

## Article

# The Impact of Land Transfer on Vulnerability as Expected Poverty in the Perspective of Farm Household Heterogeneity: An Empirical Study Based on 4608 Farm Households in China

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**Abstract:** Poverty eradication is one of the global challenges, and land transfer provides an effective path to address farmers' poverty; however, the effect of poverty reduction can show heterogeneity depending on the location, household, and head of household. This study employs the propensity value matching technique to compare the effects of the land transfer on the future alleviation of poverty among farm households, based on the vulnerability as expected poverty, using data from 4608 household tracking surveys. The findings point to the following: In general, rural land transfers can significantly lessen farm households' VEP. In terms of regional variations, the positive effects of land transfers on farm households' VEP are mainly in the west. In terms of the differences among households, it was found that land transfers contribute to lower VEP for non-poor, non-financing-constrained, and government-subsidized farm households. With regard to differences in household headship, land transfers have abating effects on the VEP of self-employed heads of farm households. The results of the study can provide a useful reference for policy-making on land management and poverty reduction among farmers

**Keywords:** land transfer; vulnerability as expected poverty; farm households; heterogeneity



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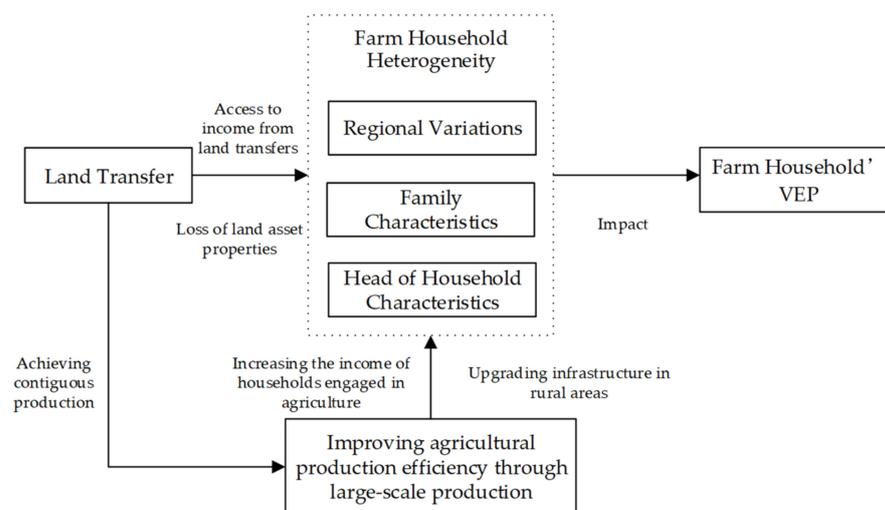
## 1. Introduction

Land is essential to the survival of farmers, as it serves multiple purposes, including production, livelihood, and social security [1,2]. However, unlike other commodities, rural land in China is collectively owned and therefore cannot be traded freely [3,4]. Historically, the dated land system has stifled agricultural productivity and created obstacles to the movement of rural labor to industries and regions that provide better economic opportunities [5]. In order to accommodate the rapid growth of China's economy and technology, the government has continuously enhanced the land property rights system [6]. In 2014, the Central Committee's No. 1 document proposed the "three rights division" for contracted land. Farmers are able to protect their land rights and interests and obtain the right to dispose of and benefit from land management rights, and land management rights can be freely traded on the market, thereby activating the asset function of land. In 2015, the "Decision of the Central Committee of the Communist Party of China and the State Council on Winning the Battle of Poverty Alleviation" proposed that farmers' cooperatives and other business entities be supported to increase the income of poor households through land transfer methods such as land trusteeship and the absorption of farmers' land management rights as shares. Through land transfer, the disadvantage of land fragmentation is eliminated, creating conditions for the realization of agricultural scale and modernization [7,8].

Land transfer is a crucial component of China's efforts to deepen the reform of its rural land system [9–11]. By granting farmers more property rights, land transfer has activated the efficiency of market resource allocation, enabled the scale and modernization of agriculture, and become a crucial factor in farmers' ability to escape poverty and become affluent [12].

China's household contracted cultivated land circulation area reached 530 million mu by the end of 2018, representing 35% of the country's cultivated land area. Consequently, a large number of surplus laborers were transferred to cities, which promoted urbanization and industrialization, boosted the overall social welfare level, and improved rural conditions by coordinating the integrated development of urban and rural areas, thereby becoming an effective practice for alleviating poverty in China's rural areas [13–15]. In 2018, the per capita disposable income of rural residents in impoverished areas was CNY 10,371, which was 1.99 times higher than in 2012 and grew by 12.1% annually on average. The alleviation of poverty in China's land transfer can serve as a valuable theoretical reference for farmers in other developing countries seeking to eradicate poverty.

Land transfer in this article refers to the transfer of land use rights from farmers with contracted land management rights to other farmers or economic organizations [16–18]. The essence of rural land transfer is that, in the context of multiple factors in the agricultural economy, the land rental market transfers land use rights from those with lower land valuations to those who are more eager to increase their production value through a mechanism of price equilibrium [19,20], and it assists farmers with varying land labor endowments in re-adjusting their marginal products [21,22]. In addition, land transfer can facilitate the transfer of rural surplus labor from agriculture to other industries [23]. This is the internal mechanism for improving the income of farmers through land transfer [24] (Figure 1).



