An Empirical Research on Influential Factors in Poverty of Peasant Households in Minority Regions in China

--- Based on Survey in 541 Peasant Households in Poverty-stricken Minority Counties in Sichuan Province

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This research was financed by the national social sciences foundation item "survey and evaluation of poverty and anti-poverty in Southwestern poverty-stricken minority counties" (Project No. 09XM008, 2009-2011) and Sichuan Agricultural University211 engineering Phase Ⅲ construction project and the major program of Department of Education in Sichuan Province "research on the vulnerability of peasant households in Minority Regions in Sichuan Province".

Abstract

Based on the data of survey in peasant households in poverty-stricken minority counties in Sichuan Province by the authors, this article is going to employ the Probit Regression Model and make an empirical analysis in influential factors in poverty of peasant households in minority regions from the three aspects of peasant household environmental characteristics, family characteristics and policy system. It is indicated by the result that, the factors of human capital and national policy system have significant influences upon poverty of peasant households, such as, educational level of family members, healthy condition and outside labor service, etc.; natural disaster and adverse topographic conditions are the important influential factors in poverty of peasant households.

Keywords: Minority region, Poverty of peasant household, Influential factors, Probit model

1. Introduction

The issue of poverty is one of the primary obstacles to establish a harmonious society in China and is an important root cause for social instability at present in China, while the issue of poverty in minority regions in China seems especially outstanding. Although the Communist Party of China and the Central Government attach

great importance to poverty issue in rural areas of minority regions, have offered organized, planned and large-scale rural poverty alleviation development ever since the middle of 80s in the Twentieth Century, and have carried out quite a lot of tendentious and favorable policies and measures in minority regions, a great deal of impoverished population is still centralized in minority areas in China. According to analysis of the monitoring result about rural poverty in national autonomous areas by the State Ethnic Affairs Commission, impoverished rural population in national autonomous areas by the end of 2008 had reached 21.02 million and the impoverishment rate was 17.6%. Given the proportion of the nationwide population of the same condition, rural impoverished population in ethnic minority areas accounts for 52.3% of the total rural impoverished population (40.07 million), and the impoverishment rate is 13.4 percent higher than the national average level (4.2%). (Note 1) Thus, an analysis of decisive factors that influence poverty of peasant households in ethnic minority areas and confirmation of the major obstacles that constrain poverty relieve has quite important realistic significance to resolve poverty alleviation issue in ethnic minority areas.

Causes for poverty in ethnic minority areas are complicated, including the overall influences of physical geography, social history and internal and external factors, all these factors interact with each other (Yang Minghong & Wang Yongli, 2005). Other domestic academics also hold similar viewpoints. Zhou Yi (1998) thought that cultural lag was one of the root causes for poverty in ethnic minority areas. Some negative aspects in traditional culture in minority nationality have effects on rural poverty in Yunnan minority nationality that can't be neglected, such as the concepts and customs of ignorance of knowledge and earlier marriage and more births (Li Guohe, 2003). Human capital issue (Jun Feng, 2004) and geographical environmental factors (Wei Zhong & Gustafson, 2000) were also believed to be important influential factors in poverty of minority nationality. From an overall perspective, Zhang Junpu (2008) thought, physical environment, institutional factors, local culture of poverty and generally low quality of peasants all had profound influences upon poverty in Northwestern minority areas. Tong Yufen and Wang Haixia (2006) analyzed reasons for poverty of minority nationality areas from the perspective of anthropogenic factors, such as, regional development, social justice, policy effect as well as impoverishment population.

