Spatial Analysis of the Return location of Migrant Workers—Case Study on 12 Villages in Henan Province, China

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Abstract: In the process of rapid industrialization and urbanization, the phenomenon of migrant workers' return accompanied its flow is attracting more and more attention of scholars. Based on the sampling data of 529 migrant workers' return questionnaires, statistical analysis and binary logistic model were used to analyze the return location choice and influencing factors of migrant workers. The study found that the village, the local township and the local county seat are the main choices for the inter-provincial migrant workers of return location. The local township and the local county seat are also the preferred locations for migrant workers to return to business, while in the city and other city are less migrant workers. The main mechanism for the choice of migrant workers of return location is the balance between the family and the economic benefits. The main factors affecting the choice of rural migrant workers' return location are the age of migrant workers, the number of primary and secondary school students, the number of migrant workers, and the per capita cultivated area. The mobility and return of migrant workers are actually the location choices and changes of migrant workers in geospatial space, which depends on the sticky size of different locations.

Key words: Return location, spatial analysis, migrant workers, circulation migration.

1. Introduction

In the process of urbanization and industrialization in China, the employment of rural laborers out of their hometown has been accompanied by a large amount of returnees. This has caused great concern of economists and sociologists [1]. In particular, affected by the global financial crisis in 2008, China's economic growth slowed down, the unemployment rate surged, and a large number of migrant workers were forced to return home. Related research has increased since 2009. In recent years, with the region transfer of industries in China, economic restructuring, and the development of the economy in the central and western regions, the return of migrant workers has continued to increase, and research on return has also become a focus of scholars' attention. At present,

domestic related research mainly focuses on the status and characteristics of the return [2], motivation [1], influencing factors [3], and economic and social impacts [4]. Return and flow are the two most basic ways for the spatial mobility of migrant workers. The related theories about the return of migrant workers in China also use foreign research results because the flow itself implicitly explains the return [1, 5, 6], such as Lewis's dual economic theory, Stark's New Economic Theory of Transition, Todaro's Expected Earnings Theory, Life Cycle Theory, Hepper's "Push and Pull" Theory, Structuralism Theory, Human Capital Theory, etc. At the same time, according to China's national conditions, scholars have also analyzed the mechanism and theoretical framework of migrant workers' return from institutionalism, cost-benefit, housekeeping, push-pull, etc., and generally believe that household registration system [7], economic policy [8], and social security [9],

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employment, income status [3], social capital and social network [10], migrant workers' individual factors and human capital [3], family factors [11] are important factors affecting the return of migrant workers. In the return effect, both positive and negative effects coexist [7], but mostly are negative selection [12]. Some scholars believe that the return will help the conversion of China's dual economic structure [13], but should be cautious about migrant workers' returning to business [12].

The international study of return migration has a long history and there are many documents. However, unlike the domestic ones, most of the returning immigrants are international immigrants, and there are few studies on return migration among various regions in one country. The earliest research on return migration was the study of Ravenstein in 1885. He discussed Counters Streams. Before the 1960s, there was very little international literature on return migration, but by the 1970s, the literature began to increase. The main cause is the economic recovery in the world. The research content of the earlier period mainly included spatial classification and time classification of the return [14, 15], talent return [16], return migration on regional development [17]and influencing factors [15, 18]. In recent years, the influencing factors of return migration [19] and its social effects [20, 21], regional and occupational choices after returning [22], return of skilled workers, and talent return [23] remain concerns. In terms of influencing factors, human capital [22], marriage, family and lifestyle [19], psychological and social factors [24], life cycle [25], connection with home country [26], unemployment, etc. are considered to have a significant impact on return migration. Some scholars believe that returning to the local area is more for agriculture, while returning to other places for more non-agricultural industries [22]. For returnees, some scholars believe that it is negative selection results [19] and bring negative impacts [27], but the other case studies show that return flow may also be

the result of positive selection [28]. Returnees are more likely to be entrepreneurs [20] brought back technology and savings [21].

The above results have provided important implications for this study, but there are few research results on the return location status of inter-provincial migrant workers. The study on the return location is not only an important part of understanding the spatial mobility of migrant workers, but also of great significance to formulate relevant policies in practice for the return area. This article will mainly focus on this issue in terms of return location distribution and influencing factors. In addition, in view of the current unrecognized concept of the returnees of migrant workers, this article defines the returners of migrant workers as: migrant workers (peasants going out to the other province for more than 6 months) return to their province and last for 6 months.

2. Sources of Data, Sample Profiles and Research Methods

2.1 Sources of Data

The data used by this research comes from the return survey of migrant workers organized by the author. The survey content mainly includes the situation of the migrant workers themselves and their families, the work places and types of migrant workers, the types of industries, income, the causes of return, the selection of return sites, and the production and business after returning. The survey methods were questionnaires for migrant workers and in-depth interviews with village officials. Among them, questionnaires were completed through questionnaires design, trial surveys, and questionnaire revisions. Investigators, a total of 12 people, came from the University of Henan University of Economics and Law. The graduate students and undergraduates were rigorously trained before the survey. The survey time is during the Spring Festival in 2014. A total of 12 villages were surveyed. They were selected taking into account terrain topography, suburban areas, economic

development levels, and distribution of migrant workers. The distribution of the sample village was more scattered in Henan Province and basically represented the overall return situation of migrant workers. After the survey, the questionnaires were entered and summarized. After eliminating individual invalid questionnaires, a database of 529 samples and 55 attributes per sample was formed. This database became the basis for this study.

2.2 Selection of the Sample Area

This article takes Henan Province as a case study region. Henan Province, located in central China, is the birthplace of ancient Yellow River civilization. Its superior geographical environment has made it one of the regions with the highest population density in China. In 2014, the population of Henan Province reached 94.13 million, accounting for 7% of the country's total [29], ranking third in the country. Although Guangdong Province is the largest populous province in China, it is largely due to population input. However, the population of Henan Province has only a small input population. On the contrary, the study area of Henan Province, has long been China's most important labor force export area. Migrant workers are generally maintained at around 10% of the country. Henan is located in the hinterland of the Central Plains and is the most important hub area for railway transportation and highway transportation in China. The convenient external transportation makes migrant workers widely distributes throughout the country. The southern coast, the eastern coast, the northern coast, the western area and the surrounding areas all become the work destination of migrant workers in Henan Province. All in all, the large number and widespread distribution of migrant workers in Henan Province have strong representation in China.

2.3 Sample Profiles

Among all the samples, there were 353 males, accounting for 66.7%, and 176 females, accounting

for 33.3%. The male-dominated characteristics were basically the same as the overall composition of migrant workers, showing the randomness of the returnees. From an age point of view, the migrant workers' proportion of below the age of 20, 21 to 30, 31 to 40, 41 to 50, 51 to 60, and over the age of 60 are 4.0%, 30.2%, 22.3%, 28.4%, 12.5%, 2.6% respectively, showing the characteristics of distributed in the older age range. In terms of education level, the number of illiterate, elementary school, junior high school, senior high school and above are 9, 175, 284, and 61 respectively, showing the characteristics of distributed in primary school and junior high school, which are basically the same as the education level of the overall migrant workers. The work time of migrant workers is relatively long, with an average of 8.3 years, of which 241 persons are for working ages below 5 years, accounting for 45.6% of the total; 155 persons for 5 to 10 years, accounting for 29.3%; 94 persons for 10 to 20 years, accounting for 17.8%; only 39 persons over 20 years, accounting for 7.4%. The work site is relatively scattered, distributed in 25 provinces and regions, but mainly in Henan, Guangdong, Beijing, Zhejiang, Shanghai, Shandong, Jiangsu, accounting for 76% of the total.

2.4 Binary Logistic Regression Model

This model is a typical log-linear model. It is widely used to analyze the nonlinear relationship between explanatory variables and the probability of occurrence events by regression, and the probability of the presenting state for different combinations on interpretation variable value, and the probability of occurrence or not for an event under certain conditions [30].