**Figure 1.** Mechanisms of the effect of land transfer on farm households' VEP.

The effect of the land transfer system on reducing poverty has attracted the attention of numerous scholars [25–27]. Land transfer has a leveling effect on marginal output, transaction income, and the Pareto effect, and it has become a crucial method for efficiently allocating rural land elements [28]. It has a significant effect on the multidimensional poverty of rural households in poor villages through a mechanism known as the “preventive saving motive” [29]. Kassie et al. believe that land transfer not only is conducive to reducing agricultural costs, but also encourages non-agricultural employment of farmers, improves the income structure of farmers, and improves the overall welfare of farmers [30]. It is well acknowledged that “preventing” poverty is far more important than “governing” poverty [31], and “preventing” poverty requires measuring farmers' susceptibility to poverty [32]. The poverty index measures only the welfare level at a static point in time; examines whether farmers are in the ex-post state of poverty, which cannot reflect the poverty risk that has not yet occurred [33]; and disregards the long-term impact of rural

land transfer [34]. Land is the most important self-owned resource of poor households [35], has the material function of providing a means of subsistence for poor households, and is deeply embedded in these families' production and living processes [36]. In comparison to the income obtained from the land transfer, the loss of land management rights will have a negative impact on the future employment, social security, and mental health of farmers, thereby increasing the likelihood of future poverty [37]. The 2002 World Development Report of the World Bank used vulnerability as expected poverty (VEP) to measure the likelihood of an individual or family falling into poverty in the future [38]. This research makes use of VEP to calculate the likelihood of a farmer falling into poverty in the future.

In recent years, a number of scholars [39,40] have examined the relationship between land transfer and rural household poverty from the perspective of poverty vulnerability. Data from a field survey of 1682 farmers in Hubei Province by Peng et al. revealed that land transfer can significantly lessen a farmer's vulnerability to poverty and that this vulnerability declines as the area of land transferred increases [41]. Sun et al. found that the poverty vulnerability of land transfer households was 5.13% lower than that of non-transfer households [42]. Nonetheless, some scholars are concerned that the loss of land management rights will increase the likelihood of poverty among farmers [43,44]. Zhang et al. conducted an empirical study based on the survey data of 1386 rural households in southern Xinjiang and discovered that land transfer can significantly increase the income level of farmers, but cannot effectively reduce their susceptibility to poverty [45].

Presently, the academic community has not reached a relatively consistent conclusion regarding the effect of land transfer on farmers' vulnerability to poverty. In light of this, the formulation and implementation of rural land policies should vary from person to person, based on how well they take into account the differences between farmers. This paper will add to the existing body of knowledge in the following ways: We explore the general findings of the impact of land transfer on the poverty vulnerability of farm households using data from a national sample survey to supplement the existing studies that are restricted to a particular province or region. We classify farm households according to the characteristics of land transfer, and we verify the impact of land transfer on poverty vulnerability under different characteristics by regression, so as to identify what groups of characteristic farm households can reduce poverty vulnerability through land transfer, carve out the groups of farm households suitable for land transfer, and provide theoretical support for the implementation policy of land transfer policy classification.

Based on previous studies, this paper empirically analyzes the impact of land transfer on the VEP of farm households using a logit model based on the 2018 Chinese Family Panel Studies (CFPS) data; uses the stepwise regression method to select variables with significant effects; and regresses each of the five dimensions of regional distribution, poverty level, financing constraints, government subsidies, and nature of work. On this basis, propensity score matching (PSM) is used to test the robustness of the study results.

## 2. Materials and Methods

### 2.1. Data

The information in this article is drawn from the most recent (2018) Chinese Family Panel Studies (CFPS) (URL: <http://www.iss.pku.edu.cn/cfps/>; accessed on 15 October 2021). The database survey aims to track and investigate data at three levels: individual, family, and community, reflecting societal, economic, and population changes in China [46]. The survey covers a variety of topics, including family finances, education, health, and child-rearing. The 2018 CFPS database survey targets a sample size of 14,218 households across 31 provinces (excluding Hong Kong, Macao, and Taiwan). In order to acquire high-quality research data, the data were efficiently screened. First, all urban household data were eliminated and only rural household registration data were retained; second, the characteristic data of the household head corresponding to the "financial respondent" were matched and the individual data of non-heads of households were eliminated; finally, the missing values, outliers, and samples missing important variables were deleted; and finally, a valid sample

of 4608 households was obtained, including 780 households with land transfer and 3828 households without land transfer.

