

The Impact of Cross-border Migrant Employment on Workers' Income in Border Areas

An Empirical Study Based on the Micro Data of Yunnan Border Areas

Jie Yang

School of Economics and Management
Yunnan Normal University
Kunming, China

Renjuan Luo

School of Economics and Management
Yunnan Normal University
Kunming, China

Abstract—Based on household survey data of the national social science fund research group in Yunnan border area, this paper examines the marginal effects of cross-border mobile employment on the wage level of workers. We use the census register's household register and whether there is someone going abroad for business or working in the same region as instrument variables to eliminate the endogeneity of cross-border flows which lead to empirical bias. The study found that the cross-border flow of employment increased their wages significantly. Even by controlling for factors of age, gender, education, national and income level before the outflow, the result is still significant and robust. The research results have some policy implications for improving the employment level and the income level of the workers in the border areas.

Keywords—border area; cross-border mobile employment; wage level; instrumental variable

I. INTRODUCTION

Migrant workers, especially a large number of migrant workers from rural areas into urban employment, are an important demographic phenomenon since China's reform and opening-up. On the one hand, the rapid development of China's economy and the new-type urbanization has increased the demand for labor force. On the other hand, the transformation of rural production and operation mode and the improvement of production efficiency enable a large number of surplus labor forces to be released, creating conditions for a large number of rural labor forces to work in cities. According to the statistical data of China's floating population development report 2016, the annual growth rate of floating population in China was about 8 million from 2011 to 2015, and reached 247 million by the end of 2015, with an annual migration rate of 17.97 percent. The large scale of population migration has provided sufficient "demographic dividend" for China's economic construction on the macro level, enabling the situation of high savings, high investment and high growth to be maintained for a long time in the past and greatly promoted China's urbanization construction (Wang Dwen, 2007). From a micro perspective, the flow of labor force to some extent improves the absolute income of rural families and reduces the relative probability of falling into poverty (Fan Shide, 2016). Since the 21st century, China has successively introduced policies such as western development, revitalization of old industrial bases in northeast

China, and "The Belt and Road" strategic planning. These regional development policies have provided new opportunities for the development of border areas. Population, as the main body of regional economic and social development, has become an important indicator of regional development, especially the trend and situation of floating employment of the working population, which is the focus of governments at all levels. In recent years, the employment pattern of population flow in border areas has taken on new characteristics. In addition to the traditional inter-provincial flow, intra-provincial and intra-city and inter-county employment, cross-border (national) employment has become a new trend of population flow in border areas. Based on the convenient geographical conditions of border trade areas, a large number of school-age labor forces began to flow out of the country and choose neighboring countries or regions to engage in business or other ways of working to obtain labor income. In the existing research literature, a large number of scholars have paid attention to the causes of rural migrant employment opportunities and wage differences in China's labor market and the empirical analysis of China's urban-rural income gap during the economic transition. Few literatures have paid attention to the impact of cross-border migrant employment on workers' wage level. Then compared with the traditional migrant employment mode in rural areas, can cross-border employment increase the income level of workers more?

Using the questionnaire data of the national social fund research group in the Yunnan border area, this paper investigates the effect of cross-border mobile employment on the wage income level of the laborers. Traditional OLS regression showed that cross-border migrant employment increased the wage level of workers effectively. However, this is not enough to determine the causal relationship between the two, because the cross-border flow behavior itself is endogenous, and the reasons are in the following. First, whether respondents choose cross-border flows is not completely random. Cross-border flows are likely the result of respondents' individual self-selection. Traditional OLS regression will cause estimation bias due to sample self-selection. Second, that surveyed people choose cross-border flows may be decided by the family features or policy factors, these factors will also affect income of floating population and those decision of floating, which will lead to endogenous of tradition OLS regression. Third,

cross-border migrant employment and the wage level of workers may also have a two-way causal relationship. In addition to the cross-border flow of employment in order to obtain higher wage income, some high-income workers may also reflect their value and employment interest through cross-border flow. An effective method to eliminate endogenous of OLS regression is using instrumental variable method to estimate. This paper uses the two instrumental variables to solve the endogeneity problem of ordinary OLS regression. The first instrumental variable is the household registration. And the second instrumental variable is whether there are people in the same area who do business or work in other places. The results of empirical research show that cross-border migrant employment has a significant effect on the improvement of workers' wage level. Even though we controlled for a variety of factors such as age, sex, education, ethnicity and income level before the outflow, the research conclusion and the performance was relatively stable.

The research results explain that cross-border employment helps to improve the employment rate and the income level of workers in border areas on a certain range of micro level; it also has some significant reference for local governments to implement the central government's "adhere to the employment first strategy and implement a more active employment policy". At the same time, China's border areas are mostly underdeveloped areas, but also rural poor agglomeration areas. Cross-border migrant employment is also conducive to the export of labor services in border and poor areas and the improvement of the overall poverty alleviation project in poor villages.

The following content is arranged as follows: the second part introduces the statistical description of the data sources and relevant indicators used in the paper; the third part empirically studies the effect of cross-border employment on wage income level; the fourth part gives the conclusion and policy implications.

II. DATA SOURCE AND STATISTICAL DESCRIPTION

A. Data Source

The empirical data in this paper are all derived from the field survey data conducted in the border area of Yunnan province by the national social science foundation project (12CMZ042). In September 2012 to August 2014, the research team selected Yunnan province border's Tengchong county, Baoshan state, which is adjacent to Myanmar, Malipo county, Wenshan state and Marguan county, which is adjacent to Vietnam. The data of 605 families' population movement in 18 village committees were collected successively, and each household was randomly selected to conduct the questionnaire survey.

The survey data contains detailed personal information, including gender, age, nationality, domicile, education, occupation at home. The survey also included respondents' awareness of national border policies, their satisfaction with frontier life and their perception of the impact of local population outflow. The most favorable for this study is that

the survey also obtained monthly income data of migrant workers.

B. Statistical Analysis

According to the statistics, among the 605 valid survey data, 493 people had experienced migrant employment, and the population mobility ratio was 81.48%. Among them, 236 of the 493 people going out and moving were in the domestic flow, and 257 people were in the cross-border flow. The proportion of the cross-border flow people was 52.13%. "Table I" shows the definition of relevant variables and the characteristics of the data used in empirical study.

TABLE I. DEFINITION OF VARIABLES AND STATISTICAL CHARACTERISTICS

variable	Definition	mean	Stand error	min	max	Sample volume
nation	Han=1 others=0	0.51	0.50	0	1	605
sex	Male=1 Female=0	0.59	0.49	0	1	605
census register	Chengchong=1 Malipo=2 Maguan=3	1.66	0.82	1	3	605
age	15-20=1; 20-30=2 31-40=3; 41-50=4 51-60=5; >60=6	3.08	1.05	1	6	605
age2	Square of age	10.74	6.68	1	36	605
edu	Illiteracy=0 Primary edu=6 Junior edu=9 High edu=12 College =15	7.23	2.94	0	15	605
social	Work outside=1 Others=0	0.91	0.29	0	1	605
abroad	Abroad=1 Non-abroad=0	0.52	0.50	0	1	493
b_income	five categories of income before there are no flows	6.55	0.57	6.24	7.84	493
a-income	five categories of income before there are flows	7.76	0.48	6.62	8.61	493

III. EMPIRICAL ANALYSIS

According to the labor economics, the wage level of employees is mainly determined by human capital, work experience and work characteristics. In the following, we will use the logarithm of monthly wages of outbound migrants as the explanatory variable for the ordinary least squares regression model. Our focus is on the effect of cross-border migrant employment on the wage level, namely the regression coefficient of variable abroad. In addition, we also control other two types of variables: first, the personal characteristics of abroad workers, including gender, age and age square terms, years of education, etc. Second, the opportunity cost for migrant workers. We use variable b_income measure out flow

in local reservation wages, because if they go out to get a lower wage employment, so they can choose in local jobs. Accordingly, we set the specific regression model of measurement as follows:

$$a_income_i = \beta_0 + \beta_1 abroad_i + \alpha^T X + \varepsilon_i \quad (1)$$

Where, a_income_i is the value of monthly income of outgoing migrant workers, $abroad_i$ is the dummy variable of whether cross-border or not, and X is the control variable vector, including personal characteristics and opportunity cost of outgoing migrant. The subscript denotes the number of outgoing flow personnel and the random disturbance.

A. The Impact of Cross-border Employment on the Wage Level: a Preliminary Test

For the convenience of the study, we temporarily do not consider the endogeneity of cross-border flow variables, but directly study the impact of cross-border flow employment on workers' wage level. "Table II" reports the results of OLS regression with the log monthly average income as the explanatory variable.

TABLE II. IMPACT OF CROSS-BORDER MIGRANT EMPLOYMENT ON WORKERS' WAGE LEVEL (OLS REGRESSION)

	Model 1	Model 2
abroad	0.1864*** (0.424)	0.0023 (0.0534)
sex		0.1695*** (0.0524)
age		-0.1142 (0.1299)
age2		0.0186 (0.0189)
edu		0.0054 (0.009)
nation		-0.0682*** (0.022)
b income		0.2057*** (0.0410)
C	7.662*** (0.0275)	6.5449*** (0.3316)
Number	493	493
F-statistics	19.34***	13.99***
R square	0.037	0.1626

^a Note: the bracket is the standard error of estimation;***, ** and * respectively indicate that the estimated coefficients are significant at the significance level of 1%, 5% and 10%.