If $X = (X_1, X_2, \cdots, X_{P-1})^T$ indicates the factors that influence the probability of occurrence of event A, $P(x)$ indicates the probability of occurrence of event A. Let F be a linear function $F(X_1, X_2, \cdots X_{P-1}) = \beta_0 + \beta_1 X_1 + \cdots + \beta_{P-1} X_{P-1}$, thus

$$P(x) = \frac{\exp(\beta_0 + \sum_{k=1}^{p-1} \beta_k X_k)}{1 + \exp(\beta_0 + \sum_{k=1}^{p-1} \beta_k X_k)} \qquad (1)$$

Eq. (1) is called the binary logistic regression model, which can directly calculate the probability of the occurrence of event A. The coefficients in the model are estimated using the maximum likelihood parameter estimation.

3. The Characteristics of Return Location of Migrant Workers

The village, the local township and the local county town are the main choices for the return of inter-provincial migrant workers. The administrative scope of the return region of the inter-provincial migrant workers mainly includes the village, the township (except the village), the county (except the township), the city (except the county), and the foreign city. According to the survey statistics, in these five types of regions, the village, the local township and the local county town have become the first choice for migrant workers. Among all the samples, 153 people returned to the village, accounting for 28.9% of the total sample, and 173 returned to the township, accounting for 32.7%, and 157 returned to the county (including 148 people in the county seat), accounting for 29.7%. The total of the three accounts for 91.3% of the total sample, and the return location shows a high degree of concentration. In addition, only 20 people returned to the city, accounting for 3.8%, and 26 people returned to the other cities,

accounting for 4.9% (Table 1).

The main reason for the township town and the county town to become the preferred location for returnees is that these two points location can realize the long-cherished wish of "leaving land without countryside" of migrant workers. First of all, in terms of spatial distance, townships and county seats are closer to the village where migrant workers are located. Among them, the average distance between townships and villages is 5.3 km, and the average distance between county towns and villages is 12.6 km. Due to the close proximity, the disruption of social networks caused by migrant workers going out to work has ceased to exist, and the social capital they own will continue to play a role in the development of non-agricultural industries. Especially for the convenience of caring for family members, such as children, the elderly, spouses. Family social relations have not been broken due to working in non-agricultural industries. In fact, the migrant workers' behavior of Chinese migrant workers follows a basic law, that is, the balance between increasing income and the family care. Returning to the village, the local township and the local county town solve the problem of the family care well. Moreover, it has basic conditions for engaging in non-agricultural industries in local towns and local county seat. As the central place of the rural area, the county town and township have the basic functions of providing services to their hinterland, and gather a large number of tertiary industries, which can carry more industrial population and labor. At the same time, under the impetus of industrial transfer and county economic development, many towns and county seats

Table 1   Return location of migrant workers.

Location	People (person)	Proportion (%)	Cumulative proportion (%)
Village	153	28.92	28.92
Local township	173	32.70	61.62
Within, the township government seat	113	21.36	
Local county	157	29.68	91.30
Within, local county seat	148	27.98	
Local city	20	3.78	95.08
Other city	26	4.91	100.00

have increasingly enhanced the functions of the secondary industry. Some industrial clusters have been well developed, enterprises have increased, and employment capacity has been improved.

The village is the "root" of migrant workers, and is the starting point and returning place for migrant workers' space activities. Most of the migrant workers returning to the village are permanently returnee, mainly including older people and those with physical ill. According to the survey statistics, the older workers are likely to be unable to meet the high-intensity work. Therefore, they choose to return to the village to engage in relatively easy farm work. This part of the migrant workers is 104, accounting for 19.7% of the total sample surveyed. Some workers have long been tired and have to return to the local area to recuperate, instead of going out to work. This part of the migrant workers is 27, accounting for 5.1%.

The local township and the local county seat have become the preferred location for migrant workers. After long-term hard work, migrant workers have accumulated a certain amount of funds, and human capital has also been upgraded to a certain extent, and then started an undertaking, mainly to open a shop for small business. According to the survey statistics, there are 121 such entrepreneurs, accounting for 22.9% of all returnees. Due to the small internal consumer market in the village, these entrepreneurial activities are rarely carried out in the village. There are almost no choices for entrepreneurial locations outside the county and outside the city. The reasons are mainly related to the distance from home or the lack of social capital. Most of these entrepreneurial activities are chosen in the local township or the local county seat, because it overcomes the above two shortcomings, enabling entrepreneurial activities to be carried out and achieving reasonable profits. But in general, such entrepreneurs are a minority, and the economic activities they engaged in are small and limited in scope.

There are fewer migrant workers in this city (except the local county) and outside the city. The two together accounted for 8.7% of the returnees of migrant workers. Only 20 cases were returned to the other county, accounting for 3.8% of the total sample, which may be related to special social relations or the ability of the county to provide jobs. 26 cases returned to other city, accounting for 4.9% of the total number of samples, mainly because they can find jobs in other city, and the income is high, and there is no burden at home.

4. Analysis of Influencing Factors

4.1 Variable Design

The return of migrant workers is an important phenomenon accompanying the movement of migrant workers and is the result of the combined effects of various factors. From a microscopic point of view, to obtain the jobs in the local recognized by the migrant workers themselves, work stability and wage income are key factors in determining the return. The individual characteristics and family characteristics of migrant workers affect their own mobility and judgment on job satisfaction, which are important factors influencing return decision-making. The status of the former work (such as job type, income, distance, working environment) is the basis factor of the decision-making of the return, and the difference between the state and the expected state of labor is an important basis for the comparison choice of migrant workers. As a source and a return convergence of migrant workers, villages play an important role in the judgment on their income, household management, satisfaction, etc., directly affecting the formulation of return decision-making. Therefore, based on the microscopic perspective, this paper selects four factors including individual factors, family factors, village factors and work factors for analysis. Previous empirical research on the factors of returning to decision-making of rural migrant workers has also

focused on the age, gender, education level, marital status, household registration nature, per capita arable land area, out-of-flow time, and relative income level factor [12, 31]. In addition, the role of family characteristics in the return of migrant workers is also of interest to sociologists and economists. Among the various influencing factors, individual factors include the gender, age, marital status, and years of education of migrant workers. Family factors include the total family population, the number of primary and secondary school students in the family, the intergenerational quantity of the family, the number of children in the family, the number of migrant workers in the family, and the number of elderly in the family. The village factors include the per capita net income of the village peasants, the per capita arable land area, and the economic status in the village, the village topography, and the distance from the nearest city. The factors of work place include factors such as the type of work, the location of the work, and the environmental pollution of the work company. The assignment and meaning of these impact factors are shown in Table 2.

4.2 Regression Analysis of the Factors Affecting the Return of Migrant Workers

Based on the existing theory and research literature, this paper establishes a binary logistic regression model of the factors affecting the return of migrant workers, and uses SPSS19.0 statistical software to estimate the model parameters by the maximum likelihood method. The regression analysis results are shown in Table 3. Among them, the dependent variable is defined as: the return of migrant workers to the local county is 1, and the return to the outside local county is 0.

It can be seen from Table 3 that the age of migrant workers, the number of primary and secondary school students in the family, the number of migrant workers in the family, and the per capita cultivated land area have reached a significant level.

Among the individual variables, the age of migrant workers has reached a significant level, indicating that the age is an important factor affecting the choice of migrant workers' return location. The regression coefficient of the age of migrant workers is positive, indicating that the older migrant workers tend to return to the local area, while the younger migrant workers tend to work in the field. According to the family life cycle theory, family members of different ages in different family life cycles have different family responsibilities and social division of labor. When migrant workers are in the family growth period and family maturity, the younger is less responsible for family responsibilities, individuals are more independent, and most want to urban environment, as well as seek a stimulating and challenging life and in higher employment wages in economically developed areas, so there is a higher probability of returning to foreign cities. Among them, the elderly migrant workers have to take care of young children and support the old. Their family burden is relatively heavy. Therefore, there is a high probability of returning to the local to care for the family or farming. The regression coefficient of the age of migrant workers is positive, which may also mean the negative flow of migrant workers' return, that is, the migrant workers returning to the county are more incompetent or unsuitable for working outside the province. So, the local probability of the elders is greater. In fact, with the increase of age and the decline in physical fitness, returning to the local area has become the majority choice for migrant workers. Under normal circumstances, when the age of migrant workers is about 50 years old, the probability of returning to the local area is significantly increased.

Among the household variables, the number of primary and secondary school students in the family and the number of migrant workers in the family have reached a significant level. The number of primary and secondary school students in the family is significantly positively correlated with the return

Table 2   Variables design.

Indicator	Code	Variables	Assignment/Unit	Meaning
Personal variables	X_1	Gender	Male 1; Female 0	Migrant worker's own gender.
	X_2	Age	Actual age/year	Actual age of migrant workers at the time of the survey.
	X_3	Years of education	Actual value	Years of education of migrant workers themselves received.
	X_4	Marriage	Yes 1; No 0	The marital status of the migrant worker himself during the survey.
Family variables	X_5	Total family size	Actual population/person	Actual population of migrant workers during the survey.
	X_6	The number of primary and secondary school students in the family	Actual value/person	The actual number of primary and middle school students in the migrant workers' family during the survey.
	X_7	Intergenerational number of the family	Actual value/generation	How many generations consists of the family.
	X_8	Number of children in the family	Actual value/person	Number of children under 7 years old in the family of migrant workers.
	X_9	Number of migrant workers in the family	Actual value/person	The number of healthy migrant workers in the family: male aged 16 to 60 years old, and females aged 16 to 55 years old.
	X_{10}	Number of elderly people in the family	Actual value/person	The number of males over 60 years old and female over 55 years old.
Village variables	X_{11}	Per capita cultivated land area	Actual value/0.0667 hm^2	Equals the total cultivated land area of the family divided by the total population of the family.
	X_{12}	The economic status in the village	Very good 1; Better 2; Medium 3; Poor 4; Very poor 5	Relative economic level of migrant workers' families in the village.
	X_{13}	The per capita net income of village peasants	Actual value/¥	Equal to the total net income of the village divided by the total population of the village.
	X_{14}	Village topography	Plain and basin 1; Hills 2; Mountain 3	Classification of terrain ruggedness of villages where migrant workers are located.
	X_{15}	Distance from the nearest city	Actual value/km	Distance from the village where the migrant worker is located to the nearest city.
Work variables	X_{16}	Work location	Central 1; Eastern 2; West 3	Geographical zone of migrant workers' destinations.
	X_{17}	The environmental pollution situation of the work company	Not 0; Lighter 1; Moderate 2; Heavier 3; Serious 4	Environmental pollution of migrant worker's work company before returning.
	X_{18}	Classification of the types of work	The classification of the work according to the goodness[1]	The occupational work type that the migrant workers mainly engaged in before returning.

Table 3   Model calculation results.

Variables	Regression coefficient	Standard error	Statistic	DF	P	Exp (B)
Constant	-3.061	1.841	2.765	1	0.096	0.047
X_1	0.041	0.381	0.012	1	0.913	1.042
X_2	0.059	0.024	6.034	1	0.014**	1.060
X_3	0.146	0.101	2.098	1	0.148	1.158
X_4	0.129	0.536	0.058	1	0.810	1.138
X_5	0.303	0.245	1.539	1	0.215	1.354

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[1] Cleaners are 1; Manual labor-based factory workers and construction workers are 2; Salespersons are 3; Technicians with a skill are 4; Business-oriented bosses are 5.

