

Article

Effects of Confirmation of Homestead Rights and Labor Transfer on Rural Income Inequality in China

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Abstract

This study provides a comprehensive analysis of the confirmation of homestead rights (CHR) in China, filling a gap in the research field of the distribution consequences of China's homestead policy reform. The main innovation of this study is to demonstrate both theoretically and empirically that the interaction between the CHR and labor transfer shapes a pro-poor outcome. This study constructed a novel binary economic mathematical framework and used intensity-based DID design on unique village household data. It was found that the CHR significantly reduced income inequality, and the transfer of working-age labor force was a powerful multiplier effect. The robustness checks, including RIF regression and PSM-DID, confirmed this causal relationship. In addition, heterogeneity analysis indicates that this impact is strongest in developed eastern regions, and, crucially, strongest in low-income and low dependency ratio households. This emphasizes that the effectiveness of CHR policies is determined by both market maturity and household structure. These findings emphasize the importance of combining land certification with labor mobility policies to achieve equitable development, providing a model worth exploring for resource allocation and institutional design in developing economies.

Keywords: homestead rights; income inequality; labor transfer; difference-in-difference



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1. Introduction

Since the inception of reform and opening-up, the Gini coefficient of China has escalated significantly, rising from 0.29 in 1980 to 0.467 by 2022 [1]. Despite the government's concerted efforts in recent years, encompassing macroeconomic strategies and micro-level policy tools, aimed at fostering regional and urban-rural integration, it has been unable to effectively mitigate the growing disparity between the affluent and the impoverished in China [2]. Notably, while the overall income of rural residents in China has witnessed a steady upsurge, the income gap among rural residents themselves has also been widening [3]. According to the China Statistical Yearbook 2023, the per capita disposable income of the rural high-income cohort in 2023 was approximately 10.32 times higher than that of the low-income group, whereas in 2000 this disparity was merely 6.47 times. Unfortunately, some scholars believe that income inequality between urban and rural areas in China is still underestimated [4]. It is urgent to narrow the wealth gap among Chinese rural residents.

Economists have delved into the intricacies of rural income inequality in China from diverse angles, including rural financial distribution, labor migration, infrastructural development, and capital allocation [5,6]. Notably, the reform of China's homestead system also has impacts on income inequality among rural residents. Since the inception of the pilot

reform of the homestead system in 2015, China formally introduced the reform of the “separation of three rights” (STR) pertaining to homesteads in main documents in 2018. The core objective of this reform is to clarify the scope and boundaries of rural residents’ homestead rights and the interests of China, thereby affording rural residents with more adequate rights to their homesteads. The STR policy refers to exploring the separation of ownership, qualification, and use rights to homesteads. Under the STR policy, ownership, contracting rights, and management rights have both overall utility and individual functions. Under this system, the Chinese government requires the implementation of collective ownership of homestead land, guarantees the qualification rights of homestead rural residents and the property rights to rural residents’ houses, and moderately relaxes the use rights to homesteads and rural residents’ houses. This, in turn, aims to enhance the synergistic relationship between homesteads and various production factors. Scholars have found that the “separation of three rights” can improve the economic benefits of homestead land and increase farmers’ income [7,8]. As a crucial prerequisite and linchpin for the reform of the homestead system, the confirmation of homestead rights (CHR) adheres to the principles of common prosperity and rural revitalization.

Previous studies have found that the policy can facilitate the transfer and optimization of homestead utilization [9,10], encouraging the migration of labor from rural to urban areas [11], promoting rural residents utilizing their homestead rights for mortgage loans [12]. However, they have not focused on some crucial concerns: has the existing homestead system in China mitigated the income inequality among rural households? If not, what factors are impeding the beneficial implementation of the policy? Some scholars of China have found that the CHR can significantly increase rural residents’ income [13], but there are few studies focusing on the impact of the CHR on rural residents’ income inequality in China. This blind spot in the research makes it difficult for us to evaluate the core welfare effects of land reform, namely distributive justice, and to provide precise policy basis for the goal of common prosperity. Meanwhile, when examining the issue of income inequality among rural households, the application of traditional OLS models may introduce bias. Significant variations may exist among different villages, with numerous factors influencing rural households’ income and inequality. Consequently, utilizing the traditional OLS model for testing could incorrectly ascribe the impacts of other factors to the CHR policy.

Therefore, this study systematically explains for the first time how the interaction between the CHR policy and labor transfer shapes the path of poverty alleviation development by constructing an analytical framework that combines theory and empirical evidence. We rely on the theory of the urban–rural dual economy and innovatively establish a mathematical model that includes CHR policy and labor transfer. We propose three core hypotheses: the CHR has an income-increasing effect and an equalization effect, and labor transfer strengthens its equalization effect. On this basis, we use the “China Rural Revitalization Comprehensive Survey” (CRRS) 2020 data and innovatively apply the Difference in Differences (DID) model based on intensity to construct identification strategies through the interaction term between village ownership rate and age group, effectively alleviating endogeneity problems. This innovative method not only provides a reliable means for accurately evaluating policy effects, but, more importantly, reveals the synergistic mechanism between land system and labor market reform, providing a theoretical basis and practical reference for developing countries to promote inclusive urban–rural transformation. The rest of the paper is as follows: Section 2 builds our theoretical model, Section 3 introduces the data sources and the research design, Section 4 shows the empirical results, and Section 5 concludes.

2. Theoretical Analysis and Research Hypotheses

According to the interpretation of the policies of the government, the CHR policy can address income inequality among rural residents through a tripartite mechanism of opportunity reshaping, capital restructuring, and livelihood transformation. In terms of opportunity reshaping, on the one hand, the CHR can overcome the geographical constraints and bloodline constraints in land transfer, achieve diversified models such as bidding mechanisms and stock cooperation [14], and promote the synchronous increases in property, operation, and wage income [15]. On the other hand, the CHR further activates idle homesteads on the basis of the “separation of three rights” policy. Village collectives develop industries such as ecotourism through paid homestead exports, increasing collective income and dividends. Families can use their homestead for new industrial models [16], such as intangible heritage studios, creating synergies between elements of industries and services. For capital restructuring and livelihood transformation, the Pilot Measures for Housing Mortgage Loans in 2016 released the potential for the capitalization of homestead land. The CHR can resolve financing restrictions through mortgage loans and revitalized rural tourism assets, which have restructured capital accumulation. Capital appreciation has enhanced the non-agricultural employment and urbanization capabilities of rural households [17], promoting livelihood transformation. The transformation of livelihoods has driven further capital accumulation, diversifying income structures beyond agriculture [18]. Labor migration shifts income dependence towards non-agricultural sources [19], increasing overall income and narrowing the gap by enabling middle- and low-income households to move upwards [20]. Next, we will design a theoretical model framework for detailed economic mathematical analysis.

