The Impact of Rural Labor Mobility on Urban-Rural Income Disparities — A Panel Data Analysis Based on Prefecture-Level Cities in Sichuan Province

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Abstract. The purpose of this paper is to use municipal panel data from 21 cities (prefectures) in Sichuan Province from 2012 to 2019 to build a model to test the relationship between labor mobility and the urban-rural income gap. The panel data is regressed and a fixed effect model is established. The following conclusions are drawn : labor mobility has expanded the urban-rural income gap, and the conversion of resident status is the main factor for the expansion of the statistical value of the urban-rural income gap ; the expansion of urban-rural income gap by rural labor mobility mainly occurs in other economically underdeveloped areas except the Chengdu Plain Economic Zone. We provide some effective suggestions for the government according to the conclusion.

Keywords: rural labor mobility urban-rural income gap.

1. Introduction

Under market economy conditions, labor mobility is a significant economic and social phenomenon, as well as a process that facilitates more rational labor allocation. Since 1985, as the focus of economic reform shifted toward urban areas, industrialization, marketization, and urbanization flourished, intensifying this trend. Large numbers of rural laborers spontaneously migrated to cities due to relatively low rural incomes and significant urban-rural income disparities, creating a wave of migrant workers. This phenomenon attracted numerous economists to study its impact on urban-rural income gaps, with research indicating that rural labor mobility is a factor that cannot be ignored.

Research on rural labor mobility has garnered significant attention from scholars both domestically and internationally. This field has been extensively explored through both theoretical research and empirical analysis, making it a highly prominent area of study. The state promotes the two-way flow of rural labor and factors between urban and rural areas, emphasizing coordinated urban-rural development and the reduction of the urban-rural income gap. The latest Central Document No. 1 once again addresses the “agriculture, rural areas, and farmers” (ARF) issues, underscoring the nation's high priority on these matters. Rural labor mobility is a crucial yet often overlooked aspect of resolving ARF challenges. The state must not only focus on income levels for rural laborers but also address the constraints faced by rural workers migrating to urban areas due to the household registration system. Consequently, the government should progressively improve the living conditions of migrant workers entering cities and facilitate rural labor mobility. In the late 1970s, the income gap between urban and rural residents in China was approximately 2.5 times, reflecting a significant trend of inequality. Following reform and opening-up, as China's economic development and residents' income levels steadily increased, the urban-rural income gap gradually narrowed and stabilized. Since the 21st century, this gap has fluctuated around 3.3 times. Although it has recently decreased to 2.5 times in 2021, the nationwide urban-rural income disparity remains a serious challenge.

Sichuan is one of China's most populous provinces and a major source of rural labor. Compared to the Sixth National Population Census, the proportion of urban residents increased by 16.55 percentage points in the Seventh Census. Among the floating population, the number of intra-

provincial migrants is approximately 6.99 times that of inter-provincial migrants, indicating massive intra-provincial labor mobility, with rural labor migration accounting for the largest share.

2. Organization of the Text

2.1. Rural Labor Mobility Narrows Urban-Rural Income Gaps

Most scholars contend that rural labor mobility positively impacts the narrowing of urban-rural income disparities. Li Shi (1999) conducted empirical analysis using sample survey data, revealing that rural labor mobility promotes income growth and equitable income distribution within rural areas, thereby helping to reduce income gaps between urban and rural areas, across regions, and within rural communities. Cai Fang and Wang Meiyan (2009) contend that rural labor mobility hinders the narrowing of urban-rural income disparities. This is because the current survey system fails to capture "permanent migrant populations," and the income recorded in rural household accounts does not fully reflect the total earnings of migrant workers. Consequently, urban residents' income levels are overestimated, while rural residents' income levels are underestimated. Therefore, rural labor mobility not only theoretically contributes to narrowing urban-rural income gaps but also holds significant practical importance. Zhong Funing (2010) contends that, when comprehensively considering changes in urban-rural population structure, income structure, and labor force composition, labor market adjustments over the past two decades have substantially reduced income disparities—to a degree far exceeding simple statistical data (and potentially in the opposite direction). Lu Lanqing (2018) points out that as labor markets improve, rural labor mobility significantly promotes income convergence. This indicates that after accounting for a range of variables, labor mobility positively impacts income gap reduction.

2.2. Rural Labor Mobility Widens the Urban-Rural Income Gap

Conversely, some scholars contend that rural labor mobility actually widens the urban-rural income gap. Fan Shide (2011) theoretically derived the mechanism by which labor migration from underdeveloped to developed regions influences income disparities. Combining theoretical analysis with empirical research using Chinese data, he successfully demonstrated that regardless of whether out-migrating labor is classified as originating from underdeveloped or developed regions, simple labor mobility cannot eliminate income gaps but instead leads to their expansion. An Husen, Yan Yinggen, and Park Eun-cheol (2011) proposed that the "threshold effect" between high urban housing prices and the household registration system creates a paradox in China's labor mobility and income growth. They argued that only when the openness of urban and rural markets reaches a critical threshold will relaxing the household registration system narrow the urban-rural income gap. Otherwise, as labor mobility intensifies, the income disparity will widen further. Fan Shide and Jiang Debo (2013) examined the "spillover and trickle-down effects" of regional human capital stock changes and corresponding potential output resulting from labor mobility, confirming that labor mobility exacerbates regional disparities. Cai Wu and Chen Guanghan (2013) noted that as the scale of urban-rural human capital mobility expands and low-skilled human capital outflows increase, income disparities widen further. Conversely, outflows of high-skilled human capital actually narrow income gaps. Simultaneously, the mobility of urban and rural human capital significantly impacts income disparities. Considering that the proportion of lower-skilled workers among mobile human capital is markedly higher than that of higher-skilled workers, it can be concluded that labor mobility exacerbates urban-rural income disparities.

2.3. Rural Labor Mobility Widens or Narrows Urban-Rural Income Gaps Under Specific Conditions

Some scholars contend that whether rural labor mobility widens or narrows urban-rural income gaps requires analysis under specific conditions. Shen Kunrong and Yu Jixiang (2011) contend that market-based resource allocation can coordinate urban-rural labor resource distribution, enabling

rural migrants and urban local labor to achieve cooperative division of labor and mutual benefit—where rural migrants boost urban residents' income growth. However, urban labor market segmentation hinders optimal labor resource allocation, impedes urban-rural labor cooperation, and suppresses the spillover effects of rural migration. Synthesizing these findings reveals that rural labor mobility's impact on urban-rural income disparities remains uncertain, potentially positive or negative. Wang, SX and Fu, YB (2019) developed a labor migration model focusing on selection effects in determining labor market outcomes. To quantify China's labor market reforms' effects on labor market outcomes, output, and income, we calibrated and adjusted this model. The study indicates that eliminating legal labor mobility restrictions and reducing migration costs positively impact overall GDP and welfare. However, population flows also trigger talent outflows from rural areas, simultaneously driving up agricultural prices and reducing agricultural productivity. While labor mobility narrows the urban-rural wage gap, it actually exacerbates capital income inequality between urban and rural areas.

2.4. No Significant Relationship Between Rural Labor Mobility and Urban-Rural Income Gap

There is no significant relationship between rural labor mobility and the urban-rural income gap.Zhang Yibo and Liu Wenxin (2012) employed an empirical research methodology combining macroeconometric analysis with microstatistical comparative analysis. Using provincial-level macro panel data from 1996 to 2006 and microdata from the China Household Income Survey conducted between 1995 and 2002, they found that urbanization and increased rural labor migration to urban enterprises did not significantly impact the urban-rural income gap.