Table 3 to be continued

X_6	0.409	0.211	3.764	1	0.052*	1.505
X_7	0.410	0.453	0.821	1	0.365	1.507
X_8	0.565	0.405	1.943	1	0.163	1.759
X_9	-0.818	0.246	11.025	1	0.001***	0.441
X_{10}	-0.179	0.315	0.325	1	0.568	0.836
X_{11}	1.587	0.473	11.246	1	0.001***	4.888
X_{12}	0.288	0.241	1.424	1	0.233	1.334
X_{13}	0.001	0.001	0.720	1	0.396	1.000
X_{14}	0.443	0.319	1.920	1	0.166	1.557
X_{15}	0.002	0.004	0.209	1	0.647	1.002
X_{16}	-0.499	0.331	2.274	1	0.132	0.607
X_{17}	0.083	0.238	0.122	1	0.727	1.087
X_{18}	-0.071	0.130	0.302	1	0.583	0.931

Note: ***, **, and * represent significant correlations at the 0.01, 0.05, and 0.1 levels respectively.

location of migrant workers, indicating that the more the number of primary and secondary school students in migrant families, the greater the probability that migrant workers choose to return to the local area. From the cross statistics of the number of primary and secondary school students in the family and the return location of migrant workers, it can be seen that the proportion with one primary and middle school students in the family is 87%, with 2 to 3 students in the family is 95%, and more than 3 students in the family is 100%. For the large number of primary and secondary school students, migrant workers have to face the burden of caring for students and counseling students, so they are more inclined to return to the local. The number of family migrant workers is significantly negatively correlated with the return location, indicating that the greater the number of migrant workers in the family, the lower the probability of returning to the local area, and the greater the probability of working in the field. This is because families with more labor can share the pressure of the family. Migrant workers have fewer burdens to take care of the family and handle the daily affairs of the family. Therefore, they can choose to work in cities with higher incomes and more employment opportunities for a long time. The employment mechanism of Chinese migrant workers actually depends on the balance between the income of work and the family care, and with the family care as the premise and basic options. That is, the migrant workers are mainly to increase household income and make up for the deficit in household income and expenditure. When family members have needs, migrant workers will choose to return to the local area.

In the village variables, the per capita arable land area reached a significant level. The per capita arable land area is significantly positively correlated with the return location, indicating that the larger the per capita arable land area of the farmers is, the more they tend to return to the local area. This is because cultivated land is the foundation of farmers and the main material basis for farmers to survive and earn economic income. The larger the area of cultivated land, the greater the total output of agricultural products, and the greater the income of the agricultural industry. On the contrary, if the area of cultivated land is smaller, the basic survival of farmers is not guaranteed, and migrant workers are unwilling to return to the local farming. The position of migrant workers in space depends on the comparison of the push and pulls forces of different locations. If the local pull increases, the migrant workers will choose to work and live locally, that is, return to the local. On the contrary, if the local pull is reduced and the external pull is increased, the migrant workers will not choose to return to the local area and choose the field.

This kind of pulling force is mainly reflected in the economic aspect, followed by the family care.

5. Conclusion

With the adjustment and change of China's regional economic structure, the spatial distribution pattern of inter-provincial migrant workers is undergoing important changes. Return has become an important process for the flow of migrant workers. Carrying out relevant research has important practical significance for understanding the spatial mobility mechanism of migrant workers. Based on the data of 529 migrant workers' return questionnaires obtained from sample surveys, the statistical analysis and binary logistic model were used to study the return location selection and influencing factors of migrant workers. The following conclusions can be drawn.

First, the village, the local township and the local county seat have become the main choices for the inter-provincial migrant workers returnees. The local township and the local county seat have also become the preferred location for migrant workers to return to business, while the local city and the other city have fewer migrant workers. On the whole, the return of migrant workers is dominated by negative choices, and the proportion of positive choices and entrepreneurial choices is small. The main mechanism for the selection of return location is the balance between the family care and the economic benefits. The township and county economy should be vigorously developed, making it the main carrier for the peasants to leave the agriculture without leaving the hometown, and fundamentally solve the problem of surplus labor transfer.

Second, the main factors affecting the choice of migrant workers' return location are the age of migrant workers, the number of primary and secondary school students, the number of migrant workers, and the per capita cultivated area. Among them, the age, the number of primary and secondary school students, the per capita arable land area and the

reflow location showed a significant positive correlation. The number of migrant workers of a family showed a significant negative correlation. The mobility and return of migrant workers are actually the choice and change of migrant workers in space. It depends on the sticky size of different locations. If the local viscosity increases, migrant workers will choose to work and live locally, that is, return to local.

Acknowledgements

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