As can be seen from "Table II", the coefficient of the cross-border flow variable abroad is positive at the significance level of 1% in the absence of other control variables in model 1, it indicates that cross-border flow employment improves the wage level of workers effectively. However, after introducing other control variables into model 2, the regression coefficient of variable abroad was positive, but the value became small and the significance level dropped significantly. By comparing the above control and non-control of personal characteristics with opportunity cost, it is shown that cross-border flow can indirectly affect the wage level through influencing personal characteristics and opportunity cost.

In fact, the above regression results may only have general reference significance, and it cannot say whether the cross-

border migrant employment has an effect on the improvement of workers' income. The reason is that the impact of cross-border employment on workers' wages may not be a single causal relationship. Although from the perspective of traditional migration theory, economic motivation is the main factor, and the real economic income differences between regions (mainly reflected in wage differences) directly drive the migration flow between groups, so the direct purpose of cross-border employment of laborers is to obtain higher wage income. But since the 21st century, along with the continuous increase of economic strength, national rights and interests of laborers security efforts to continuously strengthen, rising costs of domestic labor market, the income level of the direct embodiment for workers in recent years are also rapidly increasing, so we think the cross-border flows there may be a two-way causal relationship between employment and wages. In addition to the fact that cross-border migrant employment can improve workers' income, some workers with higher incomes may choose to reflect their value through cross-border employment. Another possibility is that young workers choose cross-border migrant employment out of curiosity and longing for foreign employment. In addition, there are also family factors or other unobservable factors that affect the cross-border flow of workers or traders. These factors are incorporated into the disturbance term and are related to the variable abroad. If that possibility exists, the laborer salary income value is adopted to directly cross-border flow of virtual variable regression can lead to estimates of endogenous errors, to deal with this problem, the strategy of this paper is to search instrumental variables for cross-border flow variables, the following we discuss how to cross-border variables abroad to choose the appropriate tool.

B. Selection and Test of Instrumental Variables

Based on the endogenous of cross-border flow variables and labor wage income, we selected two instrumental variables for cross-border flow variables. The first instrumental variable come from the answer of questionnaire "Do people in your village go to other places to do business/work?". We used the dummy variable social to measure respondents' answers to this question. When respondents chose no, the variable social was 0. When respondents choose yes, the variable social was 1. We know that China is a typical relational society, and social network plays an important role in daily life. In particular, in the labor market, social network can deliver employment information, promote the allocation between labor force and employment position, and thus help workers find better jobs (Zhang Yuan, Lu Ming, 2009). Therefore, we think that migrant workers which live in the same village make a social network. Based on the above analysis, we choose the variable social as the instrumental variable of cross-border flow variable, and we expect that the variable "whether someone in the village goes out for business/work" has a positive effect on cross-border flow employment. The second instrumental variable is the answer to the respondents' home place in the questionnaire. According to the statistical results, we use the variable census register to mark the origin of the respondents' household registration. "Census register=1, 2 and 3" respectively indicate that the respondents' home place is tengchong city, malipo county and maguan county in yunnan province. As early as the

Qin dynasties, there appeared an ancient "southern silk road" that led to the foreign territory. This ancient road roughly included starting from Chengdu today to Kunming, Dali and baoshan, climbing over Gaoligong Mountain and passing through tengchong to Myanmar, India and Afghanistan. Compared with other regions, the population along the ancient Silk Road has stronger motivation to engage in cross-border migrant work or business due to the long-term influence of business atmosphere. Thus we make census register variables as a tool for measuring the second variable of cross-border flows.

Next, we present the above two tool variables as "IV1" and "IV2", and perform the first-phase regression test on the tool variables. "Table III" reports the results of the first-phase OLS regression.

TABLE III. IMPACT OF INSTRUMENTAL VARIABLES ON CROSS-BORDER FLOWS (ABROAD)

Variables	Regression coefficient
Social(IV1)	0.2052*** (0.0473)
Census register(IV2)	-0.4696*** (0.0615)
sex	0.0892** (0.0404)
age	0.4374*** (0.1133)
age2	-0.06*** (0.0167)
edu	0.0094 (0.0074)
nation	-0.0457*** (0.021)
b_income	0.088** (0.0347)
number	493
R square	0.4361
F-statistics	87.51***

a. Note: the bracket is the standard error of estimation;***, ** and * respectively indicate that the estimated coefficients are significant at the significance level of 1%, 5% and 10%.

From the first stage of the regression results in "Table III", we find the instrumental variable social and census register's regression coefficients were significant under 1% level, the social relation network proxy variables of social influence on cross-border flows significantly positive, same as we expected. The regression coefficient of the household registration variable census register is significantly negative, indicating that regions with smaller household registration variable value tend to be more inclined to cross-border flow. According to the setting of the household registration variable in this paper, we can conclude that the migrant workers in tengchong area of Yunnan province are more willing to work in cross-border flow, which is closely related to the ancient Silk Road in this area. In addition, the F test value of the combined significance of the first-stage regression results was 93.14, which was significant at the 1% level. According to rule proposed by Stock and Staiger (1997), if the F statistic of the first stage regression is greater than 10, the original hypothesis of "the existence of weak instrumental variables" can be rejected, and the problem

of weak instrumental variables need not be worried. Based on the robustness consideration, we also used the "biased" method proposed by shea (1997) and the "Cragg-Donald Wald F" systematic measurement method proposed by Stock and Yogo (2005) to carry out the weak instrumental variable test on the instrumental variables social and census register, the results prove that there is no problem of weak instrumental variables in this paper.

C. Two-stage Least Squares Regression Results

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The two-stage least squares regression using instrumental variable method is premised on the existence of endogenous explanatory variables. In the previous analysis, we searched for two instrumental variables for cross-border flow variable abroad. The two-stage least squares regression is shown as follows and the regression results are shown in "Table IV".

TABLE IV. IMPACTS OF CROSS-BORDER MIGRANT EMPLOYMENT ON WORKERS' WAGE LEVEL (2SLS REGRESSION)

	Model 3
abroad	0.57*** (0.1554)
sex	0.0749 (0.0404)
age	-0.3769*** (0.1824)
age2	0.0532*** (0.0263)
edu	0.0091 (0.0074)
nation	-0.0014 (0.0264)
b_income	0.07485 (0.0511)
number	493
R square	0.1587
χ^2 -statistics	86.62***

a. Note: the bracket is the standard error of estimation;***, ** and * respectively indicate that the estimated coefficients are significant at the significance level of 1%, 5% and 10%.

From "Table IV" we discuss the impact of cross-border migrant employment on labor wage level in detail on the regression results. The regression coefficient of variable abroad is 0.57, indicating that the wage level of cross-border migrant workers is significantly higher than that of non-cross-border migrant workers by 57 percent. The coefficient of the variable sex is 0.0749, which indicates that in the migrant labor market, the salary of men is 7.49% higher than that of women. The coefficient of age is significantly negative, indicating that the salary level of migrant workers is negatively correlated with age, and the income level of the younger workers is higher. In addition, both the education level and the per capita income before the migration of migrant workers are positively correlated with the wage level, while the wage level of ethnic

minorities is lower than that of the Han nationality in the migrant labor market.

IV. CONCLUSION

Since the beginning of the 21st century, a new trend has emerged in the scale of migrant employment in border areas, and a large number of working-age people have begun to choose cross-border migrant employment. Economic factors are one of the important factors driving these workers to choose employment outside the country. Based on the micro household survey data in the border area of Yunnan province, this paper studies the effect of cross-border migrant employment on the labor wage level. Empirical studies show that the individual's cross-border flow behavior is endogenous. Taking the household registration of respondents and whether there are people in the same area (villages) to do business or work in other places as the instrumental variable, we adopted the two-stage least squares estimation and found that cross-border migrant employment can increase the wage level of migrant workers by 57% compared with other forms of migrant employment. The results were still significant on the basis of controlling for age, sex, education, ethnicity and income level before the outflow.

Therefore, we have the following policy implications from the study results: first, strengthen the management of population outflow and inflow in border areas, and improve the supply capacity of diversified service management for cross-border migrant employment. With the help of "The Belt and Road" construction and a new round of western development strategy, the economic and social development of border ethnic regions should be accelerated to avoid the sparsity of population in border regions. Second, adopt a variety of measures to improve the cultural quality of the population in border areas. Although the level of education for the floating population over 15 years old in China's border areas increased from 2011 to 2015, the population with the education level of junior middle school and below is still the majority in general. The average years of education receiving in our survey samples are 7.23 years. Low education level enables cross-border migrant workers to find jobs only in low-skilled labor-intensive industries, which in the long run will adversely affect the improvement of workers' income level. On the one hand, the government can adopt a variety of training methods, such as community culture education, enterprise and public institution training and evening university training, to meet the needs of the development of border areas for the cultural quality of laborers. On the other hand, preferential policies can be introduced to attract the population with higher cultural quality to the border area, providing an intellectual engine for the population employment in the border area. Third, we should attach importance to border employment and increase employment opportunities in border areas. According to the advantages of border trade in border areas, various industrial projects such as border trade, border characteristic industries and border tourism should be developed to provide employment opportunities. The government can reduce the threshold for cross-border employment and entrepreneurship by providing such preferential measures as micro-loans, tax reduction and employment guidance. Fourth, the mainland's

qualified enterprises are encouraged to invest or open branches in the border areas. While promoting the social and economic development of border areas, the protection of resources and environment in border areas should be strengthened to maintain the sustainable development of population, resources and environment in border areas.

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