2.1. The Framework

On the basis of Lewis’ classic theory of the dual economic structure of urban and rural areas [21] and the research ideas of Fabry and Maertens [22], we consider an economy with two regions (sectors): the urban and the rural. The population is L , which consists of the urban residents $\bar{L}_u$ and the rural residents $\bar{L}_r$: $L = \bar{L}_u + \bar{L}_r$. The urban residents own capital and always provide their labor to the urban sector. As for the rural residents, on the one hand, they own homestead lands which are available for production if the land rights are confirmed. On the other hand, they can choose to find a job either in the urban or the rural region, bringing about a positive labor transfer L_T from the rural to the urban.

The production processes of the two sectors are independent: the urban sector uses capital K_u and urban labor force L_u to make outputs, while the rural sector uses land QT_r and rural labor force L_r , with $L_u = \bar{L}_u + L_T$ and $L_r = \bar{L}_r - L_T$ holding. Here, T_r is the total amount of homestead land owned by rural residents and Q is the certification rate of homesteads. Following Klump et al. [23], both sectors adopt a Constant Elasticity of Substitution (CES) production function. The CES production function is a very important and widely used function form in economics, which allows the substitution elasticity between production factors such as capital and labor to be a non-constant of 1. The production functions we use are as follows:

$$Y_u = A_u \left[\phi_u K_u^{\rho_u} + (1 - \phi_u)(H_u L_u)^{\rho_u} \right]^{\frac{1}{\rho_u}}, \quad (1)$$

$$Y_r = A_r \left[\phi_r (QT_r)^{\rho_r} + (1 - \phi_r)L_r^{\rho_r} \right]^{\frac{1}{\rho_r}}. \quad (2)$$

Here, the subscript u indicates the urban sector while r indicates the rural sector. Y , A , and ϕ represent the output, the exogenous technology level, and the factor share, respectively. Generally, $A_u > A_r$ holds. $H_u > 1$ describes the productivity of urban labor.

Both ρ_u and ρ_r are parameters less than 1, characterizing the quasi-concave characteristics of the functions. Further, it is reasonable to assume that the elasticity of factor substitution is stronger in the urban sector, while the elasticity of factor substitution is weaker in the rural sector, that is, $\rho_u > \rho_r$. Notably, due to Lewis' theoretical model that suggests an infinite supply of rural labor, the scale of labor transfer mainly depends on the level of development of urban sectors; we assume both the labor transfer L_T and the recognition rate Q are exogenously determined and have no effect on each other.

We normalize the price of rural products as 1 and denote the price of urban products as $P > 1$. Under the profit-maximization problem, we can have

$$\omega_u = P \frac{\partial Y_u}{\partial L_u} = PA_u^{\rho_u} (1 - \phi_u) H_u^{\rho_u} \left(\frac{Y_u}{\bar{L}_u + L_T} \right)^{1-\rho_u} \quad (3)$$

$$\omega_r = \frac{\partial Y_r}{\partial L_r} = A_r^{\rho_r} (1 - \phi_r) \left(\frac{Y_r}{\bar{L}_r - L_T} \right)^{1-\rho_r} \quad (4)$$

and

$$\frac{\partial \omega_u}{\partial L_T} < 0, \frac{\partial \omega_r}{\partial L_T} > 0 \quad (5)$$

Additionally, in order for rural residents to spontaneously transfer from rural areas to cities, ($L_T > 0$), $\omega_u > \omega_r$ shall hold.

The total income of rural residents ω can be defined as the sum of their income obtained in rural areas and in urban areas. Assuming that urban capital is not owned by transferring rural residents, the total income of rural residents is expressed as the sum of their income obtained in rural areas plus their income obtained in urban areas. The average income of rural residents ω , therefore, can be expressed as the ratio of their total income to the rural population:

$$\omega = \frac{\omega_u L_T + \omega_r (\bar{L}_r - L_T) + \gamma Q T_r}{\bar{L}_r} \quad (6)$$

Here, γ is the exogenous coefficient determined by the land market. From the perspective of farmers, renting or selling land usually involves signing a long-term contract, and the price remains rigid for a certain period of time, so the income from the land can be considered fixed over a period of time.

From (6), we have

$$\frac{\partial \omega}{\partial Q} = \frac{1}{\bar{L}_r} [(\bar{L}_r - L_T)(1 - \rho_r) \frac{\phi_r (Q T_r)^{\rho_r}}{\phi_r (Q T_r)^{\rho_r} + (1 - \phi_r) (\bar{L}_r - L_T)^{\rho_r}} \frac{\omega_r}{Q} + \gamma T_r] > 0, \quad (7)$$

indicating that the CHR has the effect of increasing rural residents' income. This impact stems from two major mechanisms: firstly, the term γT_r represents capital restructuring, which directly converts homesteads into capital income through mortgage or lease; secondly, the other part of the equation $\frac{\phi_r (Q T_r)^{\rho_r}}{\phi_r (Q T_r)^{\rho_r} + (1 - \phi_r) (\bar{L}_r - L_T)^{\rho_r}}$ reflects opportunity reshaping, which originates from the optimization of production factor allocation caused by the increase in land factor output elasticity, thereby improving production efficiency. Therefore, we make the following hypothesis.

Hypothesis 1. *The CHR can increase rural residents' income.*

2.2. The Effects of CHR

To evaluate the effects of the CHR on income inequality, we define the income gap g between rural residents as the ratio of income between households with and without transfers:

$$g = \frac{\omega_u L_T + \omega_r (\bar{L}_r - L_T) + \gamma Q T_r}{\omega_r (\bar{L}_r - L_T) + \gamma Q T_r} \in [1, +\infty), \quad (8)$$

and we can obtain

$$\frac{\partial g}{\partial Q} = -\frac{\gamma T_r \omega_u L_T}{[\omega_r (\bar{L}_r - L_T) + \gamma Q T_r]^2} < 0. \quad (9)$$

The above results indicate that the CHR can alleviate income inequality among rural residents. The core of this equalization effect lies in the inclusive nature of the benefits brought about by capital restructuring. The land revenue generated by property rights confirmation, denoted as γT_r , is shared by all rural residents. However, for non-transfer groups who originally had lower incomes and mainly relied on rural wages and land income, the marginal utility of this additional income is greater, directly narrowing the gap between them and high-income transfer groups. Therefore, the following hypothesis can be made.

