


## Article

# Will Transaction Cost Be Reduced in the E-Commerce Model of Farmland Transfer in China?

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**Abstract:** Farmland transfer is an inevitable approach to solving farmland fragmentation and the resulting low productivity in China. Although the central government has formulated various guidelines on farmland transfer, the traditional transfer model faces high transaction cost and thus hinders transfer. With e-commerce development in China, an alternative Jutudi model of farmland transfer with e-commerce has occurred in China. Although transaction cost is an important perspective for understanding reforms, few studies have been conducted to explore whether the transaction cost of the Jutudi model would be reduced compared with the traditional model of farmland transfer and why the Jutudi model succeeds. This study introduces the operation mechanism of the Jutudi model of farmland transfer and the context of the pilot project in Jixi County, Anhui Province. Changes in transaction cost in terms of information search cost, negotiation and contracting process costs, and contract supervision and execution costs are analyzed in the Jutudi model. It is found that the productivity of transferred farmlands significantly improved using the Jutudi model in Jixi County. Transaction cost is generally lowered in the Jutudi model compared with the traditional one. How the changes in transaction cost contribute to farmland transfer is also explained. Potential problems and relevant recommendations have also been discussed to promote the Jutudi model.

**Keywords:** Jutudi; farmland transfer; e-commerce; transaction cost; farmland utilization



**Citation:** Li, X.; Peng, Y.; Yao, Y. Will Transaction Cost Be Reduced in the E-Commerce Model of Farmland Transfer in China? *Land* **2023**, *12*, 450. <https://doi.org/10.3390/land12020450>

Academic Editor: Carlos Parra-López

Received: 25 November 2022

Revised: 2 February 2023

Accepted: 5 February 2023

Published: 9 February 2023



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## 1. Introduction

The household responsibility system has been widely implemented for farmland administration in China from the late 1970s to the early 1980s. Although this system greatly promoted the grain production in Chinese farmland [1,2], its instability and dispersion inevitably made the system an institutional flaw [3,4]. Under this system, China's farmland was basically distributed according to the existing population. An entire parcel of land was divided into many small pieces for household management, resulting in serious land fragmentation [5–8].

Although some scholars have contended that land fragmentation can conditionally reduce production and market risks under an insufficient insurance market [9,10], the negative effect of land fragmentation should be paid attention. Many studies have provided persuasive evidence that the fragmentation of farmland and small-scale agricultural operations hinder mechanized production, increase production costs, and reduce the scale and technical efficiency of farmland management [11–15]. These negative effects impede the scientific and technological progress of agricultural development and the infrastructure improvement of farmland [16,17]. The combination of these factors ultimately results in huge efficiency losses [18,19] and poses a threat to China's food security [20]. By contrast, the accelerated urbanization and industrialization in China since the 1980s have prompted the transfer of agricultural surplus labor to nonagricultural industries on a large scale, although many “peasant laborers” only have part-time jobs in the cities [20–22]. This

change has led to a declined specialization of farmers, the aging of agricultural labor, and the abandonment of farmland [14,23–26], which has further reduced the productivity of farmland.

The transfer of rural land contractual management rights is the inevitable choice to alleviate and solve the farmland fragmentation [15]. This process is also a key element in realizing agricultural modernization and moderate-scale operation of farmland to promote new urbanization [27]. Solving these problems will optimize the allocation of land resources in the context of the market economy [28], improve the efficiency of land resource allocation [29,30], and offer an important means of increasing farmers' income [31].

In practice, the Chinese central government has continued to encourage the transfer of farmland contractual management rights since the 21st century. For example, as early as 2002, the central government has issued the Rural land Contracting Law of the People's Republic of China and the following Administrative Measures on the Transfer of Rural land Contractual Management Rights in 2005. These regulations provide a clear legal basis for farmland transfer. Meanwhile, the priority work formulated by the central government focused on how to promote transfer of farmland contractual management right, such as the long-term stable household responsibility system and the registration and certification of land contractual management rights. In November 2014, the central government further emphasized "San Quan Fen Zhi" with a new document named The Opinions on Guiding the Orderly Transfer of farmland Management Rights to Develop Moderate Scale Management of Agriculture. The document indicates that the innovative land transfer form should be encouraged, and the moderate-scale operation of agriculture should be developed. In July 2015, the Ministry of Finance issued the Guiding Opinion on Promoting Agricultural Moderate Scale Management through Comprehensive Agricultural Development, which calls for the moderate-scale management of farmland. However, despite the policy incentives and the market development of farmland transfer in recent years, the status of farmland transfer in China has not fundamentally changed [32]. The rate of farmland transfer remains low, and many problems still obstruct farmland transfer and utilization. Massive farmlands are scattered with small-scale operations and even inefficiently used or abandoned. Information failure and high transaction costs in current farmland transfer have also seriously hindered the transfer of farmland [33,34]. Thus, a new model of farmland transfer should be established to promote the transfer of farmland [35].

The Internet's development provides solutions to the shortage of funds, technology, and talent in the transfer of farmland. The Internet has proven its deep and even dramatic influence on the global social economy since the 21st century. As a branch of Internet technology applications, e-commerce, which emerged in the 1990s, has a powerful function in delivering information and has consistently reduced transaction costs [36,37]. The results of these technological advancements have also been applied to farmland utilization and have created an innovative e-commerce model of farmland transfer. In the traditional farmland transfer model, the innovation involved is only a change in the institutional arrangements and does not involve the scope of technological progress. Contrary to that, the e-commerce has facilitated the transformation of the farmland transfer model from a merely institutional arrangement innovation to an institutional innovation under technological progress.

Two types of e-commerce models are currently applied in China. One type is represented by the Tuli, Soutudi, and land resource networks. This type of intermediary platform model emerged in 2008 and 2009 and has been rapidly developed. Taking Tuli as an example, the platform of Tuli has released information on a total of 3,623,470 mu of land in China and a total of 71,600,100 mu of farmland in China was transferred as of 30 November 2014. By the end of 2013, the area of the farmland transfer was only 340 million mu; thus, the area of farmland transferred through the Tuli platform has accounted for 23% of the total area of farmland transfer. Such a large share also indicates to a certain extent that e-commerce can provide an important reference value for innovating China's farmland transfer model. The other type is represented by the Jutudi model of Alibaba,

which is an e-commerce model of farmland transfer, including the transfer of land use and management. In March 2014, the Alibaba Group launched its first Internet-customized private farm project called Jutudi in Jixi County, Anhui Province, with its e-commerce platform through “land transfer + agricultural e-commerce + leisure tourism.” The model transfers farmland to land use rights subscribers across China. This innovative model successfully realized the transfer and reoperation of 465 mu of idle, inefficiently used, or abandoned farmland in Jixi County. The model successfully increased the income of local contracted management owners by more than 3.5 times before the transfer. Especially in the context of the existing farmland transfer in China, the e-commerce innovation of farmland transfer has an important reference value.

Although transaction cost is an important perspective to understand reforms, few studies have been conducted to explore whether transaction cost of Jutudi model would be reduced compared with the traditional model of farmland transfer and why Jutudi model succeeds. Therefore, the present paper aims to conduct an in-depth study of the Jutudi e-commerce model of farmland transfer from the perspective of transaction costs.