## 2.2. Method

### 2.2.1. Vulnerability as Expected Poverty

Chaudhri et al. proposed the concept and measurement method of vulnerability as expected poverty [47]. VEP allows for the precise identification of households that may fall into poverty in the future. In particular, this approach quantifies the likelihood that a family will either enter or remain in poverty as a result of the risk of a sudden economic shock [48]. If the likelihood exceeds the predetermined threshold for vulnerability, the family is considered to be vulnerable to poverty. The concept of poverty vulnerability proposed by the VEP measurement method is simple to comprehend, reflects the dynamic characteristics of poverty, and can be effectively applied to cross-sectional data; consequently, it is widely utilized in academia. The formula for calculating poverty vulnerability is as follows:

$$\hat{V}_i = Prob(\ln c_i < \ln z | X_i) = \Phi \left[ (\ln z - X_i \hat{\beta}_{FGLS}) / \sqrt{X_i \hat{\theta}_{FGLS}} \right] \quad (1)$$

where  $\hat{V}_i$  is the estimated value of the probability of poverty of farmer  $i$  in the future,  $c_i$  is the per capita consumption of the household,  $z$  is the poverty line,  $\Phi$  is the cumulative distribution function of the normal distribution, and  $\hat{\beta}_{FGLS}$  and  $\hat{\theta}_{FGLS}$  denote the expected value and variance of the family's future consumption estimated by the feasible generalized least squares (FGLS) method; compared with the ordinary least squares, FGLS can effectively eliminate the heteroscedasticity of the model and improve the accuracy of the estimation results.  $X_i$  is an observable variable, mainly including family characteristic variables (including income, population, assets, liabilities, employment, and education) and household head characteristic variables (including age, gender, marriage, health, and occupation).

In order to assess a family's VEP, this study uses per capita household consumption. With respect to poverty based on consumption, two observations can be made: First, income is easily underestimated in micro-surveys, while consumption may better reflect the family's level of well-being, and second, using income as an explanatory variable can easily lead to strong endogenous problems in the measurement model. Concerning the choice of the poverty line, there are primarily two standards of per capita daily consumption of USD 1.9 and USD 3.1 proposed by the World Bank in 2015; based on China's average purchasing power and CPI index, we convert them into CNY 2800 and CNY 4570 per capita annual consumption at the end of 2018 [49]. This paper primarily measures the farmers' VEP based on their USD 1.9 per day per capita consumption, in line with existing research. Regarding the vulnerability threshold, this paper refers to the work of Gunther and Ward and sets the vulnerability line at 0.29; i.e., if the probability of a rural household falling into poverty in the future is greater than 0.29, set to 1; less than 0.29, set to 0 [50,51].

### 2.2.2. Econometric Model

In order to comprehensively examine the impact of land transfer on the poverty vulnerability of farmers, the logit model is constructed as follows:

$$\begin{cases} \log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 transfer_i + \beta_2 X_i + \varepsilon_i \\ p = prob(v_i = 1) \end{cases} \quad (2)$$

where  $v_i$  is the household poverty vulnerability status of farmer  $i$  calculated based on the per capita consumption level of the household,  $v_i = 1$  represents a poor and vulnerable household, and  $v_i = 0$  represents a non-poor and vulnerable household.  $transfer_i$  indicates whether farmer  $i$  participates in land transfer, and  $X_i$  indicates a series of control variables, mainly including family characteristics and household head characteristics.

### 2.2.3. Stepwise Regression

Since there are many control variables affecting the dependent variable in the model, and the influence of individual variables on the dependent variable is small, the sum of squared errors does not decrease when these variables are included, but on the contrary, the error becomes larger due to the increase in the number of variables, which affects the overall stability. To address this problem, the stepwise regression method is used to select the variables with significant effects from many control variables to establish a regression model. The specific model is as follows:

Given the set of candidate control variables  $T = \{x_1 \cdots x_m\}$ , from which a subset  $T_1 \in T$ , the sum of squared errors of the regression model constructed from  $T_1$  and the dependent variable is  $Q$ , and then the square of the remaining standard deviation of the model is Equation (3).

$$T^2 = \frac{Q}{n - l - 1} \quad (3)$$

$X$  in the formula is the data sample size. The selected subset  $T_1$  should minimize  $T$  as a quantitative criterion for variable selection.

Then determine an initial subset, each time from the subset outside the impact of significant variables to introduce a maximum impact on the dependent variable, and then the original subset of variables to test, from the variables that become insignificant to eliminate a minimum impact, until it cannot be introduced and eliminated. Meanwhile, there are highlights worth noting in this model. First, the significance level  $a_m$  for the introduced variables and  $a_{out}$  for the excluded variables should be selected appropriately; obviously, the larger the  $a_m$  is, the more variables are introduced, and the larger the  $a_{out}$  is, the fewer variables are excluded. The second highlight is that due to the correlation between individual variables, the introduction of a new variable will make a variable originally considered significant insignificant and thus be dropped, so we selected variables that are as independent of each other as possible.