It has been reviewed, there has been a lot of literature studying influential factors in rural poverty in minority regions, but most are qualitative analysis and descriptive research which concentrates on analysis of causes for regional poverty at a macro level, nevertheless there are only a few standardized empirical researches based on micro survey data. Since the feature of rural poverty has transited gradually from regional and global poverty to dispersive and individual poverty, focus on rural poverty has also switched to the micro level of livelihood of peasant households (Xie Dongmei, 2009). Thus, on the basis of the data survey in peasant households in poverty-stricken minority regions in Sichuan Province made by the authors, this article is going to employ Probit Model to conduct a quantitative research on influential factors in rural poverty of minority regions at a micro level and confirm the important factors that cause poverty of peasant households, which is helpful for the government to accordingly carry out policies to help peasant households to get rid of poverty and improve poverty alleviation effect.

2. Research hypothesis

Based on relevant studies both at home and abroad and on the survey made by the authors in the 541 peasant households in poverty-stricken minority counties in Sichuan Province, this article summarizes factors that affect poverty of peasant households into three major categories, namely, peasant household environment characteristics, peasant household family characteristics and policy system characteristics. Therewith, three major research hypotheses are proposed.

2.1 Peasant household environment characteristics has effects upon poverty

Environment characteristics of peasant households mainly includes production environment and living environment, such as, terrain, geographical position, natural disaster and resource condition, etc. in villages where peasant households reside. Theory of natural resource scarcity indicates that natural condition and geographical condition in villages are one of the primary causes for poverty. Generally speaking, impoverishment rate of peasant households living in mountainous areas is higher, whereas impoverishment rate of peasant households living in plain and hill areas is relatively low; the closer the distance from towns, the wider the channels of peasant households to undertake other industries and have access to information and the higher the income, and the lower the probability of being trapped in poverty. Natural disaster always accompanies with poverty and is positively correlated with it. Frequent occurrence of natural disasters does harm to agricultural development and is also the important root cause for rural poverty (Wang Guomin, 2005). Thus, this study assumes that terrain and geographical position of the place where peasant households live has effects

upon poverty of peasant households and natural disaster is positively correlated with rural poverty of peasant households.

2.2 Peasant household family characteristics has effects upon poverty

Peasant household family characteristics refers to information about the size and quality of population of peasant households, indicating ability of labor force in the family to acquire income and the condition of burden, mainly including family size, educational background, religious belief, health condition, outside labor service and skill training, etc. Under the circumstance of established restraint of external environment, family characteristics has significant influences upon poverty of peasant households (Yang Guotao, et al, 2010). It is generally believed, the large the family size of peasant households, the higher the probability to be trapped in poverty. Health condition of rural residents is negatively correlated with the impoverishment rate of individual poverty (Wang Guoxiang, 2007). Religion has important effects upon economic activities and behavioral choice of minority families. Excessive religious consumption in minority families restrains improvement of their re-production capacity and living condition, which may result in increased impoverishment rate. A significant negative correlation exists between education and rural poverty, so improving educational condition of peasant households may reduce probability of being trapped in poverty (Liu Xiuyan, 2007). Skill training can improve agricultural technology of peasant households and increase agricultural income; it may also enhance non-agricultural employment skills of peasant households and increase non-agricultural income. Outside labor service can obviously increase family income of peasant households and is helpful to reduce impoverishment rate. Hence, this study presupposes family size of peasant households, health condition and religious belief have positive effect on rural poverty, while educational background of peasant households, outside labor service and skill training have negative effect on rural poverty.

2.3 Policy system characteristics has effects upon poverty

Policy system mainly includes the two major aspects of social security system and poverty alleviation policy. Quite a lot of studies prove that policy system is an important factor that affects rural poverty in China (Xun Jianli, 2002; Cao Fang, 2004; Guo Jiang, 2007). How social security system and poverty alleviation policy are put into practice and carried out can affect poverty situation of peasant households. It was also discovered in the survey, some local governments deviated from their original direction in the process of carrying out some poverty alleviation policies. Or rather, means and methods of implementation of policies also have effects upon poverty situation of peasant households. Therefore, this study assumes that, the more complete the social security system, the more in place the implementation of poverty alleviation policy and the lower the probability of being trapped in poverty.

3. Source of data and specification of variables

3.1 Source of data

Data in this paper was derived from the questionnaire survey for the subject of the national social sciences foundation item “survey and evaluation of poverty and anti-poverty in Southwestern poverty-stricken minority counties”. This survey mainly selected as the sample regions (counties) nationwide poverty-stricken counties in the three prefectures and cities of Sichuan Province where minority nationalities gather together and employed the stratified random sampling method to decide peasant households. Based on the interview method, first of all, the authors communicated with village cadres to have a basic idea of the basic situations of economic development and income sources of peasant households. Then, they divided peasant households into the major three categories of low income family, medium income family and high income family. Finally, the authors made a random sampling in each category to make the sample cover families with different income conditions. In the survey, altogether 554 questionnaires were sent out, and got 541 effective questionnaires after rejecting those questionnaires with inconsistent content or blanks, an efficiency rate of 97.65%. The distribution of effective sample regions is shown as in Table 1. Since poverty-stricken counties in Liangshan Prefecture occupy a higher proportion all over the country, authors selected more samples in Liangshan Prefecture.

Insert Table 1 Here

3.2 Basic situation of the samples

This paper divided peasant households into poverty-stricken family and non-poverty-stricken family according to the new division standard of the poverty line ---1196 Yuan--- in Chinese rural areas. Net per capita income was based on the data about net per capita income of peasant households in 2009. It is indicated from the survey data, there are 392 families with a net per capita income below 1196 Yuan, accounting for 72.46% of all samples, signifying that 72.46% of peasant households are under poverty. In the following, the authors are going to make

a comparison between the family characteristics and environment characteristics of poverty-stricken families and non-poverty-stricken families.

Insert Table 2 Here

3.2.1 Family characteristics of peasant households and poverty of peasant households

From Table 2, it can be found by a comparison between family characteristics of poverty-stricken households and non-poverty-stricken households, there is no distinct difference in terms of the age and gender of the head of the households. However, the average educational degree of the labor force in non-poverty-stricken households is obviously higher than that in poverty-stricken households. In the mean time, the proportion of those with good health condition in non-poverty stricken households is higher than that in poverty-stricken households, and the proportion of poverty-stricken households with critical disease or physical disability is far higher than that in non-poverty-stricken households. Furthermore, the proportion of poverty-stricken households that participate in skill training is obviously higher than that of non-poverty-stricken households, but the proportion of both that don't participate in skill training is also up to 65% and above. It is indicated in statistic data about the reasons for not participating in skill training, a large majority of peasant households think that they have not accepted any corresponding training. Thus, skill training organized and developed in minority areas is still flimsy. In addition, the proportion of outside labor force and religious belief has no distinct difference.

3.2.2 Environment characteristics of peasant households and poverty of peasant households

From Table 3, it can be seen that the proportion of poverty-stricken households living in mountainous areas is obviously higher than the proportion of non-poverty-stricken households, which corresponds with the regional distribution of common poverty-stricken households. As for the variable whether there is a natural disaster, both non-poverty-stricken households and poverty-stricken households have a high proportion (above 75%). Thus, it can be seen, the natural environment in minority areas is atrocious and the natural disaster peasant households suffer from is serious. As for the variable of access of highway, both of poverty-stricken households and non-poverty-stricken households have a high proportion, which indicates that the government has attached great importance to construction of infrastructure in minority areas and has achieved benign effects.

Insert Table 3 Here

To take into an overall consideration of the comparative analysis, it can be seen, compared with non-poverty-stricken peasant households, poverty-stricken households have the typical characteristics of bad terrain condition, low cultural background, poor health condition and few opportunities to take part in skill training, etc.

3.3 Specification of variables

1). Explained variable: whether peasant households are under poverty. This paper employs the income method to measure poverty, which is a generally used poverty measurement method in a large majority of countries at present. Chinese government also employs this method to confirm poverty-stricken families and influential factors in the process of poverty alleviation. The authors classify all samples into the two major categories of poverty and non-poverty according to the standard of net per capita income of 1196 Yuan in 2009, respectively with an assignment of 1 and 0.

2). Explanatory variable. Based on the above research and analysis, please see Table 4 for definition of explanatory variable and statistic description of variable.

Insert Table 4 Here

4. Analysis and discussion of empirical results

4.1 Selection of the model

This paper takes the variable whether peasant households are impoverished as a dependent variable. Since this variable belongs to a binary variable and most independent variables are discrete data, probability model is the most optimal estimation method. Generally used probability models include Logit, Tobit and Probit, etc. Referring to similar research experiences, this paper selects the general Probit model to analyze influential factors for peasant households to fall into poverty. The specific form of the model is as following:

$$poverty = \alpha + \beta X + \mu \quad (1)$$

And

$$Poverty = \begin{cases} 1, \text{ When Income <1196, peasant households are impoverished} \\ 0, \text{ When Income } \geq 1196, \text{ peasant households are not impoverished} \end{cases} \quad (2)$$

In Formula (1), μ is a disturbance term, subject to the standard normal distribution. Thus, the binary discrete selection model that affects poverty of peasant households can be signified as following:

$$\begin{aligned} & prob(poverty = 1 | X = x) = prob(income < 1196 | x) = prob[\mu > -(\alpha + \beta x) | x] \\ & = 1 - \Phi[-(\alpha + \beta x)] = \Phi(\alpha + \beta x) \end{aligned} \quad (3)$$

In Formula (3), Φ is the standard normal cumulative distribution function, with values ranging from 0 to 1 that is strictly defined. Supposed whether the ith peasant household is impoverished is determined by net per capita income, which in turn is determined by explanatory variables. When Poverty =1, the ith peasant household is a poverty-stricken household (Income <1196); when Poverty =0, the ith peasant household is not a poverty-stricken household (Income ≥1196).

4.2 Estimation results and discussion

This paper employs Eview6.0, adopts the maximum likelihood estimation method to make estimation on the model and uses White Test Equation to rectify the heteroskedasticity. Estimation results are shown in Table 5. Model Ⅰ is the result of the first estimation, while Model Ⅱ is the result of another estimation after rejecting explanatory variables that have little correlation with explained variables.

Insert Table 5 Here

From the estimation results of the model, it can be seen that both Model Ⅰ and Model Ⅱ pass the significance test of likelihood ratio. In the meanwhile, as for the cross sectional data, it is acceptable for R^2 to respectively attain the value of 0.432 and 0.433. Generally speaking, the effect of model fitting is perfect, the test result has a statistic significance and the direction of functioning by all variables on poverty almost coincides with the theoretical anticipation. It can also be seen that the test value of Model Ⅱ is superior to the test value of Model Ⅰ. Thus, quantitative analysis is mainly made in Model Ⅱ. According to the estimation result of Model Ⅱ, we can get the following specific analysis:

4.2.1 Environment characteristics has effects upon poverty of peasant households

Topographic condition and natural disaster factor have positive effects upon poverty of peasant households. If the terrain of a village passes the significance test and is significant at the level of 1%, then its coefficent is positive. According to estimation results, peasant households living in mountainous areas are more likely to fall into poverty, which coincides with what has been anticipated. Influence of the variable of natural disaster on poverty of peasant households is significant at the level of 5% and its coefficient is positive. Thus, it can be seen, the possibility of peasant households who suffer from natural disasters falling into poverty is greater. Low-income peasant households' living condition is quite flimsy, and are quite likely to fall into poverty or return to poverty under attack of such hazards as natural disaster. However, the disatance from the town and access of highway don't have significant relations with poverty of peasant households, with the possible reason that self-sufficent natural economy is still the primary economy in these areas, while commodity economy is still underdeveloped.

4.2.2 Family characteristics has effects upon poverty of peasant households

(1) Outside labor service is significant at the level of 5%, and its estimation coefficient is negative. At present, non-agricultural income has become an important channel for peasants to increase their income. