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Exploring the Influence of Land Titling on Farmland Transfer-Out Based on Land Parcel Data

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Abstract: Existing literature about the impact of farmland titling on farmland transfer takes no account of farmland plot characteristics, which makes them unable to effectively identify the causal relationship between farmland titling and farmland transfer. After the theoretical analysis, based on land plot level micro-survey data, we adopt the instrumental variable (IV) and conditional mixed process (CMP) methods to ease the endogeneity problem in the model and conduct a quantitative analysis. The results show that the land titling program has significant and positive effects on the transfer-out of farmland. Through a heterogeneity test, we observe a more pronounced promotional effect in regions with a higher economic development level and in farmland transfer deals with government facilitation. Moreover, the further application of a mediating effect model shows that the land titling program increases the net income from farmland transfer-out through increasing the value of farmland and reducing the transaction costs, thus promoting the transferring out of farmland. The findings contribute to providing empirical evidence for how the government may facilitate and support the attaining of more efficient scale operations of farmland.

Keywords: farmland titling program; farmland transfer-out; plot characteristics

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1. Introduction

Since the 1980s, the farmland property right system has comprised village collective ownership, with parts of land property rights belonging to farmers, including the rights to transfer and contractual management [1,2]. However, frequent land adjustment, unclear property rights definitions, and lack of land contractual management certificate has resulted in the insecurity of farmers' land property rights, which has hindered the circulation of rural land in China [3]. Given these circumstances, the Chinese Central Government began to implement a series of policies to ensure the stability of land property rights. In 2008, the government issued the "Decision of the Central Committee of the Communist Party (CCP) of China on Some Issues Concerning Further Improvement of the Rural Reform and Development", which pointed out that it was important to confirm, register, and certify farmers' farmland contractual management rights. Then, the land titling program (LTP) pilot project was initiated via Document No. 1 in 2009, and villages from eight provinces were selected as pilot samples. Eventually, a nationwide scheme was launched in 2013. In fact, through giving farmers long-term contractual management rights, clarifying the spatial location of farmland, and issuing ownership certificates, China's LTP guarantees farmers' land property security.

According to property rights theory, stable and effective farmland property rights can alleviate the risk of farmers' land being encroached by the government's land-adjustment and eminent domain actions, as well as the opportunistic behavior of lessees. All of these

can help reduce the transaction costs of signing and enforcing farmland transfer contracts, thus being conducive to fostering a farmland leasing market and enhancing the operational efficiency of the market [4–10]. In the context of China's farmland property rights reform, the existing literature has been extensively discussed whether LTP can promote the transfer-out of farmland [1,11,12]. Specifically, scholars have used various approaches, such as PSM, instrumental variables (IV), or double difference approach (DID), to show empirically that enhanced farmland property rights increase farmers' incentives to transfer farmland and increase the probability of successful farmland transfer transactions, thus facilitating the development of the increasingly important farmland lease market [1,12,13]. However, some scholars have pointed out that LTP, by creating not only a monopoly of farmland of unique characteristics at specific locations, but also stronger owners' personal emotional attachment to the property, leads to farmers' "farmland price illusion", which will motivate transferring-out farmers to ask for excessive price, thus increasing transaction costs and inhibiting efficient transfer of farmland [9,10,13]. Studies using IV-Tobit regressions found that compared with farmers not under LTP, the expected rent of farmers under LTP rises sharply, which often inhibits the success of farmland transfer [14,15]. Therefore, it is worth considering whether China's LTP can promote the transfer-out of farmland.

Drawing upon the existing literature on the relationship between LTP and farmland transfer-out, we extend the analyses and contribute to the existing scholarship on the following two aspects. First, the existing literature lacks in-depth exploration on the internal mechanism of LTP affecting farmland transfer-out, and the research conclusion of the relationship between LTP and farmland transfer-out has not been unified. Considering the declining viscosity of farmers' relationship with land and villages in China, and with the accelerating progress of urbanization, China's rural has been transformed from a "rural China" to an "urban–rural China", where the emotional attachment of farmers to their farmland has been continuously weakened, the social security function of farmland has been gradually run down, and the heterogeneity of the farmland leasing market has been significantly reduced [16–18]. Therefore, based on the overarching hypothesis that farmers are in general rational, and taking into account the constraint conditions of "transition from a rural China to an urban and rural China" on farmers' decision making, in this paper we try to construct the theoretical analysis framework of the influence of LTP on farmland transfer-out.

Secondly, due to the lack of plot data, the existing literature fails to properly deal with the endogeneity problem, which may also be one of the reasons for the conflicting results. Although some scholars have tried to use the Propensity Score Matching (PSM), Two-Stage Least Squares (2SLS), DID, and other methods to alleviate the endogeneity problem, due to the limitations of the data that they used, the existing literature mostly ignored the plot characteristics of the farmland in the regressions. In fact, the farmland plot characteristics not only influence farmers' decisions of whether to transfer-out farmland in light of the different expected income associated with the different plot characteristics of the farmland [19–21], it is also an important factor affecting the progress of the LTP implementation—the government may choose villages with low terrain complexity to carry out the LTP first [22] since demarcating fragments of irregular farmland plots takes a lot more time and involves more technological complexity, thus delaying the progress of those irregular land plots being registered in certificate Therefore, it is clear that the omission of farmland plot features will lead to the correlation between the error term and the LTP variable in the empirical model, resulting in biased estimation results. Although when measuring the proportion of land-certified farmers in a village that belongs to a sampled township some literature takes the proportion of land-certified farmers in the other n-1 villages (except the villages in which the land-certified farmers proportion is being measured for the regression model) of the sampled township where the farmers are located as an instrumental variable and then applies 2SLS to alleviate the endogeneity problem of omitting variables; it should be highlighted that this instrumental variable is not exogenous to the farmland plot characteristics, so the estimated results are still questionable.

To overcome this shortcoming, we specifically use a unique dataset that contains farmland plot information to conduct the empirical analysis in this paper. While controlling the farmland plot characteristics in the model, both an instrumental variable method (IV) and a conditional mixed process estimation (CMP) are applied to further alleviate the endogeneity problem and improve on the unbiasedness of the estimation results.

