

The Structure of Income, Factor prices, and Farmland Leasing

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Abstract: Land is a critical factor asset for farmers. In the context of agricultural and rural modernization, the optimal allocation of land factors has become key to increasing farmers' income and a primary means of endowing farmers with more substantial property rights. This paper theoretically explores the relationship between farmers' household income structure and land rental behavior, and empirically tests this relationship using data from the 2013 and 2018 China Thousand-Village Surveys. The findings are as follows. First, with the intersectoral and interregional mobility of labor, wage income in farm households has increased, and agricultural production is no longer the dominant source of income. Farmers are progressively transitioning into nonfarm households and part-time farming households. Second, as the income structure shifts, the productive function of land diminishes for nonfarm and part-time farming households, while its property function gains prominence. An increasing number of farmers are more willing to lease out their land to obtain rental income. In this process, land transitions from a factor of production to an interest-bearing asset, with rent representing the dividend from holding such an asset. Third, relative factor prices have undergone substantial changes: the prices of capital relative to labor and land relative to labor have declined. Rational farm households tend to reallocate their household factor endowments, manifesting as an accelerated transfer of labor out of agriculture. Further discussion reveals that the effect of income structure change on land rental supply is more pronounced in plain areas and among households enrolled in the New Cooperative Medical Scheme. Concurrently, as the income structure evolves, the "production factor" function of land progressively weakens, while its nature as an "interest-bearing asset" becomes increasingly salient, exhibiting a clear tendency to transition from the former to the latter. Clarifying this transformation and leveraging the property function of land can effectively prevent declines in agricultural productivity and land abandonment, which is of great significance for both increasing farmers' incomes and advancing agricultural modernization.

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I. Introduction

Ongoing urbanization and industrialization in China are inducing profound changes in the rural human – land relationship. A substantial number of rural migrant workers have relocated to urban areas (Long et al., 2012; Deng and Kang, 2026), with the rural homestead vacancy rate reaching 20% in 2018 (Kong et al., 2018), and a large proportion of rural residential land remaining either idle or poorly managed (Song et al., 2021; Liu et al., 2021; Pan et al., 2026). Similar phenomena—declining rural permanent populations and inefficient use of rural residential land—have also been observed in developed countries across Europe and the Americas (Park et al., 2022). Corresponding to this interregional labor mobility is a notable shift in farmers' income structure, characterized by a sustained increase in the share of wage income. From 1985 to 2023, wage income rose from 72.15 yuan to 10,402 yuan, with its share increasing from 13.18% to 42.53%, while the share of net agricultural operating income declined from 81.35% to 33.55%. Agricultural production and operation are no longer the primary income sources for rural households. The report of the 20th National Congress of the Communist Party of China

underscored the need to deepen the reform of the rural land system and endow farmers with more adequate property rights. As a critical factor resource for farmers, land's optimal allocation inevitably plays a significant role in ensuring steady income growth. Since the No. 1 Central Document of 1984 first encouraged the gradual concentration of land in the hands of skilled cultivators, policies governing land rentals have been progressively liberalized, and the scale of land rentals has expanded. Nevertheless, the rate of farmer participation remains relatively low. This raises the central question: What is the relationship between household income structure and land rental behavior?

Compared with fragmented smallholder farming, large-scale operations—by centralizing resources, enhancing labor productivity, and improving the efficiency of technology diffusion—are theoretically more conducive to agricultural sustainability (Ren et al., 2024). However, contemporary global agriculture exhibits a highly differentiated pattern: developed countries rely on mechanized large-scale production, whereas developing countries remain predominantly smallholder-based (Lowder et al., 2021). Evidence from studies conducted in Africa (Byiringiro, 1996; Carletto et al., 2013; Julien et al., 2019), Asia (Gautam and Ahmed, 2019), and Europe (Alvarez and Arias, 2004) indicates that smallholder farms achieve higher staple crop yields per unit of land area, and that smallholders do not necessarily exit agriculture due to scale diseconomies (Larson et al., 2014). Although intensified input use—such as pesticides, fertilizers, and mechanization—has attenuated the inverse relationship between farm size and productivity (Jayne et al., 2019; Otsuka et al., 2016), these factors have not overturned this fundamental regularity. Conversely, the scale-expansion perspective posits that enlarging operational scale facilitates a more efficient allocation of land, capital, and labor, thereby enhancing total factor productivity and output. This proposition has received empirical support from studies in Australia (Sheng and Chancellor, 2019) and the United States (Key, 2019). Furthermore, evidence from Kenya (Muyanga and Jayne, 2019a), Brazil (Helfand and Taylor, 2021), and Nigeria (Omotilewa et al., 2021) reveals a U-shaped relationship between farm size and productivity, suggesting that the inverse relationship does not hold uniformly across all scales. In eastern India, small farm size constrains the poverty-reduction potential of agriculture, with the income growth of most smallholders remaining below the poverty line (Urfels et al., 2023). Empirical findings from Latin America also demonstrate a positive association between farm size and both agricultural income and income stability, further reinforcing the cross-regional validity of the general pattern that scale expansion promotes income growth (Gófaro et al., 2025).

Land transfer serves as a critical determinant in promoting sustainable rural development and improving rural household livelihoods (Cui et al., 2025). China's agricultural landscape is characterized by small-scale production and fragmented land holdings. As of the end of 2016, smallholder farmers accounted for as much as 90% of the total agricultural labor force, with approximately 210 million rural households cultivating less than 10 mu of land (Han, 2018). Given the inherently low returns from small-scale agricultural operations, and the rapid increase in wage income, the relatively low profitability of farming has incentivized land rental-out (Zhang et al., 2004; Deininger and Jin, 2009; Li, 2012; Huang et al., 2012; He et al., 2016). Further evidence suggests that an expansion of off-farm employment opportunities offers agricultural laborers a broader range of choices, increasing the likelihood of their transfer to nonagricultural sectors and thereby facilitating land rental-out. This effect is particularly pronounced when female laborers

migrate for off-farm work; the increase in off-farm employment participation significantly raises the probability of land being leased out (Huang and Sun, 2015; Che, 2016).

