricultural production is a total investment I , the market price of land tenure, the level of labor wages, and the level of interest rates are p , w , and r , respectively. The total investment is a linear sum of the three types of factor costs. Then, in an economy with a complete market and no institutional constraints attached, the agricultural production decision process can be described as an optimization problem as follows.

$$\max y = A(s, l) f(s, l, k) \quad (2)$$

$$s.t. \quad ps + wl + rk \leq I \quad (3)$$

Given p , w , and r , we note that the optimal combination of factor allocation is s^* , l^* , and k^* . Later in this chapter, we will discuss agricultural operators' decisions under the two land systems, the HCRS and STRR of rural land.

2.3.2. The Household Contract Responsibility System

Under the HCRS, Chinese agricultural producers face two constraints: On the one hand, the land owned by each agricultural producer is fixed ($s = \bar{s} > 0$), and because land-use rights allocated by the state are free and are not allowed to be traded, the price of land is zero and is not considered into the investment decisions of agricultural operators. Although there is small-scale land leasing within villagers' collectives in the later stages of the HCRS, such leasing is generally informal, small-scale, and sporadic and mainly based on villagers' sentiments, hardly resulting in a market-based transaction price. On the other hand, there is an upper limit of capital invested by farmers, denoted as \bar{k} , because individual small householders have a limited amount of capital and cannot get financing

from their land assets. Thus, agricultural producers' decision-making behavior under the HCRS can be described as an optimization problem as follows.

$$\max y = A(s, l) f(s, l, k) \quad (4)$$

$$s.t. \begin{cases} wl + rk \leq I \\ 0 \leq k \leq \bar{k} \\ 0 \leq s \leq \bar{s} \end{cases} \quad (5)$$

According to the Kuhn–Tucker condition, we can solve this optimization problem to get the maximum product y^H through the combination of (s^H, l^H, k^H) . The following scenarios may occur.

(1) When $k^H \leq \bar{k}$, since land-use rights are allocated by the state free of charge, as long as a producer enters agricultural production, the areas of land she or he owns are fixed at \bar{s} so that the combination of production factors is (k^H, l^H, \bar{s}) . Comparing with the resource allocation results under complete market, if $\bar{s} > s^*$, it means that the land allocated to the farmers under the HCRS exceeds the optimal scale, which leads to land waste. If $\bar{s} < s^*$, it means that the land allocated to farmers cannot reach the optimal scale of production. Therefore, unless there is $\bar{s} = s^*$ for each agricultural entity, the mismatch of agricultural land resources happens under the HCRS.

(2) When $k^H \geq \bar{k}$, farmers still engage in agricultural production. Land use is the same as in situation (1), in which the actual outcome should be (l^H, \bar{k}, \bar{s}) . This decision does not satisfy the first-order optimal marginal conditions, indicating that agricultural production capacity can carry out a larger production scale but is subject to land and financing constraints. More capable farmers (large professional households) cannot expand the production scale under the HCRS.

(3) Since the rural labor force is essentially free to move under the HCRS, but the rural land and financial markets are not fully open, a particular situation may arise when the wage level in the market exceeds the maximum income from agricultural production, which is:

$$wl > y^H \quad (6)$$

Under this situation, the land input is 0, and no agricultural production happens. Due to institutional restrictions, farmers cannot transfer their land, and the land assigned to them by the state is useless. This situation corresponds to the reality that during the later stages of the HCRS, a large number of rural laborers went to cities, leaving their contracted lands in the countryside deserted.

2.3.3. The Separation of the Three Rights Reform

Compared with the previous agrarian system, the “separation of the three rights” of rural land has three main features at the level of production factors: First, the law for the first time allows land-use rights to participate in the financial market as mortgage, and land and capital can be freely converted to a certain extent, so it is assumed that capital k is a nondeductive function $k = k(s)$ for land s . Second, land-use rights can be freely traded and transferred, which means that the land factor (s) is incorporated into agricultural operators' production decisions. Furthermore, the value of transferred land for farmers can be either positive or negative. Positive values represent transferring into land-use rights, and negative values represent transferring out of land-use rights, assuming that the land value is p . Third, policy factor β in the transition plays an important role. In transforming the land market, the property rights of agricultural producers are incomplete, and the existence of nonmarket mechanisms will affect the market value of the land. The closer the value of β is to 0, the more restrictive the system is on land trading, and if $\beta = 0$, the model returns to the household contract responsibility system in Section 2.3.2. If $\beta = 1$, then it is the complete market case as in Section 2.3.1. The remaining assumptions are the same as in

the previous model, and the factor allocation decisions of agricultural operators in the case of “separation of three rights” of agricultural land are shown in Equations (7) and (8).

$$\max y = A(s, l) f(s, l, k(s)) \quad (7)$$

$$s.t. rk + wl + \beta ps \leq I \quad (8)$$

Since land and capital can be converted under the STRR, the optimal factor allocation of production can be ultimately reduced to a decision in two dimensions, land and labor, with the result (s^S, l^S) . On the one hand, this result is different from the limited factor allocation and transfer of land and capital under the HCRS. The agricultural producers under the STRR can achieve the optimal solution that meets the marginal conditions through factor allocation at a given price. The farmers who exit agricultural production can transfer out of the land-use right, which creates the foundation for the new land system to improve the efficiency of agricultural production.

On the other hand, compared with the complete free marketization model in Section 3.1, the factors influencing optimal resource allocation under the STRR have changed. In addition to the wage level w , land value p , and capital interest r , which influence the optimal resource allocation under full market conditions, the institutional environment β is an essential factor that determines the factor allocation under this system, which in turn influences the organization of agricultural production.

2.3.4. Changes in Agricultural Production Organizations under the STRR

The purpose of this paper is to explore the impact of the market transformation of China’s rural land system on changes in agricultural production organizations, especially in large-scale agricultural production organizations. The process from the HCRS to the STRR improves rural land marketization, which may influence the choice of agricultural production organizations. If we take the initial allocation of land and labor factors under the HCRS as the point of origin, four types of factor allocation in agricultural production under the STRR may occur (shown in Figure 2). Quadrant I is extensional expansion. The absolute amount of labor and land owned by large-scale agricultural production organizations increases simultaneously. Of course, the extensive expansion may also include a relative concentration of labor or capital (i.e., the inflow of land-use rights is greater or lesser than the additional labor). Quadrant II is land-intensive expansion. Agricultural operators increase the inflow of land-use rights without increasing the labor input, saving labor per unit of land. Quadrant III is production contraction (withdrawal from production). Agricultural operators reduce both land and labor inputs or even exit agricultural production. Quadrant IV is labor-intensive expansion. In contrast to the second quadrant, the farmer increases the labor input without increasing the land tenure’s inflow to improve land productivity. Both market mechanisms (economic endowment) and nonmarket mechanisms (institutional environment) induce the above four possibilities of agricultural production choice.

2.4. Materials

2.4.1. Case Selection

The theoretical analysis suggests that different types of agricultural organizations occur in different regions of China under the STRR. Therefore, the growth rate of the transferred land area by agricultural production organizations can reflect the development of agricultural production organizations. Figure 3 shows which type of agricultural production organization has the fastest growth rate at the province level after the STRR (2015–2018). For example, in Figure 3, Liaoning Province is colored yellow, indicating that agricultural cooperatives were the fastest-growing agricultural production organization in Liaoning Province from 2015 to 2018.

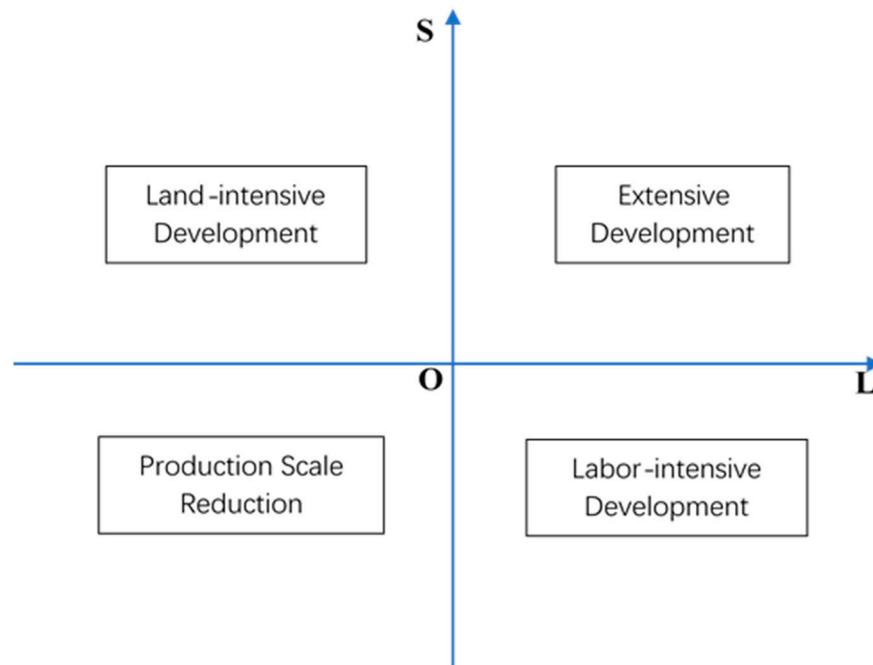


Figure 2. Changes in the configuration of four types of agricultural production factors.

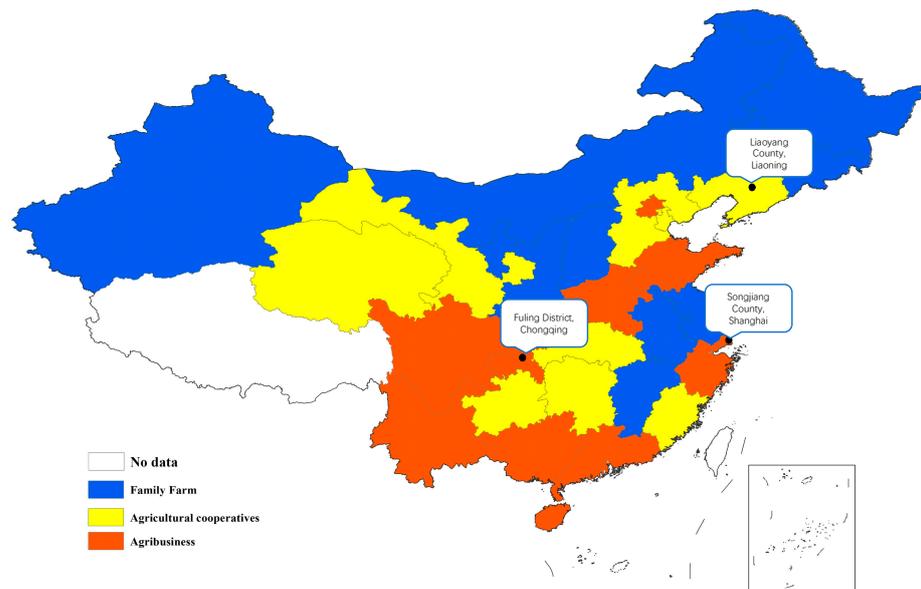


Figure 3. The fastest-growing type of agricultural production organization after the STRR (data source: China Rural Management Statistics Annual Report (2015–2018)).

To ensure each case’s representative in a specific region, we select the cases that align with the fastest-growing agricultural production organization type in Figure 3. For example, we choose the agribusiness case in Chongqing, the fastest-growing agribusiness region in China. For the same reason, the case of an agricultural cooperative comes from Liaoning. In particular, the successful case of a family farm comes from Songjiang, Shanghai. Figure 3 shows that agribusiness is growing faster in Shanghai due to its unique geographic and economic position in China and the world economy. However, Jiangsu Province and the nearby regions share a similar natural environment with Songjiang, and this is the typical family farm case available in China [43,44]. More details will be given in Section 3.

2.4.2. Data Source

This paper focuses on the market and nonmarket mechanisms that influence induced changes of the agricultural production organization in China. In the case studies and further discussion, we will use the following data.

(1) Development of agricultural production organizations. Following the reform of the STRR, the Ministry of Agriculture began to publish data on the participation of various types of agricultural production organizations in rural land transfer at the provincial level since 2015. We use the ratio of land-use rights transferred to agricultural enterprises to the total area of land transfer in the region to measure the development of agribusinesses (*agb*). The ratio of land-use rights transferred to cooperatives to the total area of land transfer in the region represents the development of cooperatives (*co*). In China, there is no uniform standard definition of family farms nationwide. However, some local governments identify family farms based on cultivated land of no less than 50 mu. Therefore, we use the number of farm households with more than 50 mu of land as a proportion of the total number of farm households to reflect family farms' development status (*farm*). The above data are from the China Rural Management Statistics Annual Report (2015–2018).