By exploiting an enriched dataset that contains farmland plot characteristics data and analyzing farmers' decisions in the background of China's evolving rural–urban societies, we confirmed strengthened property rights effectively promotes farmland transfer, thus improving farmland allocation and the agricultural efficiency. Moreover, this result is robust in light of our study's controlling of the land plot characteristics and not assuming irrationality in the model.

The paper is organized as follows. Section 2 theoretically analyzes the influence mechanism that the LTP has on farmland transfer-out and accordingly an essential empirical research hypothesis is established; Section 3 introduces the data resource, variables, and econometric model specifications. Section 4 presents empirical results and discussions. Section 5 further tests and analyzes the influence mechanism. Section 6 comprises conclusions and policy applications.

2. Theoretical Framework and Hypothesis

The net proceeds, measured by revenue minus the transfer cost, from transferring-out farmland is the key factor affecting farmers' transfer decisions. Therefore, to promote and expand farmland transfers the LTP needs to either increase the farmland value or decrease the transfer cost, or both, thus raising the net proceeds from land transfers.

2.1. LTP, Farmland Value, and Farmland Transfer-Out

LTP can increase the operating rent and trading value of farmland. In the implementation of LTP, Jiangsu province applied the principle of "certifying both the farmland and farmers' property rights", i.e., the LTP not only certifies the farmland information through field surveying and mapping, but also certifies farmers' ownership of their farmland according to the criterion specified by the relevant laws and regulations, eventually ending up with the government issuing a certificate of farmland contractual and management rights to each farmer. The LTP's certification, by clarifying owners' rights associated with the property, reduces farmers' risk of their farmland being encroached by private parties or taken under an unfair price by the government [23], i.e., the LTP effectively restrains external parties' opportunistic behavior against the farmland, thus reducing rent dissipation and strengthening owners' expected earnings from their farmland. Studies show that the operating value of farmland has increased following the LTP implementation [24,25]. Furthermore, Jiangsu, as a relatively rich province in China, also provides a wide range of funding sources, technical support, and rural services for farmers' agricultural operations, further enhancing the operational value of farmland [26].

As for the LTP's impact on the trading value of farmland, the principle of demonstration of real rights under the LTP in Jiangsu has led to a significantly improved registration system of farmland with the land contracting and management rights being certified. This clearly enhanced the credibility and protection of farmland property rights, thus effectively promoting the contractibility and tradability of farmland beyond the circle of acquaintances to a wider society [27–30]. In addition, the improvement of clarity and credibility of farmland property rights can promote the "standardization" of farmers' credit information, which can reduce the information asymmetry between financial institutions and farmers, thus alleviating the adverse selection and moral hazard problems in the rural credit market, and improve the financial institutions' recognition of farmland as a qualified collateral. Therefore, farmland not only can serve as production factors, but also provides a financing function, which has enhanced the asset elements of farmland and increased its trading value [31].

The increase in farmland operating value and trading value is beneficial to increasing farmland's rental income, thus stimulating the intention of farmers to transfer out farmland. Although some scholars pointed out that the rise of land rent will increase the cost of lessees to transfer in farmland, and squeeze their operating income, thus inhibiting the completion of farmland transfer deals. However, in fact, the rise of farmland operating value can ensure a good level of income from agricultural production and also enhance the credit availability to alleviate the financing constraints, which can pave the way to continuously optimize the allocation of production factors and form a positive interaction between the expansion of farmland operating scale and productive investments, thus further enhancing the possibility of achieving an even higher operating income of the farmland [23,32,33]. In addition, the "Opinions on strengthening the construction of policy systems to promote the development of new-type agricultural management entities" promulgated by the Jiangsu government has led to improved rural infrastructure as well as financial and credit services, thus offering a much-improved environment for the development of agriculture management entities for large-scale operations and strengthening the willingness of lessees to accept a higher rent charged by the farmers. As a result, farmland transfer-out deals have been effectively promoted.

It is worthwhile to note that some scholars think that the LTP will strengthen farmers' personal attachment to their farmland and thus increase their pain of "losing the farmland" when transferring-out farmland, which will motivate farmers to charge for their transfer-out farmland excessively beyond its economic value, thus leading to an "endowment effect" that may inhibit the farmland transferring out [34,35]. In fact, the transfer-out of farmland only entails the transfer of using right, while farmers still retain the farmland contracting right. Therefore, the pain of "losing the farmland" may not be as strong [36]. Meanwhile, in recent years, the viscosity of human–land relationship in rural areas of Jiangsu has faced a decrease. The number of people engaging in agricultural has decreased from 18.4% in 2015 to 16.1% in 2018, which is lower than 28.3% and 26.1% at the national level, respectively. In the past 40 years of reform and opening up, along with the process of industrialization and urbanization in China, farmers have gradually moved from rural areas to cities, and their emotional attachment to farmland has been weakened [13,37]. At the same time, the coverage rate of social security arrangements such as the basic social insurance for urban and rural residents, the new rural cooperative medical insurance and the basic pension in Jiangsu has exceeded over 97%, which continuously makes a dent in offering a security assurance and weakens the social value of the farmland in rural areas [38]. Therefore, under the background of the urbanization transformation in Jiangsu, the "endowment effect" of the farmland has become less obvious and the asset attribute of farmland has stood out. As a result, farmers' willingness to transfer-out farmland increases when the asset return from the transfers increases. Some scholars have also confirmed through empirical studies that the probability of farmers overestimating the value of farmland is lower when their emotional attachment to, and survival dependence on, the farmland is low and when there is a maturely developed farmland rental market, which provides further evidence for our argument in this paper that the "endowment effect theory" is not accurate and warranted in explaining the farmland transfers [39].

2.2. LTP, Transaction Costs, and Farmland Transfer-Out

LTP can reduce the pre-transaction and in-transaction costs of farmland transfer-out. As for pre-transaction costs, Jiangsu's LTP clarified the area and boundaries of farmland by means of field survey and mapping, as well as the land ownership relationship according to the criteria of laws and regulations. This not only effectively reduces the cost of farmland plot information collection and property rights definition, but also alleviates the information asymmetry between farmers and lessees, which can mitigate the phenomenon that lessees excessively hold down the rent due to their informational disadvantage and ease the adverse selection problem that high-quality farmland was squeezed out of the rental market, thus lowering the transaction costs with which the price mechanism works [40,41]. Mean-

while, on the basis of clarifying farmland property rights, Jiangsu has also issued farmland certificates to farmers, which helps strengthen the exclusivity of farmland property rights. It entitles the farmers a legal safeguard to resist the intervention from the village while transferring out their farmland, and also reduces the cost of acquiring information at ex ante about the village' attitudes towards the farmland transfer, thus securing the approval of the village leaders to ensure that the farmland transfer-out is free of interference [1]. Therefore, the LTP significantly reduces the pre-transaction costs of farmland transfer-out.

In terms of the in-transaction costs, Jiangsu issued the farmland property rights certificate, which strengthens the property rights protection and enhances the exclusiveness and credibility of farmland property rights. It not only leads to an increase in the cost of breach of contract and torts, but also reduces the uncertainty and stabilizes the expectation of both parties to the transaction, which promotes them to sign long-term transfer contracts because the risk associated with making long-term investments aimed at improving the productive efficiency of land operations is reduced. As a result, opportunistic behaviors such as predatory management are reduced, and the cost of maintaining and monitoring contract enforcement is reduced [31]. Based on the data from a nationally representative sample in rural China, Cao et al. [10] found that LTP has significantly positive effects on the possibility and amount of the long-term farmland investments such as water conservancy facilities and agricultural machinery by the new-type agricultural management entities, meanwhile significantly reducing short-termism operating behaviors. It should be emphasized, on the other hand, that some scholars hold that the LTP reinforces the asset specificity of farmland, and produces a "lock-in" effect after investments, which can increase the moral hazard of "fleece" during the period of transaction [42]. However, in fact, typically, only large-scale investments actually generate a "lock-in" effect, while the majority of small-scale farmers' productive investments in farmland is fertilizer and agricultural machinery with a relatively low withdrawal cost. For example, Xu et al. [43] used the data of "China Health and Retirement Longitudinal Survey" and found that the impact of the LTP for small-scale farmers to make long-term investments in farmland is not significant. The large-scale and long-term investments by themselves are of a public goods attribute, which is difficult to be completed by small-scale farm owners or operators. Therefore, for the majority of small-scale farmers, the "lock-in effect" is not obvious. In addition, the certificate can also serve as an accurate and legally accepted evidence for potential dispute lawsuits, which is beneficial in reducing the litigation costs [44,45].

The reduction in transaction costs has not only reduced the barriers to land transfers and extended the freedom for farmers to participate in the farmland rental market, which has released the potential supply that was originally excluded from the farmland rental market owing to the high cost of market entry [46]. Furthermore, the reduction in transaction costs can also alleviate farmers' path-dependence on their acquaintance network to transfer-out farmland, thus expanding the trading radius, increasing the range of objects, and making more opportunities available to realize a mutually beneficial trading. Therefore, the intention for farmers to transfer-out farmland is effectively enhanced and the probability that a farmland transfer-out deal succeeds has improved. Using the data from China rural fixed observation points and surveys conducted in 17 provinces in rural China, respectively, Wang et al. [1] and Ye et al. [47] confirmed that the reduction in transaction costs effectively promotes more farmers entering the farmland rental market, and extends the scope of trading partners to the new-type agricultural operation entities such as scale-operation households and companies. Accordingly, we have the following hypothesis:

Hypothesis 1. *Ceteris paribus, the LTP enhances the intention and behavior of farmers to transfer-out farmland.*

Hypothesis 2. *Ceteris paribus, the LTP promotes the intention and behavior of farmers to transfer-out farmland through reducing transaction costs and increasing the value of farmland.*

Moreover, a theoretical framework was constructed to demonstrate the influence of LTP on farmland transfer-out more clearly (as Figure 1).

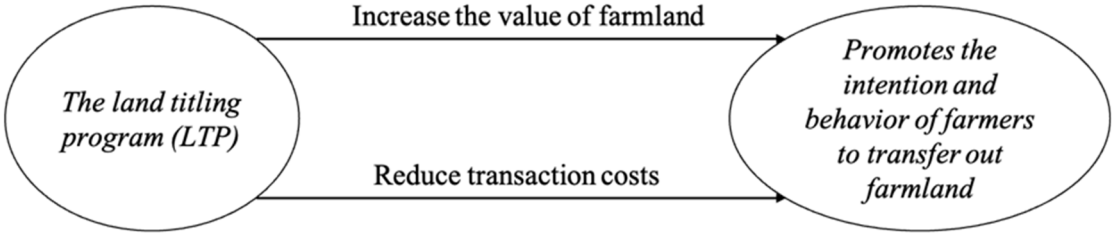

Figure 1. Theoretical framework.

3. Data and Methodology

3.1. Sampling and Data Collection

As one of the earliest provinces that have completed the LTP by 2018, Jiangsu has advanced into a "retrospective" stage of consolidating the achievements of reform and further dealing with the remaining issues. Meanwhile, it has also issued a series of policies such as "Opinions on the implementation of provincial fiscal support for the rural land circulation" to promote farmland transfer-out and development of the farmland leasing market [14,48]. Note that both the nonfarm employment rate of rural labor force and the degree of urbanization in Jiangsu province have been significantly higher than that of national average, and, accordingly, the occupational differentiation in Jiangsu's rural regions has intensified over time, the rural–urban dynamics have been on the rise, and the social–economic realm has increasingly been opening up; thus, Jiangsu province provides a very typical example displaying the symbolic constraint conditions of "transformation from a rural China to an urban–rural China" that we focus on. Therefore, we take Jiangsu as our research object, analyze the influence mechanism of LTP on farmland transfer-out based on the assumption that human beings are rational.

The data resource is a field survey conducted by our research group in Jiangsu in June 2018, during which we collected information about the features of farmland plots, farmers' individual characteristics, and the information about farmland circulation and transfers. In order to improve the representativeness and generality of our sample, the following selection methods were adopted:

First, we searched for data on farmland transactions that occurred during the first quarter of 2018 using the service platform of rural property rights transaction information in Jiangsu (see Table 1). Considering there exist obvious regional differences between the north, central, and south parts of Jiangsu, we chose Suzhou (in the south part of Jiangsu), Taizhou (in the central part of Jiangsu), and Yancheng and Huai'an (in the north part of Jiangsu) as the research areas. Second, Wuzhong from Suzhou, Jiangyan from Taizhou, Funing from Yancheng, and Lianshui from Huai'an were randomly selected as the sample counties in the respective regions. Finally, a township was randomly selected from each of the sample counties, three administrative villages were randomly selected from each township, and twenty farmers were randomly selected from each village. Data were collected through questionnaires. In order to handle the potential problem that some selected farmers refuse to take the survey or fail to accurately report the relevant information, we also selected an additional 1–2 alternative farmers in each village. A total of 256 questionnaires were issued in this survey, 210 of which were received as valid after sorting out, with an effective survey rate of 82.03%.

Table 1. Farmland Transactions in prefecture-level cities of Jiangsu in the first quarter of 2018 (top 5).

Region	Number of Transactions	Region	Amount of Transaction (Ten Thousand RMB)
Suzhou	2850	Huai'an	69,748
Taizhou	2486	Suzhou	54,292
Yancheng	2467	Yancheng	50,171
Yangzhou	1750	Xuzhou	45,809
Wuxi	1577	Taizhou	40,811

Note: The currency in the table is Chinese RMB. According to the exchange rate of USD against RMB at the time of investigation, RMB is converted into USD, and the result is as follows (ten thousand USD): 446,931.23; 347,892.28; 321,485.73; 293,534.91; 261,508.73.

The questionnaire was divided into two parts. The first part was about the basic information of farmers' individual and family characteristics, income structure, and farming operation status. The second part was about the farmland plot features. Considering that many years of intensive cultivation have made farmers familiar with their farmland plot characteristics, based on the evaluation of farmers, we adopted the Likert scale to search site conditions such as fertility, irrigation conditions, terrain, and area, as well as commuting conditions such as the distance from town and home. At the end of the field survey, we investigated key issues such as land circulation again through random telephone sampling, and verified them with the field survey results to ensure the reliability of the survey results. Finally, data of 210 households and 968 farmland plots were obtained.

3.2. Empirical Model Specifications

Considering that the dependent variables—farmers' intention and behavior of transferring-out farmland are binary dummy variables, the Probit model was adopted to estimate the impact of the LTP on farmland transfer-out through the principle of maximum likelihood. The specific model is set as follows:

$$Prob(Y_{ij} = 1) = \phi(\alpha_0 + \alpha_1 Certi_{ij} + \alpha_2 X_{ij} + \alpha_3 Z_i + \alpha_4 \theta_h) \quad (1)$$

where Y_{ij} denotes the dependent variable—the farmland plot j of household i being rented out or not. The explanatory variable, $Certi_{ij}$ indicates whether the farmland plot j of household i is included in the property rights certificate. X_{ij} denotes the features of the farmland plot j of household i. Z_i denotes household i's characteristics. θ_h represents the dummy variable at the village level to control other unobservable influencing factors.

Dependent variable. Referring to the existing literature, we adopted the intention and behavior of farmers to transfer-out farmland to measure farmers' decisions on farmland transfer-out [49]. In particular, the intention of transferring-out farmland was measured from the answers to a question in the questionnaire: "Are you willing to transfer the farmland plot j". If the answer is yes, then $Y_{ij} = 1$, otherwise equal to 0. Similarly, the behavior of farmland transfer-out was measured from the answers to the question: "Whether farmland plot j has actually been transferred out". If the answer is yes, then $Y_{ij} = 1$, otherwise equal to 0.

Independent variables. The LTP in most of the existing literature is measured by "whether farmers have the property rights certificate" or "whether the villages have implemented the LTP" [50] However, during the field investigation, we found that some farmland plots, though located in the regions where the LTP had been implemented, are not included in the issued property rights certificate. The reason was that some farmland plots are slope land plots that require a lot of techniques and costs to measure the boundary, or that some farmland plots still suffer from some problems such as ownership disputes. Therefore, the farmland not included in the property rights certificate will be regarded as confirmed if measuring LTP by "whether the farmer owns the property rights certificate" or "whether the village has implemented the LTP", leading to a biased estimation result. So, based on the collected survey information about whether the peasant household actually has the farmland-contracting and management rights certificate for a particular

farmland plot, we further differentiated whether the farmland plot j of peasant household i is recorded in the property rights certificate. If it is indeed recorded in the certificate, then $Certi_{ij} = 1$, otherwise $Certi_{ij} = 0$.

Control variables. In order to alleviate the endogeneity problems caused by missing variables, we control variables that are closely related to farmers' transferring out of farmland and the LTP in the model in light of the literature. Specifically, it includes plot features such as soil fertility, irrigation conditions, terrain, area, distance from the town and home, and individual characteristics of farmers such as age, gender, education, self-rated health status, and whether they are village cadres [51], as well as household characteristics such as household labor force, household agricultural income and expenditures, and non-agricultural income and expenditures [52]. Table 2 shows the descriptive statistics using a classification of the farmland plot features based on the collected survey information.

Table 2. Definitions and the summary statistics for farmland plot features.

Variables	Definitions	Mean (LTP)	Mean (Non-LTP)	LTP–Non-LTP
Transfer-out intention	Yes = 1, No = 0	0.356	0.037	0.320 ***
Transfer-out behavior	Yes = 1, No = 0	0.277	0.037	0.240 ***
Area	Ln (farmland plot area)	2.029	0.995	1.033 ***
Soil fertility	Good = 3, Ordinary = 2, Bad = 1	2.367	2.222	0.145 ***
Irrigation conditions	Good = 3, Ordinary = 2, Bad = 1	2.043	1.908	0.135 *
Terrain	Flat (slope < 25°) = 1, otherwise = 0	0.951	0.936	0.015
Distance to town	Ln (Distance from plot to town)	2.788	2.933	−0.145 **
Distance to home	Ln (Distance from plot to home)	1.656	2.857	−1.201 ***

Note: *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

According to the survey data, 859 farmland plots are included in the property rights certificate while 109 farmland plots are not included; hence, the rate of farmland titling reaching 88.74% in the sampled regions. Table 2 reflects the difference between farmland plots with titling certificates and the ones without. It can be seen that the intention and behavior of farmers to transfer out farmland plots that are titled are higher than for those without land titling, preliminarily suggesting that the LTP promotes the intention and behavior of farmers to transfer out farmland. At the same time, there exist significant differences in farmland plot features between the LTP group and the non-LTP group. If the farmland plot features are omitted, the error term in the regression model will be correlated with the LTP variable, resulting in an endogeneity problem. This further verifies the rationale of using the data at the farmland plot level for the empirical analysis.