Land has long been regarded as an important means of securing livelihood subsistence (Xu et al., 2018). Research grounded in functional needs suggests that, as livelihood strategies evolve over time, different groups of migrants exhibit heterogeneous valuations of the security and asset functions of homestead land (Zhang et al., 2025). With the declining share of household agricultural operating income, the productive function of land gradually weakens, while rental income emerges as a significant asset-based return that farmers derive from agricultural land (Yang and Wen, 2020; Wu and Kang, 2020), rendering the asset nature of land increasingly salient. Concurrently, the overall importance of land to rural households is diminishing (Kung and Bai, 2011), and this reduced dependence on land further facilitates exit from agricultural production (Wang and Gu, 2016). Meanwhile, land rental does increase household income, but this positive income effect is primarily observed for land lessors, while the effect on lessees is less pronounced (Ke et al., 2022). China's sustained and rapid economic development has not only led to a continuous and swift increase in rural residents' income but has also brought about notable changes in income structure, characterized by a rising share of wage income and a declining share of operating income (Du, 2021). Households with different income structures exhibit divergent preferences (Shi et al., 2011; Molua, 2011). Some studies have found that formal institutions, landowners' perceptions of land consolidation, and social capital influence villagers' decisions to participate in residential land consolidation (Kupidura et al., 2014; Lisec et al., 2014). Xia et al. (2024), by analyzing the determinants of villagers' decisions to exit homestead land in the Chengdu – Chongqing region of China, found that the ratio of agricultural income to total household income has a significant negative effect on villagers' willingness to exit. Different types of villagers make significantly different behavioral choices (Wang and Kang, 2023; Xia et al., 2024), which may explain why villagers with varying levels of agricultural land dependence make divergent choices regarding homestead exit. Villagers with relatively low agricultural income exhibit lower dependence on farmland. They typically have relatively stable nonfarm income and are comparatively well-off (Khanum et al., 2024). This renders them less reliant on rural homestead land for social security and auxiliary agricultural production functions, while placing greater emphasis on the asset-income function of land (Zhao et al., 2019). In contrast, villagers with a high agricultural income share are heavily dependent on their farmland. Lacking stable nonfarm income, their economic conditions are relatively poor (Marino et al., 2021). For these households, the social security and auxiliary agricultural production attributes of rural homestead land are of greater importance (Peng, 2013; Su et al., 2022).

In summary, the existing literature has primarily focused on separate analyses of land rental and income structure, with scant attention paid to integrating the two within a unified analytical framework. Given that income structure transformation has become a pervasive phenomenon among farm households and is likely to intensify in the future, the nature of land itself may have undergone substantial changes. Failure to examine whether land is cultivated by others may result in household neglect of agricultural production, thereby reducing agricultural productivity and, in extreme cases, leading to widespread land abandonment. Therefore, investigating the relationship between income structure and land rental-out behavior carries considerable practical significance for guiding agricultural modernization and promoting farmers' income growth. Indeed, for households with a higher agricultural operating share, farm production constitutes the primary

source of household income, and land functions as a critical factor of production, rendering it of great importance. Conversely, for households with a lower agricultural operating share, land's role as a key production factor gradually diminishes in significance. This paper seeks to elucidate the logic underlying the transformation of land's nature for typical farmers and to explore, from the perspective of factor prices, the heterogeneity in land rental behavior across households with different income structures, with the aim of providing empirical evidence to inform policies on agricultural modernization and income enhancement. We empirically test our hypotheses using data from the 2013 and 2018 Thousand-Village Surveys conducted by Shanghai University of Finance and Economics.

II. Theoretical Analysis

With economic growth, the development of the non-agricultural sector, and the establishment of factor markets, the income structure of farming households has evolved, with a decline in the share of net agricultural operating income and an increase in wage income. The income structure reflects the primary sources of income and the relative importance of factors for farming households. Despite this, farmers' wealth accumulation remains modest, with income primarily derived from factor returns. Since smallholder farming predominates in our country, with limited land and agricultural capital, capital income is relatively sparse. Consequently, farmers' primary sources of income are agricultural operations and wage income, with the overarching goal of income maximization. When household income is primarily derived from net agricultural operating income, labor, agricultural capital, and land serve as production factors for agriculture. To enhance income, farmers are compelled to increase the marginal returns of these factors to maximize household income. Conversely, when income predominantly comes from wages, labor and agricultural capital are redirected to non-agricultural sectors, while immovable and immutable land is leased out to generate rent. In this context, land transforms from a production factor into an income-generating asset for the household. Simultaneously, farmers seek to improve returns from non-agricultural employment and aim to achieve higher prices for leased agricultural capital and land, thereby maximizing household income.

Assume the composition of household income is as follows: net operating income (A), wage income (I), and capital income (C), where capital income refers to income from agricultural capital and land leasing. The function for maximizing household income under the constraint of factor endowment ($\bar{L}, \bar{K}, \bar{S}$) is:

$$\begin{aligned} \max : M &= A(K_1, L_1, S_1) + I(L_2) + C(S_2, K_2) \\ \text{st} : K_1 + K_2 &\leq \bar{K} \\ S_1 + S_2 &\leq \bar{S} \\ L_1, L_2, K_1, K_2, S_1, S_2 &\geq 0 \end{aligned} \quad (1)$$

Among these, K_1, K_2 is the allocation of capital between agricultural and non-agricultural sectors, L_1, L_2 denote the allocation of labor between agricultural and non-agricultural sectors, S_1, S_2 represents the allocation of land between its use as a labor input and its leasing out to earn rent. Construct the Lagrangian function:

$$\begin{aligned} L &= A(K_1, L_1, S_1) + I(L_2) + C(S_2, K_2) + \lambda_1 (\bar{L} - L_1 - L_2) + \lambda_2 (\bar{K} - K_1 - K_2) \\ &\quad + \lambda_3 (\bar{S} - S_1 - S_2) \end{aligned} \quad (2)$$

Based on the first-order conditions for maximization, the equilibrium values can be derived as follows:

$$(3) \lambda_1 = \frac{\partial A}{\partial L_1} = \frac{\partial I}{\partial L_2}$$

$$(4) \lambda_2 = \frac{\partial A}{\partial K_1} = \frac{\partial C}{\partial K_2}$$

$$(5) \lambda_3 = \frac{\partial A}{\partial S_1} = \frac{\partial C}{\partial S_2}$$

$\lambda_1, \lambda_2, \lambda_3$ denote the shadow prices of labor, capital, land, $\lambda_1, \lambda_2, \lambda_3 > 0$. Households allocate factors according to the principle of income maximization, with constraints being tight, $L_1 + L_2 = \bar{L}$, $K_1 + K_2 = \bar{K}$, $S_1 + S_2 = \bar{S}$. When factors are allocated to agricultural production, the marginal returns in the non-agricultural labor and capital markets represent their opportunity costs, and vice versa.