The remainder of this paper is arranged as follows. Section 2 puts forward the analytical framework based on transaction cost theory. Section 3 elaborates the study area and the natural, socioeconomic, and policy background of the case. Section 4 analyzes the transaction costs in the Jutudi model and their effects on the farmland transfer through comparing it with the traditional farmland transfer model. Section 5 presents in-depth discussions of the findings. Section 6 summarizes the main results of the study and further presents its limitations and possible research directions in the future.

## 2. The Analytical Framework Based on Transaction Cost Theory

This paper argues that the existence of high transaction costs is the main reason why it is difficult to effectively transfer farmland, which theoretically have the potential to improve the welfare of involved stakeholders. Most factors that hinder farmland transfer indirectly affect the effective farmland transfer by increasing transaction costs, which can be included in the analysis framework of transaction costs when investigating farmland transfer.

Since the concept of transaction cost was introduced by Coase [38,39], much attention has been paid to the study of transaction costs. Many scholars conducted research based on transaction cost defined by Williamson, specified from “ex ante” and “ex post” of transaction cost [40,41]. Yet, such classification excludes cost generated by distance, such as transportation cost, and overlooks the spatiality of economic activities. Hence, North [42], and Furubotn and Richter [43] defined transaction cost as all costs generated during human interaction, which covers costs involved in the establishment, use, maintenance, and transformation of the system [43]. Yang [44] further divided transaction cost into exogenous and endogenous transaction costs and incorporated the direct or indirect costs in the transaction process, such as the costs for transportation and communications, into the category of exogenous transaction costs. Therefore, the transaction cost involved in this study includes all costs generated during interpersonal communication; that is to say, exogenous transaction costs caused by transportation and communications as defined by Yang [44] are also included. Most factors that hinder farmland transfer can also be incorporated into the transaction cost analysis framework. However, to reasonably simplify the analysis, this research mainly considers three stages of transaction cost; namely, searching for transaction trader and related information, negotiating and signing contracts with traders, and contract supervision and execution. Transaction costs of transportation and communication are incorporated into the corresponding stages for analysis.

In the context of fragmentation of farmland property rights, farmland use rights are scattered in the hands of a large number of farmers. The immobility of land also determines that it is difficult for the land use rights to form a national or regional transaction market [45]. For farmers, in most cases, the land transferee only exists in a small geographical area [46]. In the absence of intermediary organizations in China’s farmland transfer market and

narrow transfer information channels [47], farmers are likely to have to pay expensive search costs to search for potential transaction partners. The difficulty of accessing price and quality information of farmland further increases the information search cost of farmers. Numerous studies have shown that poor information and high information search costs make a large proportion of farmland transfers take place among acquaintances, which also leads to a lack of incentives for farmers to transfer farmland and thus hinders farmland transfer [48–50].

The high transaction cost in the negotiation and contracting process is another important factor that hinders the effective transfer of agricultural land. In the negotiation and contracting process, both parties need to negotiate and make decisions on the transfer price, transfer area, whether to transfer, how to distribute the benefits of the transfer, and how to share the risks. In the context of China's current rural land contract-management rights transfer with mainly oral agreements, spontaneous and dispersed transactions, low marketization, and noncontractualization [50,51], the noncontractualization of the transfer contract and the lack of a pricing system for farmland transfer lead to higher negotiation costs for both sides in determining the contract [47]. The one-to-one spontaneous and dispersed transactions also increase the overall negotiation and decision-making costs. On the other hand, the restriction of China's rural land contract-management rights merely for planting crops makes the land highly asset-specific. Agricultural machinery, other tangible assets and farmers' human capital itself, also have a high degree of asset specificity. High asset specificity means higher risks and asset sunk costs [52]. Assessing such sunk costs increases the negotiation and decision costs of both sides. Farmland transfer also means that the transferor would lose control of the contract and management rights of his/her land for a long period of time in the future, and both parties cannot predict the transaction costs that may arise in the future due to various uncertainties and opportunism, so both parties have to negotiate on other matters, resulting in an increase in transaction costs. In addition, resistance from government departments or policies also affect farmland transfer through increasing transaction costs. Empirical research by scholars has found that intervention by village cadres in farmland transfer would increase the uncertainty of farmers' behavior and increase the transaction costs [53].

The implementation and supervision process of farmland transfer also generates transaction costs and hinders the effective farmland transfer. First, the cost of contract performance increases for both parties to farmland transfer under noncontractual contracts or unregulated contracts. The existence of limited rationality and opportunism makes one party break the contract when they think it is profitable to violate the contract and cause losses to the other party, such as changing the use of the farmland and requesting to repossess the farmland in the middle of the contract period. Second, even with a more complete contractual arrangement, the uncertainty of policies, environment, and farmers' behavior during land transfer period may also make one party to fail to fulfill the contract as expected by the other. If both parties want to monitor each other's behavior, they have to use methods such as establishing a monitoring system and paying guarantee fees, which also implies additional monitoring costs. The existence of transaction costs in the enforcement and monitoring process would eventually hinder effective farmland transfer by reducing the expected income of farmers [51].

In addition, some scholars have found that the employment security function of households is another important factor limiting farmland transfer [54]. This can also be explained from the perspective of transaction costs. If there is no transaction cost between the two parties of farmland transfer, and the transferor of farmland can take back the farmland at any time due to employment needs, and if the transferor of farmland has already paid costs in the process of operating the farmland during this period, both parties can agree on the compensation of these costs without spending transaction costs, then when the transferor of farmland does not need to use the farmland to meet employment needs, the transfer of farmland to the transferor will not have any impact on the employment security function of farmland. However, because of the transaction costs involved in negotiating

compensation for the transferor's investment in farmland and monitoring the transferee's use of farmland (e.g., not changing the use of farmland), the transfer of farmland may have an impact on the employment security function of farmland, thus preventing efficient farmland transfer.

At the theoretical level, e-commerce would bring about significant changes to the transaction costs incurred in the process of agricultural land transfer. On the one hand, based on the Internet platform, e-commerce can break the geographical limitation of the two sides of the transaction, so that they can obtain more information about the potential transferees of farmland in a wide geographical area and reduce the information search cost. The information on land quality and price provided by the e-commerce platform and the programmed pricing mechanism can reduce the information asymmetry between the two sides of the transaction and save the information search cost and bargaining cost. If the e-commerce platform provides a more complete contract and a standardized system of monitoring the transfer, it can reduce the possibility of opportunistic behavior and reduce the cost of performance and monitoring for both parties. On the other hand, in addition to the management transaction costs of the establishment and operation of e-commerce platform itself, e-commerce of farmland transfer also generates other new transaction costs, including network coordination risk. Therefore, the impact of e-commerce of farmland transfer on transaction costs is not unidirectional. Whether the change in transaction costs would promote farmland transfer in practice cannot be provided a clear answer from theoretical discussion.

Another point worth noting is whether the model of farmland transfer facilitated by e-commerce platform would have an impact on the allocation efficiency of agricultural land resources. What are the characteristics of farmland utilization, operation, and productivity under the innovative model of farmland transfer through e-commerce compared with other models of farmland transfer? Even if e-commerce can facilitate farmland transfer by reducing transaction costs, the innovative model of e-commerce of farmland transfer loses its meaning from the perspective of optimal allocation of farmland resources if farmland resources are not used more effectively.