4. Empirical Results and Discussions

In this section, we first report the results of the benchmark regression: the impact of the LTP on farmland transfer-out. Second, the robustness test and heterogeneity analysis are conducted on the basis of using the instrumental variable method to alleviate the endogeneity problems in the model.

4.1. Results of the Benchmark Regression

In Table 3, columns 1–3 are results of the influence that the LTP has on the intention of farmland transfer-out. Column 1 shows that without controlling variables, the LTP promotes the intention of farmers to transfer-out farmland, which is significant at the 1% level. After adding variables of land plot features and farmers' individual characteristics (column 2) as controls into the model, and taking into account other unobservable factors at the village level (column 3), the LTP still shows a significant positive effect on the intention of farmland transfer-out at the 1% level. The result is consistent with the conclusion of Hu and Luo [53]. In Jiangsu, which has been "transforming from a region of rural China style to one of urban and rural China style", farmers may no longer have strong emotional

attachment to the farmland and the life security function of farmland to peasants has not become obvious. The LTP strengthens the real rights protection of farmland property rights, highlights the asset attributes of farmland, and increases the expected income from land circulation and transfers, thus promoting the intention of farmers to transfer-out farmland.

Table 3. Effects of the LTP: the benchmark regression.

Variables	1	2	3	4	5	6
	Intention of Transfer-Out			Behavior of Transfer-Out		
LTP	1.320 *** (0.213)	1.487 *** (0.267)	1.910 *** (0.371)	1.097 *** (0.213)	0.814 *** (0.235)	1.118 *** (0.312)
Farmland plot features	NO	YES	YES	NO	YES	YES
Household individual characteristics	NO	YES	YES	NO	YES	YES
Dummy variable of village level	NO	NO	YES	NO	NO	YES
Number of observations	968	968	968	968	968	968

Note: (1) *** denote statistical significance at 1% levels, respectively. (2) Figures in the brackets are clustered standard errors. (3) The control variable—Farmland plot features—includes farmland site conditions and commuting distance. The Household individual characteristics control variables include age of the head of the household, gender of the head of the household, years of education of the head of the household, and self-assessed health status of the head of the household, household labor force ratio, village cadre status, and ratio of farming income to total income. These control variables used in the following paragraphs refer to the same and will not be further explained.

In Table 3, columns 4–6 are results of the influence that the LTP has on the behavior of farmland transfer-out. Column 4 shows that without controlling variables, the LTP promotes the behavior of farmers to transfer-out farmland, which is significant at the 1% level. After adding variables of land plot features and farmers' individual characteristics (column 5) into the model, and taking into account other unobservable factors at the village level (column 6), the result remains robust. This result is consistent with the research conclusions of Holden et al. [54], Deininger et al. [4], and Yami et al. [23] on Ethiopia, Nicaragua, and the Dominican Republic. Their empirical results show that the improvement of land property rights guarantees can reduce the transaction costs of agricultural land transfers, and also reduce the risk of the transferred farmers' land loss. Moreover, the LTP increases the farmland management value, and stabilizes the expectation of lessees' income from agricultural management of the farmland. Hence, the probability of lessees accepting the charges of farmland owners will rise and the chance of actual completion of the farmland transfer-out deals will be promoted.

Therefore, Hypothesis 1 of this paper is verified.

4.2. Approaches to Endogenous Problems

Due to the limited indicators covered by the survey data, our model is still likely to have omitted variables that affect both the independent variable: the LTP and the dependent variable: farmland transfer-out. Moreover, the developmental maturity of the farmland rental market will influence the implementation of the LTP policy, which may lead to the existence of an endogeneity problem of two-way causality. Therefore, referring to the existing literature [55], the ratio of the land area included in the property rights certificate to the total land area of the village was selected as an instrumental variable for the LTP variable. We adopted the Ivprobit model and conditional mixed process (CMP) to alleviate the endogeneity problem. The selection of the ratio as the instrumental variable was based on the following considerations: first, the correlation condition of the instrumental variable is satisfied. The proportion of the land area included in the property rights certificate in a village reflects the overall situation of the LTP implementation in that village; hence, it will affect the progress and result of farmland property rights being titled for a single farmer. Meanwhile, the F value of the Ivprobit model in the first stage is 15.83, which is greater than the threshold of 10, indicating that there exists no problem of weak instrumental variable.

Second, it satisfies the exogeneity requirements. Generally speaking, the individual intention and behavior of farmers to transfer-out the farmland do not affect the LTP implementation in the whole village, so the instrumental variable is not directly related to the farmland transfer-out. Meanwhile, referring to Fang and Zhao [56], we further verified whether the instrumental variable is exogenous statistically by regressing the farmland transfer-out to both the LTP and the instrumental variables. If the instrumental variable only affects the farmland transfer-out indirectly through the LTP, it will have no significant influence on the farmland transfer-out directly under the control of the LTP. The results in column 1 and column 2 of Table 4 show that on the basis of the significant positive coefficient of the LTP, the impact of the instrumental variable on the farmland transfer-out is not significant, indicating that the instrumental variable meets the requirement of exogeneity.

Table 4. Effects of the LTP: IV regressions.

Variables	1	2	3	4	5	6
	Exogeneity Test		Results			
	Intention of Transfer-Out	Behavior of Transfer-Out	Intention of Transfer-Out		Behavior of Transfer-Out	
			Ivprobit	CMP	Ivprobit	CMP
IV	1.145 (0.800)	1.095 (0.880)				
LTP	1.479 *** (0.268)	0.804 *** (0.236)	4.068 ** (1.682)	3.312 *** (0.666)	3.280 * (1.694)	2.710 *** (0.824)
Farmland plot features	YES	YES	YES	YES	YES	YES
Household individual characteristics	YES	YES	YES	YES	YES	YES
Dummy variable of village level	YES	YES	YES	YES	YES	YES
Number of observations	968	968	968	968	968	968

Note: (1) *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. (2) Figures in the brackets are clustered standard errors.

The results in column 3 and column 5 of Table 4 show the result of the Ivprobit model. After controlling land features and farmers' individual characteristics as well as considering other unobservable factors at the village level, the LTP significantly promotes the intention and behavior of farmers to transfer out farmland, which are at the level of 5% and 10%, respectively. Moreover, considering that LTP is a discrete variable, the first stage of the Ivprobit model adopts a linear estimation method. Hence, adopting the Ivprobit model to deal with the discrete type variable—LTP—will make the estimation result biased due to the model setup bias. Therefore, we further adopted the conditional mixed process method (CMP) proposed by Roodman [57] to verify the robustness of the above results. The results are shown in columns 4 and 6 in Table 4. It can be seen that LTP has a positive impact on the intention and behavior of farmers to transfer-out farmland at the level of 1%, which confirms that the LTP, indeed, motivated farmers to transfer-out farmland.

4.3. Robustness Test

4.3.1. Biprobit Model

As the unobservable factors influencing farmers' intention to transfer-out farmland may also affect other unobservable factors that influence farmland transfer-out behaviors, this can result in correlations between the error terms in the farmland transfer-out intention model and the farmland transfer-out behavior model, thus affecting the estimation efficiency. To deal with this concern, we adopted the biprobit model to further examine the impact of the LTP on both the intention and behavior of farmers to transfer out farmland. Results in column 1 and column 2 in Table 5 show that after controlling farmland plot features and farmers' individual characteristics as well as considering unobservable factors at the village level, the LTP has a positive effect on the intention and behavior of farmers

to transfer out farmland at the significance level of 1%. This shows that even considering the possible correlation of the disturbance terms between the intention model and the behavioral model, the causal relationship of the LTP, farmland transfer-out intention and behavior is still robust.

Table 5. Effects of the LTP: Biprobit regressions.

Variables	1	2
	Intention of Transfer-Out	Behavior of Transfer-Out
LTP	1.483 ***	0.960 ***
	(0.269)	(0.260)
Farmland plot features	YES	YES
Household individual characteristics	YES	YES
Dummy variable of village level	YES	YES
Number of observations	968	968

Note: (1) *** denote statistical significance at 1% levels, respectively. (2) Figures in the brackets are clustered standard errors.

4.3.2. Propensity Score Matching (PSM)

Although we have mitigated the self-selection problem to some extent by adding control variables to the model, the model is based on a linear model assumption. There will be a problem of functional form misspecification in the model setting if the assumption does not hold. Since the propensity score matching (PSM) method does not require functional form to be set, this relaxes the linear model assumption and thus mitigates estimation bias due to functional form misspecification. Therefore, we introduced the PSM to further test the causal relationship between the LTP and farmland transfer-out.

Specifically, we first selected the control variables in the benchmark regression as covariates. Then, we used a Logit model to calculate the propensity score. Finally, the LTP group and the non-LTP group with the most similar propensity scores were automatically matched into a group through the radius matching method or the kernel method. In this paper, we used the above two matching methods to ensure the robustness of the matching results. After matching by PSM method, the absolute values of standard deviations of most covariates were reduced to less than 10%. Meanwhile, the Pseudo R2 was also significantly lower in the joint distribution test after matching, which shows that the matching effect was good. Results of the two matching methods are shown in Table 6. It can be found that the LTP has a positive impact on both the intention and behavior of farmland transfer-out at the significant level of 1%, which indicates that the model setting bias of the benchmark regression model does not exist, and the results show a good robustness.

Table 6. Effects of the LTP: PSM regression.

Variables	Matching Method	ATT	Standard Deviation	T Value
Intention of transfer-out	Radius	0.275	0.039	7.00 ***
	Kernel	0.291	0.040	7.22 ***
Behavior of transfer-out	Radius	0.185	0.039	4.79 ***
	Kernel	0.202	0.040	5.07 ***

Note: *** denote statistical significance at 1% levels, respectively.

4.4. Heterogeneity Test

Although the above analysis has verified the positive effect of the LTP on farmers' intention and behavior of transferring-out farmland, we believe that the regional economic development level, and whether the government intervenes in farmland transfers or not, may lead to differentiation in the policy effect. Therefore, the regional economic development level and whether or not the government intervenes in farmland transfer-out are taken as the criteria to further analyze the heterogeneous effects of the LTP.

4.4.1. Economic Development

Generally speaking, the interaction between rural and urban areas in regions with a higher economic development level is stronger, as a result in those regions there exist relatively more non-agricultural employment opportunities for rural households, thus can better reflect the constraint condition of the transformation from a "rural China" to the "urban and rural China" that we focused on in the background analysis. This can lead to a strengthened "property rights incentive effect" and a stronger policy effect of the LTP. Therefore, based on the GDP of each county in 2019, we selected Wuzhong and Jiangyan as areas with a higher economic development level, and meanwhile Funing and Lianshui as areas with a lower economic development level, then we conducted sub-sample regressions separately. Results are shown in Table 7, which are consistent with the baseline regression results. In both of the two groups with different levels of economic development, the LTP has a significant positive effect on the intention and behavior of farmland transfer-out. It shows that the incentive effect of the LTP still exists when the heterogeneity of regional economic development levels is considered. By further comparing coefficients of the two groups, it can be further seen that the LTP has a greater impact on the intention and behavior of farmers to transfer-out farmland in areas with a higher economic development level.

Table 7. Effects of the LTP: Heterogeneity based on the regional economic development levels.

Variables	Regions with a Higher Economic Development Level		Regions with a Lower Economic Development Level	
	Intention of Transfer-Out	Behavior of Transfer-Out	Intention of Transfer-Out	Behavior of Transfer-Out
LTP	0.511 ***	0.264 ***	0.455 ***	0.255 **
	(0.122)	(0.097)	(0.113)	(0.103)
Farmland plot features	YES	YES	YES	YES
Household individual characteristics	YES	YES	YES	YES
Dummy variable of village level	YES	YES	YES	YES
Number of observations	481	481	487	487

Note: (1) ** and *** denote statistical significance at 5% and 1% levels, respectively. (2) Figures in the brackets are clustered standard errors. (3) The reported results are marginal effects.

4.4.2. Type of Farmland Transfer-Out Deals: The Impact of Government Intervention

Some farmland transfer-out deals were spontaneous transactions without government intervention, while others were accomplished with the government support in the process. Ma et al. [8] shows that government intervention can strengthen the transaction cost reduction effect of the LTP and thus further promote farmers' decisions on farmland transfer-out. Therefore, we conducted sub-sample regressions based on whether the government intervenes in the farmland transfer-out deals or not, and the results are shown in Table 8. It can be seen that the LTP has a significant positive impact on both types of farmland transfer-out deals. Moreover, the further comparison of coefficients of different groups shows that the impact of the LTP on farmland transfer-out with government intervention is significantly higher than that on spontaneous transactions. A possible explanation is that moderate government interventions in farmland transfer can serve as an intermediary platform, which is beneficial to alleviating the problem of information asymmetry between the transaction parties, and significantly reducing their searching cost. At the same time, governments tend to improve the rules of farmland transfer, standardize the farmland rental market, strengthen the transaction cost reduction effect of the LTP, thus further promoting the intention and behavior of farmers to transfer-out farmland.

Table 8. Effects of the LTP: Heterogeneity in the effect on different types of farmland transfer-out deals.

Variables	Spontaneous		Government Intervention	
	Intention of Transfer-Out	Behavior of Transfer-Out	Intention of Transfer-Out	Behavior of Transfer-Out
LTP	0.443 ***	0.167 **	0.491 ***	0.272 **
	(0.088)	(0.066)	(0.157)	(0.127)
Farmland plot features	YES	YES	YES	YES
Household individual characteristics	YES	YES	YES	YES
Dummy variable of village level	YES	YES	YES	YES
Number of observations	443	443	525	525

Note: (1) ** and *** denote statistical significance at 5% and 1% levels, respectively. (2) Figures in the brackets are clustered standard errors. (3) The reported results are marginal effects.

5. Mediation Mechanisms

5.1. Testing for the Mediation Mechanisms

On the basis of the above analysis confirming a positive effect of the LTP on the intention and behaviors of farmers to transfer-out farmland, we would like to further delve deeper into the mechanisms of how the LTP affects farmland transfers. To achieve this, we selected the farmland value and transaction costs as the intermediate variables and adopted a sequential steps approach to test the indirect effects, so as to further investigate whether the LTP for farmland contracting and management rights will affect the net income of farmland transfer-out, thus influencing farmers' decisions to transfer out of farmland. The regression models are as follows:

$$mediation_{ij} = \theta_0 + \theta_{med} Certifi_{ij} + \sum \omega_k Con_{ij} + \lambda_v + \varepsilon_{ij}, \quad (2)$$

$$Y_{ij} = \varphi_0 + \varphi_{cr} Certifi_{ij} + \varphi_{med} mediation_{ij} + \sum \omega_k Con_{ij} + \lambda_v + \varepsilon_{ij}, \quad (3)$$

where $mediation_{ij}$ represents the mediating variable, including the farmland value and transaction costs of farmland transfer-out deals. Con_{ij} represents the control variable and is consistent with the benchmark regression. λ_v represents village level fixed effects. For the farmland value, most of the existing literature uses the rent of transferred-out farmland to measure its value [58–60]. One question that should be highlighted is that though we cannot observe the rent of farmland that were not transferred out, the farmland, for sure, still had potential market value. If they are assigned a zero value, the estimated result will be biased. To deal with this problem, in our regressions we computed the potential market value of the farmland plots that were included in the property rights certificate but not transferred out, as the average rent of other farmland plots that were included in the certificate and transferred out in the village where the farmland plot was located. When it came to farmland plots that were not included in the certificate and not transferred out, we used the average rent of other farmland plots that were not included in the certificate but transferred out in the village where the farmland plot was located, to compute the potential market value of farmland plots. Since there is no direct question designed in the questionnaire to measure transaction costs, we referred to the existing literature by using the proportion of farmland transfer-out in each village as a proxy variable. A larger value of the proxy variable indicates that the local market for farmland transfer-out is more active and the transaction costs are lower [61]. If we observe that the LTP stimulates the increase in farmland value and the reduction in transaction costs, thus promoting the transfer-out of farmland, then this indicates that the LTP increases the net income of farmland transfer-out.

We test for the mediation effect in the following steps: First, on the basis that the LTP does promote farmland transfer-out, i.e., the estimated coefficient α_1 in Equation (1) is statistically significant, we check, in a statistically significant sense, whether the LTP affects the mediator (Equation (2)) and whether the mediator variable affects farmland transfer-out while controlling for LTP (Equation (3)). If both of the estimated coefficients θ_{med} and φ_{med}

are statistically significant, it indicates the mediating effect exists, and then we will need to carry out the fourth step test. However, if at least one of the coefficients is not significant, then we will need to carry out the second step test. Second, since the mediating effect model in this paper is nonlinear, the statistical significance of the null hypothesis: $\theta_{med} \times \varphi_{med} = 0$ is tested by the KHB method. If $\theta_{med} \times \varphi_{med} = 0$ is significant, it indicates the mediating effect exists, and then we should proceed to the third step, otherwise stop the analysis. Third, test the coefficient φ_{cr} in Equation (3). If φ_{cr} is not statistically significant, it indicates that there exists a perfect mediation effect in the model. If φ_{cr} is statistically significant, the signs of $\theta_{med} \times \varphi_{med}$ and φ_{cr} should be compared. If the signs are consistent, it indicates a partial mediation effect exits, otherwise indicating the cover effect exits.

5.2. The Test Result of the Mediation Effect

Results of the mediating effect of the farmland value on farmland transfer-out are shown in Table 9, columns 1 to 3. Result of Step 1 (Table 9, column 1) shows that the LTP has a positive impact on the mediator variable: farmland value, which is significant at the 1% level. It can be seen that the LTP increases both the operating and trading value of farmland and hence pushes up the leasing rent, which is consistent with the conclusions of Cheng et al. [62] and Qiu et al. [63]. Meanwhile, the increase in farmland leasing rent promotes both the intention and behavior of farmland transfer-out at the significance of 1% (Table 9, columns 2 and 3), indicating that the indirect effect is significant. Under the background of "rural China transforming into an urban and rural China", the LTP promotes the intention and behavior of farmland transfer-out by increasing the leasing rent and households' circulation income. Based on the significance results of θ_{med} and φ_{med} in Step 1, Step 3 was carried out and the results (Table 9, column 2 and 3) show that the LTP has a significant influence on farmland transfer-out at the 1% level, which is consistent with the sign of $\theta_{med} \times \varphi_{med}$, indicating that the farmland value has a partial mediating effect on farmland transfer-out.

Table 9. Effects of the LTP: Mediating effects.

Variables	1	2	3	4	5	6
	Mediation Mechanism of Farmland Value			Mediation Mechanism of Transaction Cost		
	Farmland Value	Intention of Transfer-Out	Behavior of Transfer-Out	Transaction Cost	Intention of Transfer-Out	Behavior of Transfer-Out
LTP	0.269 ***	1.444 ***	0.662 ***	−0.160 ***	2.094 ***	1.289 ***
	(0.014)	(0.288)	(0.253)	(0.051)	(0.409)	(0.346)
Farmland value		0.804 ***	1.079 ***			
		(0.218)	(0.204)			
Transaction cost					−2.160 **	−2.526 ***
					(0.911)	(0.916)
Control variables	YES	YES	YES	YES	YES	YES
Dummy variable of village level	YES	YES	YES	YES	YES	YES

Note: (1) ** and *** denote statistical significance at 5% and 1% levels, respectively. (2) Figures in the brackets are clustered standard errors.

Results of the mediating effect of transaction costs on farmland transfer-out are shown in Table 9, columns 4 to 6. The result of Step 1 shows that the LTP has a negative impact on the mediator variable: transaction costs, which is significant at the 1% level, indicating that the LTP leads to a reduction in transaction costs before and during the period of farmland transfer-out, which is consistent with the conclusions of the existing literature [50,62]. Meanwhile, the reduction in transaction costs promotes the intention and behavior of farmland transfer-out at the significance of 5% and 1%, respectively (Table 9, columns 5 and 6), indicating that the indirect effect is significant. The LTP reduces the transaction costs of farmland transfer-out, lowers the entry barrier of the farmland rental market, expands the trading radius, thus effectively expanding the market and promoting the intention

and behavior of farmers to transfer-out farmland. Based on the significance results of θ_{med} and φ_{med} in Step 1, Step 3 was carried out and the results (Table 9, column 5 and 6) show that the LTP has a significant influence on farmland transfer-out at the 1% level, which is consistent with the sign of $\theta_{med} \times \varphi_{med}$, indicating that transaction costs have a partial mediating effect on farmland transfer-out, which verifies Hypothesis 2 in this paper.

6. Conclusions

On the basis of constructing the theoretical framework of "long-term benefit–net benefit–transfer of farmland", we used the household-level and land plot-level micro-survey data that we collected in Jiangsu province and adopted the probit model as well as the mediating effect model to conduct a quantitative analysis of the extent and mechanisms of the influence that land titling has on farmland transfer-out. Conclusions are as follows: First of all, the result of the benchmark regression shows that the LTP has a significant positive impact on both the intention and behavior of farmers to transfer-out farmland. After adopting the instrumental variable method (IV) and the conditional mixed process (CMP) to ease the potential endogeneity problem in the model, using the biprobit model and the propensity score matching method (PSM) for re-estimation, the results are still robust. Secondly, we further investigate the heterogeneous effects of the LTP on different farmland transfer-out. It is found that in regions with a higher economic development level and in farmland transfer deals with government facilitation, we observe a more pronounced promotional effect of the LTP on farmland transfer-out. Finally, the study confirms that the LTP increases the net income from farmland transfer-out through increasing the farmland value and reducing transaction costs, thus promoting the transferring out of farmland.

Based on the above conclusions, some policy implications are as follows: First of all, under the constraint conditions of "transition from a rural China to an urban and rural China", LTP can promote farmers to move out of the farmland. In particular, the government should further promote the development of secondary and tertiary industries, increase non-agricultural employment opportunities, and raise wage levels through means such as lowering corporate taxes, as well as improve the social security system, so as to weaken farmers' dependence on farmland for survival, enhance the property attributes of farmland, thus promoting farmers to further integrate into the urban life. Secondly, the policy effect of land titling differentiates depending on the regional economic development level and intervention measures of government. Therefore, the government should give full consideration to the differences in regional economic levels and increase the policy support for the overall development of urban and rural areas in economically underdeveloped areas. At the same time, the government should do a good job in guiding and managing the development of the farmland transfer market, establish an open and transparent information transmission mechanism for farmland transfer, standardize farmland transfer procedures, promote farmers to transfer out of farmland, and improve the farmland transfer market. Finally, unlike other countries that guarantee farmers' rights to land property by granting them land ownership [13,64,65], China's LTP promotes the transfer of farmland by strengthening farmers' rights to contractual management and transfer of farmland while retaining collective ownership of farmland. Therefore, the government should guarantee farmers' contractual management right of farmland, protect farmers' income of farmland, so as to promote farmland circulation.

Finally, it should be pointed out that this research can be further improved upon in the following two aspects in the future: First of all, by only using data from a field survey in Jiangsu, this paper only reveals the policy effect of land titling in Jiangsu. However, with the deepening trend of the transformation from "rural China" to "urban and rural China" at the national level, it is necessary to use data from other representative regions to further confirm the conclusions of this paper. Secondly, owing to the limitation of data availability, the cross-section data used in this paper only reveal the static effect of land titling on farmland transfer-out while it is difficult to eliminate the potential interference caused by factors that do not change with time. In a follow-up study, multi-stage panel

data at the land plot level should be used to further alleviate the endogeneity problem and capture the long-term dynamic effect of land titling on farmland transfer-out.

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