Hypothesis 2. *The CHR can alleviate income inequality among rural residents.*

2.3. The Effects of Labor Transfer

Then, we investigate the effects of labor transfer on income inequality among rural residents. From (9), we can have

$$\frac{\partial g}{\partial L_T} = \frac{\left[\left(\frac{\partial \omega_u}{\partial L_T} L_T + \omega_u \right) + \left(\frac{\partial \omega_r}{\partial L_T} L_r - \omega_r \right) \right] \pi - \vartheta \left(\frac{\partial \omega_r}{\partial L_T} L_r - \omega_r \right)}{\pi^2} \quad (10)$$

Here, $\vartheta = \omega_u L_T + \omega_r (\bar{L}_r - L_T) + \gamma Q T_r$, $\pi = \omega_r (\bar{L}_r - L_T) + \gamma Q T_r$. According to (5), it can be seen that

$$\frac{\partial g}{\partial L_T} < 0, \quad (11)$$

showing a negative effect of labor transfer on income gap. An increase in labor transfer could alleviate income inequality among rural residents, which is consistent with Liao et al. [24]. This is essentially a manifestation of livelihood transformation. The shift of labor from agriculture to higher-paying non-agricultural sectors has produced a leap in income. This is consistent with existing research results; labor transfer provides opportunities for upward mobility for low- and middle-income farmers to obtain higher incomes through non-agricultural employment, which helps narrow the gap with high-income farmers and alleviate income inequality [25].

Using (10), we can further investigate how labor transfer affects the above inequality-alleviating effects of the CHR:

$$\frac{\partial^2 g}{\partial Q \partial L_T} = \frac{\frac{\partial \vartheta}{\partial Q}}{\pi^2} \frac{\partial (\pi - \vartheta)}{\partial L_T} < 0 \quad (12)$$

This implies that labor transfer enhances the CHR's effects of alleviating income inequality among rural residents. More importantly, formula (12) reveals the synergistic effect of the CHR policy and labor transfer, due to the interaction between livelihood transformation and opportunity reshaping. Transferring labor earns high wages, while

staying in rural areas allows for more effective utilization of homestead assets due to the increase in land–labor ratio and property rights protection, resulting in synchronous and rapid income growth for both parties, with the latter having a more significant catch-up effect.

From the perspective of age, the working population can be divided into the working-age population and non-working-age population. This is because there may be elderly people and children among the workers. Assuming that the total rural population is the sum of the initial working-age population $\bar{L}_{rp}$ and the initial non-working-age population $\bar{L}_{ru}$, that is, $\bar{L}_r = \bar{L}_{rp} + \bar{L}_{ru}$. Similarly, the labor transfer population can also be decomposed into labor-age population transfer L_{Tp} and non-labor-age population transfer L_{Tu} , that is, $L_T = L_{Tp} + L_{Tu}$. Then the effective rural labor force L_{rp} satisfies $L_{rp} = \bar{L}_{rp} - L_{Tp}$. Due to the non-working-age population not entering production, their transfer does not affect the production function and wages. The production function, wages, and income gap in the rural sector can be rewritten as:

$$Y_r = A_r \left[\phi_r (QT_r)^{\rho_r} + (1 - \phi_r) (\bar{L}_{rp} - L_{Tp})^{\rho_r} \right]^{\frac{1}{\rho_r}} \quad (13)$$

$$\omega_r = \frac{\partial Y_r}{\partial L_{rp}} = A_r^{\rho_r} (1 - \phi_r) \left(\frac{Y_r}{\bar{L}_{rp} - L_{Tp}} \right)^{1-\rho_r} \quad (14)$$

$$g = \frac{\omega_u L_{Tp} + \omega_r (\bar{L}_{rp} - L_{Tp}) + \gamma QT_r}{\omega_r L_{rp} + \gamma QT_r} = \frac{\vartheta^p}{\pi^p} \quad (15)$$

Obviously, we can obtain:

$$\frac{\partial^2 g}{\partial Q \partial L_{Tp}} < 0, \frac{\partial^2 g}{\partial Q \partial L_{Tu}} = 0, \quad (16)$$

which shows that the positive effect of labor transfer, as a matter of course, comes from the impact of the transfer of the working-age population. The above results lead to the following hypothesis.

Hypothesis 3. *Labor transfer promotes the suppression of income inequality among rural residents through the CHR policy, and its positive effect is mainly caused by the transfer of working-age population.*

3. Data Sources and Research Design

The data utilized in this paper originates from the China Rural Revitalization Survey (CRRS), conducted by the Rural Development Institute of the Chinese Academy of Social Sciences. Initiated in 2020, the first phase of the survey has released its data for that year. This survey round encompasses over ten provinces and regions nationwide, including Guangdong, Shandong, and Zhejiang. The dataset spans more than 50 counties (or cities) and 156 townships (or towns), reflecting a commendable breadth of coverage. After excluding samples with outliers and missing values in key variables, the final dataset for this study comprises 12,749 samples.

3.1. Variable Selection and Descriptive Statistics

3.1.1. Explained Variables

The cornerstone explanatory variable is rural residents' income inequality. Adhering to the approach outlined by Ledić [26], the annual income of farm households is transformed into logarithmic form for the baseline regression analysis. To assess the extent of income

inequality at the household level, we utilize the Kakwani index as relative deprivation index [27,28]. The Kakwani index primarily captures the extent of income inequality among farm households by illuminating their relative deprivation status. Within a specific village, a farm household's income level (X_i) inversely correlates with its degree of income disadvantage and relative income deprivation. In simpler terms, as a farm household's income increases, it experiences less income disadvantage and, consequently, less relative income deprivation, manifesting as a lower level of income inequality. For a farm household j , its level of relative income deprivation relative to farm household i , given the latter's income level X_i , is calculated as follows:

$$K(X_i, X_j) = \begin{cases} X_j - X_i, & X_j > X_i \\ 0, & X_j \leq X_i \end{cases} \quad (17)$$

The theory of relative deprivation is applied to compare the income level of farmer i with those of other rural residents in the same village. The resulting relative deprivation levels are summed and then normalized by dividing them by the mean income of all rural residents in the village, denoted as μ . This calculation produces an index of relative deprivation for farmer i within the village, reflecting their economic position relative to their peers:

$$Kakwani = \frac{1}{n\mu} \sum_{j=1}^n K(X_i, X_j) = \frac{1}{n\mu} (n_{X_i}^+ \mu_{X_i}^+ - n_{X_i}^+ X_i) = \frac{n_{X_i}^+}{n\mu} (\mu_{X_i}^+ - X_i) = \pi_{X_i}^+ \frac{\mu_{X_i}^+ - X_i}{\mu} \quad (18)$$

n denotes the number of all farm households in the village, $n_{X_i}^+$ denotes the number of farm households with incomes greater than X_i in the village, $\mu_{X_i}^+$ denotes the mean value of income for farm households with incomes greater than X_i , and $\pi_{X_i}^+$ denotes the ratio of the number of farm households with incomes greater than X_i in the village to the number of farm households in the whole village. The Kakwani index is a metric that ranges between 0 and 1, with increasing values indicating heightened income inequality.

Divide the rural residents in each village into two groups based on their homestead certification rate. Rural residents with a certification rate higher than the median are considered the high certification rate group, while those with a certification rate lower than the median are considered the low certification rate group. The income distribution of rural residents is shown in Table 1. The income of rural residents in the high certification rate group is higher than that of rural residents in the low certification rate group at each income percentile level, indicating that the CHR has an income-increasing effect on rural residents, but the impact on income inequality among rural residents is not yet clear.