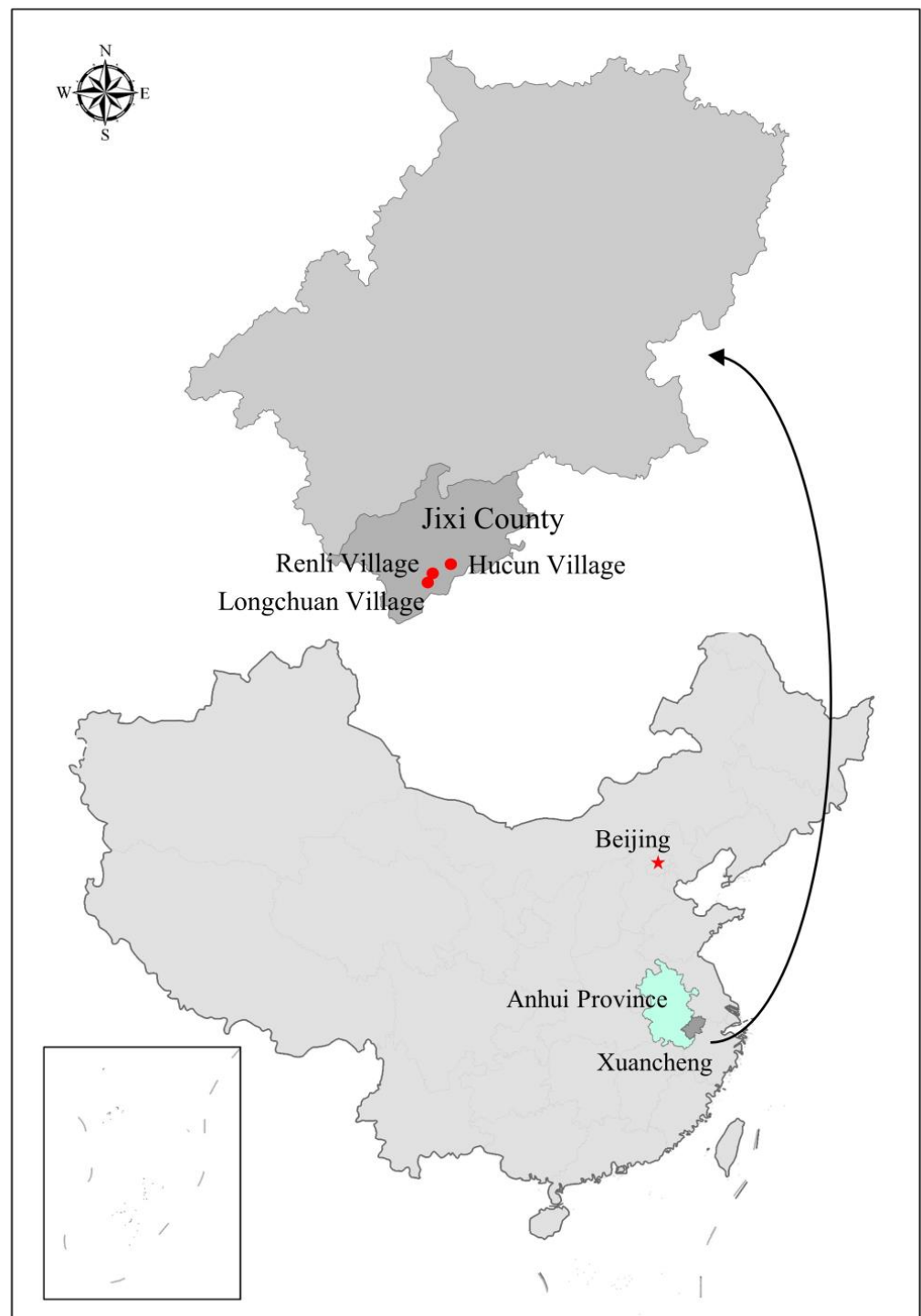
In this paper, we discuss the innovative model of e-commerce of farmland transfer mainly from the perspective of transaction cost, taking the current typical model of e-commerce of farmland transfer—the Jutudi Model—as an example.

### 3. Study Area and Background of the Jutudi Model

Jixi County is a mountainous area in the southeast of Anhui Province (as shown in Figure 1). This county has only half an acre of cultivated land per capita. The farmers' income is generally low. However, Jixi owns outstanding landscape and human resources. Jixi is a national ecological county and a national historical and cultural city. There are multiple tourist attractions in Jixi, providing a basis for integrating e-commerce transfer of farmland with ecotourism and green agriculture. Yet, economic development is relatively backward, and agriculture still occupies an important position in Jixi. In 2013, agriculture accounted for 1.65 billion yuan of the county's total GDP of RMB 5 billion. By the end of 2013, the total population was 176,700, of which the registered agricultural population was 139,700. However, a large number of rural laborers migrate to secondary and tertiary industries or outside Jixi. The number of employees in the primary industry is only 49,000, and the younger generation is basically not farming. In 2013, the per capita net income of rural residents was 9245 yuan, and the land's employment security for farmers was weakened. These factors caused approximately 30% of the farmland to be idle, 10% to be freely cultivated, and a substantial size of farmland to be inefficiently utilized, which, on the other hand, provide favorable conditions for transferring farmland contractual management rights. Meanwhile, the social welfare and social security in Jixi obtains continuous development. By the end of 2013, a total of 99,000 people had participated in basic pension scheme for rural residents, and 142,000 people had participated in new rural cooperative medical system. The social security function of land for farmers was weakened.



The rapid growth of the fiscal revenue for many years has provided a guarantee for the government to provide policy and financial support for farmland transfer.



**Figure 1.** Location of study area.

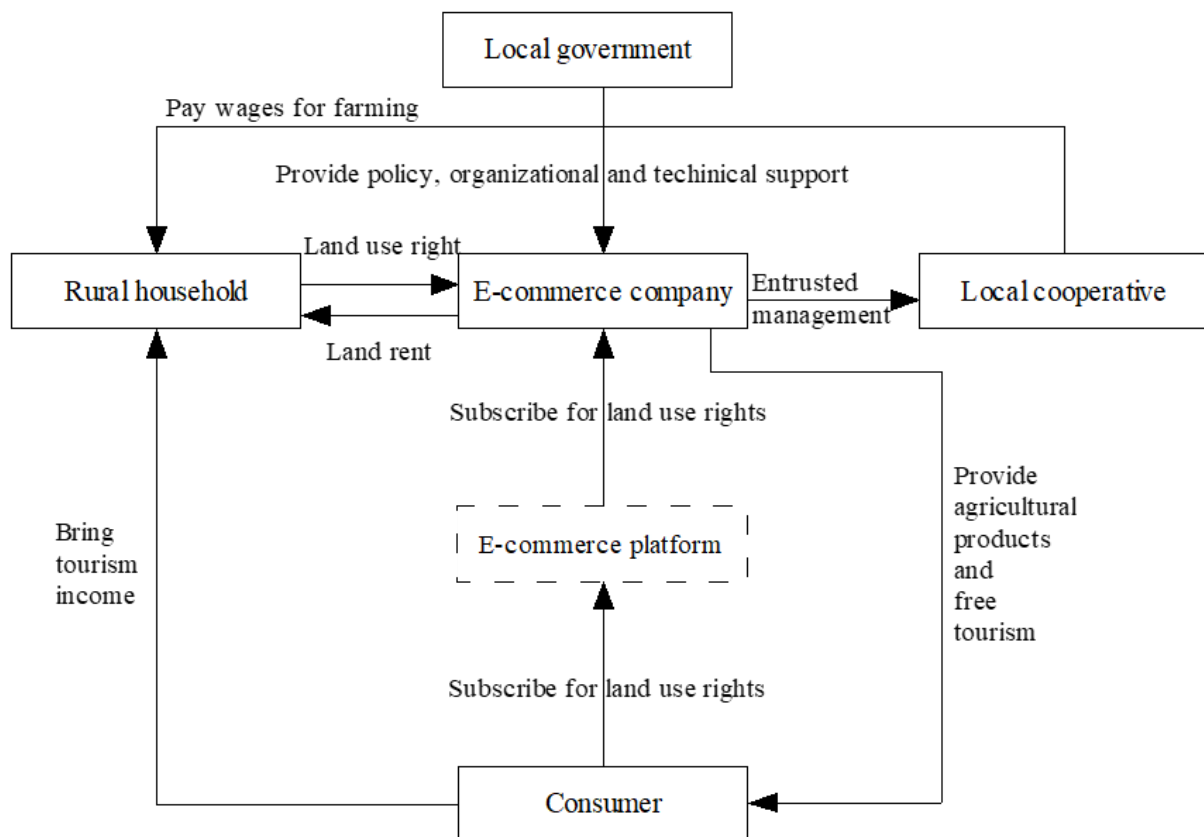
The Jutudi model of farmland transfer and e-commerce was first launched in March 2014 in Jixi County, Anhui Province and has been jointly implemented by Zhejiang Xinghe E-Commerce Co., Ltd. and the Alibaba Group. The model integrates the transfer of farmland contractual management rights with e-commerce agricultural product and rural leisure tourism. The e-commerce company sets the right to use the idle farmland that is transferred from the farmers as the subject for business operation. The land use right of

transferred land is divided into a one-year package of 580 yuan, a one-and-a-half-acre package of 2400 yuan, and a one-year acre of 4800 yuan through Alibaba's cost-effective e-commerce platform. The sales information is released, and each package is transferred to consumers across China through the e-commerce platform to realize the subscription of land use rights. The e-commerce company also labels the transferred land to clarify the land use rights subscribed by the consumers. However, the transferred land is not directly operated by the subscribers of the land use rights but is handed over to local cooperatives entrusted by the e-commerce company for farming and management. These cooperatives formulate the package farming of agricultural products according to the consumer demand and deliver the agricultural products produced by the farmland (base output is guaranteed in the contract) to the land use right subscribers twice a month, or the consumers personally pick the products when the crop matures.

The first phase of the Jutudi project of Jixi County transferred 465 mu of farmland from 382 rural households in Longchuan, Longxu, Hu, and Zhongtuan villages and Yingzhou, Fuling, and Shangzhuang towns. Through the e-commerce platform, farmland has been transferred to 3560 land use right subscribers across China, including Anhui, Jiangsu, Zhejiang, Shanghai, Inner Mongolia, Beijing, and Shenzhen. The process has increased the income of original local contractual operators by more than three times.

At present, the five-in-one operation of farmland transfer, which includes e-commerce company, local cooperatives, local government, farmers, and land use right subscribers (consumers), has been basically formed. The e-commerce company obtains the land use right of idle farmland transferred from farmers in the form of "one-year-one-sign, household-to-household" short rent. The e-commerce company entrusts local cooperatives to hire local farmers to farm, packs the land use right of farmland into a package, and transfers the package to subscribers across China through the Internet platform for profit. Local cooperatives accept the commission of the e-commerce company to manage the transferred farmland resources and are responsible for farming and payment of farm workers' wages and other expenses. The local government provides policy, organizational, and technical support for the Jutudi model. This model aims to promote the transfer of idle and inefficiently used farmland, advance the appropriate scale of farmland management, increase farmers' income, and enhance the development of local tourism. The county-level government establishes a project guidance group with the county party committee secretary and the county head as the coordinators, with the county agricultural committee as the executor, and the county relevant departments and towns as members. The project guidance group assists the e-commerce company to transfer the farmland, provides certain capital to repair the infrastructure of farmland, and sends agricultural technicians to assist in planting crops that meet green food standards. Several support policies have been introduced to encourage the transfer of farmland and the development of e-commerce. Through the Jutudi model, the local government has a positive effect on the implementation of the policy of "innovating land transfer model, encouraging the orderly transfer of land management rights and moderate-scale operation of the land" formulated by the central government. The local government also uses this model to stimulate local economic development. Farmers are also generally willing to transfer farmland to the e-commerce company to increase their own income. When farmers agree to transfer farmland, they can receive a rent of 750–800 yuan per mu per year, which is higher than the average grain income of farmland (approximately 600 yuan per mu per year). Furthermore, farmers have the right to prioritize farming for the transferred farmland and can also cultivate the farmland transferred by other farmers to obtain wages for working days (70 yuan per day for men and 50 yuan per day for women). The farmers can also gain extra income, such as accommodation, food, and beverages brought by tourists who visit the Jutudi project. Land use right subscribers (consumers) can also obtain reliable agricultural products because the land to be transferred should also meet certain environmental standards. In addition, the consumers can enjoy free tourism tickets and free farm stays of local scenic spots. The consumers are therefore

willing to subscribe for this part of the land use right at a higher price. Figure 2 summarizes the basic operating mechanisms of the Jutudi model.



**Figure 2.** The basic operating mechanism of the Jutudi model.

At the policy level, with the central government encouraging farmland transfer and moderate-scale operation, the county government has launched numerous support policies, such as the Several Opinions on Accelerating the Development of E-Commerce and Jixi County Modern Agriculture Development Incentive measures. The county government proposed a “one-off transfer of farmland with a scale of more than 50 acres, giving a one-time reward of 100 yuan per mu” to encourage farmland transfer. Relevant policies of the local government contribute to the development of the Jutudi model.

#### 4. Why the Jutudi Model Succeeds through the Lens of Transaction Cost

The 465 mu of fragmented farmland, which was originally abandoned or inefficiently used and difficult to transfer, was successfully transferred through the Jutudi model. The transfer did not change the nature, use, and status of the farmland, and at the same time increased the farmers’ income. Under the technological progress of e-commerce and the supporting institutional arrangements, the Jutudi model has considerably changed transaction cost during farmland transfer, and the changes in transaction costs have ultimately contributed to the development of farmland transfer. Thus, the Jutudi model of farmland transfer has delineated what is difficult to achieve in the traditional farmland transfer model. The following sections would briefly introduce the concept of transaction cost, which is further used to analyze why the Jutudi model succeeds.



