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Analysis of Willingness and Influences for Preventive Resettlement in China-------The Three Gorges Reservoir Case

Zijiang Hu[1] and Guoqing Shi[2]
[1]Nanjing University of Finance and Economics, Nanjing, China
[2]Hohai University, Nanjing, China

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Abstract. In this paper, the formation mechanism of population migration dynamics is analyzed based on the "Push-pull Theory". Combining with the case study of preventive resettlement in the Three Gorges Reservoir Area, the influencing variables of migration intention are determined. The logistic regression model was used to analyze the migration intention, and the important influencing factors were obtained from the positive and negative correlative factors. The conclusion of the analysis has great significance for improving the effectiveness of the implementation of disaster-avoidance migrants.

Preventive resettlement is the resettlement of all or part of the residents living in disaster-prone areas before disasters occur, which will prevent other risk reduction measures and reconstruction activities from failing at great cost to lives and property. Preventive resettlement is a preventive immigration, which essentially emphasizes "Immigration Due to Danger".

The motivation and willingness of population transfer has always been an important subject in demography, economics and sociology. New School of Migration Economics believes that immigration is a rational choice[1,2]. It regards the family rather than the individual as the main body in pursuit of maximization of income. The value judgment factor centered on the family plays the most important role, followed by cost-benefit factor and non-cost-benefit factor. Because migrants have different willingness to migrate, their families, resources, social and economic conditions are different, and their needs are different in migration direction, resettlement mode, housing reconstruction, production and life recovery. If these problems are not handled properly in the process of resettlement, the effectiveness of disaster-avoidance migrants and the realization of their goals will be directly affected[3].

The Formation Mechanism of Population Migration Willingness Motivation

The development of things is a process, and all phenomena in nature, human society and the field of thinking develop forward as a process. If the motive force of development is external factors, it can only change the position and form of things, but not directly affect the structure and attributes of things. Internal factors are the necessary and sufficient conditions for things to change. According to the push-pull theory of population migration, population migration is caused by a series of "forces", including the push to force a person to leave his original place of residence, the pull to attract him to another place of residence, and the resistance in the process of migration. Thrust is the natural, economic and social pressure that forces people to move out. The pull force is the natural, economic and social motive force that attracts residents to move in. Resistance factors mainly include distance factors, material factors and differences in language and culture, as well as the value judgment of immigrants themselves on these factors. Population migration is the result of the combination of push factors, pull factors and resistance factors.

For preventive resettlement, such as disasters threaten the safety of people's lives and property, they constitute the objective conditions and external motivations for immigration. Potential risk factors of natural disasters and adverse social-economic conditions in population migration areas (such as lack of natural resources, poor living environment, low employment opportunities, low income, low level of social security, lack of cultural life, etc.) form the driving force of population

self-relocation. Because of the safety of natural environment, the living standard of production can be improved. The excellent social and economic conditions (such as employment, old-age security, medical security, education, conversion from agriculture to non-identity, etc.) form the pull force of the population willing to transfer outward. In order to promote risk-averse relocation, the government provides resettlement and compensation policies, which give impetus to population migration. However, under the push-pull force of this population transfer, there is another intermediate obstacle force that cannot be ignored. It is called resistance or exclusion force, which is mainly embodied in migrants' perception of disaster risk determines their choice of relocation intention; in disaster-risk areas, there are still a large number of laborers working in cities, who are free from rural areas and cities, and have not yet realized the real meaning of population transfer; The resettlement of migrants involves many problems, such as the restriction of land and its system, the limited capacity of absorbing population in cities and towns, the high cost of living in cities and towns, the weak competitiveness of transferring population in employment, the lack of rational guidance in population transfer, the obstacles of household registration system and the low level of social security etc. At the same time, in terms of internal factors of population transfer, the quality of the migrant family population is suitable for the livelihood skills of the new residence. Satisfaction of migration demands and protection of migrants' rights and interests are the main reasons for migration resistance or exclusion. Based on this analysis and reasoning, in this paper, the formation mechanism of migration dynamics of preventive resettlement is established as shown in figure 1.

