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THE IMPACT OF RURAL LABOUR MIGRATION ON HOUSEHOLD INCOME: THE CHINESE EXPERIENCE AND A CONCEPT FOR THE EU AND UKRAINE

Abstract

This study analyses how rural labour migration affects household income in rural areas, combining theoretical approaches and empirical data. Using an unbalanced panel sample from several periods based on data from the China Family Panel Studies (CFPS), the authors apply the propensity score matching (PSM) method and a fixed effects model to assess the impact of RLM on incomes of rural households. The results show a significant positive effect, achieved mainly

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through the strengthening of family social capital and access to the social security system. Heterogeneity analysis indicates that the effect is more pronounced in western China and among low-income households. The paper also conceptualises the applicability of China's experience to the European Union and Ukraine, given similar demographic challenges, dependence on the agricultural sector and depopulation processes. The results are of practical importance for the formulation of rural economy development and migration management policies, especially in the context of post-pandemic and post-war recovery.

Key Words:

rural households, household income, labour migration in the EU, rural labour migration, social capital, social protection, social welfare, two-way fixed effects.

JEL: D12, R23, J61.

3 figures, 3 formulas, 10 tables, 40 references.

Problem Statement and Literature Review

With the rapid development of China's economy and society, the income of rural households has increased annually due to government agricultural support policies. However, the income gap between urban and rural areas remains substantial. In 2023, the ratio of urban to rural incomes was 2.39 (National Bureau of Statistics of China, n.d.). This income gap is primarily influenced by biased or targeted economic policies (Yuan et al., 2020; Zhong et al., 2022). Currently, compared to urban residents, rural households' income growth is relatively slow. Why are rural households' incomes growing slowly, and what are the influencing factors? Numerous scholars have explored these factors from various perspectives (Yang & Liu, 2012; Chang et al., 2012; Mishra & Moss, 2013; Giles & Mu, 2024; Nordin & Hojgard, 2019; Biagini et al., 2020; Li et al., 2022; Chen et al., 2022; Yao et al., 2023; Ding, 2023; X. Wang et al., 2023; Y. Wang et al., 2023; Yu et al., 2024). Among the influencing factors, labour migration has also been extensively studied, but no consensus has been reached. Similar imbalances are observed in

Eastern European countries, particularly in Ukraine, where regional inequalities and mass labour migration pose structural challenges for the agricultural sector.

The primary perspective holds that labour migration positively impacts the growth of rural household income. Taylor et al. (2003) examined this phenomenon through the lens of labour mobility and the effective allocation of resources. They argued that labour migration facilitates the free flow of inter-regional resources and the efficient allocation thereof, thereby enhancing farmers' incomes and alleviating poverty. Additionally, households experiencing labour mobility can significantly decrease their poverty rates, with a higher proportion of labour migration correlating with increased per capita income (Xu & Li, 2023).

The second viewpoint is that labour migration leads to a reduction in rural household income. This perspective hinges on the imbalance of resources and the information asymmetry. Taylor & Martin (2001) argue that the continuous outward migration of rural labour results in the loss of human and material capital in rural areas, thereby negatively impacting rural productivity and the income levels of households. Giles & Mu (2024) believe that while transferring surplus rural labour can increase household income, those who migrate to other regions may face comparatively high costs. Migrant workers moving into urban employment also encounter unequal treatment in terms of job training and social security. These factors collectively hinder the flow of rural labour to cities and the growth of rural residents' income.

The third perspective maintains that there is no clear linear correlation between labour migration and household income. Du et al. (2005) explore two complementary datasets from impoverished regions in China to assess whether individuals from poor households migrate and whether such mobility aids in enhancing their family's economic conditions. They discover an inverted U-shaped correlation between the level of family resources and migration possibility. Zhang & Fu (2024) argue that the impact of labour migration on rural households' income is uncertain because of regional and spatial differences between households.

Ukraine is characterised by a high proportion of seasonal migration from rural areas, which often leads to short-term income growth but, in the long term, exacerbates demographic depopulation and imbalances in the production structure of the agricultural sector (Libanova & Pozniak, 2023; Chan et al., 2023). Yaroshenko et al. (2024) study emphasises that social capital and informal networks play a key role in shaping labour migration decisions among the rural population of Ukraine, and that the lack of policies for the reintegration of returning migrants hinders the economic effect of migration processes.

At the EU level, studies that consider labour migration in the context of the European Green Deal, rural development and the circular economy are relevant (European Commission, 2020). Particular attention is paid to migration as a tool for the balanced development of peripheral regions and social cohesion.

The above literature shows that there is a close relationship between labour migration and rural household income, but the conclusions are different due to using various methods and different perspectives. A key limitation of these studies is that most of the studies focus on the impact of single factors on households' income, with few exploring the mechanisms of the effects, such as mediated effects. Moreover, the existing literature primarily relies on macro-level data to empirically analyse the impact of rural labour mobility on farmers' income and tends to engage in speculative analyses or small-scale case studies grounded in qualitative research.

This research aims to study how rural labour migration affects farm income in China and create a theoretical framework which could work for EU and Ukrainian contexts.

The research examines how rural labour migration creates economic changes for households through social capital and social security system operations.

(1) The impact of rural labour migration on income of rural households

With the rapid development of urbanization, labour mobility has emerged as a significant feature of modern society, particularly the migration from rural to urban areas. This trend has profound implications for the increase in incomes of rural households. Firstly, labour mobility enhances labour productivity, boosting local labour's wage levels and facilitating a substantial accumulation of income (Ottaviano & Peri, 2012).

Secondly, rural residents, who are working in urban areas, are afforded the opportunity to learn and master new skills, ranging from basic cultural knowledge to professional capabilities. By enhancing these skills, migrant workers significantly boost their employment competitiveness. Upon returning to their hometowns, they can apply these newfound skills to agricultural production by adopting more advanced planting techniques and management methods. Consequently, this leads to improved agricultural production efficiency and product quality, thereby increasing the market competitiveness and sales revenue of agricultural products.