#### 4.1. Information Search Cost

With the fragmentation of farmland property rights in China, the farmland use rights are dispersed in the hands of various farmers. The land fragmentation further enhances the farmland decentralization, and the immovable characteristics of land determine the difficulty of forming a national or regional market for farmland use rights [45]. For farmers, in most cases, land transfer is constrained within a small geographical area, which means a limited number of potential transferees [46].

With the current lack of intermediary organizations and narrow information channels in China's farmland transfer market [48], farmers seeking potential traders are likely to pay expensive search costs. Obtaining the price and quality information of farmland is difficult for farmers, which further increases the information search cost. Many studies have confirmed that poor information and high information search costs have caused a considerable part of farmland transfer to transpire between acquaintances, which has hindered farmland transfer [49,55].

Under the Jutudi model, the information search cost of farmland transfer includes two aspects. The first aspect is the information search cost between the land transferors and the e-commerce company. The second one is the information search cost between e-commerce company and consumers who subscribe to land use rights. Contrary to the spontaneous dispersive information search between farmers under the traditional model, the e-commerce company obtains farmland transferred under the guidance and assistance of the county agricultural committee. The land transfer information provided by the county agricultural committee is used to understand and identify regions with large farmland available for transfer in the county. The e-commerce company uses this information for door-to-door transactions and negotiate with farmers on farmland transfer. If most farmers in the region are willing to transfer, then the land transfer procedures are initiated. However, if most farmers are not willing to transfer, then the region of land transfer must be reselected. During the land transfer, informational assistance and transfer guidance of the county agricultural committee can save certain information search costs compared with the spontaneous circulation between farmers under the traditional model. However, if farmers are generally reluctant to transfer, then they should constantly search for new transfer areas, resulting in increased transaction costs. By contrast, given that the Jutudi model does not require the full connection of all transferred farmland plots, there would be no problems for transferred farmland operation if some parts of the land in the transfer area fail to flow. Therefore, in comparison with the traditional model that should be concentrated to form a large-scale and mechanized operation, the Jutudi model facilitates the exploration of traders that are willing to transfer their farmlands and a reduction in information search costs. After the local farmers are familiarized with the Jutudi model, many farmers take the initiative to find e-commerce companies that wish to sign land transfer contracts.

In this process, the cost of information search between the two parties is reduced, and the e-commerce company screens the farmland according to factors, such as distance and soil fertility, and then further negotiate with the selected farmers. During the e-commerce company's transfer of farmland to consumers, the cost of information search is considerably reduced through the benefits of e-commerce. Many studies have deduced that the immovable nature of land constrains land transfer to within a small geographical area [45,46], thereby increasing the difficulty of information search. In an interview with the local county agricultural committee, it was found that the abandonment or inefficient use of the farmland in the Jutudi project area was primarily generated due to the young locals' obligations to their existing jobs, the generally insufficient family agricultural labor force, and relative surplus in agricultural labor force, while finding suitable traders for land transfer is difficult. The high cost of information search has dissuaded many farmers from searching for transactions and transferring farmland. The e-commerce platform enables the searching for numerous potential traders nationwide at a low cost. Particularly under the special land system arrangement in China, urban residents do not enjoy the right to contract and manage farmland. In addition, as China's food safety problems frequently

occur, a considerable number of urban residents hope to operate transferred farmland to obtain safe and healthy agricultural products. From the Jutudi model of the Jixi County, the number of clicks on the project reached 500 million in five days from March 11 to 16 in 2014. A total of 350,000 people consulted on and 3560 people subscribed for land use rights. The farmland transferees come from several provinces including Anhui, Jiangsu, Zhejiang, Shanghai, Inner Mongolia, Beijing, and Guangdong, which shows the strong advantages of an e-commerce platform in searching for farmland transfer information. In addition, the farmers who transfer farmland do not need to pay for searching for traders under the Jutudi model, which is the main factor that hinders local farmers from transferring farmland under the traditional model.

#### *4.2. Transaction Costs for the Negotiation and Contracting Process*

High transaction cost in the negotiation and contracting process is another important factor that hinders effective farmland transfer. In the negotiation and contracting process, both parties should negotiate and make decisions on the price and area of transfer, whether to transfer, how to distribute benefits, and how to share risks. The transfer of farmland contractual management rights in China was dominated by oral agreements, spontaneous and decentralized transactions, low marketization, and noncontracting under the traditional model [52]. Hence, the noncontractualization of transfer contracts and the absence of a pricing system for farmland transfer have led to high negotiation costs for both parties in determining the contract [48]. One-on-one spontaneous decentralized trading also increases the cost of negotiation and decision making. By contrast, given that the use of the farmland contractual management right is limited to the cultivation of crops, farmlands have a high degree of asset specificity. Physical assets, such as agricultural machinery and human capital, also have a high degree of specificity. A high specificity of assets indicates higher risk of sunk cost [52]. Transferring farmland involves abandoning assets, such as agricultural machinery and farming capacity, in the anticipation of more compensation. However, the sunk cost of the farmland transferor cannot actually increase the utility of the transferee, and the assessment price of the sunk cost increases the negotiation and decision-making costs of both sides. In addition, the farmland transfer also indicates that the farmland transferor loses control over their own farmland contractual management rights for a long time in the future. The two parties cannot predict the transaction costs that may arise in the future because of uncertainty. Considering opportunistic behavior, the two parties should negotiate on several other issues, thereby increasing transaction costs. Resistance from government departments or policies also affect farmland transfer by increasing transaction costs. Empirical studies by authors of [53] confirmed that government resistance, such as village cadres' intervention in farmland transfer, increases the uncertainty of farmers' behavior and increases the transaction costs of farmland transfer.

Under the Jutudi model, the transaction costs of negotiation and contracting of farmland transfer mainly include the two aspects: transaction costs between the e-commerce company and farmers who transfer farmland, and the transaction costs between the e-commerce company and consumers who subscribe for land use rights. The e-commerce company actively negotiates and signs with farmers on issues related to farmland transfer after searching for information about potential farmers and offer prices to those who are willing to transfer farmland according to the location and land quality. The transfer prices can be divided into three grades; namely, 800 yuan/(mu year), 750 yuan/(mu year), and 300 yuan/(mu year). The main grades are 800 yuan/(mu year) and 750 yuan/(mu year). Essentially, from an economic point of view, it is based on the principle of differential rent to determine the price of farmland transfer. In the actual negotiation process, for those with better geographical location, more fertile farmlands, the e-commerce company negotiates in accordance with the actual situation and may propose higher price. Generally, the farmers' income from the land transfer under the Jutudi model is higher than that of the local farmers' spontaneous transfer or the local cooperatives' land transfer under the traditional model. The farmers' income is also higher than the local average grain income (600 yuan

per mu per year). Higher transfer price also naturally reduces the transaction cost of bargaining. However, the vague pricing system may still make the bargaining process incur high transaction costs, and one-by-one negotiations with farmers also make the e-commerce company spend more in this transaction process. In addition, the e-commerce company pays land transfer rents immediately after the farmland transfer. Grain subsidies issued by the central government to the farmers are still enjoyed by the original land contractors, which further reduces the transaction costs of bargaining. In the transfer contract, the e-commerce company draws a unified written contract for the farmland transfer. If the farmers have any objection to the terms, then they further negotiate according to the actual situation and requirements of the farmers. Clauses can be added to the contract until both parties agree. During the field study, it was found that most farmers recognize the written contract drafted by the e-commerce company, yet some farmers would also recommend some requirements based on the format contract provided by the e-commerce company. For example, some farmers propose that they want to take back the farmland to be farmed the following year because they cannot reserve the seeds needed for planting without planting land, then the e-commerce company must agree to reserve a breeding land for the farmers. Under the Jutudi model, contractual and relatively complete transfer contracts can help reduce the opportunistic tendency of the two parties and transaction costs [52].