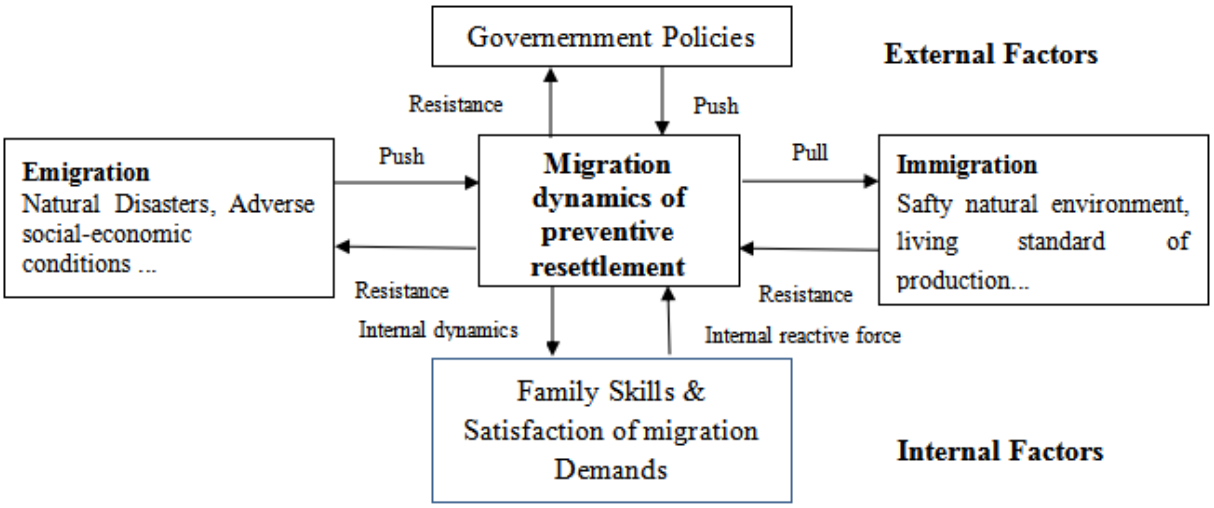

Figure 1. Formation mechanism of migration dynamics

When push-pull force is greater than resistance force, population migration will be effectively implemented. The resistance factors will be solved well, to make them into the motive force of migration, so as to urge migrants to produce strong subjective motive force of migration out of their yearning for the safety of life and property and the development of future families.

Sample Analysis of Migration Intention

Based on the dynamic mechanism of population migration willingness, this paper is in accordance with the investigation and analysis of population migration willingness of geological hazards in the Three Gorges Reservoir Area in Zigui County, Hubei Province. The survey covers the regional characteristics of villages and towns, the household situation of farmers (age of the head of the household, physical condition, etc.), the family situation (number of family population, number of children, number of elderly population, annual per capita income, income source situation, etc.), the original living situation (original housing location, area, distance from the township, scale of the original place of residence), landslide awareness, social security and willingness to migrate, etc. According to the principle of random sampling, the rural households in Shazhenxi and Guojiaba,

subordinate to Zigui County, were surveyed and interviewed by sampling questionnaires. 209 samples from 47 households were sampled.

The analysis shows that: ① There is a general willingness to evade danger and move, and a total of 44 households expressed willingness and indifference, accounting for 93.61%; Thirty-seven of them offered to relocate voluntarily if the policy was appropriate; Thirty-five households (74.46%) were willing to move to county towns. ② In terms of the willingness of house compensation, 30 households (63.82%) were selected according to the area, structure and unified standard of housing. ③ In terms of housing resettlement willingness, the majority of households choose to build affordable housing centrally, with 27 households (57.44%) purchasing according to policy, followed by direct subsidies for purchasing houses and self-purchasing, with 14 households (29.78%). ④ In terms of employment and placement, government placement of jobs (16 households, 34.04%) and self-employment (15 households, 31.91%) are generally chosen. ⑤ Among the main concerns of migration, 33 households were most worried that they could not afford to buy houses in cities and towns, while 21 households were worried that losing land would reduce their income. ⑥ Thirty households were willing to withdraw from the contracted land and accounted for 63.82%; In land and woodland disposal, eighteen households (38.29%) were generally willing to pay production and resettlement fees to the collective after demolition, and thirteen households (27.65%) who demolished their houses and handed them over to the collective after land compensation according to area. ⑦ In terms of policy security, 34 households, accounting for 72.34%, pay more attention to the old-age insurance. ⑧ In skills training, 28 households, accounting for 59.57%, paid most attention to practical technology.

Analysis of the Influencing Factors of Migration Intention

Logistic Regression Model

Logistic regression is a probabilistic non-linear regression model, which is a multivariate analysis method to study the relationship between classification observation results and its influencing factors. Linear representation of muti-variables in logistic regression model:

$$p(y=1/x_1,x_2....x_k)=\frac{1}{1+e^{-(\beta_0+\beta_1x_1+...+\beta_kx_k)}} \tag{1}$$

$$In[p/(1-p)]=\beta_0+\beta_1x_1+\beta_2x_2+.....+\beta_kx_k \tag{2}$$

For the relocation of preventive resettlement, in the formula (1): *P* indicates probability of willingness to move, βis regression coefficient, βk indicates regression coefficient of the k-th influencing factor, x_k is the k-th independent variable, and k indicates number of influencing factors. Among:

β0 is a constant term, influenced by factors of independent variable X_K

βk=0, indicates that P is independent of the variable x_k, and migration willingness is not determined by the X_K factor;

βk>0, indicates that P is related to variable x_k, and variable X_K is the positive factor of migration willingness.

βk<0, indicates that P is related to variable x_k, variable X_K is the negative factor of migration willingness.

Calculate the OR value of the link strength index between descriptive factors and migration willingness, as shown in formula (3)

$$OR=e^{\beta_k} \tag{3}$$

Migration Intention Affects Variable Settings

According to the characteristics of the survey sample, the variables affecting the migration willingness of preventive resettlement are divided into six categories. There are 15 input variables as shown in table 1. Let Y be the output variable, Y=1 indicates willing to migrate, Y=0 indicates reluctance to move or indifference.

Table 1. Variables affecting the migration willingness of preventive resettlement

Willingness of preventive resettlement		Two-valued Description
Effecting Factor	Variable	1=willing; 0=unwilling, not care
Migrant Individual	age	1=0~35; 2=36~45; 3=46~55; 4=56~90
	physical condition	1=good; 2=common; 3=bad
Migrant Family	family population	Continuous variable: 1~8
	number of children	Continuous variable: 0~3
	number of elderly population,	Continuous variable: 0~3
	annual per capita net income	1=<5 000; 2=≥5 000~15 000; 3=≥15 000
	income source	1=Agricultre; 2=Other
Original Living Conditions	original housing location	1=Far away; 2=Nearly; 3=On landslide
	original housing area	Continuous variable: 40~400
	distance from original residence to town	Continuous variable: 1~40
	scale of original residence	Continuous variable: 1~70
Cognitive of Landslide Risk	understanding of landslide measures	1=yes; 2=no
	high-risk land no-tillage area	Continuous variable: 0~15
Social Security	pension insurance participation Status	1=no; 2=yes
	Medical Insurance Participation	1=no; 2=yes

Logistic Regression Analysis of Samples

The classical Logistic regression model is used to analyze the subjective and objective factors affecting the willingness of population migration, and the conclusion of the influence degree of various factors on the willingness of population migration is obtained, so as to provide reference for the implementation of decision-making and the establishment of resettlement planning for preventive resettlement. In this paper, the significance of logistic regression coefficient for 47 samples of family migration intention is analyzed by using SPSS 16.0[8], as shown in Table 2.

Table 2. The result of sample analysis

	Variable	B	S.E,	Wals	df	Sig.	Exp (B)
Model1	Age	-1.076	0.051	12.202	1	0.000	0.279
	physical condition	1.565	0.172	0.233	1	0.963	0.972
	family population	-0.985	1.480	1.800	1	0.016	-0.081
	number of children	1.751	0.468	3.734	1	0.092	0.054
	number of elderly population	0.018	0.012	0.615	1	0.033	0.099
	annual per capita net income	-0.027	1.005	0.077	1	0.081	-0.131
	income source	-4.662	1.803	6.688	1	0.015	-0.257
	original housing location	0.732	0.441	18.647	1	0.000	1.869
	original housing area	-1.414	1.056	3.943	1	0.032	0.543
	distance from original residence to town	1.169	1.150	0.022	1	0.203	0.144
	scale of original residence	-0.374	0.157	4.889	1	0.039	0.854
	understandingof landslide measures	-0.399	0.311	0.887	1	0.012	0.775
	high-risk land no-tillage area	1.576	0.403	12.288	1	0.000	2.089
	pension insurance participation	2.377	1.626	2.137	1	0.014	0.323
	Medical Insurance Participation	1.620	0.839	1.731	1	0.000	3.189
	Constant	-7.363	2.486	8.694	1	.101	0.001
...		…					
Model2	Age	-1.116	0.224	21.232	1	0.000	0.311
	number of children	1.564	0.223	4.265	1	0.000	4.658
	number of elderly population	-0.526	0.243	24.54	1	0.024	0.546
	original housing location	0.523	0.103	25.932	1	0.000	1.668
	original housing area	-1.099	0.462	5.833	1	0.016	0.327
	scale of original residence	-0.231	0.089	6.831	1	0.009	0.795
	understandingof landslide measures	-0.544	0.457	1.662	1	0.000	0.571
	high-risk land no-tillage area	1.275	0.285	15.806	1	0.000	3.254
	medical insurance participation	1.024	0.714	2.364	1	0.000	2.784
	Constant	-4.589	1.845	6.546	1	0.000	0.003

Note:S.E---standard errors, df---DOF, Sig---P

In order to eliminate the multiple collinearity of variables, Wald test is used to eliminate variables that do not meet the requirements of regression equation until all variables in the regression equation have passed the significance test.

Model 1 introduced these independent variables (such as age, physical condition, family population, number of children, number of elderly population, annual per capita net income, income source, original housing location, original housing area, distance from original residence to township, scale of original residence, understanding of landslide response measures, high-risk land no-tillage area, pension insurance participation Status, Medical Insurance Participation) into the model for significance test according to 95% confidence level. SPSS 16.0 will gradually eliminate variables that have not passed the significance test in subsequent calculations. After six stages of logistic analysis, the data in model 2 are finally obtained. The probability P value (Sig.) of significance test of regression coefficients of all variables is less than 5% significant level.

The calculation results of the measurement model are analyzed. Nine variables including age, number of children, number of elderly population, location of original housing, area of original housing, scale of original land, understanding of landslide response measures, area of high-risk land no-tillage and medical insurance participation finally passed the 5% significance level test. Among them, age, the number of the elderly population, the area of the original housing, the scale of the original place, and whether to understand the landslide response measures are negatively correlated with the willingness of migrants to avoid disasters. There was a positive correlation between the

number of children, the location of the original housing, the area of high-risk land, the participation of medical insurance and the willingness of migrants to avoid disasters.

Analytical Review

The Influence of Individual Factors of Immigration. The age variable of the head of household passed the significance level test of 1%. If the coefficient is negative, it shows that the older the head of household is, the smaller the willingness to migrate is. The main reason is that because the head of the household is too old, his physical condition is not as good as that of the young and middle-aged, his physical strength and energy are relatively high for relocation, and his enthusiasm for relocation is not very high. The willingness of preventive resettlement has little relationship with the variables of the head of household's physical condition.

The Impact of Migrant Family Factors. ①Family population variables fail to pass the significance level test of model 2, which shows that the number of family population has little effect on migration intention. The reason may be that peasant households are represented by the head of the household, which is easy to coordinate and unify. The rest of the family members do not have too many opinions and follow the decision of the head of household. Therefore, the number of the family population is not enough to have a great impact on the willingness of migrants. ② Quantitative variables of children passed the significance level test of model 2 and were positively correlated. It shows that the higher the proportion of children in families, the stronger the willingness of family migrants to avoid disasters, which is mainly due to the relatively backward configuration of software and hardware and the low level of education in rural schools in China. As parents, they prefer their children to receive a good education and change their future destiny. For long-term consideration, families with a large number of children have a higher willingness to migrate; ③ The number of elderly population variables passed the 5% significance level test, which was negatively correlated with the willingness of immigrants. For each additional elderly population in the family, the proportion of willingness of preventive resettlement decreased by 54.6%. The main reason is that the old population has relatively low acceptance of new things and new environment, weak adaptability, loss of agricultural production capacity and limited economic income; In addition, homeland inseparability is also an important reason for reluctance to take the risk of immigration in later years. ④ The annual per capita income and income source variables failed to pass the significance level test. The main reason lies in the low income level of farmers. Although the degree of dependence on land may be high, the desire to be compensated by the migrants to avoid disasters encourages them to increase their willingness. Farmers with relatively stable income may not rely on land to a high degree, the main source of income has been transferred to non-agricultural income, and they are more adaptable to the market, in this case, the willingness of immigrants will not be greatly affected.

Influences of Factors of Original Living Conditions. ① The original housing location passed the significance test of 1% level. Peasant households living on landslides have the strongest willingness to relocate. The main reason lies in the risk of landslides, which may damage people's lives and property at any time, and cause great psychological pressure to people; ② The original residential housing area variable passed the significance test of 5% level of model 1 and model 2, and was negatively correlated with migration intention; Immigrants with large housing area and good structure are not willing enough because they are unwilling to abandon their existing fixed assets and fear that they will not have enough confidence in the recovery of production and living standards after the relocation, the greater the loss caused by house demolition, the lower the willingness of migrants to move; ③ The distance between the original residence and the township did not pass the significance level test. The main reason is that the residence of sample households is not far from the township, so it does not affect their willingness to migrate; ④ The scale of original residence was passed by 1% significance test, which is negatively correlated with immigration intention. This shows that the large-scale peasant households in their original residence are relatively concentrated in physical capital, social capital and human capital, and their production and living costs are relatively low. Their willingness to migrate is not strong enough. On the

contrary, the willingness to relocate of households with dispersed residence increases by 79.5% with the decrease of one unit.

Impact of Cognitive Factors of Landslide Risk Avoidance. ① Whether the variables of landslide response measures are understood have passed the 1% significance level test, which shows that farmers who have a better understanding of landslide disaster and response measures pay more attention to the safety of life and property, and have strong subjective initiative, which is higher than those farmers who do not know enough about the relocation intention; ② The stopping farming area variable of high-risk land passed the 1% significance level test, and was positively correlated with the willingness of preventive resettlement, the willingness of migrants to avoid disasters will increase by 3.25 times with the increase of no-tillage area per unit, the more abandoned farmland, the more risk estimates farmers have, the stronger their willingness to relocate.

The Influence of Social Security Factors. The variables of medical insurance participation passed the 1% significance test, which showed that on the basis of other conditions, farmers participating in medical insurance had higher willingness to avoid disasters. Because the economic burden of disease is more terrible than that of old people, the medical conditions in rural areas are backward, the medical environment in cities and towns is relatively good, and the farmers participating in medical insurance enjoy basic social security and have been trusted, so the willingness of immigrants will be stronger.

Conclusion

A conclusion can be drawn from the comprehensive analysis: these factors such as age, the number of elderly population, the area of original residential buildings, the scale of original places, whether to understand the landslide response measures and the willingness of migrants to avoid disasters have a negative impact, while the number of children, the location of original housing, the area of high-risk land, the participation of medical insurance and the willingness of migrants to avoid disasters have a positive impact. In order to ensure the development of disaster-avoiding migrants, the scope and object of disaster-avoiding migrants should be defined according to the factors such as individual migrants, their families and their places of origin, and reasonable compensation standards should be set. When it comes to the cost of migration, the government should take active measures to expand the channels of funds to solve the difficult problems of migration. According to the primary and secondary factors affecting willingness, relocation can be carried out in stages, aiming at the poor living environment, low level of risk awareness and poor housing area, minority immigrants move out first; for the relatively good other conditions, the migrants who live in concentrated areas should carry out follow-up relocation and formulate a good resettlement plan for migrants. In addition, it is necessary to strengthen the wide publicity of disaster-avoidance immigration policies and establish a smooth communication and feedback mechanism.

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