Assuming that the prices of factors are determined by their marginal productivity, when household income changes over time, the relationship between the variation in household income, factor prices, and factor allocation is as follows:

$$\begin{aligned} \frac{dM}{dt} &= \frac{\partial A}{\partial K_1} \frac{dK_1}{dt} + \frac{\partial A}{\partial L_1} \frac{dL_1}{dt} + \frac{\partial A}{\partial S_1} \frac{dS_1}{dt} + \frac{\partial I}{\partial L_2} \frac{dL_2}{dt} + \frac{\partial C}{\partial S_2} \frac{dS_2}{dt} + \frac{\partial C}{\partial K_2} \frac{dK_2}{dt} \frac{\partial A}{\partial S_1} / \frac{\partial I}{\partial L_2} \\ &= \left(\frac{\partial A}{\partial L_1} / \frac{\partial I}{\partial L_2} \frac{dL_1}{dt} + \frac{dL_2}{dt} \right) \frac{\partial I}{\partial L_2} + \left(\frac{dK_1}{dt} + \frac{\partial C}{\partial K_2} / \frac{\partial A}{\partial K_1} \frac{dK_2}{dt} \right) \frac{\partial A}{\partial K_1} + \left(\frac{dS_1}{dt} + \frac{\partial C}{\partial S_2} / \frac{\partial A}{\partial S_1} \frac{dS_2}{dt} \right) \frac{\partial A}{\partial S_1} \end{aligned} \quad (6)$$

To examine the relationship between changes in household income, labor allocation, and factor prices, divide both sides of the equation by the marginal productivity of non-agricultural employment:

$$\begin{aligned} \frac{dM}{dt} / \frac{\partial I}{\partial L_2} &= \left(\frac{\partial A}{\partial L_1} / \frac{\partial I}{\partial L_2} \frac{dL_1}{dt} + \frac{dL_2}{dt} \right) + \left(\frac{dK_1}{dt} + \frac{\partial C}{\partial K_2} / \frac{\partial A}{\partial K_1} \frac{dK_2}{dt} \right) \frac{\partial A}{\partial K_1} / \frac{\partial I}{\partial L_2} \\ &\quad + \left(\frac{dS_1}{dt} + \frac{\partial C}{\partial S_2} / \frac{\partial A}{\partial S_1} \frac{dS_2}{dt} \right) \frac{\partial A}{\partial S_1} / \frac{\partial I}{\partial L_2} \end{aligned} \quad (7)$$

From equation (7), it can be inferred that when wages in non-agricultural employment rise, indicating an increase in the marginal productivity of non-agricultural employment, the price of capital relative to labor ($\frac{\partial A}{\partial K_1} / \frac{\partial I}{\partial L_2}$) and the price of land relative to labor ($\frac{\partial A}{\partial S_1} / \frac{\partial I}{\partial L_2}$) will both gradually decrease. This increases the opportunity cost of household operations. If factors are not reallocated, the change in household income relative to the opportunity cost of agricultural production ($\frac{dM}{dt} / \frac{\partial I}{\partial L_2}$) will decrease.

According to Euler's theorem, the household income structure can be expressed as a function of factors and their marginal productivity:

$$M = \left(\frac{\partial A}{\partial L_1} L_1 + \frac{\partial A}{\partial K_1} K_1 + \frac{\partial A}{\partial S_1} S_1 \right) + \frac{\partial I}{\partial L_2} L_2 + \left(\frac{\partial C}{\partial K_2} K_2 + \frac{\partial C}{\partial S_2} S_2 \right) \quad (8)$$

Under the given factor constraints, when wage income rises, resulting in a decline in the relative prices of capital to labor and land to labor, and an increase in the opportunity cost of agricultural operations, households will reallocate factors to maximize income. This reallocation is manifested as a shift of labor, capital, and land to the non-agricultural sector.

Assume that a critical threshold is when net operating income constitutes 50% of household income, i.e.

$$\left(\frac{\partial A}{\partial L_1} L_1 + \frac{\partial A}{\partial K_1} K_1 + \frac{\partial A}{\partial S_1} S_1 \right) = \frac{\partial I}{\partial L_2} L_2 + \left(\frac{\partial C}{\partial K_2} K_2 + \frac{\partial C}{\partial S_2} S_2 \right) \quad (9)$$

When net agricultural operating income exceeds 50%, it serves as the primary source of household income, and land functions as a production factor, $\frac{\partial C}{\partial S_2} / \frac{\partial A}{\partial K_1} < 1$, $\frac{\partial C}{\partial K_2} / \frac{\partial A}{\partial K_1} < 1$. To maximize household income, farmers will enhance the marginal returns of household factors by increasing capital investment and expanding production scale in response to rising labor prices. Rational farmers will thus increase agricultural capital investment, reduce capital leasing, $\frac{dK_1}{dt} > 0$, $\frac{dK_2}{dt} < 0$, allow capital to substitute labor, $\frac{dS_1}{dt} > 0$, $\frac{dS_2}{dt} < 0$, they will also expand agricultural production and lease additional land to further boost the marginal returns of labor in agriculture $\frac{\partial A}{\partial L_1}$. In this scenario, the prices of factors, as opportunity costs of agricultural production inputs, drive the reallocation of factors, including substitution and scale expansion.

When $\frac{A}{M} < \frac{I+C}{M}$, net agricultural operating income is below 50%, an increase in labor prices raises the opportunity cost of agricultural operations. Farmers will seek to enhance returns from non-agricultural employment and expect to achieve higher prices for leased agricultural capital and land to maximize household income. Consequently, the scale of household agricultural production will gradually decrease, and agricultural inputs will diminish, $\frac{dS_1}{dt} < 0$, $\frac{dS_2}{dt} > 0$, $\frac{dK_1}{dt} < 0$, $\frac{dK_2}{dt} > 0$.

$$\Delta M = \Delta A + \Delta I + \Delta C$$

$$\Delta M = \left(\frac{\partial A}{\partial L_1} \Delta L_1 + \frac{\partial A}{\partial K_1} \Delta K_1 + \frac{\partial A}{\partial S_1} \Delta S_1 \right) + \frac{\partial I}{\partial L_2} \Delta L_2 + \left(\frac{\partial C}{\partial K_2} \Delta K_2 + \frac{\partial C}{\partial S_2} \Delta S_2 \right) \quad (10)$$

Here, $\Delta I + \Delta C$ denotes the increment in household income from factor allocation in the non-agricultural market, ΔA represents the increment in net agricultural operating income,

$\Delta I + \Delta C$ and ΔA serve as opportunity costs for each other. $\frac{\partial I}{\partial L_2} \Delta L_2 > \left(\frac{\partial A}{\partial L_1} \Delta L_1 + \frac{\partial A}{\partial K_1} \Delta K_1 + \frac{\partial A}{\partial S_1} \Delta S_1 \right)$

Means the opportunity cost of agricultural operations is high, factors will shift from agricultural to non-agricultural activities, resulting in an increase in total household income.