### 2.2.4. PSM Method

Whether land transfer reduces the poverty vulnerability of farm households is a non-randomized experimental self-selection problem that is highly susceptible to selective error, which can be effectively addressed by propensity score matching (PSM). PSM is a non-parametric analysis method of counterfactual inference, which can effectively reduce selectivity bias and endogeneity by analytically processing non-experimental and observational data, and it is commonly applied in the evaluation of policy effects. PSM is used to test the robustness of the logit regression results. The logit model is used to calculate the conditional probability fitting value of the sample farmers' land transfer, which is the propensity score (PS).

$$PS_i = \Pr[D_i = 1|X_i] = E[D_i = 0|X_i] \quad (4)$$

$$ATT = \frac{1}{N^t} \sum_{i \in I^t \cap S} \left\{ Y_i - \sum_{j \in I^c \cap S} W_{ij} Y_j \right\} \quad (5)$$

where  $N^t$  is the number of samples of land transfer households,  $I^t$  is the sample set of the disposal group (participating in land transfer),  $I^c$  is the sample set of the control group (not involved in land transfer),  $Y_i$  is the observed value of the sample of the disposal group, and  $Y_j$  is the sample of the control group.  $S$  is the common support domain set,  $W_{ij}$  is the matching weight, and ATT is the average disposition effect. The main method is to match the samples of the control group and the disposal group according to the propensity value to ensure that there is no significant difference in their main characteristics. Then, the control group is used to estimate the counterfactual state of the treatment group (i.e., no participation in the transfer) and calculate the poverty caused by the land transfer and the net treatment effect of vulnerability ATT.

### 2.3. Variables

Since the focus of this paper is on whether the loss of land management rights increases the risk of poverty for the farmers, the key variable defined is whether farmers transferred their farmland. Farmers who transferred their farmland are controlled for using question FS2 “whether they lease their land to others”, with a value of 1 if the household transferred its farmland and 0 otherwise. A significance of  $p < 0.1$  is set, and 10 control variables are identified by excluding insignificant variables through stepwise regression. Descriptive statistics are provided in Table 1.

**Table 1.** Variable definition and descriptive statistics.

Variables	Variable Meaning	Calculation Method	Mean	Std
explanatory variable transfer	land transfer	land transfer = 1, other = 0	0.169	0.375
family characteristic variables				
lnincome	per capita household income	logarithm of per capita household income	10.483	1.072
lnasset	family assets	logarithm of family assets	12.028	1.188
lnagri	agricultural machinery assets	logarithm of family farming machinery assets	3.231	4.062
lnralat	social capital	logarithm of the family relationship expenditure	7.116	2.388
lnsize	family size	logarithm of household size	3.908	1.979
subside	government subsidy	government subsidy = 1, other = 0	0.657	0.474
house	housing property	more than 1 property = 1, other = 0	0.140	0.347
household head characteristic variables				
lnage	age of head of household	logarithm of 2018 respondent age	52.696	13.316
marry	head of household marriage	married = 1, other = 0	0.858	0.348
edu	head of household education	education level	6.310	4.176

## 3. Results

### 3.1. Baseline Regression and Sub-Regional Regression

The results of the baseline regression of the impact of the land transfer on the VEP of farm households are presented in Table 2. The results indicated that across the sample, all other factors being equal, land transfer effectively decreases the VEP of farm households, in that the transfer of land management rights does not increase the likelihood of farm households falling into poverty in the future. This conclusion is generally consistent with Deng and Wang et al.’s findings [52,53].

**Table 2.** Baseline regression and sub-regional regression results.

Variables	All Area	East	Middle	West
transfer	−0.00605 *** (0.00123)	−0.00227 (0.00196)	−0.00523 ** (0.00206)	−0.0102 *** (0.00229)
lnincome	−0.00508 *** (0.000679)	−0.00642 *** (0.00111)	−0.00523 *** (0.00124)	−0.00443 *** (0.00116)
lnasset	−0.00130 ** (0.000571)	−0.00280 *** (0.000887)	−0.000120 (0.00109)	−0.000356 (0.000998)
lnagri	−0.000576 *** (0.000140)	−0.000191 (0.000236)	−0.000308 (0.000251)	−0.00114 *** (0.000242)
lnralat	−0.00102 *** (0.000251)	−0.000659 * (0.000358)	−0.00121 *** (0.000453)	−0.00143 *** (0.000493)
lnsize	0.0391 *** (0.00121)	0.0314 *** (0.00190)	0.0396 *** (0.00220)	0.0471 *** (0.00222)
subside	−0.00236 ** (0.00118)	−0.00158 (0.00178)	−0.00219 (0.00218)	−0.00296 (0.00219)
house	−0.00318 * (0.00167)	−0.00032 (0.00253)	−0.00459 (0.00290)	−0.00628 ** (0.00317)
lnage	0.0434 *** (0.00218)	0.0343 *** (0.00384)	0.0356 *** (0.00394)	0.0544 *** (0.00368)
marry	−0.0230 *** (0.00174)	−0.0188 *** (0.00279)	−0.0215 *** (0.00333)	−0.0282 *** (0.00294)
edu	−0.00125 *** (0.000145)	−0.00113 *** (0.000254)	−0.00149 *** (0.000260)	−0.00127 *** (0.000244)
Constant	−0.0936 *** (0.0121)	−0.0251 (0.0207)	−0.0770 *** (0.0228)	−0.154 *** (0.0204)
R-squared	0.275	0.256	0.283	0.306
N	4608	1511	1350	1747

Note: Standard errors are in parentheses; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Same below.