2.5. Literature Review

Existing literature has produced abundant theoretical research on whether and how rural labor mobility relates to urban-rural income disparities, laying a solid theoretical foundation for subsequent studies. However, these studies suffer from limitations such as early research periods and relatively macro-level analysis. Therefore, this paper will delve into the following three aspects:

First, Research Methods: Early literature primarily employed qualitative research and descriptive statistical methods without conducting empirical analysis. This study utilizes municipal-level data from Sichuan Province's cities (prefectures) between 2012 and 2019, with labor mobility scale as the core explanatory variable and the ratio of urban to rural disposable income as the measure of the urban-rural income gap. It adopts experimental quantitative research and empirical analysis methods, employing a fixed-effects model for empirical analysis.

Second, research sample: Existing literature partly uses microdata and partly relies on national panel data, which is relatively macro-level. However, significant regional disparities exist across China, making macro-level analysis alone of limited reference value for specific regions and unable to accurately reflect local realities. Therefore, this study focuses on 21 prefectures (cities) within Sichuan Province to more precisely capture the impact of intra-provincial rural labor mobility on urban-rural income disparities.

Third, Research Perspective: Most literature examines inter-provincial and inter-regional rural labor mobility, while studies on intra-provincial labor movement remain relatively scarce. Rural laborers exhibit a pronounced tendency to migrate from low-income to high-income areas not only nationally but also within provinces, particularly in Sichuan Province, which hosts a substantial rural labor force.

3. Literature References

3.1. Panel Model Specification

Using labor mobility scale as the primary explanatory variable, incorporating the urban-rural income gap and the lagged labor mobility scale along with other secondary explanatory variables, the following fixed-effects model was constructed:

$$Gap_{it} = \beta_0 + \beta_1 \mathrm{Gap}_{i(t-1)} \beta_2 \mathrm{L1}_{it} + \beta_3 \mathrm{L1}_{i(t-1)} + \beta_4 \mathrm{L2}_{it} + \beta_5 \mathrm{L3}_{it} + \beta_6 \mathrm{PCI}_{it} + \beta_7 \mathrm{IP}_{it} + \beta_8 \mathrm{EI}_{it} + \beta_9 \mathrm{EOS}_{it} + \beta_{10} \mathrm{AS}_{it} + \beta_{11} \mathrm{DEO}_{it} + \eta_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Where Gap denotes the urban-rural income gap; L1 represents the scale of labor mobility; $\mathrm{L1}_{i(t-1)}$ indicates the lagged scale of labor mobility; L2 signifies inter-regional labor mobility; L3 represents the resident population; PCI denotes per capita income; IP represents the level of industrialization; EI denotes educational investment; EOS represents the employment ownership structure; AS indicates agricultural support intensity; DEO signifies the degree of economic openness; η_i is the regional fixed effect; λ_t is the time fixed effect; ε_{it} is the random disturbance term, where i and t denote region and year, respectively.

3.2. Variable Selection and Data Sources

Table 1. Variable Classification

Variable Classification	Variable Symbol	Variable Name
Dependent variable	Gap	Urban-rural income gap
Factors of labor mobility	L1	Scale of labor mobility
	L1_1	One-period lag of variable L1
	L2	Interregional labor mobility
	L3	Permanent residents
Indirect allocation factors	EI	Education investment
	AS	Level of agricultural support
Other economic intervention factors	PCI	Per capita income
	IP	Level of industrialization
	EOS	Structure of Employment Ownership
	DEO	Degree of economic openness