When $\frac{\partial I}{\partial L_2} \Delta L_2 > \Delta A$, i.e. $\frac{\partial I}{\partial L_2} \Delta L_2 > \Delta A$, regardless of the value of ΔC , when $\Delta I + \Delta C \geq \Delta A$

wage income exceeds net agricultural operating income, the transfer of land, capital, and labor out of agricultural operations will always enhance household income $\Delta M \geq 0$. Net agricultural operating income is no longer the primary source of household income, and the income structure of households is characterized by $\frac{A}{M} < \frac{I}{M}$, with a decline in the relative prices of capital to labor

and land to labor. The importance of land and agricultural capital further diminishes, leading farmers to prefer leasing out land for rental income. As a result, $\frac{dS_1}{dt} < 0$, $\frac{dS_2}{dt} > 0$, land exists as a

productive asset, with rent representing the holding dividend of the land. The process of changes in household income structure reflects the transition of factor characteristics. The trend shows an increase in wage income and a decrease in net agricultural operating income, with rising

opportunity costs of agricultural operations, while factor prices indicate a decline in the relative prices of capital to labor and land to labor. When net agricultural operating income ceases to be the primary source of household income, the significance of land diminishes, its productive function weakens, and land gradually shifts from being a production factor to a productive asset.

Therefore, this study can make the following conclusions: as the income structure of rural households evolves, the nature of factors also concurrently changes. In scenarios where labor wages rise rapidly, the relative prices of capital and land compared to labor decline. When net agricultural operating income is the primary source of household income, land and capital function as production factors, and farmers, aiming to maximize household income, will inevitably enhance the marginal returns of factors. This is manifested in the allocation of factors, such as increasing capital investment and leasing additional land. When wage income becomes the main source of household income, farmers seek to maximize household income by securing higher non-agricultural employment earnings and land rents. At this stage, land gradually transitions into a productive asset.

III. Research Design

1. Model Design

Based on the theoretical analysis of the impact of income structure and factor prices on land transfer, this study examines how the structure of farmers' household income influences land rental. In the model design, the dependent variables are whether the land is rented out and the scale of land rental M_m . The subscript m denotes individual households, and the specific regression equation is:

$$M_m = \alpha_{0m} + \alpha_{1m}\theta + \alpha_{2m}lnu_m + \alpha_{3m}lnw_m + \sum \beta_m X_m + \delta_m \quad (11)$$

θ represents the household income structure, u denotes land rental income, w is the price of labor input, and X encompasses other variables, including the amount of cultivated land, labor scale, agricultural capital, agricultural subsidies, and asset status. α , β represent coefficients and δ standard errors, respectively. Additionally, to further analyze the impact of household income structure on land transfer, an interaction term between income structure and land rental income is introduced.

$$M_m = \alpha_{0m} + \alpha_{1m}\theta + \alpha_{2m}lnu_m + \alpha_{4m}\theta*lnu_m + \alpha_{3m}lnw_m + \sum \beta_m X_m + \delta_m \quad (12)$$

2. Variable Specification

(1) Dependent Variables: To investigate the impact of changes in household income structure on land transfer, this study examines two dependent variables: First, land rental activity, which measures the willingness of households to lease out land (table 1). Second, the scale of land rental, measured by the ratio of leased land area to the total contracted farmland area owned by the household (Yao, 2000; Kung, 2002).

(2) Independent Variables: The primary independent variable is the household income structure, assessed by the proportion of net agricultural income. Additionally, factor prices, which significantly influence factor allocation, are considered. The factor prices include land rental fees and labor wages. Specifically, the rental fee is derived from the average rental price of farmland in the village, which approximates the market price of land owned by the household. Labor wages are based on the expected local wage level for rural labor, reflecting the opportunity cost of labor input in agricultural production.

(3) Control Variables: Since the predominant mode of agricultural operation in China remains small-scale farming and decisions are made at the household level, land rental is related to household endowments (Zheng, et al., 2018; Liu and Wang , 2018). Controlled household factors include contracted farmland area, labor scale, agricultural capital, agricultural subsidies, and financial asset status.

Table 1: Variable Descriptions and Statistical Summary

Variable	Description	Observations	Mean	Standard Deviation	Minimum	Maximum
Land Rental	Whether the household rents out land (Yes=1, No=0)	12028	0.16	0.36	0.00	1.00
Rental Scale	Ratio of leased land area to total contracted farmland	12028	0.12	0.30	0.00	1.00
Land Rental Price	Logarithm of average village rental price	12028	5.73	0.35	4.42	6.65
Proportion of Net Agricultural Income	Ratio of net agricultural income to total household income * 100%	12028	33%	0.36	0.00	1.00
Wage Level	Logarithm of expected local non-agricultural wage	12028	7.55	0.32	6.14	8.99
Farmland Endowment	Logarithm of the household's contracted farmland area	12028	1.69	0.76	0.01	7.39
Household Size	Logarithm of the number of household members	12028	1.25	0.56	0.00	2.77
Agricultural Capital	Logarithm of fixed assets used in agricultural production	12028	3.19	4.27	0.00	11.51
Agricultural Subsidies	Logarithm of agricultural subsidies received by the household	12028	4.52	2.74	0.00	11.81
Asset Status	Logarithm of financial assets owned by the household contracted farmland area	12028	3.40	4.56	0.00	13.82

Note: Compiled by the author from the Thousand Villages Survey data.

3. Data and Variable Statistical Description

(1) Data Source: The data utilized in this study is derived from the "Thousand Villages Survey" conducted by Shanghai University of Finance and Economics in 2013 and 2018. This survey has been carried out for 13 years since 2008, with the methodologies for the 2013 and 2018 investigations consistent with previous iterations of the "Thousand Villages Survey." The approach includes both fixed-point and return-to-village surveys. The fixed-point survey involves over 30 team leaders and more than 300 students, who form the research team to conduct field surveys in 30 counties across 22 provinces nationwide. From each county, two representative townships are selected, and from each township, ten administrative villages are chosen. Subsequently, 15 households are randomly sampled from each selected village for the survey. The return-to-village survey leverages the opportunity for university students to return to their villages during summer vacations, requiring them to complete research activities. Each returning student conducts surveys in 1-2 villages. The survey subjects are determined based on a multi-stage systematic proportional sampling method with unequal probabilities. This study uses

data from households with contracted farmland greater than 0 in the 2013 and 2018 surveys (sample size of 12,028 households).