Special institutional arrangements under the Jutudi model also present an important influence on the transaction costs during negotiation and contracting process. The farmland transfer under the Jutudi model does not require the complete connection of all farmland plots. Hence, if some farmers are unwilling to transfer or demand higher farmland transfer price, then they can choose not to transfer this part of the farmland. In comparison with the traditional model that requires all farmland to be connected to form a mechanized large-scale operation, the farmland transfer will not face “nail household” behavior caused by farmers’ opportunistic behavior, thereby avoiding possible transaction costs.

This study uses the analytical paradigm developed by Williamson [41] to conduct empirical research from three dimensions of transaction costs, namely, asset specificity, transaction frequency, and uncertainty. In the transfer of farmland contractual management rights, the specificity of the physical assets and geographical location of the agricultural investment, such as agricultural machinery and irrigation facilities, makes farmers vulnerable to a high risk of being ripped off and increases bargaining transaction costs. The high specificity of farmland assets due to stringent institutional restrictions on the use of farmland contractual management rights has also increased transaction costs [53]. However, under the Jutudi model, the original intensive farming and meticulous farming model is maintained without the use of pesticides and modern technologies. The potential productivity of farmland resources does not significantly change despite the renovation of various infrastructure. This condition reduces the bargaining costs of both parties in the transfer of farmland assets due to a high specificity of land use restrictions. For the e-commerce company that do not need to invest considerably in physical assets (the government provides funds to repair farm infrastructure), the company purchased two large agricultural tractors, two small agricultural tractors, and various farm implements and was willing to accept a one-year lease. At the same time, the Jutudi model also adopts the system of the preferentially employing farmers who transfer farmland to undertake agricultural, labor-based activities. The farmers who have low universal human capital and find it difficult to find jobs in the nonagricultural sectors can continue to obtain income from agricultural production activities, thereby reducing transaction costs due to the specificity of the human capital. In addition, with few farmlands to cultivate, farmers in Jixi normally use traditional iron and wood farm tools and do not necessarily invest tractors, harvesters, or other large-scale agricultural machinery. It was estimated that the large and medium-sized iron and wood farm tools in Jixi were worth merely 326.72 yuan per household (up to the end of 2013). Therefore, the specificity of agricultural physical assets is relatively low, which will not significantly increase transaction costs in the negotiation and contracting process.

There are some other issues that may also affect transaction cost. For example, as Jutudi is a new model to transfer land contractual management rights through e-commerce, whether such an unfamiliar way increases the farmers' misgivings, thus increasing transaction cost remains questionable. In addition, whether the local government would impose resistance on this model and increase the difficulty of transfer also matters in the transaction cost. During the field study, it was found that most farmers, who transferred farmland through Jutudi model, did not understand this model. These farmers also did not care about how the model works and who their own contractual management rights were transferred to as long as the e-commerce company that contracted with them paid rent and used the farmland in accordance with the contract. This was echoed by the land transfer willingness survey conducted by the research team in 10 districts in Zhejiang and Jiangsu in 2008; 146 of the 214 rural households were willing to transfer farmland; nearly 70% of the respondents had no requirements for the transferee. Therefore, it can be reasonably inferred that the e-commerce characteristics of the Jutudi model does not significantly increase bargaining costs for farmers. It should be noted that, in the field study, we found that some farmers did not want to transfer farmland or had no intention to transfer initially. However, we later found that most farmers were willing to transfer farmland; some even actively contacted the e-commerce company to transfer the farmland. Yet, the e-commerce company did not have to provide an extra price for these farmers that later got in contact. This phenomenon demonstrates that the collective transfer behaviors of most farmers reduce the worries of uncertainty that may increase bargaining costs. In terms of government resistance, various local township and village cadres initially did not support farmland transfer by the e-commerce company due to frequent reports of Internet fraud cases. However, with the county government's active support and promotion, the local township and village cadres all actively participated in the farmland transfer. Thus, government resistance in this case did not significantly increase the cost of negotiations.

By contrast, given that the e-commerce company has set and posted the price of all types of farmland packages online, consumers found the information through the Internet and would subscribe for land use right and pay through the Internet if they accepted the deal. As the supply of farmland package cannot meet the actual demand at the predetermined transfer price, the e-commerce company needs not bargain with consumers on the transfer price. Therefore, transaction costs between the e-commerce company and consumers are mainly reflected in the consultation process of human and time costs. There were few transaction costs on bargaining the content of the contract and transfer price. However, given that consumers were relatively unfamiliar with the model and proposed large amount of consultation (350,000 consultations in phase one took place), the transaction costs of the consultation process were relatively high.

Under the Jutudi model, the e-commerce company should bear not only the costs of negotiation and contracting with farmers but also the consultation cost with land subscribers. Farmers who transfer farmland mainly shoulder the cost of negotiation and contracting with the e-commerce company. High transfer price, written contracts, and other special institutional arrangements under the Jutudi model can reduce transaction costs in the process of negotiation and contracting, although the negotiation cost remains high due to door-to-door negotiation.

#### *4.3. Contract Supervision and Execution Costs*

The execution and supervision of the farmland transfer contracts would also generate transaction costs and hinder the effective farmland transfer. The cost of executing the contract between two parties increases if it is a noncontractual or nonstandard contract. Bounded rationality and opportunism make the traders violate the contract when he thinks it is profitable to violate the contract and brings losses to the other party, including changing the farmland use or taking back the farmland in the middle of the contract period. Moreover, even with additional complete contractual arrangements, the uncertainties of policy, environment, and farmers' behavior during the farmland transfer may cause one

party to fail in fulfilling the contract according to the other party's expectations. If both sides want to supervise each other's behavior, then they must use the supervision system and pay the deposit, which also indicates that they must pay additional supervision costs. Transaction costs in the process of execution and supervision ultimately hinder the effective transfer of farmland by reducing the expected income [52].

Under the Jutudi model, contract supervision and execution costs have also changed significantly. First is the supervision fee paid by consumers and the e-commerce company to ensure the execution of contracts and establish special institutional arrangements. Under the Jutudi model, the e-commerce company promises to strictly avoid the use of chemical fertilizers and pesticides in planting and provide consumers with green primary ecological agricultural products. However, land use right subscribers in different regions of China do not understand the real operation of their subscribed land. Hence, the e-commerce company has designed special institutional arrangements to facilitate consumer supervision, e.g., (1) installing cameras on each piece of land for the consumers to view real-time land cultivation through app provided by the e-commerce company; (2) preparing a lumpsum deposit of 500,000 yuan for the consumers' rights protection in case of compensation for complaints from users. If the local cooperative uses chemical fertilizers and pesticides in the course of farming, then the local cooperative bears joint liability; (3) purchasing insurance for crops with long planting time and high risk. Nevertheless, these institutional arrangements cannot fundamentally guarantee that the agricultural products received by land subscribers are genuinely produced from the farmland. The consumers are difficult to find whether the e-commerce company sends the agricultural products purchased from the market instead of the agricultural products produced by the subscribed farmland. Therefore, these institutional arrangements cannot completely avoid the possible opportunistic behavior of the e-commerce company.

Second is the high transportation cost under the Jutudi model. The e-commerce company must send fresh products harvested from the subscribed farmland to consumers across China, which incurs huge transportation costs. In order to reduce transportation costs and ensure the freshness of agricultural products as much as possible, land use rights subscribers have been screened, and no contracts have been signed with subscribers in several remote areas, such as in Qinghai Province. Yet, transportation costs are still high, even with such screening arrangements. According to Jixi's local logistics' standard fee, 10 yuan are needed to send 1 kg of agricultural products to Shanghai, 15 yuan to Beijing, and 18 yuan to Hainan Island. The logistical cost of the agricultural product is usually more than twofold of the value of the agricultural products.

Third is the negotiation and compensation costs from the breach of the e-commerce company. Under the immature logistics of fresh agricultural products, various vegetables may not be fresh when they arrive the consumers. Under current technological conditions, the e-commerce company can only keep agricultural products fresh in vacuum packaging for approximately 10 h and nitrogen packaging for only 20 h. The needed time from the picking, packaging, logistics, and distribution of agricultural products to consumers may exceed the time limit for preservation, thereby resulting in transaction costs raised by disputations that the agricultural product quality does not meet the requirements. Thus, the e-commerce company must negotiate with consumers to reship or negotiate a refund for other transportable vegetables from farmland.

Various characteristics of e-commerce significantly increase the cost of contract supervision and execution in farmland transfer according to abovementioned discussions. On the other hand, other special institutional arrangements in the Jutudi model may also reduce the supervision and execution costs of farmland transfer contracts. Under the traditional model, supervising the actual use of transferred farmland is difficult for farmers, which can result in the illegal change in farmland use. By contrast, under the Jutudi model, any attempt to change the use of farmland is easy to detect because of the need to grow contractual crops and need for consumers to monitor farmland cultivation through cameras,

which reduce the uncertainty of the farmland use after transfer and cost of the supervision required.

Table 1 summarizes the institutional arrangements of Jutudi model and the traditional farmland transfer model and the corresponding changes in terms of information search cost, negotiation and contracting process costs, and contract supervision and execution costs.

**Table 1.** Change in transaction cost of farmland transfer in the Jutudi model.

Types of Transaction Cost	Institutional Arrangement of Traditional Farmland Transfer Model	Institutional Arrangement of Jutudi Model	Change of Transaction Cost (Jutudi Compared with Traditional One)
Information search cost	Spontaneous and decentralized transfer of farmland among farmers	The Agricultural Commission provides information and guidance for transfer and door-to-door consultation. There is minimal transaction cost for farmers during the information search stage	Lowered, but still high
	Fully connected transferred farmland plots is required for centralized farmland management	The transferred farmland plots are not required for full connection while relatively concentration is sufficient. Therefore, it is easier to search transferee for farmland transfer compared with the traditional model	Lowered
	Normally, the transferee search transferor for farmland transfer	Many farmers actively contact the e-commerce company for transferring farmland	Lowered
	The transferees are restricted to a small geographical area and the number of transferees is small	A large number of potential transferees can be searched across China at a very low cost	Dramatically dropped
Negotiation and contracting process costs	The farmland transfer price is relatively low with ambiguous pricing system and door-to-door negotiation	The farmland transfer price is relatively high with ambiguous pricing system and door-to-door negotiation	Lowered, but still high
	Most transfer rent is immediately paid, and the governmental subsidies for grain crops normally belong to the transferee	The transfer rent is immediately paid, and the governmental subsidies for grain crops normally belong to the transferor	Lowered
	Oral agreement is dominated with high risk of opportunism	A unified written contract for the farmland transfer is provided and specific terms can be added through negotiation if there are objections	Lowered
	Fully connected transferred farmland plots is required for centralized farmland management	The transferred farmland plots are not required for full connection and therefore the “nail households” behavior can be avoided	Lowered
	The transferee of farmland may change the use of farmland, invest more physical assets, and have a higher degree of asset specificity	The potential productivity of farmland has not changed significantly, so there is no need to invest too much physical assets, and the degree of asset specificity is low	Lowered
	Farmers may face unemployment after transferring farmland and are unwilling to transfer	Farmers who transfer farmland are employed for farming to reduce transaction costs caused by human capital specificity	Lowered



Table 1. Cont.

Types of Transaction Cost	Institutional Arrangement of Traditional Farmland Transfer Model	Institutional Arrangement of Jutudi Model	Change of Transaction Cost (Jutudi Compared with Traditional One)
Contract supervision and execution costs	The transferor for farmland transfer is usually familiar with the transferee	The transferor for farmland transfer is unfamiliar with e-commerce model and the transferee	The cost will not be significantly increased
	Under the intermediary model, the transferor of farmland will bargain over the transfer contract and price	The land use rights subscribers will not affect the transfer contract and price, but the labor and time costs will be incurred when the subscribers consult	Lowered, but still high
	Insurances for crops are needed without other extra expenses	Cameras for each piece of land should be installed while 500,000 yuan deposit and insurances for crops are needed to protect consumer rights	A significant increase
	There are no transportation problems as the agricultural products will be sold nearby or with centralized sale	There is high transportation cost as the land use rights subscribers are scattered across China	A significant increase
	There are no negotiation and compensation costs resulted by deterioration of the quality of agricultural products	There are negotiation and compensation costs resulted by deterioration of the quality of agricultural products	Increased
	It is difficult to supervise the utilization of transferred farmland	It is easy to detect behaviors that change the use of farmland	Lowered

## 5. Discussion

Whether farmland resources can be effectively utilized is a good measurement of the success of the innovative model of farmland transfer. The field study found that a total of 240 mu of high-quality rice and 225 mu of seasonal vegetables and fruits were planted on 465 mu of farmland transferred through the Jutudi model. Of the total, 80% of the transferred lands were planted with cereals, oils, and the remaining 20% were planted with vegetables or fruits including grapes, vegetables, radishes, tomatoes, cantaloupes, strawberries, and watermelons. In actual cultivation, modern planting techniques, such as greenhouses, were not used. Under the guidance of agricultural technicians, grain growers and local farmers used intensive farming method to cultivate according to the standards of green agricultural products. In terms of farmland infrastructure, the government only repaired the field roads and did not damage the demarcation facilities established by the farmers in the plots caused by the fragmentation of farmland property rights.