Lastly, labour migration enhances the economic structure of rural areas. As an increasing number of young workers depart from villages, the labour structure within these rural communities inevitably undergoes restructuring. This shift compels the remaining population in the villages to seek new production methods, such as replacing manual labour with mechanization. This shift towards modernization not only reduces production costs but also improves economic efficiency. Based on these observations, the following hypothesis (H1) is proposed in this paper: *Labour migration promotes the increase of rural households' income*.

(2) The mediated effect of rural labour migration on rural households' income

First of all, the influence of rural labour mobility on household income through social capital: When rural residents leave their local areas to seek employment opportunities, they are not merely moving into physical space, but are also expanding their social space. This trans-regional interpersonal network exposes farmers to a broader array of social resources. In urban settings, migrant workers acquire diverse work skills and life experiences through interactions and collaborations with peers from various regions. Concurrently, they gain additional social support and assistance through these newly established networks, which significantly bolster the income levels of rural families. According to research by J. Wang et al. (2023), rural households can enhance non-agricultural employment prospects, improve family welfare, and boost their income by leveraging their social capital. Based on the above analysis, the following hypothesis (H2) is proposed in this paper: *Social capital acts as an intermediary in the relationship between labour mobility and rural household income*.

Secondly, the influence of rural labour mobility on household income through welfare: On one hand, as labour mobility transitions from rural to urban areas, workers often secure higher wages and superior working conditions compared to those available in the countryside. This transition to urban employment typically provides more stable wages, directly enhancing family income. However, simply increasing wages is insufficient for a comprehensive elevation of a family's economic status; thus, the enhancement of welfare is crucial. Welfare improvements arise due to benefits such as medical insurance, housing subsidies, and access to educational resources. Augmenting these benefits can significantly alleviate financial burdens on families. For instance, comprehensive medical insurance can reduce the risk of poverty due to healthcare expenses, housing subsidies can mitigate the financial strain from urban living costs, and access to quality education ensures children's future opportunities. On the other hand, enhanced welfare benefits can also boost the enthusiasm and loyalty of migrant workers, thereby improving work efficiency and productivity, which in turn contributes to an increase in family income. Benefits provided by enterprises or governments, such as paid leave, educational subsidies for children, and pension plans, can instil a sense of security and belonging in workers, motivating them to contribute more effectively to the development of the company or community. Based on the considerations outlined above, this paper proposes the following hypothesis (H3): *Rural labour mobility can raise household income levels by increasing welfare*.

Methodology

Econometric methodology

This paper employs a two-way fixed effects econometric model to examine the impact of RLM on farmers' income. The model (1) is as follows:

$$Income_{it} = \alpha + \beta Migration_{it} + \gamma CV_{it} + \delta_i + \mu_t + \varepsilon_{it}, \quad (1)$$

Where: *i* and *t* denote family and year, respectively. $Income_{it}$ represents the per capita net income of the household. $Migration_{it}$ is whether there is labour mobility. CV_{it} represent the control variables that affect household income, including the characteristics of the family member variables, family characteristics variables, etc. β and γ are parameters to be estimated. δ_i represents the individual fixed effects, and μ_t is the year fixed effects. Lastly, ε_{it} denotes the error term.

Additionally, according to the mediated-effect model used by Wen & Ye (2014), we utilize the stepwise regression method to analyse how rural labour migration influences the income of Chinese farmers. The regression models constructed for this analysis (see Equation 2 and Equation 3) are outlined below:

$$MD_{it} = \gamma_0 + \gamma_1 Migration_{it} + \gamma_2 CV_i + \delta_i + \mu_t + \varepsilon_{it}, \quad (2)$$

$$Income_{it} = \delta_0 + \delta_1 Migration_{it} + \delta_2 MD_{it} + \delta_3 CV + \delta_i + \mu_t + \varepsilon_{it}, \quad (3)$$

Where: MD_{it} is the mediator variable in model (2). The coefficient γ_1 represents the effect of the independent variable (Migration) on the mediator variable (MD). The coefficient δ_2 of model (3) represents the effect of the mediator variable (MD) on rural households' income (Income) while accounting for the impact of the independent variable (Migration). The coefficient δ_1 measures the direct effect of the independent variable (Migration) on the dependent variable (Income), controlling for the effects of the mediator variable (MD). Definitions for other variables remain consistent with those given in Equation (1). The mediation effect is deemed significant if γ_1, δ_1, and δ_2 each demonstrate statistical significance.

Data sources and descriptive statistics

(1) Data sources

The data utilized in this paper are sourced from the China Family Panel Studies (CFPS), encompassing panel data from 2016, 2018, and 2020. CFPS is a nationwide large-scale sample survey project organized and conducted by the China Social Science Survey Center of Peking University, covering eastern, central, and western China. The database is categorized into community, family, adult, and children. This study specifically utilizes adult and family data. Only rural household samples are included in this research, focusing on the relationship between RLM and rural households' income. By integrating adult and family-level datasets, this study addressed issues related to missing and outlier data, ultimately yielding a final sample of 31,228 rural households across 31 provinces.

(2) Description of variables

Dependent variable: Income. It represents the per capita net income of the household. This study selects rural households' annual per capita net income as the dependent variable, following the framework established by Yang et al. (2022). To address heteroscedasticity and reduce data skewness, the income variable is processed logarithmically.

Independent variable: Migration. It represents RLM. The data are derived from responses to the CFPS questionnaire, which asks: «In the past 12 months, have any of your family members worked away from your hometown (for example, in cities)?» If the answer is yes, the value is 1; otherwise, the value is 0.

Control variables: This study selects the following control variables based on prior academic research and data availability.

(1) Individual factors include Age3 (Age*Age/100), Health, and EDU. The value of Age3 is calculated by squaring the age and dividing by 100; The value of health is 1, denoting a good, excellent, or very good state of health; a value of 0 indicates a bad state of health. The value of EDU represents the level of farmers' education. According to the survey data, there are 8 types of education levels: 1. Never attended school (0 years). 2. Primary school (6 years). 3. Junior high school (9 years). 4. Senior high school (12 years). 5. Junior college (15 years). 6. Undergraduate (16 years). 7. Master's degree (19 years). 8. Doctor's degree (22).

(2) Household factors include the following. 1) *Fsize*: Number of family members. 2) *Finance_asset*: Total household financial assets. 3) *Fixed_asset*: Household fixed assets. 4) *Land_asset*: Household land property value. To en-

sure data stability, the values for *Finance_asset*, *Fixed_asset*, and *Land_asset* are each processed logarithmically.

Mediator variables: This study examines the following two variables that mediate the effect of RLM on households' income.

(1) Socapital: Expenditure on gifts for social relations. This variable is referred to in the article of Jiang et al. (2022), in which the expenditure on gifts for social relations serves as a proxy variable for social capital.

(2) Welfare: Pension enrolment. The data are derived from answers to the CFPS questionnaire, which asks: «Have you enrolled in one or more of the following pension programs?» If the answer is «yes» and enrolled in any type of pension programs, the value is 1; otherwise, the value is 0.

Instrumental variable: IV-rate. The IV-rate is the average proportion of family members who work away from home in the province except for the sample.

Issues of endogeneity can lead to inconsistent estimates. To tackle this, the study employs the instrumental variable method. The chosen instrumental variable, denoted as IV-rate, is the average proportion of family members working away from home across the province, excluding those in the sample. There exists a robust correlation among rural residents working away from home within the same province, who generally share comparable economic backgrounds. Nonetheless, the income of households within our sample remains uninfluenced by the IV-rate, as it is derived from data outside of the sample group. Therefore, the instrumental variable (IV-rate) satisfies the conditions of correlation and exogeneity, ensuring it is a suitable choice for addressing endogeneity in this analysis.

The detailed explanation of variables and descriptive statistics are shown in Table 1 and Table 2.

Table 1

Description of variables

Variables	Label	Description
Dependent variable: Households' income(log)	Income	Average disposable income in household
Independent variable: Rural labour migration	Migration	Whether work away from hometown (yes=1 no=0)

Variables	Label	Description
Control variables:		
Age of farmer	Age3	Age*Age/100
Status of health	Health	Excellent/very good/good=1 poor=0
Education	EDU	Education years Never been to school (0) Primary school (6) Junior high school (9) Senior high school/secondary school/technical school/vocational senior school (12) 3-year college (15) 4-year college (16) Master's degree (19) Doctor's degree (22)
Family members	Fsize	Number of family members
Finance assets (log)	Finance_asset	Total household financial assets
Fixed assets (log)	Fixed_asset	Household fixed assets
Land assets (log)	Land_asset	Household land property value
Mediator:		
Social capital (log)	Socapital	Expenditure on gifts for social relations
Pension enrolment	Welfare	Whether enrolled in pension program (yes=1 no=0)
Instrumental variable:	IV_rate	Average rate of family members who work away from home in the province except for the sample.

Table 2

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Income	31228	9.249	0.917	0	15.24
Migration	31228	0.367	0.482	0	1
Age3	31228	26.043	16.715	0.81	104.04
Health	31228	0.666	0.472	0	1
EDU	31228	6.397	4.511	0	22
Fsize	31228	4.589	2.077	1	21
Finance_asset	31228	6.98	4.614	0	15.32
Fixed_asset	31228	4.135	4.458	0	16.12
Land_asset	31228	8.038	4.122	0	15.43
Socapital	30910	7.256	2.218	0	11.849
Welfare	20370	0.641	0.479	0	1
IV_rate	39187	0.185	0.028	0.068	0.5

Research Results and Discussion

Results of the benchmark regression

We use two-way FE models to analyze the impact of RLM on farmers' income. The estimation results are shown in Table 3. In this study, we control for time and individual fixed effects, as well as fixed effects at the provincial level, to minimize the impact of regional factors on the accuracy of the regression results.

Table 3

Results of the benchmark regression model

	Income		
	(1)	(2)	(3)
Migration	0.121***	0.128***	0.127***
	(0.011)	(0.011)	(0.011)
Age3		-0.023***	-0.024***
		(0.006)	(0.006)
Health		0.017	0.012
		(0.013)	(0.013)
EDU		0.007	0.007
		(0.006)	(0.006)
Fsize			-0.046***
			(0.006)
Finance_asset			0.017***
			(0.001)
Fixed_asset			0.013***
			(0.002)
Land_asset			0.020***
			(0.002)
Constant	9.205***	9.751***	9.655***
	(0.005)	(0.181)	(0.181)
Individual effect	Yes	Yes	Yes
Time effect	Yes	Yes	Yes
Province effect	Yes	Yes	Yes
N	35737	32155	31228
R^2	0.726	0.729	0.739

Notes: a. Standard errors are reported in parentheses; b. ***, **, and * represent significance at $p \leq 0.01$, $p \leq 0.05$, and $p \leq 0.10$, respectively.

Column 1 presents the regression results on the impact of RLM on farmers' income. Column 2 builds upon the first model by controlling for individual characteristic variables, such as age, health status, and education level. Column 3 further adds family characteristic variables, including family members, financial assets, fixed assets, and land assets, to the previous two models. The coefficients of Migration in Columns 1, 2, and 3 of Table 3 are 0.121, 0.128, and 0.127, respectively, and all are significant at the 1% level. This indicates that RLM can significantly increase rural households' income, which supports hypothesis (H1) of this paper. In Column 3, the coefficient of Age squared is negative and significant, suggesting an inverted U-shaped relationship between age and rural households' income. That is, household income increases with age, but after a certain point, further increases in age reduce household income. The coefficient of family size is significantly negative, indicating that larger family sizes lead to lower per capita income levels for households. Finally, the marginal coefficients of finance assets, fixed assets, and land assets are all significantly positive, suggesting that higher levels of household assets are associated with higher rural households' income.