Table 1. Different Income Quantiles and the Rate of CHR.

Annual Income of Households (10,000 Yuan) and Income Quantile	10%	25%	50%	75%	90%
High certification rate group	1.196	2.673	5.540	10.37	18.46
Low certification rate group	1.110	2.545	5.485	9.967	17.00

3.1.2. Explanatory Variables

We measure the intensity of the CHR by using the certification rate of each village, and multiplying it with the working-age population as the independent variable of the model to analyze the impact of the CHR on income inequality among rural residents. In order to eliminate potential endogeneity issues, this article constructs a twofold difference between village and age levels, adds the fixed effects of village and age, and controls for factors that do not change with age at the village level and the influence of factors that

do not change between villages at the age level. The first difference in this article is the difference in the certification rate of homesteads among different villages, and the second difference is the difference in the degree of influence of CHR policies on different age groups within the village. The method of constructing differences using different age groups is common in the literature [29,30]. The working-age population is the main contributor to household income. Therefore, this article selects the age range of 16–59 years old for the working-age population defined by the Chinese government as the starting point to consider the differences in policy impact between the working-age population and the non-working-age population.

3.1.3. Labor Transfer Variables

The mechanism studied in this article is labor transfer. We chose whether someone works outside the village and the proportion of families working outside the village as proxy variables for labor transfer. If the answer to the question “Do you work outside the home” in the questionnaire is “yes”, it means that the interviewee is included in labor transfer, and this is used to calculate the ratio of the number of people working outside the village to the size of the household.

3.1.4. Control Variables

Taking into account data accessibility, this paper drew upon the work of previous research to select control variables from basic characteristics, natural capital, social capital, and self-assessment perspectives [31–33]. The basic characteristics include the gender, marital status, and years of education of the respondents; social capital is quantified by considering membership in the Chinese Communist Party, the holding of cadre positions, and the presence or absence of a pension; natural capital includes the area of homestead, quantity of homestead, and cultivated land owned by rural residents; self-evaluation is measured by residential satisfaction and satisfaction with annual household income. The above variable setting and descriptive statistics are shown in Table 2.

3.2. Model Settings

Referring to the research of D’Albis et al. and Ren et al. [34,35], by multiplying the certification rate of homesteads in each village with the working-age labor, and incorporating the fixed effects of village and age, this paper constructs the following strength difference-in-differences model to control for factors that do not change with age at the village level and the influence of factors that do not change between villages at the age level:

$$Y_{ist} = \beta_0 + \beta_1 \text{certify_rate}_s \times \text{labor_age}_t + \alpha X_{ist} + \theta_s + \mu_t + \varepsilon_{ist} \quad (19)$$

Among them, the Y_{ist} represents the logarithm of the annual household income of individual i belonging to village s and age group t , as well as the inequality index of that household; certify represents the confirmation rate of homestead rights in village s ; labor_age_t is a dummy variable representing the working-age population aged 16–59; X_{ist} is a series of control variables considered; θ_s represents the fixed effect of the village, which controls for a series of factors at the village level that do not vary with age and have an impact on income inequality among rural residents; μ_t is an age fixed effect that controls for a series of factors at the age level that do not vary with the village and have an impact on income inequality among rural residents; ε_{ist} is a random perturbation term; β_1 is the core coefficient of concern for the research institute, representing the impact of CHR on income inequality among rural residents; β_0 is a constant term, and α is the coefficient of a series of control variables; at the same time, the model adopts clustering standard errors at the village level.

Table 2. Variable Setting and Descriptive Statistics.

Variable Type	Variable Name	Variable Definition and Assignment	Mean Value	Standard Deviation
Explained variables	Income	Logarithmic calculation of annual household income for rural residents	1.609	1.109
	Kakwani	Measurement of the Kakwani index using rural residents in the village as a reference group	0.373	0.272
Explanatory variables	Certify	The ratio of the number of households with confirmation to the total number of households in a village	0.758	0.218
	Labor age	Whether the labor is at working age; yes = 1, no = 0	0.633	0.482
	Certify_Age	Multiplying the village ownership rate by the working-age population	0.479	0.404
Labor transfer variables	Outflow	Do rural residents work outside the village? Yes = 1, no = 0	0.510	0.500
	Outflow rate	The ratio of the number of people working outside the village to the size of the household.	0.500	0.493
Control variables	Gender	Male = 1, female = 0	0.518	0.500
	Marital	Being married = 1, not married = 0	0.710	0.454
	Education	No education = 0, primary school = 6, junior high school = 9, high school = 12, junior college = 15, undergraduate = 16, master's degree = 19, doctoral degree = 23	7.891	4.316
	Pension	Do you have pension insurance? Yes = 1, no = 0	0.820	0.384
	CCP member	Whether they are a CCP member; yes = 1, no = 0	0.104	0.305
	Cadre	Whether they are a cadre; yes = 1, no = 0	0.068	0.251
	Homestead area	Family homestead area (square meters)	231.5	220.8
	Homestead number	Number of family homesteads	1.198	0.509
	Cultivated land area	Household cultivated land area (acres)	6.420	9.682
	Residential satisfaction	The satisfaction level of the respondents towards their living environment; very dissatisfied = 1, not very satisfied = 2, average = 3, relatively satisfied = 4, very satisfied = 5	4.079	0.838
	Family income satisfaction	The satisfaction level of respondents with household income; very dissatisfied = 1, not very satisfied = 2, average = 3, relatively satisfied = 4, very satisfied = 5	3.405	1.062

4. Empirical Results and Analysis

4.1. Benchmark Regression

The benchmark regression results are shown in Table 3. The columns (1) and (3) show the regression results without fixed effects, while the columns (2) and (4) show the final regression results with village fixed effects and age fixed effects. In columns (1) and (2), regardless of whether fixed effects are added or not, the coefficient of the multiplication term of the certification rate and labor age is significantly positive at the 1% level, indicating that the CHR has an effect that increases rural residents' income. In columns (2) and (4), regardless of whether fixed effects are added or not, the coefficient of the multiplication term of the certification rate and labor age is significantly negative at the 1% level, indicating that the CHR has a significant inhibitory effect on income inequality.

among rural residents. From the results of adding fixed effects, it can be seen that for every 10% increase in the village property rights confirmation rate, the logarithmic expected annual household income of rural residents increases by an average of 2.81% standard deviations, and the relative deprivation index is expected to decrease by an average of 0.67% standard deviations. This indicates that the CHR has the effect of promoting rural residents' income growth and reducing income inequality, which provides support for our Hypotheses 1 and 2.

Table 3. Benchmark Regression Results.

	(1) Income	(2) Income	(3) Kakwani	(4) Kakwani
Certify_Age	0.352 *** (0.041)	0.281 *** (0.092)	−0.084 *** (0.010)	−0.067 *** (0.025)
Gender	−0.042 *** (0.015)	−0.017 (0.013)	0.007 * (0.004)	0.007 ** (0.003)
Marital	−0.208 *** (0.025)	−0.003 (0.041)	0.064 *** (0.005)	−0.010 (0.011)
Education	0.002 (0.003)	0.001 (0.004)	0.001 * (0.000)	−0.003 (0.009)
Pension	−0.079 (0.065)	0.005 (0.058)	0.006 (0.014)	0.003 (0.015)
CCP member	0.173 *** (0.041)	0.104 *** (0.034)	−0.015 (0.010)	−0.025 *** (0.009)
Cadre	0.080 * (0.042)	0.047 (0.035)	−0.016 (0.010)	−0.018 ** (0.009)
Homestead area	0.002 ** (0.000)	0.002 ** (0.001)	−0.004 (0.003)	−0.005 * (0.003)
Homestead number	0.079 (0.066)	0.111 * (0.067)	−0.039 *** (0.013)	−0.040 *** (0.014)
Cultivated land area	0.008 *** (0.002)	0.008 *** (0.002)	−0.002 *** (0.000)	−0.002 *** (0.000)
Residential satisfaction	0.073 *** (0.025)	0.061 *** (0.022)	−0.022 *** (0.006)	−0.018 *** (0.006)
Family income satisfaction	0.164 *** (0.022)	0.147 *** (0.020)	−0.030 *** (0.005)	−0.039 *** (0.005)
Constant	0.572 *** (0.148)	0.455 *** (0.163)	0.611 *** (0.035)	0.694 *** (0.041)
Villages fixed effects	N	Y	N	Y
Age fixed effects	N	Y	N	Y
Sample size	12,749	12,749	12,749	12,749
R ²	0.066	0.306	0.052	0.210

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

Following the inclusion of fixed effects, subsequent analyses examine the marginal effects of control variables on rural residents' income levels and inequality. As demonstrated in Columns (2) and (4), basic demographic controls reveal no statistically significant relationship between gender and rural residents' income. However, males exhibit a greater capacity to mitigate experienced income inequality compared to female counterparts, though this effect operates independently of direct income generation. Marital status and educational attainment years show no significant association with either income dimension in the regression results. The non-significance of education may reflect the complex returns to schooling in rural labor markets, where its benefits might be channeled more through facilitating labor migration rather than directly boosting agricultural income, a mechanism potentially absorbed by our fixed effects design. With respect to social capital indicators, pension insurance participation demonstrates no measurable income or inequality effects, which could be attributed to the relatively low benefit levels of rural pension schemes, rendering them insufficient to significantly alter household income structures or inequality patterns. Conversely, Communist Party membership correlates with both elevated income levels and reduced income inequality at the 1% significance level. While cadre status shows no discernible income effect, it contributes to significant inequality reduction. Natural

capital evaluations indicate that homestead area, homestead parcel quantity, and cultivated land all positively affect income growth while compressing income dispersion. Subjective well-being metrics reveal positive correlations, as higher satisfaction with housing conditions and income adequacy correspond to greater income gains and reduced inequality, even after controlling for objective socioeconomic factors.

Collectively, the mixed significance of these control variables provides a nuanced backdrop against which the robust effect of CHR can be understood. It suggests that, in the context of contemporary rural China, institutional reforms like land certification and the reallocation of core productive factors like labor transfer may exert a more direct and powerful influence on household economics than some traditional demographic and social capital metrics. These non-significant findings are not shortcomings but may be some valuable insights, indicating a shift in the mechanisms driving rural prosperity and distribution, where the role of state-led institutional innovation is paramount.

4.2. Robustness Test

In order to rigorously address potential issues regarding the effectiveness and sensitivity of our empirical strategy, this section has implemented a comprehensive robustness check. We evaluated the sensitivity of the core findings by using alternative model specifications, variable definitions, and estimation methods. Meanwhile, based on the DID design, we validated the reliability of the study through placebo testing and reverse causality testing. The consistent results of these different tests detailed below provide strong evidence for the reliability and robustness of our conclusion on the CHR alleviating rural income inequality.

First, referring to Firpo et al. [36], this article first uses the recentered influence function (RIF) regression for robustness testing. RIF regression can effectively overcome endogeneity issues caused by omitted variables and is often used in research to explore distribution inequality. This article constructs RIF regression models based on the Gini coefficient, the 90–10 percentile range of household income, and the 90/10 percentile ratio of income, as follows:

$$RIF\{Y_{ist}; v^k(F_Y)\} = \beta_0 + \beta_1 \text{certify_rate}_s \times \text{labor_age}_t + \alpha X_{ist} + \theta_s + \mu_t + \varepsilon_{ist} \quad (20)$$

Among them, Y_{ist} represents the annual household income of individual i belonging to village s and age group t , and $v^k(F_Y)$ represents the Gini coefficient, 90–10 percentile, and 90/10 percentile ratio of Y_{ist} , respectively.

The regression results are shown in Table 4. For the three RIF regression indicators used, the CHR has a significant negative effect at the 1% level, indicating that the CHR has a role in reducing income inequality among rural residents. At the same time, this article also used RIF regression to plot the regression coefficients of rural residents with income percentiles ranging from 10% to 90% at intervals of 5%, as shown in Figure 1. The regression coefficients of the CHR for different-income rural residents generally showed a decreasing trend, and the impact on low-income rural residents was greater than that on high-income rural residents, indicating that there is a mitigating effect on income inequality among rural residents.

Second, considering that in the process of confirming homestead rights, various regions usually follow the practice of “easy first, difficult later, and gradually piloting”, the order of the policy for rural residents in different regions is not random, but may be influenced by the region and their own situation, resulting in selective bias. Therefore, this article also used the PSM-DID method for robustness testing. After using 1:1 nearest neighbor matching, the results are shown in column (4), and the effect of the CHR on the

relative deprivation index is still significantly negative, once again verifying the robustness of the benchmark regression.

Table 4. RIF Regression Results and PSM-DID Test Results.