Table 2. Variable Descriptions

Variable Symbol	Variable Name	Variable Declaration
Gap	Urban-rural income gap	Adjust the per capita disposable income of urban and rural residents using the Consumer Price Index (CPI), and express it as the ratio of urban per capita disposable income to rural per capita net income.
L1	Scale of labor mobility	Using the 2011 urban population ratio as the baseline, subtracting the urban population ratio for each subsequent year from it represents the total labor force undergoing long-term migration due to household registration mobility and status changes.
L1_1	One-period lag of variable L1	In the model presented in this paper, we introduce the scale of labor mobility from the previous period as an instrumental variable to measure its endogeneity.
L2	Interregional labor mobility	Using the proportion of mechanical population growth in the total regional population, as constructed by Lu Ming and Chen Zhao (2004), as the measurement standard.
L3	Permanent residents	Using the permanent resident population figures for each city (prefecture) in the current year
EI	Education expenditure	The ratio of the city's (prefecture's) education expenditure to its total fiscal expenditure
AS	Level of agricultural support	The ratio of the city's (prefecture's) agricultural, forestry, and water affairs expenditures to its total fiscal expenditures
PCI	Per capita income	Using per capita regional GDP of each city (prefecture)
IP	Level of industrialization	The ratio of the sum of the output value of the secondary and tertiary industries in each city (prefecture) to the city's (prefecture's) gross domestic product is used to represent.
EOS	Structure of Employment Ownership	The ratio of the number of employees in state-owned economic units in each city (prefecture) of Sichuan Province to the total number of employees in all cities (prefectures) of Sichuan Province.
DEO	Degree of economic openness	The ratio of the total import and export value of each city (prefecture) in Sichuan Province to its respective GDP is used to represent.

All data are sourced from the Sichuan Statistical Yearbook.

3.3. Empirical Results Analysis

The table below presents panel model regression results based on data from 21 prefecture-level cities in Sichuan Province from 2012 to 2019, with control variables added sequentially. Rural labor mobility (L1) significantly widens the urban-rural income gap at the 5% significance level. Rural workers gain better job opportunities and higher wages in cities compared to rural areas. However, since their household registration has shifted to urban status, their income is counted within urban statistics. The majority of rural laborers migrating to cities are young and able-bodied workers. Those remaining in rural areas with rural household registration are predominantly individuals with partial or total loss of labor capacity. The proportion of this group continuously increases as young and able-bodied rural laborers leave, leading to a persistent decline in rural per capita net income and widening the urban-rural income gap. Second, skilled agricultural labor constitutes a vital component of rural labor migration. However, declining per capita capital stock in agriculture hinders improvements in agricultural labor productivity. Schultz observed that at specific stages of economic development, workers' knowledge and technical skills become crucial for agricultural productivity gains. Therefore, while government investment in agriculture increases physical capital, corresponding human capital development must keep pace. Otherwise, advanced technologies and equipment introduced without skilled operators will lead to resource idleness and waste.

The positive and statistically significant (at the 10% level) coefficient for per capita income (PCI) indicates that growth in per capita income has widened the urban-rural income gap. With industrialization and urbanization, cities have experienced far faster economic growth and expansion in economic scale than rural areas. While some of the growth in per capita income is attributable to increases in rural residents' incomes, the pace of this growth remains relatively slow compared to urban areas. The growth in urban residents' income is the primary driver of overall income growth. Therefore, sustained per capita income growth indicates a widening gap between urban and rural residents' per capita income.

The coefficient for education investment (EI) is negative but not significant, suggesting that education investment can narrow the urban-rural income gap. However, the impact of education is long-term and gradual, so it does not show significant effects in the short term.

The coefficient for agricultural support (AS) is negative and significant at the 1% level. Government support for rural areas—including financial, material, and other resources—facilitates coordinated urban-rural development, enabling rural regions to share in the benefits of urban growth. Fiscal support for agriculture plays a crucial role in promoting agricultural development, increasing farmers' incomes, and balancing urban-rural development.

The coefficient for economic openness (DEO) is negative but not highly significant. This lack of significance stems from uneven economic openness across provinces and labor mobility between regions.

The Employment Ownership Structure (EOS) coefficient is negative and significant. The transformation of state-owned enterprises and state-owned economic sectors in non-rural areas into private and collective economies, along with the development of emerging enterprises in township areas, has released a large number of jobs. This has increased the employment rate of rural labor, raised labor income, and narrowed the income gap.