It is widely accepted in the academic literature that regional economic development is a crucial factor in determining whether or not rural households are able to reduce their poverty levels [54]. There are obvious gaps in the economic development of eastern, central, and western China, and land prices are relatively low in economically underdeveloped regions [55]. Rapidly advancing industrialization and urbanization have substantially increased urban labor compensation, causing a large number of rural laborers to migrate to cities [56]. The level of economic development, industrial structure, employment capacity, and wage level of cities have an immediate impact on the income of urban farmers [57]. Generally, the non-agricultural supply of labor pattern of Chinese agricultural families exhibits specific geographical characteristics [58], and this pattern is driven by the development of non-agricultural enterprises outside the village [59]. In other words, the growth of these industries will have an obvious effect on rural labor migration but will have no discernible effect on the mobility of agricultural property rights [60]. However, within the sub-regional sample, the effect of land transfer on household VEP is statistically insignificant in the eastern region, but statistically significant at the 5% and 1% levels in the central and western regions. There is significant heterogeneity in the estimated coefficients for land transfer between the central and western regions. This may be due to the fact that the development of tertiary industry in the western region lags behind and cannot provide enough alternative employment opportunities outside agriculture, and that the livelihood conversion costs incurred by farm households after the transfer of farmland are more expensive; therefore, the impact of the land transfer on reducing VEP of farm households is not as significant in the western region as it is in the central region.

The results for the control variables show the following: (1) For household characteristics, the estimated coefficients for the variables household income, household assets, agricultural assets, social capital, and housing property were negatively significant, while the estimated coefficients for household size and government subsidies were positively significant. This suggests that higher household income, increased assets, the accumulation

of social capital, participation in non-farm businesses, and improved housing conditions will all contribute to reducing household poverty vulnerability. The greater the household size, the greater the risk of future poverty shocks to the farm household. Land transfer would reduce the risk of poverty for households receiving government subsidies; a possible explanation is that the funds obtained from land transfers are an important source of income for such households. (2) Regarding the characteristics of the household head, the marital status and education of the household head had a significant negative effect on the VEP of the household, while the age of the household head had a significant positive effect. VEP is influenced by many factors, such as natural resources, ability, and economic cycles, and only 10 control variables were selected for our study, resulting in a regression with an  $R^2$  between 0.2 and 0.4, but it is sufficient to explain the impact of land transfer.

### *3.2. Heterogeneity in the Impact of Land Transfer on Household Poverty Vulnerability across Different Types of Farm Households*

The fundamental situation, economic source, and capital composition of the family have a substantial bearing on the impact of land transfer. Farmers experience the most economic pressure and the least social pressure; farmers have the highest adaptability to social capital and the lowest adaptability to financial capital [61]. Cultivated land serves as a social security function for farmers, and land assets not only represent agricultural production means in rural China, but also provide employment security for farmers and can be used as collateral for loans [62], allowing farmers to apply for bank loans [63]. With the improvement of the farmland transfer market, the availability of non-agricultural labor has increased, the average non-agricultural labor time of rural households has risen, and the average household income has increased [64]. The family characteristics of farmers, such as income, sources of income, and social capital, have a direct effect on the likelihood of future poverty [65,66]. Different types of farm households were grouped and regressed in clusters to assess the impact of the land transfer on their VEP.

#### *3.2.1. Clustering Farmer Households According to Their Poverty Level*

According to World Bank poverty thresholds of USD 1.9 and USD 3.1 per capita per day, households with per capita daily consumption of USD 1.9 or less are classified as extremely poor, those with a per capita daily consumption of USD 1.9 to USD 3.1 are classified as relatively poor, and those with a per capita daily consumption of USD 3.1 or more are classified as non-poor. Consequently, the impact of the land transfer on VEP of three types of farm households, namely absolutely poor, relatively poor, and non-poor, was investigated. In Table 3, columns 1 to 3 display the regression results of land transfer on VEP of absolute poverty, relative poverty, and non-poverty households. The number of absolute poverty in the sample is 0, so column 1 is empty. The results indicated the following: (1) Land transfer can substantially reduce the household VEP of non-poor and relatively poor farmers. This suggests that non-poor and relatively poor farmers can use land transfer to revitalize their household assets to increase their income, reduce poverty, and improve their ability to resist poverty in the future. (2) The further comparison revealed that the greater absolute value of the estimated coefficient of land transfer on VEP of households with relative poverty suggests that land transfer is more effective at preventing the occurrence of poverty in this population. Relatively poor households are even more lacking in the original accumulation of capital to escape poverty. The poverty trap theory proposes that the vicious cycle of low income–low savings–low capital formation–low output–low income is the root cause of poor households' inability to escape poverty [67]. The short-term rental income effect brought by land transfer can provide relatively poor households with the necessary capital accumulation to break out of the poverty trap.