	(1) Gini Coefficient	(2) 90–10 Percentile	(3) 90/10 Percentile Ratio	(4) Kakwani
Certify_Age	−0.127 *** (0.045)	−0.569 ** (0.231)	−88.060 *** (25.270)	−0.068 *** (0.025)
Control variables	Y	Y	Y	Y
Villages fixed effects	Y	Y	Y	Y
Age fixed effects	Y	Y	Y	Y
Constant	0.410 *** (0.066)	−0.779 ** (0.319)	−170.900 *** (37.860)	0.693 *** (0.042)
Sample size	12,749	12,749	12,749	12,556
R ²	0.184	0.155	0.169	0.211

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

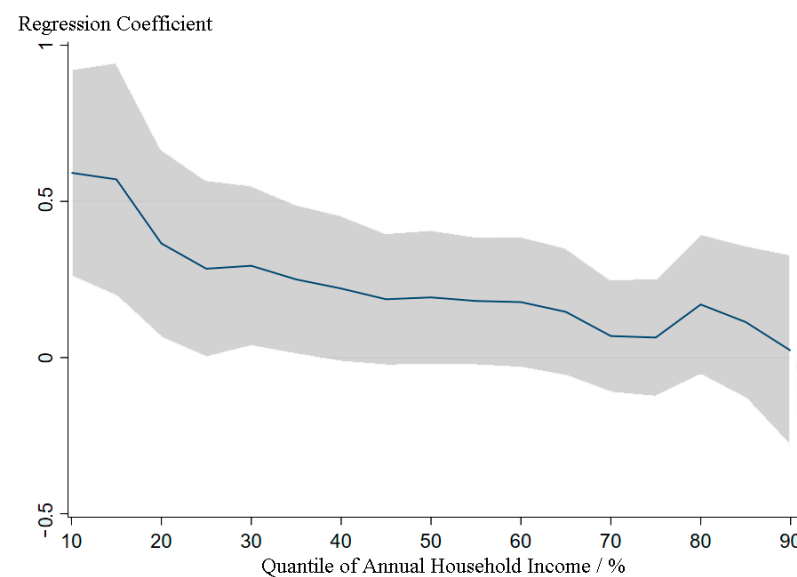


Figure 1. RIF Regression Coefficients of CHR for Rural residents with Different Income Quantile.

Third, we also conduct robustness tests by changing the dependent and explanatory variables, and the results are shown in Table 5. The inequality index used in benchmark regression is calculated based on the relative deprivation status of rural residents within the village. Therefore, in columns (1) and (2), this article calculates the relative deprivation index of rural residents within townships and counties, respectively. The regression results show that, regardless of the level of income inequality calculated for rural residents, the CHR has a restraining effect on it. On the other hand, this article refers to Ghio et al. [37], changing the definition of the working-age population from 16–59 years old to 15–64 years old, which is an internationally recognized standard, and multiplying it with the village confirmation rate to construct a new double-difference variable. As shown in column (3), the impact of the CHR on income inequality among rural residents is still significantly negative.

Fourthly, we also employed a two-stage least squares method using instrumental variables (IV-2SLS) to reduce errors caused by endogeneity. The instrumental variable we used is the number of homesteads in the village. On the one hand, the number of homesteads in a village to some extent determines the strength of government departments in confirming the ownership of homesteads, meeting the principle of correlation of instrumental variables; On the other hand, the number of homesteads in a village cannot directly affect the income inequality of village residents, meeting the principle of exogeneity. Its K-P rk LM value and K-Paap rk Wald F value indicate that it has passed the unidentifiable test and weak

instrumental variable test. As shown in column (4), the coefficient of CHR on income inequality remains significantly negative, further strengthening our conclusion.

Table 5. Test Results of Changing the Variable and Instrumental Variable Test.

	(1) Kakwani	(2) Kakwani	(3) Kakwani	(4) Kakwani
Certify_Age	−0.061 *** (0.024)	−0.053 ** (0.022)	−0.049 ** (0.024)	−0.205 ** (0.097)
Control variables	Y	Y	Y	Y
Villages fixed effects	Y	Y	Y	Y
Age fixed effects	Y	Y	Y	Y
Constant	0.735 *** (0.040)	0.768 *** (0.037)	0.685 *** (0.040)	0.606 *** (0.037)
Sample size	12,749	12,749	12,749	12,749
R ²	0.264	0.300	0.202	0.032
Kleibergen-Paap rk LM statistic				24.147
Kleibergen-Paap rk Wald F statistic				39.786

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

Finally, we constructed a placebo test by randomly assigning a certification rate to each village to construct an erroneous regression variable for 500 repeated regressions, resulting in 500 erroneous estimation coefficients. As shown in Figure 2, the estimated coefficients of the repeated regression are roughly symmetrically distributed around zero and follow a normal distribution. All coefficients are far away from the benchmark regression coefficient of −0.067, and have passed the placebo test, indicating that the suppression of income inequality among rural residents by the CHR is not caused by the influence of other random factors.

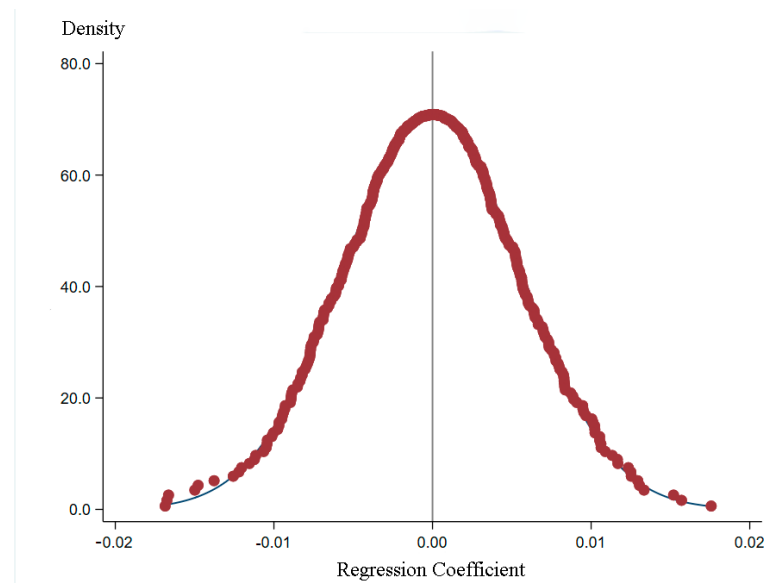


Figure 2. Result of Placebo Test.

4.3. Hypothesis Testing for Age

The key to constructing a difference-in-difference model in this article lies in the different income impacts brought on by the policy of CHR on different age groups. Since the main source of income in households comes from the working-age population, it is assumed that the impact of policies on the working-age population is the most significant. However, a household does not only include the working-age population. In order to verify the rationality of using the working-age population to construct a DID model, this paper tested the age recognition hypothesis, as shown in Table 6. In columns (1) and (2), the study added two variables: the size of the household labor force “Labor_Num” and the

proportion of the household labor force “Labor_Rate”. The impact of the CHR on income inequality among rural residents is still significantly negative, indicating that the direction of policy suppression of income inequality among rural residents is not affected by the demographic structure of their households.

Table 6. The Results of Hypothesis Testing for Age.