Before the implementation of the Jutudi model, the transferred farmland was mostly inefficiently used. Most of the farmlands merely planted one crop per year, and many farmlands were abandoned. Farmland productivity was extremely low, and the waste of farmland had also adversely affected land fertility. In the Jutudi model, all the transferred farmland were utilized. The productivity of farmlands significantly improved. The prohibition of pesticides and chemical fertilizers was also beneficial for the long-term use of farmlands. In the Jutudi model, the productivity of farming land was even considerably higher than the average of Jixi county. In 2014, Jixi County's grain yield is 464 kg/mu. With the Jutudi model, in only 8 months from April 2014 to December 2014, more than 300 tons of grain output were sent to land use rights subscribers. The average yield was more than 650 kg/mu, which did not include the food that the consumers harvested from the farmland. However, given the institutional arrangements, several types of crops would be planted on one plot whereas some farmlands would be planted with crops that do not best meet the characteristics of the land. In addition, the economies of scale of the plot were also difficult to realize due to varying demands from varying consumers for the nearing land plots. Therefore, the potential of farmland use yet cannot be fully realized.

Despite promoting farmland transfer and increasing farmland utilization, there are also still some problems. The first is the short-term transfer. The current Jutudi model signed contracts with farmers every year, which was initially designed for reducing farmers' worries. Yet, in practice, if farmers are not willing to transfer in the new term, then the e-commerce company must research for other farmland transfer, thereby increasing uncertainty and transaction costs. This problem also resulted in reluctance of the e-commerce company to invest in long-term, thereby hindering improvement of farmland productivity. The second problem is that farmland cannot be scaled up for mechanized utilization. The farmland in the Jutudi mode was relatively concentrated in several areas, which alleviated the high farming cost caused by land fragmentation and improved efficiency of farmland use. However, the Jutudi model could not realize large scale of transferring connected plots and renovate infrastructure for scale and mechanized operation, which resulted in maintaining intensive cultivation. The third problem is the quality and safety of the agricultural products and preservation and transportation of the fresh agricultural products. Although several institutional arrangements had been devised to monitor the quality of agricultural products, they still did not guarantee the quality of the agricultural products. High logistics costs have significantly increased the cost of contract fulfillment. The fourth problem is the operational benefits of the e-commerce company. During the entire process of the first phase of the Jutudi project, the e-commerce company actually lost approximately 500,000 yuan. The interview in the field study demonstrated that a considerable part of the losses was caused by insufficient business experience and the e-commerce company was also convinced that the Jutudi model could be profitable under reasonable operation. However, in the long run, if the model is not beneficial, the e-commerce company will definitely withdraw from the model.

Several suggestions are proposed to solve the abovementioned problems. First, under the principle of "legal, voluntary, and paid," the long-term farmland transfer contract should be promoted through consulting farmers and designing certain institutional arrangements. For instance, farmers can enjoy certain profit distribution while shoulder certain risks in these institutional arrangements. In addition, large scale of transferring connected plots and renovating infrastructure for scale and mechanized operation should be promoted. These arrangements would reduce the future transaction costs of farmland transfer and attract long-term investments from the e-commerce company. The second is to improve the pricing system and contract of farmland transfer to reduce transaction costs incurred in the negotiation and contracting and disputes arising from the improper execution of the subsequent contracts. The third is to promote standardized production of agricultural products and improve the quality monitoring system to ensure the quality of agricultural products produced by farmland. Such measures would reduce contract fulfillment costs and reduce negotiation and compensation costs due to the inability to guarantee the quality of the agricultural products. The fourth is to develop a cold chain logistics system for agricultural products, optimize the logistics distribution process, and replant crops that are not ideal for transportation. Whenever possible, the land subscription rights can be transferred to consumers with similar geographical locations to solve the problem of transporting fresh agricultural products, thereby reducing high transportation cost under this model. For the e-commerce company, experience should be learned to avoid unnecessary costs, and new profit growth points should be explored on the basis of the Jutudi model through ecotourism and other additional services to improve business efficiency. High economic efficiency will also make the model dynamic in transferring farmland. Thus, farmers are willing and can shoulder most of the information search costs because the need to bear less information search costs will lead to farmers being willing to participate in farmland transfer.

It is noted that the Jutudi model found in Jixi County can also provide references for farmland transfer in other regions. The key success factor discussed here is to reduce the transaction cost of farmland transfer through e-commerce, which is also feasible as Alibaba has already developed such platforms. While paying due attention to the mentioned

insufficiencies discussed above, the government of other regions should consider how to attract Alibaba by considering the potential amount of farmland transfer the possible large-scale utilizations facilitated by proper industry development. Institutional arrangement suitable for such kind of reforms should be available. In addition, how to help with providing skilled labors for large-scale utilizations of transferred farmland can also enhance confidence of the e-commerce company to develop the markets.

## 6. Conclusions

On the basis of field research, this study summarizes the operation mechanism of “five in one” for the e-commerce company, local governments, local cooperatives, farmers, and land use right subscribers in the Jutudi model. Under the Jutudi model, farming land is in a relatively concentrated area and utilized in an intensive manner. The comparisons show that the productivity of transferred farmland under the Jutudi model has significantly improved, but the production potential of farmland cannot be fully realized.

Under the Jutudi model, transaction costs in the information search stage of farmland transfer are significantly reduced by the special farmland use mode and characteristics of e-commerce. Farmers do not need to pay transaction costs for information search. High farmland transfer price, written contracts, and various special institutional arrangements in this model can effectively reduce the transaction costs in the negotiation and contract stage to a certain extent. Although various institutional arrangements in the model may reduce transaction costs in contract supervision and execution phase, several characteristics of e-commerce itself significantly increase transaction costs in this phase. This model has indirectly brought about a far-reaching impact on the optimal allocation of the farmland resources by promoting the circulation of agricultural products, sustainable use of farmland, and rural economic development. Generally, the innovative mode of e-commerce farmland transfer is significant in mitigating and solving the problems of farmland transfer, farmland use, and rural development in China.

Given the resource constraints, this study fails to measure the transaction costs in this model through questionnaires. As an emerging model of farmland transfer and utilization, the Jutudi model has also been launched in many cities across China, such as Zhuji in Zhejiang, Wuyuan in Jiangxi, Yuanyang in Yunnan, and Tongyu in Jilin. Only one cycle of complete operation has been completed in Jixi County, Anhui Province. The development of the model would be affected by local natural, social, economic, and policy conditions to some extent. The inability to compare the development of the Jutudi model in different regional contexts may make this study not comprehensive enough. In the future, additional in-depth quantitative and comparative studies on the Jutudi model from the perspectives of transaction costs and farmland transfer decisions should be considered. In addition, the conditions required for promoting Jutudi model should also be explored to facilitate the local government to decide how to operate and improve in order to promote Jutudi model.

**Author Contributions:** Conceptualization, X.L.; methodology, X.L. and Y.P.; validation, X.L. and Y.P.; formal analysis, X.L., Y.P. and Y.Y.; investigation, X.L.; resources, X.L.; writing—original draft preparation, X.L. and Y.P.; writing—review and editing, X.L., Y.P. and Y.Y.; visualization, X.L. and Y.P.; funding acquisition, X.L. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by the National Natural Science Foundation of China (grant number 72074192; 71603234).

**Data Availability Statement:** Not applicable.

**Acknowledgments:** The authors would like to thank the respondents who provided help with the pilot study, interview, and formal survey.

**Conflicts of Interest:** The authors declare no conflict of interest.

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