**Table 3.** Regression results grouped by household poverty level.

Variables	Absolute Poverty	Relative Poverty	Non-Poverty
transfer		−0.00797 * (0.00463)	−0.00535 *** (0.000820)
control variable	control	control	control
Constant		−0.295 *** (0.0470)	−0.0625 *** (0.00804)
R-squared		0.392	0.276
Observations	0	965	3643

### 3.2.2. Clustering by Criteria of Farm Household Financing Constraints and Government Subsidies

It is common for farmers in rural areas to be constrained by financing, which has become a significant factor impeding their ability to increase their income and reduce poverty. Farmers are divided into financing-constrained households and non-financing-constrained households based on the results of the questionnaire item “Have you ever been denied a loan or credit?” On this basis, the effect of land transfer on the poverty and vulnerability of farmers with varying financial constraints is investigated. Government subsidies refer primarily to whether or not farmers have received various cash or in-kind subsidies from the government, such as subsistence allowances, subsidies for returning farmland to forests, and agricultural subsidies. Government subsidies are an essential policy instrument for alleviating poverty. Farmers were classified as government-subsidized and non-government-subsidized farmers, and the disparate effects of land transfer on the poverty and vulnerability of these two groups were investigated.

The regression results in Table 4 indicate the following: (1) Land transfer has no significant effect on the VEP of rural households with financing constraints, but it has a significant inhibitory effect on the VEP of households without financing constraints. Possible causes include a rise in the demand for credit due to the diversification of farmers’ sources of income away from agriculture after the transfer of their land, particularly in the form of non-farm self-employment activities. Non-financing-constrained households can more easily meet credit needs and quickly convert household income to non-agricultural operations, whereas this is difficult for financing-constrained households. (2) Land transfer can effectively reduce the VEP of government-subsidized households while having no significant effect on households that have not received government subsidies. The government’s planned provision of targeted vocational education, property development and alleviation programs, and other preferential policies may be the cause of this smooth resolution of the employment issue facing rural land transfer households.

**Table 4.** Regression results grouped by financing constraints and government subsidies.

Variables	Financing Constraints		Government Subsidies	
	(1) Yes	(2) No	(3) Yes	(4) No
transfer	−0.00155 (0.00342)	−0.00510 *** (0.00168)	−0.00441 *** (0.00170)	−0.00419 (0.00291)
control variable	control	control	control	control
Constant	−0.100 *** (0.0269)	−0.0912 *** (0.0137)	−0.131 *** (0.0144)	−0.0464 ** (0.0219)
R-squared	0.255	0.279	0.324	0.217
Observations	1001	3607	3029	1579

### 3.3. Heterogeneity in Head of Household Characteristics

The individual circumstances of the household’s primary breadwinner are a significant factor in that household’s level of financial well-being and, by extension, its degree of independence from subsistence vulnerability and external risks, and they vary widely [68]. The job category of the head of household will lead to a widening of the poverty and income

gap, and the impact of human capital on household economic growth is significantly greater than that of physical capital [69]. When farmers retire or become too old to work in agriculture, they will sublease their cultivated land in order to maintain their daily consumption [70]. According to the results of a survey conducted by Glauben et al. [71], educational attainment plays a significant role in reducing poverty. The vulnerability of structural poverty is the primary source of vulnerability in rural China, and compulsory education has significantly decreased the vulnerability to poverty [72]. Universal primary education reduces structural poverty vulnerability more effectively than temporary poverty vulnerability [73]. Further analysis proves that compulsory education primarily improves various abilities to obtain a permanent income, such as cognitive ability and participation in non-agricultural work, which are crucial means of reducing structural poverty [74]. Consequently, it is essential to identify these characteristics that influence household head income and incorporate them into the assessment of land transfer effects, as we will do in this paper.

The relationship between land transfer and a family's VEP will vary depending on the nature of work of the head of household, who is typically the primary decision-maker and backbone of the family. Farmers are classified into three categories based on the employment status of the household's head: self-employed farmers, farmers with unstable employment, and farmers with stable employment. Farmers whose primary source of income comes from their own agricultural operations are considered self-employed, farmers whose primary source of income comes from both agriculture and non-agricultural jobs are considered unstably employed, and farmers whose primary source of income comes from non-agricultural jobs with a stable employer are considered employed farmers. Accordingly, the variability of the impact on farm household VEP with different employment choices of the household head is examined. The regression results are shown in Table 5.

**Table 5.** Regression results grouped by the nature of work of the household head.

Variables	The Nature of the Householder's Work		
	(1) Self-Employed	(2) Not Stably Employed	(3) Stably Employed
transfer	−0.00527 ** (0.00222)	−0.0108 ** (0.00465)	−0.000913 (0.00144)
control variable	control	control	control
Constant	−0.150 *** (0.0173)	−0.107 ** (0.0528)	−0.0282 ** (0.0139)
R-squared	0.301	0.348	0.132
Observations	3125	121	610

Table 5 presents regression results for the effect of land transfer on household VEP for each of the three household head employment choices. Land transfer can significantly reduce the VEP of self-employed farmers but has no significant effect on the VEP of employed farmers. Possible explanations include the fact that the family income structure of self-employed farmers is single, the transfer of farm land creates contiguous production that increases the efficiency of agricultural output, and the income increase effect is obvious, thereby effectively reducing VEP.