	(1) Kakwani	(2) Kakwani	(3) Kakwani	(4) Kakwani
Certify_Age	−0.070 *** (0.026)	−0.059 ** (0.025)		
Labor_Num	−0.064 *** (0.005)			
Labor_Rate		−0.177 *** (0.020)		
Certify_Prop			−0.235 *** (0.022)	
Certify_Non				0.067 *** (0.025)
Control variables	Y	Y	Y	Y
Villages fixed effects	Y	Y	Y	Y
Age fixed effects	Y	Y	Y	Y
Constant	0.854 *** (0.042)	0.814 *** (0.042)	0.779 *** (0.040)	0.643 *** (0.037)
Sample size	12,749	12,749	12,749	12,749
R ²	0.267	0.225	0.228	0.210

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

In column (3), this article multiplies the village tenure rate with the proportion of the household labor force to construct a new differential variable, “Certify_Prop”. The regression result is still significantly negative, once again indicating that the ratio of working-age population to non-working-age population in households does not affect the inhibitory effect of the CHR on income inequality among rural residents. In column (4), this article multiplies the village ownership rate with the non-working-age population to generate a new variable, “Certify_Non”, and regresses to explore the income impact of the non-working-age population under policies. The results are significantly positive, indicating that when only considering the non-working-age population, the CHR may actually exacerbate income inequality among rural residents. Therefore, it is reasonable for this article to use a double-difference model constructed by the working-age population to explore the impact of the CHR on income inequality among rural residents, and its inhibitory effect mainly comes from the influence of the working-age population.

4.4. Text of Labor Transfer Mechanism

By constructing the following triple-difference equation, this article examines the role of labor transfer in suppressing income inequality among rural residents in the process of confirming homestead rights:

$$Y_{ist} = \beta_0 + \beta_1 \text{certify_rate}_s \times \text{labor_age}_t + \beta_2 \text{certify_rate}_s \times \text{labor_age}_t \times \text{out}_i + \beta_3 \text{out}_i + \alpha X_{ist} + \theta_s + \mu_t + \varepsilon_{ist}. \quad (21)$$

Here, out_i represents whether individual i , located in village s and in age group t , works outside the village (outflow) and the proportion of family members who work outside the village (outflow rate). The regression results are shown in Table 7. In columns (1) and (2), a triple-difference variable was constructed by multiplying the variables of out-of-village employment and the proportion of out-of-village employment by the original difference variable. The regression coefficients -0.058 and -0.064 were significantly negative at the 1% level, indicating that labor transfer has a promoting effect on alleviating income inequality among rural residents in the process of confirming homestead rights. Similarly to the previous text, considering that there may still be some non-working-age population in the transferred labor, this article uses the village certification

rate and non-working-age population to generate the interaction variable “Certify_Non”, and multiplies it with the variables of out-of-village employment and the proportion of out-of-village employment to generate a triple-difference variable for regression. As shown in columns (3) and (4), the triple-difference coefficients of 0.050 and 0.047 are both significantly positive, indicating that when only considering the non-working-age population, the inhibitory effect of the CHR on income inequality among rural residents will not only be offset, but may even exacerbate income inequality among rural residents. The research results indicate that labor transfer plays an increasing role in alleviating income inequality among rural residents in the process of confirming homestead rights, and this increasing effect mainly comes from the labor transfer of the working-age population, which provides support for our Hypothesis 3.

Table 7. The Results of Labor Transfer Mechanism Testing.

	(1) Kakwani	(2) Kakwani	(3) Kakwani	(4) Kakwani
Certify_Age	−0.038 (0.026)	−0.036 (0.026)		
Certify_Non			0.0370 (0.022)	0.039 (0.013)
Certify_Age × Outflow	−0.058 *** (0.015)			
Certify_Non × Outflow			0.050 *** (0.013)	
Outflow	0.095 *** (0.0142)		0.053 *** (0.013)	
Certify_Age × Outflow Rate		−0.064 *** (0.015)		
Certify_Non × Outflow Rate				0.047 *** (0.014)
Outflow Rate		0.097 *** (0.014)		0.053 *** (0.013)
Control Variables	Y	Y	Y	Y
Villages Fixed Effects	Y	Y	Y	Y
Age Fixed Effects	Y	Y	Y	Y
Constant	0.645 *** (0.042)	0.644 *** (0.042)	0.763 *** (0.048)	0.787 *** (0.041)
Sample Size	12,749	12,749	12,749	12,749
R ²	0.223	0.223	0.214	0.237

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

4.5. Further Analysis

We also explore the heterogeneous results caused by regional differences in the impact on rural household income inequality of the CHR. As shown in Table 8, the coefficient of effect of the CHR shows that the effect on the eastern region is greater than the that on the central region and greater than that on the the western region in China. In the eastern region of China, the CHR has significantly reduced the income inequality level of rural residents at the 1% level; in the central and western regions of China, although the coefficient is also negative, it is not a significant result. On the one hand, as the most economically developed region in China, the degree of market mechanism perfection in the eastern part is much higher than that in the central and western regions. A sound land transfer market is conducive to improving the efficiency of resource allocation [38]. The rural land transfer market in the eastern region is well developed, with clear property rights after property rights are confirmed. Land is more easily converted into capital gains through leasing, mortgages, and other means, promoting income growth for low-income rural residents; the level of industrialization and urbanization in the eastern region is high, and the transfer of labor is convenient. The labor force released through property rights can quickly integrate into non-agricultural industries, forming a dual income channel of “land transfer rent with non-agricultural wages”, significantly narrowing the income gap. However, the economy in the central and western regions is relatively underdeveloped, and land transfer transactions are not active. The policy of the CHR is difficult to transform into actual benefits through

market mechanisms, which suppresses the effectiveness of policies; the surplus labor force is difficult to effectively transfer, and the income-increasing effect of land tenure is limited to within agriculture, with limited impact on improving inequality. On the other hand, local governments in the eastern region have stronger capabilities [39], high efficiency in implementing the CHR policies, and more complete supporting measures such as property rights trading platforms and financial support, which can amplify policy effects; however, there is a phenomenon in the western region where policy implementation is merely a formality, property rights certificates are idle, and the actual resource redistribution effect is weak. Therefore, the effect of the CHR on alleviating income inequality among rural residents is more significant in the eastern region.

Table 8. Regression Results Grouped by Region.

	(1) Eastern Kakwani	(2) Central Kakwani	(3) Western Kakwani
Certify_Age	−0.144 *** (0.037)	−0.043 (0.060)	−0.008 (0.036)
Control variables	Y	Y	Y
Villages fixed effects	Y	Y	Y
Age fixed effects	Y	Y	Y
Constant	0.747 *** (0.067)	0.664 *** (0.076)	0.678 *** (0.069)
Sample size	4700	3801	4240
R ²	0.236	0.208	0.237