(2) Variable Statistical Description. The "Thousand Villages Survey" data reveals that the land rental rate is relatively low, at only 16%(table2). Additionally, the proportion of rented farmland relative to the total contracted farmland is also modest, approximately 12%. This suggests that smallholder farming remains the predominant mode of agricultural production in China, with the land transfer market and institutional framework still requiring refinement. The proportion of agricultural operating net income in the family income structure is 33%, consistent with existing statistical data on rural household income structures, indicating that agricultural operating net income is no longer the primary source of family income. As this study involves household surveys targeting families with members residing in rural areas, it excludes those who have migrated or do not live in rural areas. Consequently, among the surveyed rural households, it is common for families either not to rent out farmland or to do so incompletely, leading to relatively low rates of land rental and rental scale.

Based on the relationship between household income structure and land transfer, it is evident that the rental of farmland and its scale generally increase as the proportion of agricultural operating net income in household income decreases. In non-agricultural households, the farmland rental rate reaches 22%, with a rental scale of 19%. For non-agricultural part-time households, the rental rate is 10%, and the rental scale is 5.71%. Agricultural part-time households have a rental rate of 11% and a rental scale of 5.7%, while purely agricultural households exhibit a rental rate of only 5% and a rental scale of just 3%. This indicates that as the proportion of agricultural operating net income in household income decreases, both the willingness to rent out farmland and the scale of rental increase. The decreasing proportion of agricultural operating net income signifies a diminishing production factor nature and importance of land to farmers, thereby increasing the willingness and scale of rental.

The wage level decreases as the proportion of agricultural operating net income in household income declines. Changes in the household income structure reflect adjustments in the sources of income and the relative importance of factors within the household. With the relative increase in wage income, there is a decline in the price of agricultural capital relative to labor and land relative to labor. Rational farmers thus reallocate factors to enhance income, evidenced by the shift of labor and capital to non-agricultural sectors, while immovable and unchangeable land is leased out to generate rental income. Consequently, wage income becomes the primary focus for increasing household income. Therefore, examining current rural residents' income levels and income structure trends, and exploring farmer decision-making regarding factors under different income structures, holds substantial practical significance.

Table 2: The relationship between household income structure and agricultural land transfer

	Non-Agricultural Households		Non-Agricultural Part-Time Households		Agricultural Part-Time Households		Purely Agricultural Households	
	Mean	Observations	Mean	Observations	Mean	Observations	Mean	Observations
Land Rental	0.22	6274	0.1	2113	0.11	1339	0.05	2302
Rental Scale	0.19	6274	0.06	2113	0.06	1339	0.03	2302

Land Rental Price	5.76	6274	5.71	2113	5.7	1339	5.71	2302
Proportion of Net Operating Income	4.54%	6274	32.94%	2113	63.14%	1339	95.38%	2302
Wage Level	7.57	6274	7.55	2113	7.54	1339	7.48	2302
Land Endowment	1.49	6274	1.8	2113	1.94	1339	1.96	2302
Household Size	1.29	6274	1.28	2113	1.2	1339	1.15	2302
Agricultural Capital	2.61	6274	3.83	2113	4.08	1339	3.66	2302
Agricultural Subsidies	4.2	6274	4.99	2113	4.91	1339	4.71	2302
Asset Status	3.47	6274	3.64	2113	3.45	1339	2.95	2302

Note: Compiled by the author based on the "Thousand Villages Survey" data, following existing literature practices (Central Policy Research Office, Ministry of Agriculture and Rural Affairs, Rural Fixed Observation Point Office, 1997). Households with agricultural operating net income accounting for over 80% of total household income are classified as purely agricultural households; those with agricultural operating net income accounting for 50% to 80% are classified as agricultural part-time households; those with agricultural operating net income accounting for 20% to 50% are classified as non-agricultural part-time households; and those with agricultural operating net income below 20% are classified as non-agricultural households.

IV. Empirical Analysis

Based on the discussion of income structure, factor prices, and farmland transfer mechanisms, empirical testing was conducted using data from the Thousand Villages Survey. Additionally, Deininger and Jin (2005) identified that labor, land, and capital scale are key factors influencing farmland leasing in rural China, thus this study controls for household endowment factors in its empirical analysis.

1. Factor Prices and Farmland Transfer

Factor prices are a primary determinant of factor allocation. The empirical results (Table 3) demonstrate that land rent significantly positively affects both the willingness to lease out land and the scale of land leased. Higher land prices correlate with a greater willingness to lease out land and an expanded lease scale. After controlling for household endowment factors and time-region fixed effects, the coefficients for the impact of rent on farmland leasing and lease scale are 0.026 and 0.014, respectively, meaning that a 1% increase in rent levels results in a 2.6% increase in the willingness to lease land and a 1.4% increase in the scale of farmland leased. Consistent with the mechanism discussion, rent represents the expected return from leasing land and the opportunity cost of land inputs in agricultural production. For rational farmers, higher expected returns from leasing land and higher opportunity costs of agricultural inputs lower the willingness to engage in farming, thereby increasing the scale of land leased.

The evolution of household income structure reflects changes in the primary sources of income and the relative importance of factors. Empirical results (Table 3) indicate that the proportion of net operating income has a significantly negative impact on the leasing of land by households. As the share of net agricultural income decreases, the scale of leased land increases. The coefficients for the effect of net operating income proportion on land leasing and lease scale are -0.186 and -0.170, respectively, meaning that a 1% reduction in agricultural operating income proportion results in a 0.186% increase in the willingness to lease land and a 0.170% increase in the scale of farmland leased. Further analysis of the impact mechanism of household income

structure on farmland leasing, by incorporating interaction terms of these two continuous variables into the regression model, shows that the effect of net operating income proportion on land leasing and lease scale becomes insignificant. The interaction term's effect on land leasing and lease scale is significantly negative, and the coefficient for rent on farmland leasing increases after including the interaction term. This is consistent with the conclusions drawn from the mechanism analysis. The logic of farmland leasing differs among households with varying income structures, based on the relative importance of income sources and factors. As labor prices rise rapidly, the relative prices of capital and land decrease. When agricultural net income is the primary source of family income, land and capital function as production factors. To increase income, farmers must raise the marginal returns of factors to maximize household income, which is reflected in the allocation of factors, such as increasing capital investment and renting land. When wage income is the main source of family income, farmers seek to maximize household income by expecting higher non-agricultural employment income, agricultural capital, and land rent, causing land to gradually evolve into an income-generating asset.