(2) Proxy variables for market mechanisms. The theoretical model in 2.3. mentions that the relative price of land and labor is an important market mechanism that influences the organization of agricultural production. Since no statistical data reflect rural land transfer prices in China, the information on land transfer transactions posted by farmers and various agricultural business entities on the Internet Land Transfer Platform (ILTP) can relatively fill this gap. We use crawler technology to obtain the unique land transaction data released on the ILTP from 2014 to 2018 and obtain information on 21,870 nationwide farmland transactions. Then, we calculate the average price per unit area of these transactions as the province's rural land price. To illustrate the representativeness of the data, in Figure 4, first, we show the correlation between prefecture-level agricultural GDP and land transfer price data from 2015 to 2018, where we see a positive and significant correlation between the two variables.

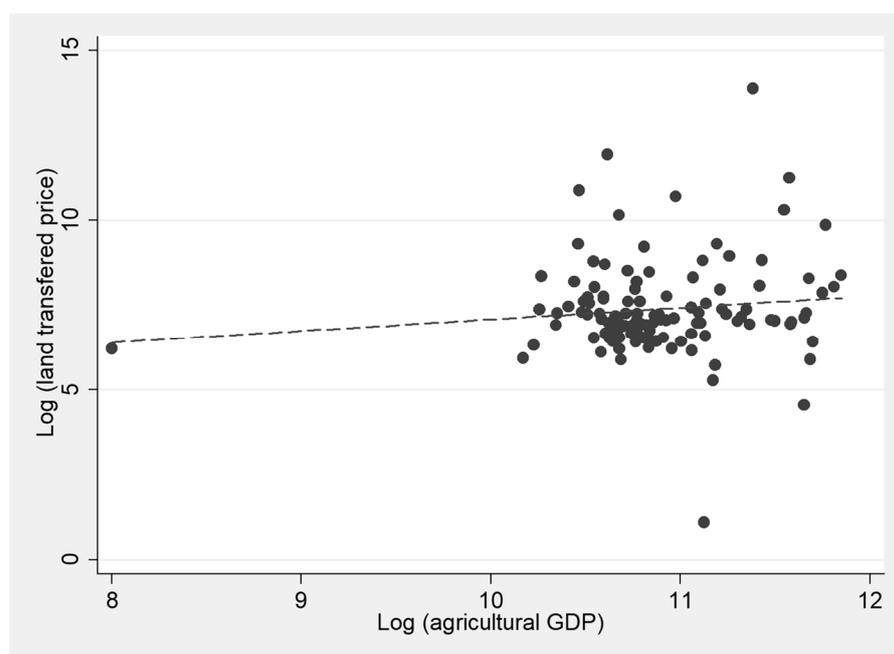


Figure 4. The provincial level land transferred price and agricultural GDP from 2015 to 2018.

Second, we compare the percentages of crop sown areas with the sample distribution in each province in 2018 and find that they are generally consistent. In addition, the sample covers all major grain-producing areas in China, indicating that it can better reflect the rural land transaction prices in various regions of China (Figure 5).

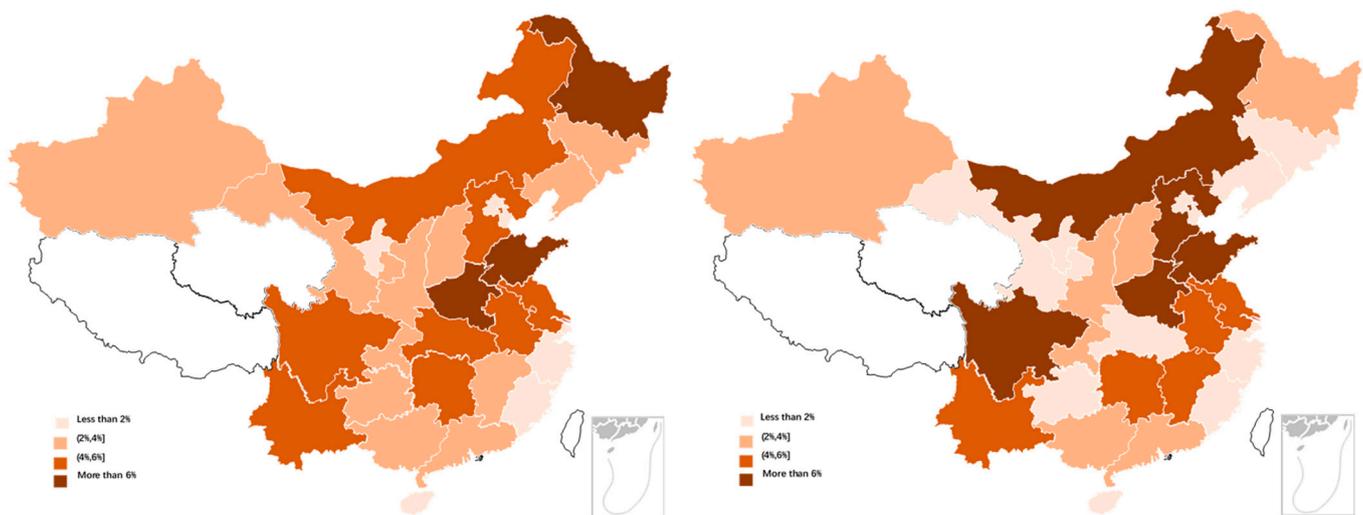


Figure 5. Proportion of sown area and sample distribution (**left** of the figure is sown area in 2018; **right** is sample distribution). Data source: China Rural Statistical Yearbook (2019).

The labor market price is the wage earnings of rural residents in each province, which is the opportunity cost of farmers' labor input. The data on rural labor wages are from the China Statistical Yearbook. We calculate the price of labor relative to land in Equation (9).

$$price = \frac{rent\ of\ rural\ land}{wage\ of\ rural\ people} \quad (9)$$

(3) Proxy variables for nonmarket mechanisms. The Law of the People's Republic of China on Mediation and Arbitration over Rural Land Contracting and Management Disputes requires that localities set up agricultural land arbitration committees to handle land transfer and management disputes. The committees must include a certain number of farmers. The larger is the proportion of farmers in the agricultural land arbitration committee, the more control farmers have over the land transactions, and the more willing they are to transfer land rights in the region's rural land market. Therefore, we use the percentage of farmer members in the agricultural land arbitration committee to proxy the policy environment. The higher the percentage is, the more market-friendly the policy environment (larger β) is. These data are from the China Rural Management Statistics Annual Report (2015–2019).