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

Further, Table 9 shows the heterogeneous results caused by the impact of the CHR on income inequality among rural residents in suburban villages and impoverished villages. Whether in suburban or non-suburban villages, the CHR has a certain alleviating effect on income inequality among rural residents, but the intensity is greater and the effect is more significant in non-suburban villages. Similarly, the alleviation of inequality through the CHR exists in both impoverished and non-impoverished villages, but its effect is stronger on impoverished villages. For non-suburban villages, the value of homesteads is underestimated before property rights are confirmed. After property rights are confirmed, significant appreciation can be achieved through transfer or large-scale operation, directly benefiting ordinary rural residents and narrowing the gap with wealthy rural residents. Suburban villages are influenced by urbanization, and homesteads can be partially capitalized through informal transaction [40], with limited marginal value-added effects from property rights confirmation. At the same time, the income sources of rural households in suburban villages are more diversified, and the impact of the CHR on income structure is relatively small. For impoverished villages, the initial assets of rural residents, such as land and funds, are limited. Granting clear property rights can help them break through financing constraints, activate the value of existing assets, and achieve a catch-up effect. Meanwhile, impoverished villages are often key areas for targeted poverty alleviation by the government, and the CHR often overlaps with supporting policies such as industrial poverty alleviation and cooperatives, forming a policy combination [41]. For non-impoverished villages, rural residents already have a certain amount of asset accumulation, and the marginal benefits of CHR are relatively low, which may even widen the gap due to the concentration of land to large households. On the other hand, non-poor-village rural residents have diverse sources of income, and the sensitivity to policies for the CHR has decreased [14]. Therefore, the effect of the CHR on alleviating income inequality is more pronounced in non-suburban and impoverished villages.

Table 9. Regression Results Grouped by Whether They are Suburban Villages or Poverty Villages.

	(1) Suburban Kakwani	(2) Non-Suburban Kakwani	(3) Impoverished Kakwani	(4) Non-Impoverished Kakwani
Certify_Age	−0.058 (0.042)	−0.071 ** (0.030)	−0.100 ** (0.045)	−0.059 * (0.031)
Control variables	Y	Y	Y	Y
Villages fixed effects	Y	Y	Y	Y
Age fixed effects	Y	Y	Y	Y
Constant	0.608 *** (0.083)	0.722 *** (0.047)	0.801 *** (0.079)	0.660 *** (0.049)
Sample size	2789	9956	3594	9070
R ²	0.213	0.218	0.257	0.203

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

To further explore the differences in family decision-making behind the complex phenomenon of labor force transfer, we conducted grouping analysis from two dimensions: family structure and economic status. The results are summarized in Table 10. We first based groups on the median household income. The analysis found that the equalization effect of the CHR is more significant in low-income families. This indicates that the CHR policy, as a universal institutional reform, has significant benefits for the poor. For low-income families, the asset effect and marginal utility of income opportunities brought by property rights confirmation are greater, which can effectively help them move upward and effectively narrow the income gap within the village. In contrast, high-income families have more diverse sources of income and lower dependence on homestead land and its derivative income, so the marginal impact of policies is relatively small. Due to the influence of family structure on labor transfer [42], we also analyzed it from the perspective of family dependency ratio. Referring to Fang’s research [43], we define the family dependency ratio as the ratio of non-working-age population to working-age population in a family. The results show that the inhibitory effect of the CHR on income inequality was significantly stronger in families with low dependency ratios, but not significant in families with high dependency ratios. This discovery clearly indicates that the structural constraints brought about by the family life cycle are the key factors affecting policy effectiveness. Low dependence has a lighter burden than family upbringing, flexible labor allocation, and can fully utilize the opportunities brought by the CHR policies to achieve income doubling through labor transfer and homestead land activities. On the contrary, families with high dependency ratios are limited by family responsibilities, making it difficult for their labor force to be liberated from rural areas, and, therefore, their benefits from policies are relatively limited.

Table 10. Regression results grouped by household income and dependency ratio.

	(1) High Income Kakwani	(2) Low Income Kakwani	(3) High Dependency Ratio Kakwani	(4) Low Dependency Ratio Kakwani
Certify_Age	−0.019 (0.021)	−0.036 ** (0.029)	−0.017 (0.038)	−0.038 ** (0.030)
Control variables	Y	Y	Y	Y
Villages fixed effects	Y	Y	Y	Y
Age fixed effects	Y	Y	Y	Y
Constant	0.400 (0.038)	0.616 (0.040)	0.678 (0.008)	0.685 (0.054)
Sample size	6293	6454	5507	7237
R ²	0.466	0.477	0.307	0.304

Note: The numbers in parentheses represent clustering standard errors; *, **, *** correspond to significance levels of 10%, 5%, and 1%, respectively. Y indicates that the regression includes control variables or fixed effects, while N indicates that the item is not included.

5. Discussion and Conclusions

This study provides robust theoretical and empirical evidence that China's confirmation of homestead rights (CHR) policy significantly mitigates rural income inequality, with labor transfer serving as a key reinforcing mechanism. By integrating a dual-economy theoretical framework with rigorous micro-econometric analysis using nationally representative data, the empirical results lend robust support to the three hypotheses derived from our theoretical model. Specifically, Hypothesis 1 is conclusively supported by Table 3, as the CHR demonstrates a statistically significant income-enhancing effect for rural residents. Hypothesis 2 is strongly validated by Tables 3–5, with empirical evidence confirming that the CHR serves as a significant mitigating force against rural income inequality. Hypothesis 3 is corroborated by Tables 6 and 7, underscoring that labor transfer, particularly of the working-age population, acts as a positive moderator that amplifies the inequality-alleviating effect of the CHR.

We advance the existing literature in several important ways: Firstly, previous research has mainly focused on the income-increasing effect of land rights certification, but we have demonstrated that the CHR also has an equilibrium effect on income distribution. Secondly, we believe that labor transfer is an important channel for the CHR to alleviate inequality. We identify labor transfer, especially of the working-age-population, as a critical channel through which the CHR alleviates inequality. This finding complements the literature on labor mobility and rural development, highlighting the synergistic effect between land institutional reform and labor market integration. Thirdly, our heterogeneity analysis indicates that the inequality-reduction effect of the CHR is more pronounced in eastern regions, non-suburban villages, and impoverished villages, particularly for low-income and low-dependency-ratio families. Fourthly, we constructed a new mathematical model to derive the process by which the CHR alleviates income inequality among rural residents, which was not addressed in previous research.

These findings have significant policy implications. This reminds policy makers to promote tailored land rights frameworks and targeted labor transfer plans to maximize the poverty alleviation potential of the CHR; strengthening financial inclusiveness and land market development in underdeveloped regions is also crucial. In addition, in an environment where technology continues to advance and environmental governance is increasingly emphasized, we believe that future policies should combine technological progress with ecological governance by developing digital platforms related to homesteads and introducing ecological compensation plans that incentivize sustainable land use practices. Future policy directions may include developing digital platforms for trading and valuing homesteads, as well as promoting green building technology and ecological compensation schemes in rural tourism development, and incorporating environmental standards into the process of homestead development and utilization.

Finally, we acknowledge several limitations. The cross-sectional nature of our data restricts causal inference over time. Future research could employ panel data to capture dynamic effects and incorporate non-economic dimensions of inequality, such as social capital and gender disparities. Nonetheless, this study offers a replicable analytical framework for understanding land reform and inequality in developing economies, contributing to both scholarly and policy debates on sustainable rural transformation.

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