Results of mediation effects analysis

Based on mediator-effect models (2) and (3), we have formulated the following empirical study.

(1) Mediator: Social capital (Socapital): Expenditure on gifts for social relations is selected as the proxy variable for social capital. To ensure data stability, the variable is processed logarithmically. This mediation effect was investigated using the Sobel test. The test results are displayed in Table 4, Columns 1 and 2.

The regression results in Column 1 show that Migration has a significantly positive effect on Socapital at the 1% level, indicating that RLM significantly enhances the social capital of rural households. The results in Column 2 demonstrate that Socapital has a significantly positive impact on Income at the 1% level. Even after controlling for the mediating variable, the impact of Migration on Income remains significantly positive. Following the Sobel test, the coefficient is 0.004 and is significantly positive at the 1% level, thereby validating the mediated effect of social capital. This suggests that labour mobility can enhance social capital, which in turn increases the income of rural households. Therefore, hypothesis (H2) has been confirmed.

Table 4

Results of the mediation models

	(1) Socapital	(2) Income	(3) Welfare	(4) Income
Migration	0.118***	0.126***	0.018**	0.116***
	(0.032)	(0.011)	(0.008)	(0.013)
Socicapital		0.033***		
		(0.003)		
Welfare				0.581***
				(0.015)
Constant	6.343***	9.400***	0.982***	9.799***
	(0.517)	(0.178)	(0.121)	(0.199)
Sobel Test		0.004***		0.001*
		(0.001)		(0.001)
CV	Yes	Yes	Yes	Yes
Individual effect	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes
Province effect	Yes	Yes	Yes	Yes
N	30910	30910	20370	20370
R^2	0.630	0.745	0.670	0.740

Notes: a. Standard errors are reported in parentheses; b. ***p ≤ 0.01, **p ≤ 0.05, *p ≤ 0.10.

(2) Mediator: Social welfare (Welfare)

The RLM enhances family income through the promotion of social welfare. To investigate this, the study selects individuals enrolled in one or more pension programs as the proxy variable for mediation effect analysis. The findings are presented in Table 4, Columns 3 and 4. The coefficient of Migration on Welfare is significantly positive, suggesting that higher Migration levels can boost rural households' Welfare. Similarly, the coefficient of Welfare on Income is significantly positive, demonstrating that improved social welfare can lead to increased households' income. The Sobel test results confirm a significantly positive outcome at the 10% level, thus supporting the mediating role of social welfare. This indicates that labour mobility can elevate social welfare, subsequently raising the income of rural households. In conclusion, hypothesis (H3) is validated.

Robustness test and endogeneity analysis

To ensure the reliability and robustness of the conclusions presented in this paper, we conduct a series of robustness tests as follows:

(1) Alternative dependent variable

In model (1), we replaced per capita household income with total household income as the dependent variable. The regression results, displayed in Column 1 of Table 6, show positive and significant findings that are consistent with the conclusions of this study.

(2) Sample matching

To avoid endogeneity issues caused by sample selection bias, propensity score matching (PSM) was employed to test robustness. This study uses the prevalent method of nearest-neighbour matching with a calliper of 0.01 and k=1. The results presented in Table 5 indicate substantial decreases in Pseudo-R2, Mean Bias, and LR chi2 following matching.

Table 5

Balance diagnostics of explanatory variables and average treatment effect of PSM

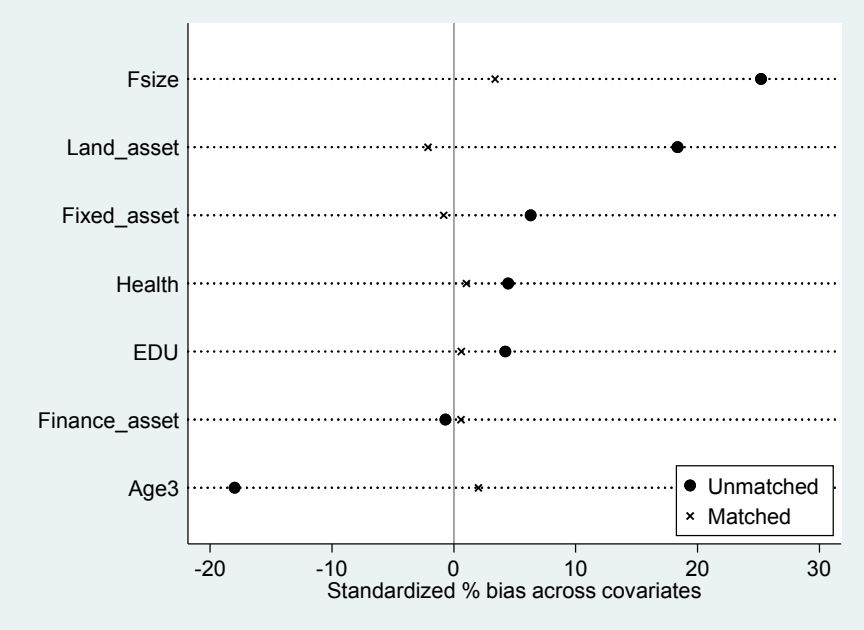
Sample	Pseudo-R^2	LR chi^2 (p-value)	Mean Bias	ATT (s.e.)
Unmatched	0.018	590.78(0.000)	11.0	
Matched	0.001	24.37(0.000)	1.5	
				0.113^{***}
				(0.014)

Notes: Standard errors in parentheses; ***p < 0.01.

The Average Treatment Effect on the Treated (ATT) is significantly positive at the 1% level. Figure 1 illustrates a notable reduction in standardized bias across covariates after nearest-neighbour matching.

Figure 1

Standardized bias across covariates after nearest-neighbour matching



Furthermore, Figure 2, which shows the results of the common support hypothesis test, indicates that the propensity scores of the treatment and control groups exhibit a wide overlap, suggesting high-quality sample matching with low loss of samples. All these results indicate that the PSM analysis is valid.