### 3.4. PSM Robustness Analysis

PSM was developed to test the validity of the preceding conclusions. The farmer households whose farmland was transferred out were assigned to the disposal group, while those who did not participate in the farmland transfer were assigned to the control group. The disposal group and the control group were matched based on their propensity scores, and a balance test was conducted to ensure that there were no significant differences in their main characteristics. The causal relationship between land transfer and VEP of rural households was then investigated. At the same time, based on the family poverty level, financing constraints, government subsidies, and type of work of the household

head as criteria, the subsamples are divided for group testing and the average elimination effect is calculated using two matching methods: nuclear matching and nearest neighbor matching. The results of the PSM robustness test are shown in Table 6.

**Table 6.** PSM method robustness test results.

Sample Classification	Matching Method	ATT	Std. Err.	Sample Classification	Matching Method	ATT	Std. Err.
full sample	kernel matching	−0.027 **	0.0118	financing	kernel matching	0.0093	0.0240
	neighbor matching	−0.0385 *	0.0208	constraints	neighbor matching	0.0408	0.0420
east	kernel matching	−0.0110	0.0190	non-financial	kernel matching	−0.036 ***	0.0137
	neighbor matching	−0.0338	0.0362	constraints	neighbor matching	−0.0538 **	0.0248
middle	kernel matching	−0.0230	0.0177	government	kernel matching	−0.040 ***	0.0126
	neighbor matching	−0.0179	0.0353	subsidies	neighbor matching	−0.0235	0.0266
west	kernel matching	−0.037*	0.0199	non-government	kernel matching	0.0018	0.0182
	neighbor matching	−0.0216	0.0367	subsidies	neighbor matching	0.0001	0.0256
absolute poverty	kernel matching	null	null	self-employed	kernel matching	−0.0271 *	0.0157
	neighbor matching	null	null	neighbor matching	neighbor matching	−0.0483	0.0324
relative poverty	kernel matching	−0.0076	0.0433	not stably	kernel matching	−0.0786	0.0843
	neighbor matching	−0.0444	0.0774	employed	neighbor matching	−0.0277	0.1170
non-poverty	kernel matching	−0.035 ***	0.0102	stably employed	kernel matching	−0.0156	0.0116
	neighbor matching	−0.0372 *	0.0206	neighbor matching	neighbor matching	−0.0167	0.0211

Note: The average treatment effect on the treated(ATT) is a participant average treatment effect.

Table 6 demonstrates that the ATT of land transfer on VEP of rural households under the two matching methods is negative and statistically significant. In general, land transfer reduces the VEP of farm households by 2.7% to 3.8%. A possible explanation is that China's per capita arable land is small, and the corresponding land transfer area for farm households is small, so the measured land transfer does not have a significant impact on VEP. The ATT in the western region is significantly negative, and land transfer can reduce the VEP of rural households in the western region by about 3.7%. The average disposal effect in the central region is negative but not statistically significant, which is significantly inconsistent with the negative regression coefficients in Table 2, indicating that the effect of land transfer on the VEP of rural households in the central region requires additional investigation. The average disposition effect in the eastern region is also not significant, which partially corroborates the robustness of the regression results in Table 2.

The ATT of absolute and relatively poor households is not statistically significant, which is consistent with the conclusion of the regression analysis presented in Table 3. The average disposal effect of non-poor households is notably negative, and land transfer can reduce the VEP of non-poor households by 3.5% to 3.7%. This verifies the validity of the regression results presented in Table 3.

From the standpoint of financing constraints and government subsidies, the average disposal effect of households with financing constraints is insignificant, whereas the ATT of households without financing constraints is significantly negative. The transfer of land will reduce the VEP of households without financial constraints by 3.6% to 5.4%. The ATT of farmers who receive government subsidies is significantly negative, and land transfer can reduce the VEP of government-subsidized families by 4%, whereas the average disposal effect of farmers who do not receive government subsidies is positive. The effect is inconsequential. This verifies the validity of the regression results in Table 4.

Based on the household head's job nature grouping, the ATT is significantly negative for self-employed farmers, and land transfer can significantly reduce the poverty risk of self-employed farmers by 2.7%. However, the ATT does not have a significant impact on reducing the VEP of the two types of farm households. The robustness of the regression conclusions presented in Table 5 is evident.

In conclusion, most of the research conclusions presented in Tables 2–5 have passed the robustness test.

## 4. Discussion, Conclusions, and Implications

### 4.1. Discussion

Transferring rural land is conducive to enhancing the utilization efficiency of rural land resources, boosting the competitiveness and comprehensive economic benefits of agriculture, and ensuring the continuous increase in farmers' income. However, land transfer compensates agricultural households primarily for the production function of the land, but insufficiently for its security function and asset function [75]. Farmers who transfer land may become "uncultivated land, insecure, and unemployable" if they engage in new labor, participate in labor market competition [76,77], and adapt to urban life [78]. We believe that the issue of the impact of the land transfer on VEP cannot be generalized and needs to be discussed according to the heterogeneity of farm households.

According to the poverty trap theory, regional differences, material resources, educational level, social capital, and financial constraints all have an effect on poverty [79]. In terms of regional heterogeneity, the higher the level of regional economic development and the more comprehensive the infrastructure, the more conducive they are to reducing the likelihood of future poverty in the region; otherwise, the region will fall into persistent poverty [80,81]. This also applies to the effect of land transfer on reducing poverty. Heterogeneity in family characteristics, family income, financial constraints, government subsidies, and other characteristics will result in greater income and labor dividend heterogeneity resulting from land transfer [82–84]. There are disparities in family wealth, and the primary factor is the household head [85]. For the majority of peasant families, the household head is the determining factor in the family's income [86]. The education and occupation of the household head have a strong explanatory power for the family's wealth [87–89]. According to the findings of this study, land transfer can encourage the diversification of farmers' livelihood strategies, thereby increasing farmers' income. Land transfer facilitates large-scale agricultural production and is a crucial means for farmers to increase their income. The study portrayed the group of farmer households able to reduce VPE through land transfer.

Compared with existing studies, this paper uses the VEP indicator to measure the future poverty risk faced by farming households, overcoming the fact that current studies only measure the welfare level of individuals or households at a certain point in time; it takes into account the heterogeneity of farming households and explores the poverty reduction effect of land transfer on households with different characteristics separately; the use of the PSM method effectively solves the endogeneity problem of VEP.

In addition, there are some shortcomings in this research, which future research would need to address: (1) The modest reduction in poverty vulnerability in the PSM test results may be due to the small size of the transferred land area, which needs to be focused on in the next surveys and studies. (2) The effect of land transfer on the VEP of rural households in the east and central region has not yet been conclusively demonstrated, and further research is necessary to analyze the effects of land transfer on poverty reduction in different regions, disaggregated by level of economic development and conditions of intensive land use. (3) Due to a lack of data, the selection of factors influencing VEP is not comprehensive enough, for example, the distance between the village and the main town can be used as a variable to measure how land values affect the VEP. In the future, we will conduct in-depth research on the aforementioned topics in an effort to arrive at more meaningful conclusions and offer more instructive recommendations for practice.

### 4.2. Conclusions and Implications

This paper conducted a categorical regression of farm households through a multidimensional perspective and applied the PSM method to test the effect of land transfer on farm household VEP and its heterogeneity. The findings indicate the following: (1) In rural China, land transfer has been shown to have abatement effects on VEP of between 2.9% and 4.2% for farm households. (2) In the western region, land transfer significantly reduces the VEP of farm households, while in the eastern and central regions, no such reduction

is seen, and the effect on the VEP of farm households in the central region remains to be demonstrated. (3) In terms of household characteristics subgroups, land transfer has no significant effect on the VEP of farming households already in poverty (absolute and relative poverty), while it can significantly reduce the VEP of non-poor farming households. (4) Land transfer was effective in promoting VEP reduction among farm households without financial constraints and with government subsidies, but had no effect on VEP among farm households with financing constraints and without government subsidies. (5) When considering the subgroup of characteristics associated with household heads, land transfer primarily has a significant abating effect on the VEP of self-employed farmers, while having no significant impact on the VEP of employed farmers. These results provide empirical evidence for government land management, agricultural development, and the decisions of farmers.

The preceding findings have significant policy ramifications: The first step is to expedite the process of reforming the system that governs rural land and then to standardize and methodically guide the flow of rural land. Currently, the small amount of arable land per person in China's rural areas, the difficulty of structural adjustment, and the high cost of agricultural production are significant factors limiting the efficiency of agriculture, the increase in farmer income, and the revitalization of rural areas. Transferring rural land is conducive to enhancing the efficacy of rural land resource utilization, boosting the competitiveness and comprehensive economic benefits of agriculture, and ensuring farmers' income growth is sustainable. In addition, the loss of land management rights does not result in severe poverty shocks for farming households, as land transfer enables farmland-transferring households to harvest land transfer rents, boosts the capital accumulation of farming households, encourages the diversification of farmers' occupations, and enhances the structure of farming households' household income. Secondly, rural land transfer must adhere to the local, village-based, and household-based principles. Due to the varying natural conditions in different regions and the unbalanced rural economic development that has resulted in significant differences among villages and farmers, the promotion of land transfer should be tailored to local conditions, meaning that it should be different from village to village and different from household to household. Furthermore, it should not be carried out in a manner that is too hasty, as this would infringe on the lawful rights and interests of farmers. The third phase is to put in place a system to facilitate the transfer of land in rural areas. The government should propose a series of targeted financial and human capital service protection policies, such as financial assistance for eligible new agricultural businesses to take precedence in agriculture-related projects. Furthermore, issues such as a lack of funds for relocating families and achieving diversification of livelihood strategies and sustainable livelihoods should be addressed. In the meantime, the government should offer targeted vocational and special skills training in non-farming fields to increase farmers' employability outside of agriculture.

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