As wage levels increase, the relative price of land to labor decreases, causing land to shift towards non-agricultural uses. Empirical results reveal that wage levels have a significantly positive effect on land leasing. The coefficients for the impact of wage levels on farmland leasing and lease scale are 0.156 and 0.138, respectively, meaning that a 1% increase in wage income results in a 15.6% increase in the willingness to lease land and a 13.8% increase in the scale of farmland leased. Wage levels reflect the opportunity cost of agricultural production and operations. Higher wages indicate a greater opportunity cost and a lower relative price of land to labor, prompting rational farmers to lease out land to maximize household income. This partly explains the large-scale migration of agricultural labor to non-agricultural sectors and the increasing scale of land transfer over the past two decades. Moreover, since the coefficient for wage levels exceeds that for land rent, household decisions regarding farmland leasing are based on comparisons of wage income, capital income, and net agricultural income. The increase in wage income reduces the relative price of land to labor, making wage income more influential on leasing decisions in the absence of capital income considerations.

Household endowment factors, to some extent, influence or constrain farmland leasing. The area of contracted farmland has a significantly positive effect on farmland leasing; as the scale of contracted land increases, so does the willingness and extent of land leased by households. In the current agricultural context in China, the scale of contracted farmland is generally small, insufficient to meet the conditions for large-scale operations. Larger contracted farmland often provides households with better bargaining power when leasing land, resulting in higher lease rates and larger lease scales. Conversely, household population size has a significantly negative effect on farmland leasing. Larger households are more likely to consolidate their resources and engage in diversified agricultural activities, thus showing a lower propensity to lease out land or lease it on a smaller scale. Agricultural capital investment also has a significantly negative impact on farmland leasing. Greater investment in agricultural capital, especially in specialized assets such as agricultural machinery, reduces the willingness to lease out land. If agricultural capital is not utilized in production, the initial investment becomes a sunk cost. Therefore, considering the sunk costs of agricultural capital, households exhibit a lower willingness and scale for leasing out farmland.

Table 3: Factor Prices and Farmland Leasing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Land Rental				Rental Scale			
Land Rental Price	0.030*** (0.009)	0.028*** (0.009)	0.026*** (0.009)	0.040*** (0.012)	0.017** (0.008)	0.015* (0.008)	0.014* (0.008)	0.028*** (0.010)
Net Agricultural Income	-0.191** *	-0.189*** (0.009)	-0.186*** (0.009)	0.068 (0.142)	-0.176*** (0.008)	-0.173*** (0.008)	-0.170*** (0.008)	0.066 (0.118)
Land Rent *Net Agricultural Income				-0.044* (0.025)				-0.041** (0.021)
Wage Level	0.178*** (0.010)	0.181*** (0.010)	0.156*** (0.011)	0.156*** (0.011)	0.158*** (0.009)	0.162*** (0.009)	0.138*** (0.009)	0.137*** (0.009)
Farmland	0.041*** (0.005)	0.043*** (0.005)	0.047*** (0.005)	0.046*** (0.005)	0.024*** (0.004)	0.026*** (0.004)	0.029*** (0.004)	0.029*** (0.004)
Household	-0.005 (0.006)	-0.015** (0.006)	-0.013** (0.006)	-0.013** (0.006)	-0.009* (0.005)	-0.019*** (0.005)	-0.018*** (0.005)	-0.017*** (0.005)
Agricultural Capital	-0.005** *	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Agricultural Subsidies	-0.007** *	-0.008*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)	-0.007*** (0.001)
Asset Status	0.002*** (0.001)	0.002*** (0.001)	0.002** (0.001)	0.002** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.001** (0.001)	0.001** (0.001)
Time Fixed	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Regional Fixed	No	No	Yes	Yes	No	No	Yes	Yes
Constant	-1.316** (0.085)	-1.300*** (0.085)	-1.156*** (0.086)	-1.234*** (0.097)	-1.101*** (0.071)	-1.084*** (0.071)	-0.949*** (0.072)	-1.022*** (0.080)
R ²	0.081	0.083	0.09	0.09	0.094	0.097	0.105	0.106
Observations	12028	12028	12028	12028	12028	12028	12028	12028

*Note: The values in parentheses are robust standard errors. * ** *** denote significance at the 10%, 5%, and 1% levels, respectively. Columns (1) and (5) include only explanatory variables, columns (2) and (6) control for year effects, columns (3) and (7) control for regional fixed effects, with regions categorized into major production areas, major consumption areas, and balanced production-consumption areas. Columns (4) and (8) include interaction terms of rent and income structure.*

Agricultural subsidies exert a significantly negative impact on the leasing of farmland. The primary objective of these subsidies has often been to reduce agricultural production costs and increase agricultural productivity, thereby enhancing farmers' engagement in production. Since the initiation of the quality seed subsidy pilot in 2002, the abolition of agricultural taxes, and the advancement of the agricultural subsidy system—which now encompasses agricultural support protection subsidies and subsidies for agricultural machinery—this system has become a central

component of the national policies for supporting and benefiting agriculture. These subsidies are typically designed with specific agricultural characteristics or distribution methods that relate to agricultural production operations, which, to some extent, boosts farmers' enthusiasm for agricultural production. However, as a form of transfer payment, subsidies may deter farmers from leasing out their land or may lead them to increase rental prices, thus impeding farmland leasing. Conversely, the impact of household asset status on farmland leasing is significantly positive. That is, the greater the financial assets of a household, the more willing they are to lease out land. In resource-rich households, higher capital income makes farmland more likely to be regarded as a part of family assets, thus leased out as an income-generating asset to secure its holding benefits.

2. Household Income Structure, Factor Prices, and Farmland Leasing

The relationship between factor prices and farmland transfer across different income structures is examined. As wage levels rise, agricultural labor shifts across sectors and regions. The most noticeable change in household income structure is the decreasing proportion of agricultural operating net income, which continues to decline. According to data from the National Bureau of Statistics, in 2021, the proportion of agricultural operating net income in total income was 34.68%, while wage income had increased to 41.51%. Agricultural operating net income is no longer the primary source of household income.

To further explore the relationship between household income structure and farmland leasing, the marginal effects of land rental prices on farmland leasing and scale were computed at different levels of agricultural operating net income proportion. Empirical results indicate that when the proportion of household agricultural operating net income is less than 50% (Figure 1), the marginal effect of land rental prices on farmland leasing gradually diminishes and is statistically significant as the proportion of agricultural operating net income increases. When the proportion exceeds 50%, the marginal effect of land rental prices on farmland leasing decreases further and becomes statistically insignificant. This finding aligns with the discussion in the mechanism analysis, where if the share of agricultural operating net income in a household is less than 50%, the income from non-agricultural markets surpasses that from agricultural markets. Consequently, the willingness to lease out land increases, making the impact of rental prices on farmland leasing more significant, and this effect intensifies as the proportion of household operating income continues to decrease.

When the proportion of household agricultural operating net income is below 37.5% (Figure 2), the marginal effect of land rental prices on the scale of farmland leasing gradually diminishes and is statistically significant as the proportion of operating net income increases. However, when this proportion exceeds 37.5%, the marginal effect of land rental prices on the scale of farmland leasing further decreases and becomes statistically insignificant. Thus, when the share of agricultural operating net income is relatively low, particularly when it is no longer the primary source of household income, the greater income from non-agricultural employment results in a heightened impact of rental prices on farmland leasing. This supports the hypothesis of this paper, highlighting that under different income structural conditions, the importance of land as a factor for households shifts. When agricultural operating net income ceases to be the principal source of household income, land rental prices may not be the decisive factor in farmland transfer. The increased marginal utility of rental income leads to an expansion in the scale of land leasing by households.

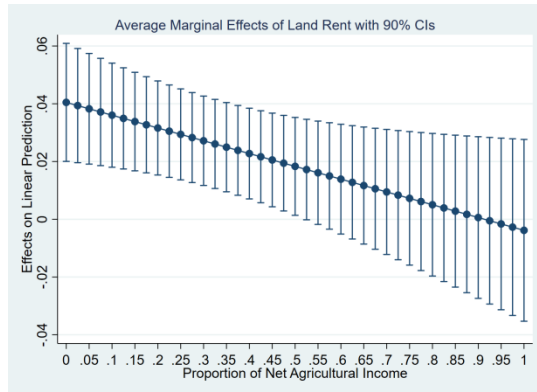


Figure 1: Income Structure and Land Leasing

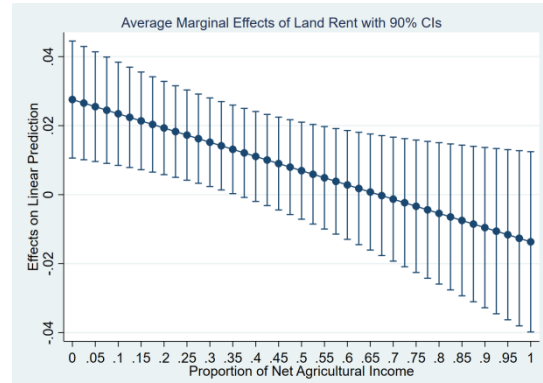


Figure 2: Income Structure and the Scale of Land Leasing

3. Heterogeneity Analysis

Agricultural production and management in our country exhibit considerable heterogeneity. Land leasing is closely associated with factors such as topography, with significant variations between plains, mountains, and hills in terms of agricultural practices and scale. Consequently, the impact of changes in household income structure on land leasing also varies, necessitating an analysis based on whether the land is situated in plains or non-plains regions. Historically, land has been viewed as a crucial means of securing livelihood (Zhang and Zhou , 2017; Xu et al., 2018), and land leasing forms differ under various social security models. Therefore, this study explores the heterogeneity of land leasing based on participation in the New Rural Cooperative Medical Scheme.

In plains regions, the impact of rent on land leasing and the scale of land leasing is more pronounced. Wage levels in plains regions have a lesser impact on land leasing compared to non-plains regions, whereas the effect on the scale of land leasing is greater in plains regions (Table 4). Due to the relatively flat terrain, capital can more easily substitute for labor in plains regions, facilitating larger-scale agricultural production and a more developed land leasing market, thus enhancing the influence of rent on both land leasing and its scale. Conversely, as wage levels reflect the opportunity cost of labor in agricultural production, higher wages lead to a lower relative price of land compared to labor. Additionally, in plains regions where capital more easily substitutes labor, agricultural production scales up more readily; however, the impact of wage levels on the willingness to lease land is lower in these areas.

For households participating in the New Rural Cooperative Medical Scheme, the effect of land rent on land transfer is more significant, and the impact of wages on land transfer is smaller. The New Rural Cooperative Medical Scheme, which provides comprehensive coverage for major illnesses and partial reimbursement for minor ailments, enhances rural families' ability to withstand risks and reduces their reliance on land for security. Households enrolled in this scheme are more likely to benefit from market resource allocation, particularly those with lower shares of agricultural operating income. For households not participating in the scheme, the influence of wages on land leasing and leasing scale is more substantial. These households exhibit a stronger reliance on income, and higher wages increase the opportunity cost of labor in agricultural production, making it more likely that they will exit agriculture in pursuit of higher earnings.

Table 4 Heterogeneity Analysis

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Land Leasing		Leasing Scale		Land Leasing		Leasing Scale	

	Region of Plains	Region of Non-Plains	Region of Plains	Region of Non-Plains	Participatin g in New Rural Cooperativ	Not Participatin g in New Rural	Participatin g in New Rural Cooperativ	Not Participatin g in New Rural
Land Rental Price	0.053** (0.026)	0.051*** (0.015)	0.044** (0.022)	0.027** (0.012)	0.053*** (0.017)	0.029 (0.019)	0.044*** (0.014)	0.012 (0.016)
Net Agricultural Income	0.156 (0.277)	-0.181 (0.173)	0.272 (0.236)	-0.203 (0.140)	0.162 (0.187)	-0.023 (0.223)	0.184 (0.153)	-0.041 (0.187)
Land Rent *Net Agricultural Income	(0.065) 0.047	0.005 (0.031)	-0.083** (0.040)	0.012 (0.025)	-0.059* (0.033)	-0.031 (0.039)	-0.061** (0.027)	-0.025 (0.033)
Wage Level	0.142*** (0.020)	0.177*** (0.014)	0.146*** (0.017)	0.137*** (0.011)	0.125*** (0.014)	0.206*** (0.018)	0.109*** (0.011)	0.183*** (0.015)
Other Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.186*** (0.199)	-1.488*** (0.125)	-1.153*** (0.170)	-1.050*** (0.101)	-1.079*** (0.128)	-1.535*** (0.155)	-0.918*** (0.105)	-1.267*** (0.131)
R ²	0.117	0.08	0.137	0.088	0.077	0.111	0.094	0.125
Observations	5169	6859	5169	6859	7202	4826	7202	4826

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

4. Robustness Analysis

To further ensure the reliability of the conclusions, a robustness check was conducted (Table 5). When household income is entirely derived from agricultural operations, and there are no other sources of income, the opportunity cost of labor is relatively high. To enhance labor returns, households may opt to increase capital investment to substitute for labor and expand agricultural production scale, thus leasing in agricultural land. Consequently, the impact on land leasing may differ from the effects discussed in the context of household income structure. To assess the stability of these results, this analysis excludes the scenario where households have no alternative income sources. When households compare the returns on factors, they may choose to shift household factors to the non-agricultural market. In cases where land cannot be leased, households may opt to let land fallow to avoid irrational decisions related to labor input in agricultural operations. Therefore, this study excludes samples of fallow land to examine the effects of income structure and factor prices on land transfer. Villager families, generally speaking, tend to possess more information and have more developed social networks compared to other households. The empirical analysis thus excludes samples from village cadre families. The empirical results align with the foundational discussions. Households with varying income structures exhibit significant differences in their land leasing decisions. This divergence is attributable to changes in the relative prices of factors, particularly with the rise in wage income, leading to a decrease in the relative prices of capital versus labor and land versus labor. Households are likely to reallocate factors to enhance income, manifesting as a shift of labor, capital, and land to non-agricultural operations.

Land that cannot be moved or altered in nature is leased out to obtain rental income, thereby transforming land from a production factor into a productive asset for households.

Table 5: Robustness Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	Excluding where income solely comes from agricultural operations sample		Excluding Fallow Land Sample		Excluding Village Cadre Sample	
	Leased Land	Scale of Lease	Leased Land	Scale of Lease	Leased Land	Scale of Lease
Land Rental Price	0.036*** (0.013)	0.023** (0.011)	0.042*** (0.014)	0.027** (0.012)	0.050*** (0.013)	0.035*** (0.011)
Net Agricultural Income	0.022 (0.186)	0.014 (0.155)	0.003 (0.155)	0.003 (0.131)	0.119 (0.150)	0.101 (0.124)
Land Rent *Net Agricultural	(0.039)	(0.036)	(0.037)	-0.035	-0.053**	-0.047**
	(0.032)	(0.027)	(0.027)	(0.023)	(0.026)	(0.022)
Wage Level	0.172*** (0.012)	0.153*** (0.010)	0.153*** (0.012)	0.139*** (0.010)	0.154*** (0.011)	0.136*** (0.009)
Other Control	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-1.333*** (0.104)	-1.114*** (0.087)	-1.195*** (0.107)	-1.005*** (0.090)	-1.292*** (0.102)	-1.067*** (0.084)
R ²	0.086	0.103	0.101	0.119	0.092	0.107
Observations	10907	10907	10565	10565	10744	10744

Note: Values in parentheses represent robust standard errors. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

V. Conclusions and Policy Recommendations

This study explores the heterogeneity of agricultural land leasing among families with varying income structures in the theoretical section and empirically tests the findings using survey data from 2013 and 2018, resulting in the following conclusions:

(1) There has been a significant transformation in the income structure of rural households, with operating net income no longer serving as the primary source of family income. Changes in income structure reflect not only the evolution of major income sources but also adjustments in the allocation of factors across different sectors. The importance and function of factors vary among families with different income structures, leading to differences in factor allocation.

(2) The price of factors directly determines their allocation. In scenarios where labor prices rise rapidly, the relative prices of capital to labor and land to labor decrease. Rational farmers tend to adopt labor-saving methods to enhance the marginal returns of factors. This is reflected in land factors as either leasing out land (exiting agricultural production) or leasing in land (expanding agricultural production).

(3)The impact of factor prices on agricultural land leasing varies among households with different income structures. For families where operating net income is the primary source, land functions predominantly as a production factor. In contrast, for families where wage income is the main source, land primarily serves as a financial asset, leading to the transfer of labor, capital, and land to non-agricultural sectors, with immovable and unalterable land being leased out to generate rental income.

(4)Household endowments influence agricultural land leasing to some extent. Larger household contracting land and financial assets, coupled with smaller agricultural capital and labor scale, increase the tendency for households to lease out land. The objectives of agricultural subsidies, which include reducing agricultural production costs and enhancing farmers' production enthusiasm, along with their agricultural-specific characteristics, have suppressed land leasing. Variations in topography, landforms, and social security arrangements also contribute to the heterogeneity of land leasing decisions.

The shortcomings of common prosperity are evident in rural areas. With significant changes in the income structure of farming families and the evolving nature of land as a financial asset, there is an urgent need to improve the institutional framework and land factor markets. Based on the conclusions of this study, adjustments and enhancements in the following policy areas should be considered:

Firstly, enhance agricultural policies to increase farmers' production and operational enthusiasm. This involves refining policy guidance, incentive mechanisms, and implementation strategies to steer agricultural production towards modernization. While agricultural subsidies, as a form of transfer payments, have positively impacted farmers' income, they should also assume broader functions. Consequently, it is crucial to actively guide the establishment and improvement of land markets, without overly emphasizing the protective function that might impede land leasing and the expansion of agricultural production. Promoting the development of labor-saving technologies, agricultural social services, and mechanization will further advance agricultural modernization.

Secondly, deepen land system reform to fully leverage the property function of land. By advancing the "three land reforms," achieve the free and orderly flow and optimal allocation of rural resources, thereby broadening farmers' income channels. Enhance the land transfer market to ensure transparency in the transfer process, voluntary agreements between buyers and sellers, and reasonable land transfer pricing, thereby avoiding land abandonment and leasing difficulties due to an unsuitable land market. Stimulate the property function of land to increase farmers' holding dividends and boost their income.

Thirdly, clarify the structure of farmers' income to solidify the focus on income enhancement. Traditionally, China's agriculture has been dominated by small-scale farming. Given the constraints of price ceilings on agricultural products and rising production costs, significantly increasing farmers' income solely through improved operating net income is unlikely. Wage income has thus become a primary focus for income growth. Variations in income structure affect factor allocation, leading to changes in income enhancement strategies. For families primarily relying on agricultural income, increasing operating profits and expanding agricultural mechanization and production scale are key. In contrast, families with predominant wage income expect appropriate prices for factors, allowing land to effectively serve as a financial asset.

Finally, The findings of this study also bear relevance to the optimal allocation of land factors in other parts of the world, encompassing rural residential land consolidation, land acquisition, and land transfer, in both developed and developing countries. Inappropriate land transfer and the process of land concentration may simultaneously trigger adverse distributional consequences, including the displacement of smallholders, insecure land tenure, and the erosion of rural livelihood diversity (Kebede et al., 2023; Pierri et al., 2025). How to properly guide target groups to participate in the optimal allocation of land factors while preventing their engagement in land speculation is a matter of considerable concern to policymakers. Although the target-group characteristics of land policies—such as land acquisition and land transfer—in other regions may not fully align with those in China, the discrepancy between market forces and target groups' expectation perceptions, as well as the land-related behaviors of these groups, can influence policy implementation. Therefore, the results and policy implications of this study may offer useful references and novel insights for the refinement and optimization of land policies in other parts of the world. Nevertheless, this study has certain limitations. Given that we currently have access to only two years of detailed household-level decision data, this may introduce some bias in estimating the structural effects in land rental behavior. Future research should incorporate multi-period tracking data to further complement and refine the analysis.

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