Column 2 in Table 6 presents the regression results after PSM, revealing a statistically significant positive coefficient for Migration at the 1% level. This suggests that RLM contributes to the enhancement of rural households' income. The alignment of these results with the benchmark regression underscores their robustness after mitigating sample selection bias.

Figure 2

Common support of the propensity score

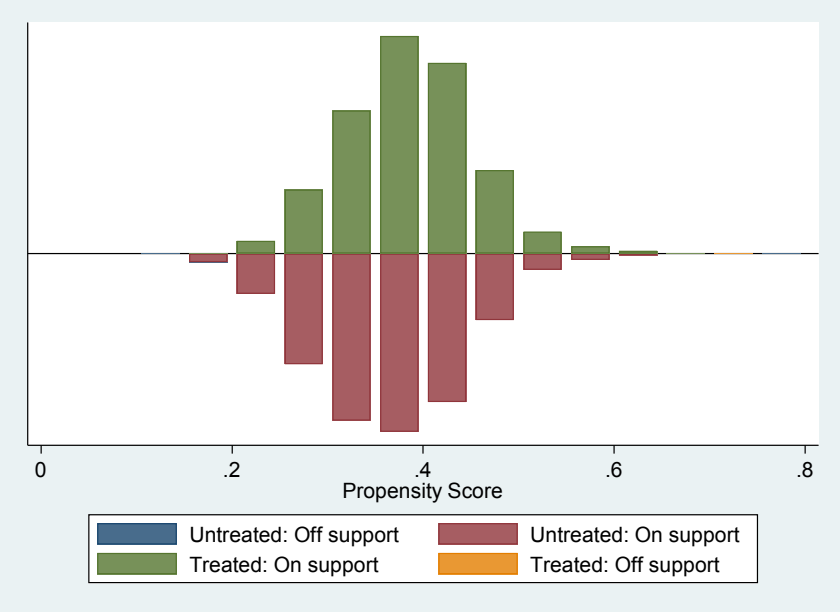


Table 6

Robustness analysis

	(1) Income	(2) Income
Migration	0.155***	0.143***
	(0.011)	(0.020)
CV	Yes	Yes
Constant	10.175***	10.006***
	(0.183)	(0.359)
Individual effect	Yes	Yes
Time effect	Yes	Yes
Province effect	Yes	Yes
N	31228	9622
R^2	0.772	0.744

Notes: a. Standard errors are reported in parentheses; b. ***p≤ 0.01, **p≤ 0.05, *p≤ 0.10.

Endogeneity analysis

Due to the complexity of gathering all relevant variables affecting rural households' income, there may be omitted variables in the regression model. Additionally, rural households' income could influence labour migration, suggesting potential bidirectional causality between labour migration and rural households' income, which introduces endogeneity issues. To address the endogeneity problem stemming from this mutual causality, it is crucial to identify instrumental variables that are associated with the independent variables but uncorrelated with the dependent variables. Following the research methodology established by Tan et al. (2022), we employ the average proportion of labour migration in the province, excluding the sample (IV-rate), as an instrumental variable for labour migration. This instrumental variable is correlated with labour migration (the independent variable) yet is not associated with the rural households' income in the sample (the dependent variable), meeting the criteria for relevance and exogeneity required of an instrumental variable. Consequently, using this instrumental variable is theoretically justified.

To determine if RLM (Migration) acts as an endogenous variable in relation to a household income, we conduct the following test. The results from the Durbin-Wu-Hausman test are displayed in Table 7, Column 2, where the chi-square value is 3.326 with a probability of accepting the null hypothesis at 0.068. These results lead to the rejection of the exogenous null hypothesis at the 10% significance level, thus the alternative hypothesis is accepted, indicating that Migration is indeed an endogenous variable. Furthermore, to assess whether the instrumental variable (IV-rate) is weak, we perform additional testing as detailed in Table 7, Column 2. The results clearly show that there is no issue of a weak instrumental variable, evidenced by Shea's partial R-squared being 0.002 and the minimum eigenvalue statistic standing at 79.664. This analysis confirms the validity of the instrumental variable in use.

Table 7 presents a comparative analysis of the Ordinary Least Squares (OLS) method and the Instrumental Variables (IV) estimates using Two-Stage Least Squares (2SLS) regression, factoring in instrumental variables (IV-rate). Column 1 of Table 7 details the results from the OLS regression, while Column 2 provides the 2SLS regression results.

The estimates from both Column 1 and Column 2 consistently demonstrate that the impact of RLM (Migration) on household income is significantly positive at the 1% level. This finding implies that higher rates of RLM are associated with increased household income, reaffirming the validity of hypothesis (H1). Moreover, when addressing the endogeneity problem, the coefficient value for Migration is notably higher in the 2SLS estimation compared to the OLS estimation. This discrepancy suggests that the influence of RLM on household income is underestimated when the endogeneity issue is overlooked. Therefore, it is crucial to consider such endogeneity effects to accurately assess the role of RLM in enhancing household income.

Table 7

Comparison of the OLS and 2SLS estimates

	(1) OLS	(2) 2SLS
Migration	0.127***	0.502***
	(0.011)	(0.172)
Constant	9.655***	9.230***
	(0.180)	(0.140)
CV	Yes	Yes
Individual effect	Yes	NO
Time effect	Yes	Yes
Province effect	Yes	Yes
N	31228	39187
R^2	0.739	0.225
Chi-square		3.326(p=0.068)
Shea's partial R-squared		0.002
Minimum eigenvalue statistic		79.664

Notes: a. Standard errors are reported in parentheses; b. ***p≤ 0.01, **p≤ 0.05, *p≤ 0.10.

Heterogeneity analysis

(1) Heterogeneity analysis based on East, Central, and Western grouping

The estimation results from the grouped regression analysis, which considers the geographical variations across the eastern, central, and western regions, are depicted in Table 8, Columns 1, 2, and 3. The eastern regions are Shanghai, Tianjin, Shangdong, Guangdong, Guangxi, Jiangsu, Hebei, Zhejiang, Fujian, Liaoning. The central regions are Jilin, Anhui, Shanxi, Jiangxi, Henan, Hubei, Hunan, Heilongjiang. The western regions are Yunnan, Sichuan, Gansu, Guizhou, Chongqing, Shaanxi.