(4) Other control variables. To enhance the comparability of the empirical results with the existing literature, we include the following control variables that are used in related research [18,21,45,46]: The per capita cultivated land area (mu) in primary industries in each province is calculated to reflect the man–land relationship (manland). The cultivated land area is from the China Rural Statistical Yearbook, and the number of laborers employed in primary industries is from the China Agricultural Management Statistical Annual Report. The regional annual per capita GDP (pgdp) and the share of agricultural output in the regional GDP (agdp) are from the China Statistical Yearbook. We remove Tibet, where there are too much missing data. The statistical characteristics the variables are in Table 2.

Table 2. Statistical characteristics of the variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
agb	120	0.1208	0.0702	0.0072	0.3362
co	120	0.2173	0.0940	0.0163	0.5601
farm	120	0.0219	0.0408	0.0013	0.1959
price	120	2.1703	12.6031	0.0005	132.1935
policy	120	0.2086	0.0858	0.1023	0.7222
manland	120	9.1095	6.7025	2.6129	31.5433
pgdp	120	59,483.5500	27,083.1900	2984.0000	140,211.0000
agdp	120	9.3142	5.0115	0.3000	23.4000

3. Results

This section further analyzes how market and nonmarket mechanisms induce agricultural organizations based on case studies. First, the withdrawal of smallholders from agricultural production, the production contraction scenario in quadrant 3 in Figure 2, is a realistic option for most smallholders after the STRR. A follow-up survey with about 20,000 rural households conducted by the Ministry of Agriculture shows that the proportion of farming households engaged in agricultural production declined from about 83.16% of the total number of farming households in 1995 to 46.90% in 2017. The incomplete land transfer market under the HCRS leads to many farming lands being deserted (data source: USDA Rural Fixed Research Site Data <http://www.rcrc.agri.cn/jizn/jgsz/ngdgdcd/>, (15 June 2018)). As rural land and labor market develop, most small farmers can transfer their land-use rights and gradually withdraw from agricultural production. Therefore, small farmers exiting agricultural production will not create a new type of business entity. Meanwhile, the surplus of land and labor provides production factors for other agricultural entities to expand their production scale. Other agricultural production organizations emerge in Figure 2: family farms, farmers' cooperatives, and agricultural enterprises.

3.1. Family Farms: Songjiang County, Shanghai

In the western plain of Shanghai, Songjiang District is a traditional agricultural production base for the Shanghai–Nanjing–Hangzhou city cluster. However, attracted by the city's high income, more and more rural people move to nearby cities to work, leaving some rural lands deserted.

In the face of this declining agriculture, Songjiang village collectives began to repossess land from farmers who were engaged in nonagricultural production or who worked in cities for a fee and reaucted the repossessed land-use rights within the village collectives. To ensure more efficient use of agricultural land, the village collective stipulated that villagers participating in the auction must meet the following conditions: (1) They must have the ability to purchase agricultural machinery. (2) The local villagers must farm the land acquired through the auction. (3) Participants in the auction must be local people, and only local labor can be employed. Thus, Songjiang has achieved rural land resources' reallocation through an auction mechanism based on social relations within the village collectives. On the one hand, based on its authority and the villagers' trust, the village collective achieves the concentration of dispersed land, eliminating the process of one-on-one negotiation with the individual farmer and reducing the transaction costs of land concentration. On the other hand, land purchase eligibility belongs only to the village collectives' members, and purchasers of land-use rights commit to hiring only local labor. This commitment is a non-market-based network of social relations.

Constrained by the incomplete nature of China's land markets and the difference in the degree of completeness of urban and rural land markets, rural land in Songjiang, Shanghai, cannot be traded on the same market land in its surrounding cities. In Songjiang, when land value cannot be realized through the open market, intracollective auctions based on rural social networks or rural political power have made it possible for professional farmers to form family farms. Family farms specializing in agricultural production are more

efficient than individual households. With the same amount of communal agricultural land in the village, part-time farmers withdraw from the land, and full-time family farms take over the land, which increases the average labor input per unit of land. The expansion of “labor-intensive” family farms has increased agricultural productivity and total agricultural output. Nine hundred sixty-six family farms operate 22,931 mu of rural land in Songjiang as of 2017, and 70.9% of family farms are mechanized. The average annual income of a family farm in Songjiang is more than CNY 100,000, almost the same as that of rural households who migrate to urban areas.

The land around other large cities in China (e.g., Beijing and Guangzhou) faces the same problem. Rural land factor markets are less developed than urban land markets. Rural land can only realize its value through government expropriation. Thus, most agricultural lands face the dilemma of being left unused. In Songjiang’s case, through nonmarket or “quasi market,” local villagers and the local village collective based on social networks and the relative marginal productivity of land and labor have enabled the revitalization of local idle agricultural land resources and have induced the development of family farms.

3.2. Agricultural Cooperative: Liaoyang County, Liaoning

Liaoyang County is located in the northeastern plain region of China, a fertile and sparsely populated area. In 1998, Liaoyang County had only one tractor per village and no specialized agricultural equipment for paddy fields or dry fields. At the beginning of 2008, to solve the shortage of agricultural machinery, more than 30 farmers in Qingyuwan Village, Liuhao Town, Liaoyang County, established a cooperative and raised more than RMB 2 million to buy agricultural machinery. However, they had no extra funds for the follow-up maintenance of machinery and other production investments. Under the government support policy of agricultural cooperatives, the Liaoyang County Rural Credit Union, under the name of the “Innovative Rural Financial Services” experiment, established a credit union in Liuhao to circumvent the ban on land-use rights transfer to outsiders of the village under the HCRS. From 2008 to 2012, the Liuhao Credit Union accepted the cooperative’s land-use rights as mortgages, providing more than CNY 400,000 for the cooperative to further invest in agricultural production. Through this method, the villagers of Qingyu Bay solved the lack of funds to purchase and maintain agricultural machinery and realized the mechanized production of agriculture. Afterward, some farmers from nearby villages and towns who went to the city directly entrusted their lands to the cooperative for mechanized management, and the cooperative has thus realized profits. As of 2018, this cooperative’s registered capital is CNY 10.45 million. The agricultural machinery rental service is popular in nearby villages, serving a land area of 35,000 mu, with an annual profit of more than CNY 400,000.

Policy plays a significant role in the development of rural cooperatives in Liaoyang. In northeastern China, the marketization level is low, and rural land value is relatively low. Therefore, the Liaoyang county government promotes rural land-use rights as collateral to finance large-scale mechanized production. As a result, the demand for labor on land decreases. By entrusting land to cooperatives, farmers have achieved the “land-intensive” expansion of agricultural production.

In 2009, only 30.3% of the cooperatives in Liaoning were profitable. About 13% had a standard accounting system, and most cooperatives’ financial management was opaque, which opened the door to corruption and violation of farmers’ rights. After the STRR, these cooperatives may find it difficult to survive under the increasing marketization and decreasing government support.