Table 3. Empirical Results

Variable	Model One Urban-rural income gap	Model Two Urban-rural income gap	Model Three Urban-rural income gap	Model Four Urban-rural income gap	Model Five Urban-rural income gap
The Lagging Effect of the Urban-Rural Income Gap	0.194***	0.261***	0.259***	0.204***	0.194***
	(3.58)	(4.69)	(4.57)	(3.82)	(3.58)
Scale of labor mobility	2.200**	2.046**	2.112**	2.155**	2.200**
	(2.38)	(2.12)	(2.14)	(2.36)	(2.38)
The lagging phase of labor mobility scale	1.839*	1.846*	1.914*	1.810*	1.839*
	(1.96)	(1.89)	(1.93)	(1.97)	(1.96)
Interregional labor mobility	0.167		0.040	0.154	0.167
	(1.08)		(0.24)	(1.01)	(1.08)
Permanent residents	-0.000		-0.000	-0.000	-0.000
	(-1.10)		(-0.52)	(-1.04)	(-1.10)
Per capita income	0.000				0.000
	(1.00)				(1.00)
Level of industrialization	-0.004				-0.004
	(-0.94)				(-0.94)
Education investment	-0.006			-0.005	-0.006
	(-1.29)			(-1.11)	(-1.29)
Level of agricultural support	-0.015***			-0.015***	-0.015***
	(-5.21)			(-5.58)	(-5.21)
Structure of Employment Ownership	-0.464**				-0.464**
	(-2.41)				(-2.41)
Degree of economic openness	-0.000				-0.000
	(-0.53)				(-0.53)
intercept term	-5.889**	-6.097**	-6.397**	-6.026**	-5.889**
	(-1.99)	(-2.06)	(-2.11)	(-2.15)	(-1.99)
Sample size	167	167	167	167	167
R-squared	0.929	0.915	0.915	0.928	0.929
City fixed effects	Control	Control	Control	Control	Control
Year Fixed Effect	Control	Control	Control	Control	Control

4. Summary

(1) The flow of rural labor has widened the income gap between urban and rural areas, partly due to changes in household registration status. The government must accelerate the development of a more open and fluid labor market with improved policies, regulations, and comprehensive social security systems. Unreasonable household registration systems and policies that hinder rural laborers from migrating to cities for work must be correspondingly reformed and improved.

(2) Increase government transfer payments and expand public services, particularly for low-income urban groups and migrant workers. Narrow the gap in access to public goods between migrant workers and established urban residents to enhance cities' employment appeal to rural labor.

(3) Increase government investment in agriculture, especially in human capital, to narrow the urban-rural wage gap and enhance the comparative efficiency of agriculture. This will prevent a mass exodus of rural labor into cities that could lead to unemployment, encouraging some workers to return to their hometowns to start businesses or continue agricultural production, thereby avoiding the contraction of agricultural production scale.

(4) The government should establish an employment-first economic development strategy, adjust industrial structures, vigorously develop secondary and tertiary industries such as commerce, industry,

and services—especially labor-intensive sectors—to provide ample employment opportunities for rural labor entering cities and enhance the absorption capacity for rural labor.

(5) While vigorously developing urban economies, the government must not neglect rural economic growth. It should continue advancing the rural revitalization strategy, increase agricultural funding, transfer talent and technology to rural areas, raise the mechanization rate of agricultural production, thereby boosting agricultural productivity and ultimately increasing farmers' incomes.

(6) Economic openness also plays a role in narrowing the urban-rural income gap, though less pronounced. Cities across Sichuan Province should increase import-export trade, enhance economic vitality, and improve the quality of economic development.

(7) The government should advance the privatization of state-owned enterprises in urban areas and foster the development of township enterprises to provide more employment opportunities for rural labor.

(8) While education's role in narrowing the urban-rural income gap may not be immediately apparent, it exerts a long-term and gradual influence. It effectively enhances human capital, cultivates more high-quality talent, and drives economic development. Regional economic growth, in turn, generates more transfer payments for education, creating a virtuous cycle.

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