These findings show that the impact of RLM (Migration) on rural household income is significantly positive across all three regions. Specifically, the coefficients of Migration on rural households' income in the eastern, central, and western regions are 0.084, 0.147, and 0.147, respectively, each statistically significant at the 1% level. These results indicate that the impact of migration on household income is most pronounced in the central and western regions, whereas the eastern region experiences a comparatively lesser impact. This variation can be attributed to the different stages of economic development across these regions. The central and western regions, being less developed, offer significant income-boosting opportunities through migration due to limited local employment prospects.

Table 8

Impact heterogeneity of RLM on farmers' income in subsample models: East, Central, West

	(1) East	(2) Central	(3) West
Migration	0.084***	0.147***	0.147***
	(0.020)	(0.021)	(0.018)
CV	Yes	Yes	Yes
Individual effect	Yes	Yes	Yes
Time effect	Yes	Yes	Yes
Province effect	Yes	Yes	Yes
Constant	9.695***	9.910***	9.370***
	(0.347)	(0.331)	(0.275)
N	10964	8949	11093
R^2	0.766	0.726	0.705

Notes: a. Standard errors are reported in parentheses; b. ***p≤ 0.01, **p≤ 0.05, *p≤ 0.10.

In contrast, the eastern region, with its advanced economy, higher wage levels, and abundance of local employment and entrepreneurial opportunities, makes it less necessary for farmers to migrate to improve their income. Consequently, labour migration has a relatively smaller impact on the income of farmers in the eastern region. This regional disparity underscores the importance of considering local economic conditions when analysing the effects of labour migration on household income.

(2) Heterogeneity analysis based on household income classification (Low, Mid, and High)

To explore the heterogeneity of the relationship between RLM and household income across different economic conditions, the samples have been segmented into three distinct groups: low-income families, middle-income families, and high-income families, based on ascending per capita income levels. Table 9 presents the regression results of each subgroup.

Table 9 shows the regression results for low-, middle-, and high-income households in Columns 1, 2, and 3, respectively. Regression analysis shows that the coefficient of migration on rural households' income in low-income rural households is 0.167, and it is significantly positive at the 1% level. For middle-income households, the coefficient is 0.020, which is significantly positive at the 1% level. For high-income households, the coefficient is -0.031, which is significant at the 5% level.

Table 9

Impact heterogeneity of RLM on farmers' income in subsample models: Low, Mid, and High

	(1) Low	(2) Mid	(3) High
Migration	0.167***	0.020***	-0.031**
	(0.023)	(0.008)	(0.016)
CV	Yes	Yes	Yes
Individual effect	Yes	Yes	Yes
Time effect	Yes	Yes	Yes
Province effect	Yes	Yes	Yes
Constant	8.624***	9.514***	11.077***
	(0.471)	(0.103)	(0.259)
N	6569	5427	6853
R^2	0.634	0.555	0.684

Notes: a. Standard errors are reported in parentheses; b. ***p≤ 0.01, **p≤ 0.05, *p≤ 0.10.

The above results suggest that the impact of migration on farmers' income is the strongest in low-income families, and then in middle-income families, while in high-income families the coefficient is negative, and the significant level is just 5%. This situation may occur because for impoverished families, seeking employment in more developed regions rather than their hometown can be a viable option to enhance their income. Wealthier families, who typically possess greater social capital and resources, can secure stable income through alternative avenues such as investments or business ventures and thus tend to rely less on labour migration.

Comparative perspective: Labour migration in the EU and Ukraine

Similar to the Chinese case, labour migration in the European Union and Ukraine is a determining factor in the socio-economic development of households, but it takes on different forms and mechanisms of influence. China focuses primarily on rural-urban migration within its borders because this process enables farmers to earn higher incomes through their transition from farming to industrial and service work. The well-being of Ukraine's population depends mainly on external labour migration to EU nations which generates substantial remittances while creating inno-

vative economic systems in rural territories. The European Union demonstrates two distinct mobility patterns because it allows free movement of workers between member states while accepting external migrants including Ukrainians who now represent the biggest group of temporary protection recipients since 2022.

The three cases show migration functions as a household income booster but institutional frameworks together with geographical settings produce varying effects on its scale and nature. The three countries experience migration as a household income booster yet their internal regional economic gaps in China and their dependence on European workforces in Ukraine and their migrant integration challenges in EU countries create different migration effects.

The use of current European and international statistics allows us to assess the scale and economic impact of labour migration from Ukraine to the EU in a comparative context. According to Eurostat (n.d.), as of June 2025, there were approximately 4.31 million Ukrainian citizens under temporary protection in European Union countries, accounting for over 98% of all beneficiaries of this mechanism. The highest rates of persons with temporary protection per 1,000 population were recorded in the Czech Republic (34.7), Poland (27.2) and Estonia (25.1), indicating a concentration of Ukrainian migrants in Central and Eastern European countries (Eurostat, n.d.).

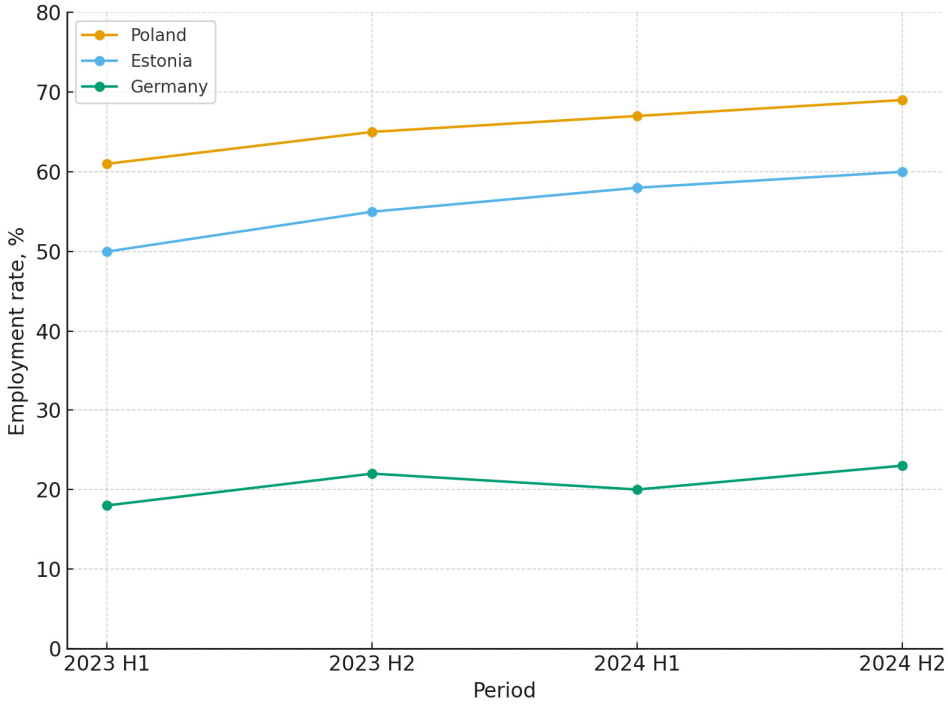
The OECD (2023–2024) data shows regional differences in the integration of Ukrainians into European labour markets: their employment rate in Poland and the Baltic states exceeded 50%, while in Germany, Austria and Belgium it was less than 25% (OECD, 2024) (see Figure 3). This indicates a significant difference in the effectiveness of the realisation of the right to work, which depends on institutional conditions, language barriers and structural features of labour markets.

Figure 3 confirms the key hypothesis of the study that the effects of external labour migration are heterogeneous and depend both on the economic profile of the host country and on institutional barriers to integration. In the case of Central and Eastern Europe (Poland, Estonia), they are more pronounced, while in Western Europe (Germany), integration is slower.

The dynamics of Ukrainian integration in selected EU countries in Figure 3 clearly demonstrates the heterogeneity of adaptation processes in labour markets. The employment rate in Poland demonstrated the most consistent growth because the government successfully implemented integration programs while employers maintained strong labour needs which resulted in a 61% to 69% employment rate increase between 2023 and 2024. The institutional framework of Estonia supported refugee integration well because the employment rate rose from 50% in 2023 to 60% by the end of 2024. In Germany, the employment rate among Ukrainians remained significantly lower, ranging between 20% and 23% throughout 2024. The employment rate remained low because the number of Ukrainians in Germany increased from 18% to 22% in 2023 before stabilizing multiple barriers to entering the workforce, which included time-consuming qualification recognition processes and strict language requirements and a fragmented job market structure.

Figure 3

The dynamics of Ukrainian integration in Poland, Estonia, and Germany by employment rate



Source: based on OECD (2024).

External migration of workers has a significant impact on Ukraine's economic performance. According to Ratha et al. (2024), the share of personal remittances in Ukraine's GDP decreased from 13.9% in 2022 to 9.1% in 2023 and to about 6.3% in 2024. At the same time, the volume of remittances in monetary terms decreased to approximately $11.97 billion in 2024, compared to $14.967 billion in 2023. Another important context is mobility within the EU itself. According to estimates by the European Central Bank, Ukrainian refugees could replenish the eurozone with 0.3–1.3 million workers in the medium term, alleviating the labour shortage in European labour markets (Botelho, 2022).

This decline is explained both by the high base effect of wartime and the gradual integration of Ukrainian migrants into the social systems of EU countries, which has partially reduced their propensity to send remittances (Ratha et al., 2024).

Table 10

Empirical Evidence: EU–Ukraine

Indicator	Value	Breakdown/Notes
Beneficiaries of temporary protection in the EU	≈ 4.31 million; Ukrainians 98.4%	Women 44.7%; Men 24.1%; Minors 31.2%
New TP decisions Q2 2025	150,005	+9.3% vs Q1 2025
Top TP beneficiaries per 1,000 inhabitants	Czechia 34.7; Poland 27.2; Estonia 25.1	EU average 9.6
Employment rate of Ukrainians (Poland)	69%	Up from 61% YoY; +2.7% GDP contribution
Employment rate of Ukrainians (Estonia)	≈ 60%	Gradual growth since 2023
Employment rate of Ukrainians (Germany)	22%	Approx. 300,000 employed by July 2025
Remittances to Ukraine	USD 4.2 billion	–14% YoY
Remittance channel dynamics	Official +2.1% YoY; Informal –17.3% YoY	Shift towards formal channels

Source: Eurostat (n.d.), Ratha et al. (2024).

Table 10 systematises key empirical data on the scale and socio-economic impact of migration from Ukraine to the EU as of 2023–2025. It covers the number and structure of beneficiaries of temporary protection, new decisions by EU Member States, differentiation of indicators per 1,000 population, as well as the employment rates of Ukrainians in Poland, Estonia and Germany. Separate sections are devoted to the dynamics of remittances to Ukraine, changes in the use of formal and informal transfer channels, the geography of sources of income, and the contribution of Ukrainian migrants to the GDP of host countries (for example, +2.7% in Poland).

Table 10 provides a comprehensive picture of the impact of external labour migration on EU labour markets and Ukraine's financial stability, highlighting regional and structural differences in integration processes.

Migration creates changes in household income through two main mechanisms: social capital and social protection systems. The social networks established by Ukrainian labour migrants between their home and destination countries help people find work and adapt to new environments while sharing information and resources (Levitt & Lamba-Nives, 2011). The networks establish conditions

for a «remittance economy» to develop mainly in rural areas because these regions lack domestic income sources. The EU Temporary Protection Directive (European Parliament, 2024) allows Ukrainians to access labour markets and basic social services and education, but their integration levels differ across Member States because institutions show varying abilities to support migrants (OECD, 2023).