The success of Liaoyang’s agricultural cooperatives was because when land could not be freely transferred and mortgaged, the government’s market-oriented guidance bypassed the policy restriction on the mortgage of land-use rights, which reduced institutional costs (β increase). However, most cooperatives that rely on government subsidies do not realize this kind of institutional cost reduction and even decrease β due to the reliance on government subsidies. Therefore, whether the market mechanism dominates the

cooperative's resource allocation is the fundamental factor determining the success or failure of agricultural cooperatives.

3.3. Agribusiness: Fuling District, Chongqing

Fuling District is located in the central part of Chongqing. Since 2008, Chongqing has been one of the first pilot areas in China to implement rural land-use rights reform that the central government allowed it to launch a rural land exchange. In the same year, Chongqing established the rural property rights exchange, the first provincial-level rural land exchange in China, with a government agency as its backdrop. The Chongqing rural property rights exchange has developed several financial products from land-use rights trading, the most famous being "land tickets". A "land ticket" is a certificate of the right to use a particular piece of rural land on which information about the land quality, the area of the land, and the life span of the land is recorded in a standardized manner. Land tickets can be traded freely in the open market with anyone, regardless of farmers or urban citizens, which breaks the restrictions on the free movement of land between urban and rural areas in China and gives rural land the same market status as that in urban areas. Accordingly, land tickets can also be counted as corporate assets and mortgaged, pledged, and traded as derivatives. The advantages of Chongqing's more advanced rural land financial system and policies were almost unique in the country until 2014 and contributed to making Chongqing attractive to many agribusinesses.

In Fuling District's Lidu Town (now Lidu Street), for example, a total of 13,120 mu of farmland use rights was transferred to 12 agribusinesses in 2012, accounting for about one-fifth of the village's agricultural land. Fuling's agricultural development has been a great success and cultivates the "Fuling Pickles Group" with a market value of more than CNY 15 billion, a leading agricultural enterprise in China. However, leading agricultural enterprises to increase production efficiency, per capita agricultural output in Fuling remains 1.7 times the average level in Chongqing. Meanwhile, leading enterprises have also brought more commercialization of agricultural products. In 2016, the commercialization rate of agricultural products in Fuling District reached 69.2%, higher than Chongqing's average level of 11.9%, and even far higher than the national level (shown in Figure 6). The trial in Chongqing suggests that the more efficient the market is, the more agricultural enterprises can acquire more land and labor through market-oriented channels to achieve large-scale agricultural production.

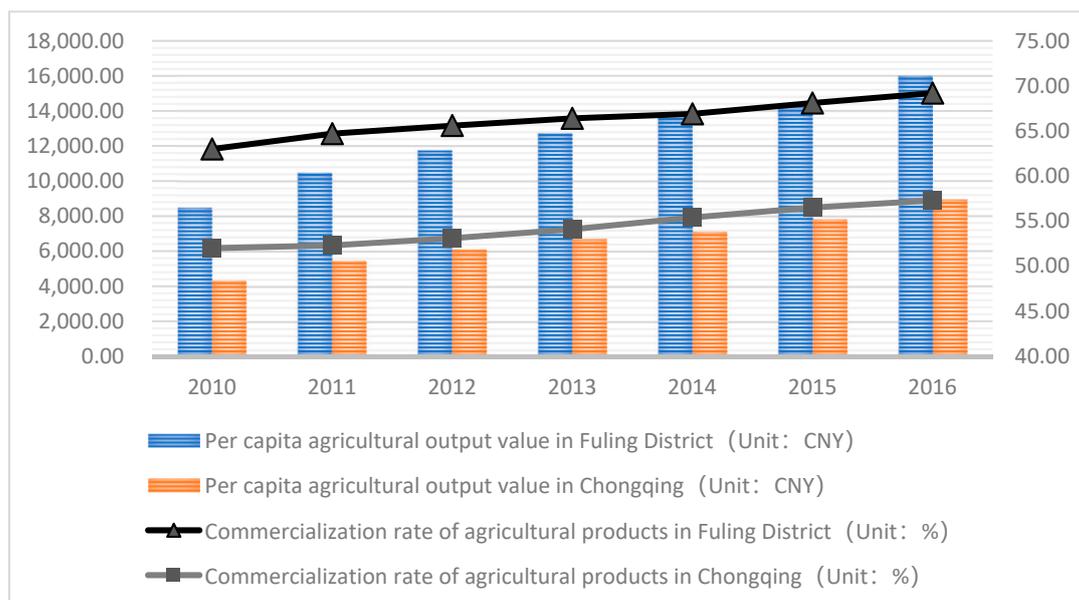


Figure 6. Per capita agricultural output and the rate of commercialization of agricultural products in Fuling and Chongqing.

3.4. Comparison of the Three Types of Large-Scale Production Organizations

Comparing the three types of agricultural business entities, we find that in rural land factor market transformation, market and nonmarket mechanisms intertwine to influence resource allocation and eventually induce the formation of an agricultural production organization. The three types of production organizations correspond to the three paths of agricultural production in the mode. First, family farms maintain the development mode under poor agricultural production factor market conditions. Farmers acquire production factors through relative marginal productivity of land and labor instead of relative price and social relations within the village. In family farms, the scale of rural agricultural land remains unchanged (or even decreases); meanwhile, the labor input per unit of land is increased by transforming farmers from part-time to full-time. As a result, agricultural output increases from labor-intensive development.

Second, the development of agricultural cooperatives is influenced by both market and nonmarket mechanisms. The policy orientation determines the success or failure of cooperatives in market transformation. In Liaoyang, a region with relatively more arable lands per capita and an underdeveloped rural land market, farmers' cooperatives mainly rely on government support. The Liaoyang local government has helped farmers get financed based on their land-use rights mortgage for a large scale of mechanized farming expansion, the "land-intensive" expansion described in the model. However, we have also seen some government support abuse, which has distorted farmers' cooperatives' incentives.

Third, in areas where rural land factor markets are relatively developed, leading agricultural enterprises have increased agricultural productivity through absolute scale expansion of various factors. However, man-land relations lead to different relative prices of land and labor, which may lead to relatively labor-intensive or land-intensive agribusinesses. Agribusinesses represent the scale expansion and technology upgrading in modern agricultural production, with the market's opening to agricultural production factors.

Finally, it is still important to emphasize that the emergence of the new agricultural organizations is based on small and inefficient farmers' opportunities to exit agricultural production and entrepreneurs' entry with capital and technology through land transfer (Figure 7).

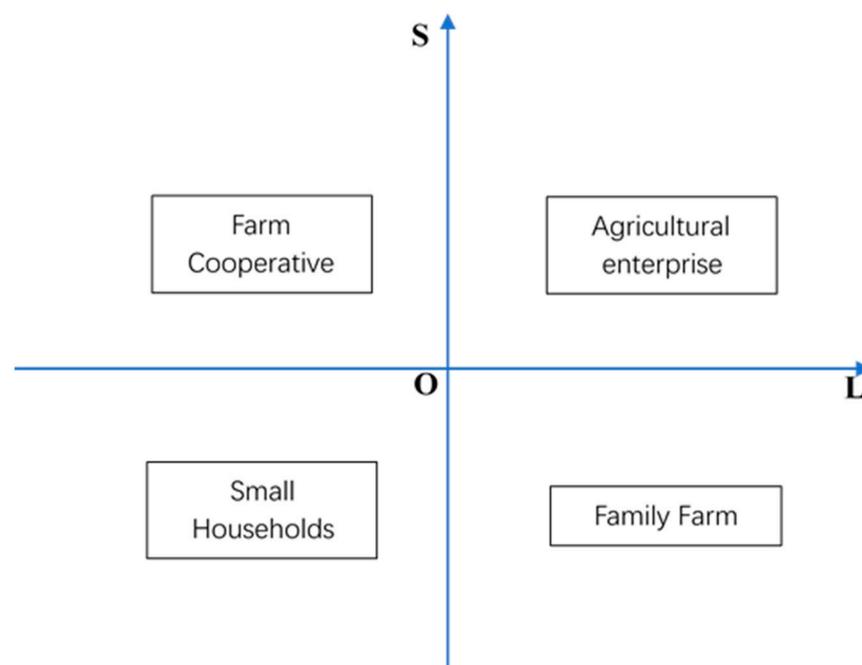


Figure 7. Diversified model of agricultural organizations in China.

4. Discussion

Three case studies indicate that the level of marketization, man–land relations, and government policy orientation influences agricultural production organizations' choice in different regions in China, which is consistent with the model in Section 2.3. As the value of land-use rights plays collateral to help farmers access external finance, capital investment in the agriculture sector is a function of the land price. According to the implicit function theorem, allocating the optimal factors in agricultural production can be a function of wage, land rent, and the institutional environment.

$$s^s = S(w, p, \beta) \quad (10)$$

$$l^s = L(w, p, \beta) \quad (11)$$

According to Equations (9) and (10), two mechanisms determine resource allocation during the transition. The first type is a market mechanism, affecting the allocation of resources mainly through the relative prices (w and p) of labor and land. The second type is a nonmarket mechanism, allocating land and labor through the relative marginal productivity and exogenous interventions from the government (e.g., government subsidies, land acquisition, and other policies). The empirical analysis will examine the impact of these two types of mechanisms on developing different types of agricultural production organizations. In this section, we will further discuss the market and nonmarket factors that shape the organization of agricultural production under the STRR by using evidence from empirical analyses and economic geographical approaches.

4.1. Empirical Analysis

First, empirical research needs to test whether the relative price of land and labor has an impact on agricultural production organizations. Second, the theoretical analysis shows that the policy environment (β) affects whether land factor prices can be fully reflected in market transactions, which is essential in determining whether new types of agricultural production organizations will develop. Finally, in the current incomplete Chinese rural land market, the substitution of man–land relations for price channels to influence agricultural production organization choices may still exist (e.g., Lin's relative marginal productivity channel). Referring to related empirical studies [18,21,45,46], we use the following regression in Equation (12).

$$\ln Y = \ln price + \ln policy + \ln manland + \ln agdp + \ln pgdp + \varepsilon \quad (12)$$

In Equation (12), Y is the dependent variable representing various agricultural production organizations at the provincial level. *Price*, *policy*, and *manland* are the three main explanatory variables representing land and labor's relative price, policy environment index, and man–land relations, respectively. Meanwhile, we control the provincial per capita GDP (*pgdp*) and the share of agricultural output to the regional GDP (*agdp*), and ε is the residual term. All variables are treated logarithmically in the regression equation. All variables are described in Section 2.4.2, and the primary regression results are in Table 3.

4.2. Further Discussions

We can draw three main conclusions from the results in Table 3. First, the market mechanism shows the induced effect on the organization of agricultural production. Comparing model 1 with model 3, we find that land and labor's relative prices are reflected differently in different forms of agricultural production organization. The significant positive coefficient of relative price on agribusiness indicates that agricultural enterprises will have more opportunities in regions with higher relative price of land to labor. The regions with a more developed market for rural land and land value are more recognized; they are more attractive to outside entrepreneurs. The regression coefficient of price on cooperatives in model 2 is significantly negative, indicating that the ideal organization of

agricultural production in areas where the price of labor is rising faster relative to land price is a “land-intensive” agricultural cooperative. However, the coefficient of price on family farms is not significant, indicating that, relative to agricultural enterprises and cooperatives, individual farmers are probably less able to participate in the rural land market transaction, more relying on the land transfer within the village. Therefore, the market mechanism does not play a significant role in the decision of family farms. The empirical results are consistent with the Shanghai family farm case, where the path of family farm development is through internal village land allocation rather than external market players’ entry.

Table 3. Basic regression results (for the reason of brevity, we report only the most important regression results).

	Model 1	Model 2	Model 3
Variable	Lnagb	Lnco	Lnfarm
lnprice	0.0669 ** (2.40)	−0.0654 * (−1.68)	−0.0247 (−0.67)
lnpolicy	0.7015 *** (4.28)	−0.2690 * (−1.72)	−0.2025 (−1.57)
lnmanland	−0.4447 *** (−3.15)	0.1141 * (1.81)	1.4784 *** (16.10)
lnpgdp	−0.4559 *** (−4.60)	−0.0818 (−0.63)	0.3126 *** (3.58)
lnagdp	−0.4648 *** (−5.69)	0.1115 (1.03)	0.8793 *** (13.02)
intercept	5.6528 *** (4.21)	−1.7076 (−1.01)	−13.1526 *** (−12.52)
F	9.05 ***	2.49 **	104.18 ***
R-squared	0.2852	0.0949	0.7685

Note: *, ** and *** represent variables that are significant at the 10%, 5%, and 1% significance levels, respectively, with the corresponding *t*-values for the variables in parentheses.

Based on the economic geographical approach, we can more clearly explain this empirical result. Referencing the construction method of the Krugman-type index [47–49], we calculate the index reflecting the characteristics of a regional agricultural production organization as Equation (13) (characteristics of a regional agricultural production index, CAPOI).

$$CAPOI_{r,i,t} = share_{r,i,t} - share_{CN,i,t} \quad (13)$$

Let *r*, *i*, and *t* denote the region, type of agricultural production organization, and year, respectively. $share_{CN,i,t}$ is the average share of production organization *i* in year *t* in China. CAPOI measures the difference between the regional share of a certain agriculture production organization and that of the whole country. The higher the value is, the better the development of this type of agricultural production organization is. Then we calculate the mean and standard deviation of CAPOI and display them on the map.

Figures 8–10 compare the changes of CAPOI under the STRR for agribusinesses, agricultural cooperatives, and family farms in 2015 and 2018, respectively. By comparison, first, we can find that the changes in the agricultural production organization at the national level are consistent with the empirical results. For example, agricultural organizations are better developed in regions where agricultural land-use rights reform was implemented earlier (e.g., Sichuan and Chongqing). Another example is in eastern China, where the rural economy is developed, and agricultural cooperatives are disappearing as an “inappropriate” organization. In particular, the distribution of family farms has no remarkable change after the STRR. As we mentioned in case study 3.1 and model 3, the role of market mechanisms in family farms is insignificant.

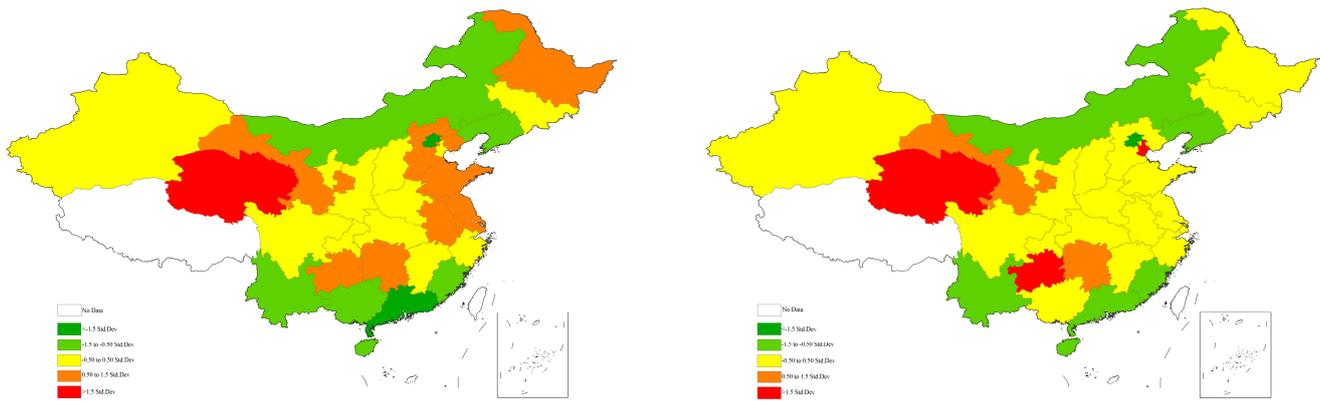


Figure 8. The changes of CAPOI for agribusiness from 2015 to 2018 (left is in 2015, right is in 2018—same as following).

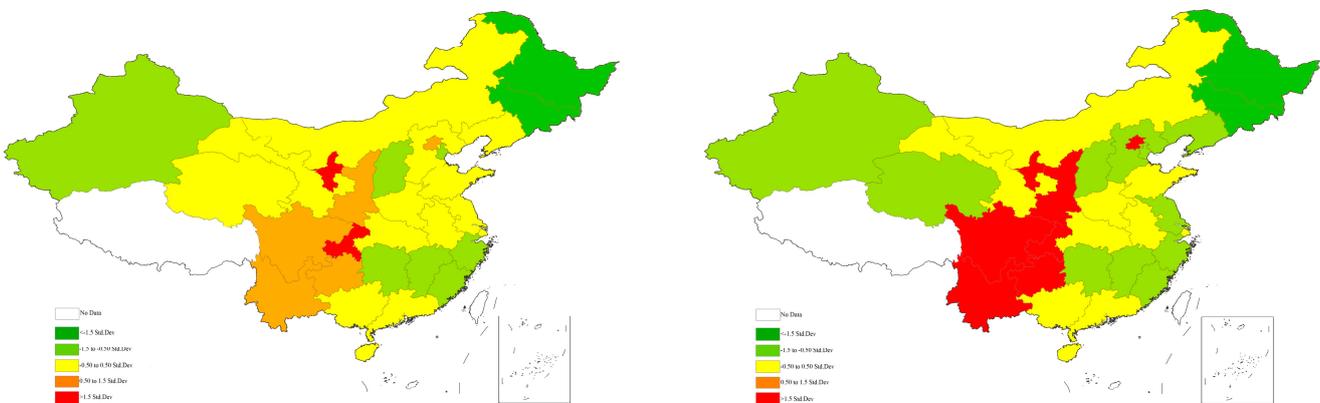


Figure 9. The changes of CAPOI for agricultural cooperatives from 2015 to 2018.

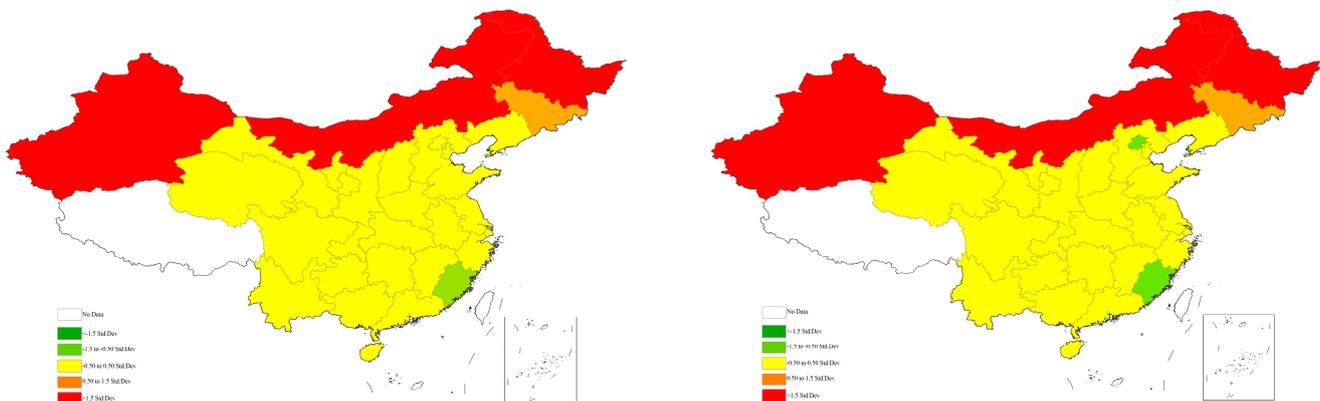


Figure 10. The changes of CAPOI for family farms from 2015 to 2018.

Second, the policy index shows contrast effects on agribusinesses and cooperatives. The more market-friendly policy induces more agribusinesses and reduces cooperatives. The positive effect of a market-oriented policy on profit-maximizing agribusinesses is consistent with our expectations. However, the opposite effect of a market-oriented policy on villagers' cooperatives suggests that a market-oriented rural land reform may lead to cooperatives' contraction. A realistic explanation for this is that most farmer cooperatives in China rely on policy subsidies, and government support is the main drive to boom the cooperatives. Only very few cooperatives that are self-selected by farmers like the case in Liaoyang with government market-friendly support can succeed. This finding can better explain most of the failures of the cooperatives established by the government instead of farmers, as confirmed by Yan and Chen and Inchinkhorloo and Yeh [37,38]. The effect of

a policy on family farms remains insignificant. Once again, it shows that family farms allocate resources based on rural social networks and traditional family bonds. External factors such as government and market price have little influence on family farms.

Third, from models 1 to 3, the man–land relations have a significant impact on all three types of organizations, regardless of whether the price variable is significant or not, indicating that the man–land relations influence the agricultural production organizations in the incomplete rural land market through both market and nonmarket mechanisms. *Manland* has significantly positive effects on family farms in model 3, indicating that although family farms do not participate in the transaction in the land market, man–land relations through nonprice mechanisms, such as relative marginal productivity, are still evident. Changes in man–land relations in China in recent years can also provide evidence for this conclusion. Table 4 shows the changes in man–land relations in China from 2008 to 2017, which is consistent with the third conclusion. Variations in the man–land relationship across China are important in shaping a diversified agricultural production organization.

Table 4. Man–land relationship changes in 2008–2017 (unit: acre) (data source: China Statistical Yearbook (2018, 2009); China Agriculture Yearbook (2018, 2009)).

Region	Province	Per Capita Cultivated Area in 2008	Per Capita Cultivated Area in 2017	Change Rate
Northern China	Beijing	0.3320	0.1802	−45.7%
	Tianjin	0.4477	0.4058	−9.4%
	Hebei	0.4188	0.4762	13.7%
	Shanxi	0.6057	0.6348	4.8%
	Inner Mongolia	1.7380	2.3838	37.2%
Northeastern China	Liaoning	0.5945	0.8651	45.5%
	Jilin	1.0778	1.4656	36.0%
	Heilongjiang	1.7053	2.5459	49.3%
Eastern China	Shanghai	0.3622	0.1594	−56.0%
	Jiangsu	0.3564	0.4506	26.4%
	Zhejiang	0.2419	0.2699	11.6%
	Anhui	0.4043	0.4984	23.3%
	Fujian	0.1963	0.2399	22.2%
	Jiangxi	0.2867	0.3635	26.8%
	Shandong	0.3850	0.4755	23.5%
Central China	Henan	0.3322	0.4208	26.6%
	Hubei	0.3907	0.5386	37.8%
	Hunan	0.2646	0.3295	24.5%
Southern China	Guangdong	0.2313	0.1908	−17.5%
	Guangxi	0.3658	0.4370	19.5%
	Hainan	0.4241	0.4589	8.2%
Southwestern China	Chongqing	0.4123	0.5299	28.5%
	Sichuan	0.3298	0.4068	23.3%
	Guizhou	0.4506	0.5780	28.3%
	Yunnan	0.5213	0.6000	15.1%
	Tibet	0.4036	0.4709	16.7%
Northwestern China	Shaanxi	0.5832	0.5940	1.8%
	Gansu	0.6964	0.9437	35.5%
	Qinghai	0.5199	0.5189	−0.2%
	Ningxia	0.9221	1.1106	20.4%
	Xinjiang	0.7659	1.0458	36.6%

5. Conclusions

Based on a model of factor allocation under a land system reform, this paper illustrates the influence of market and nonmarket mechanisms on the factor allocation of agricultural production to induce the emergence of different agricultural production organizations.

According to the expansion paths of different agricultural productions, we classify the development of Chinese agricultural production entities into “extensional expansion,” “labor-intensive expansion,” and “land-intensive expansion,” with the exit of small farmers from agricultural production. First, the STRR provides the opportunity for small farmers to transfer their land-use rights to new players and realize their land assets. Second, a family farm is an organization represented by “labor-intensive expansion,” which increases agricultural production efficiency by increasing more professional labor inputs. Third, the agricultural cooperative is the representative form of “land-intensive expansion,” supported by policies that enable the mechanization and large-scale production of agriculture under conditions of relative abundance of land. Fourth, in areas where the rural land market is relatively developed, agribusinesses can realize large-scale agricultural operations through land transfer and land-use rights mortgage financing, the “extensive growth” described in the model. Further, the empirical analysis shows that market and nonmarket mechanisms have different impacts on different agricultural organizations. The mixed impact of these two mechanisms is the most crucial factor in the “induced” diversification of agricultural organizations in China.

Our study provides evidence for several conjectures and hypotheses regarding the development of rural land markets in China and agricultural production organizations in China [3,17]. In addition, our research responds to some controversies about the effectiveness of the STRR [9,10]. Such diversification of agricultural production organizations can even occur in an economy where the land market partially works. This paper also enriches research on the relationship between property rights change and forms of production organization. There are still some problems in the current Chinese rural land market to restrict a large scale of agricultural production. For example, agricultural land-use rights are limited to agricultural development, regardless of the suitability for cultivation. The purpose of this restrictive policy is to guarantee food security. However, as more and more rural populations give up farming, this institutional arrangement may no longer guarantee food production. The further deepened marketization of rural land factors remains the future trend in China. We expect that agricultural production and management organizations suitable to the regional development needs will be more efficient with the rural land market integrating with the urban land market and free mobility of farmers between agriculture and nonagricultural industries based on price signals.

This study comprehensively explains the market and nonmarket mechanisms that influence the changing agricultural production organizations. However, because of a lack of data, we cannot make rigorous causality identification. Regarding future research, we would like to dig more data for cutting-edge causal identification research. In addition, we would like to enrich our research with more evidence from countries during market transition or urbanization.

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