An analysis of the heterogeneity of effects shows that the impact of external labour migration is most pronounced in Central and Eastern European countries, where there has been a rapid influx of Ukrainians into the labour market and an increase in remittances to their country of origin. Western European countries experience a reduced effect because of language differences and institutional challenges that create barriers. The socio-economic position of Ukrainian households determines how important remittances are for their survival with rural low-income families depending on them as their main income source, but wealthier families use them as an additional financial resource (Clemens & McKenzie, 2018).

The dynamics of Ukrainian labour integration in the EU remain uneven. In Poland, the employment rate of Ukrainians ranges from 53% to 71%, in the Czech Republic it is around 60% (with at least 30% working in two jobs), and in Romania it is 43%. This clearly demonstrates that different national contexts shape both the volume of remittances and the potential for mobilising household income (Tucha et al., 2023).

In China, internal rural-urban mobility determines the dynamics of income growth in farming households. In the EU and Ukraine, labour migration similarly acts as a critical mechanism for improving the well-being of the population.

However, while in China the main channel of influence is the integration of migrants into urban labour markets, Ukraine and EU countries are more characterised by the cross-border nature of social capital, which is formed through networks of interaction between migrants and their families. The transnational connections between these countries enable financial and social resource exchange while establishing new economic integration possibilities.

The effect of remittances, which remains decisive for the income of many Ukrainian households, makes them overly dependent on external factors, in particular on fluctuations in the EU economy and exchange rate dynamics. The main factor behind migrant household vulnerability in China stems from domestic regional economic disparities. The main cause of vulnerability in Ukraine and EU countries stems from worldwide economic and financial disturbances. A complete policy framework should unite migration promotion strategies with external risk protection systems to create enduring rural development benefits from labour migration.

Policy implications

Based on the conducted analysis, we have developed the following policy recommendations for labour migration and rural development.

Policy recommendations for China

First and foremost, given the clear impact of labour migration on boosting household income, proactive steps and tailored policies should be implemented to facilitate labour mobility. For instance, enhancing vocational training for farmers can improve their skills and qualifications; additionally, loosening urban household registration restrictions could also be beneficial. Secondly, the mobility of labour can significantly bolster farmers' income through enhanced family social capital and social welfare. Therefore, the government should provide public spaces that facilitate learning and interaction among migrant workers. Moreover, improvements should be made in medical care, pension schemes, and educational opportunities for children, along with other social security and public services for rural migrant workers. By leveraging these enhancements, both the monetary and non-monetary welfare of migrant workers can be elevated. This, in turn, will more effectively advance the ongoing urbanization process in China. Finally, comprehending the diverse impacts of RLM on household income is crucial for a deeper understanding of the direction of China's market-oriented reforms, particularly in terms of urbanization. This understanding will enable policymakers to tailor strategies that address the specific needs and circumstances of different rural areas and family economic status, ensuring that the benefits of urbanization are distributed more equitably and effectively across various groups.

Policy implications for the EU and Ukraine

Firstly, special programmes should be created to improve the efficiency of money transfers, as external labour migration has a significant impact on the financial stability of Ukrainian households. Policies should aim to improve access to financial services in rural areas, while reducing the cost of remittances and facilitating business financing through remittances for small and medium-sized enterprises.

Secondly, the integration of Ukrainian migrants into the labour markets of EU countries remains an important condition. There is a need for coordinated measures at EU level aimed at removing barriers to access to employment, language and administrative barriers, and speeding up the procedures for the recognition of qualifications. Strengthening such measures will increase the stability of household incomes and reduce dependence on short-term forms of employment.

Thirdly, in the context of Ukraine, policy must take into account the dependence of local economies on remittances. It is necessary to create national programmes to support households, which will protect their incomes during periods of instability and encourage some migrants to return by developing opportunities in the domestic labour market.

Given regional differences, EU policymakers should focus more on Central and Eastern European countries, which bear the brunt of integrating Ukrainian migrants. Ukraine should develop strategies to mitigate inequalities between rural and urban regions in the use of remittances. This approach will improve the material well-being of migrants and their families and ensure a more even distribution of the benefits of migration for the national economy.

Conclusions

Initially, the paper conducted a theoretical analysis to explore the influence of RLM on rural households' income. Subsequently, utilizing panel data from the CFPS, we developed an empirical investigation by a two-way fixed effects econometric model. This model verifies that the migration of rural labour significantly impacts the income of households, with variations observed across different regions and income levels. Additionally, the Sobel test identifies distinct mechanisms – social capital and social welfare – that mediate the effect of labour migration on rural household income. To ensure the empirical findings' validity, we used rigorous robustness analysis, including alternating the dependent variable, propensity score matching (PSM), and an instrumental variable (IV). According to the above theoretical and empirical study, this paper draws the following conclusions:

(1) RLM contributes to the increase of rural households' income.

(2) The influence of RLM on rural households' income comes out by the improvement of social capital and social welfare.

(3) The influence of RLM on rural households' income varies by region and economic status of the family: the impact is more pronounced in the western region compared to the central and eastern regions. Additionally, this effect is significant for low-income families, whereas it is negligible for high-income families.

Compared with existing studies, this paper offers several noteworthy contributions:

Firstly, it utilises micro-survey data from the China Family Panel Studies (CFPS) spanning 2016 to 2020 to conduct a large-sample empirical analysis.

Secondly, it introduces a mechanism analysis that elucidates the impact of labour migration on rural households' income through two mediating variables: social capital and social security.

Thirdly, the robustness of the findings is affirmed using econometric techniques, specifically propensity score matching (PSM) and instrumental variable (IV-2SLS) methods.

Fourthly, the paper delves into heterogeneity analysis, exploring variations across different regions and among households with different economic statuses.

Therefore, the research significantly enhances the existing empirical evidence concerning the determinants of rural households' income. In the future, these approaches could be adapted to analyse migration processes in EU countries and Ukraine, where rural labour migration also has a significant impact on the socio-economic development of agricultural regions.

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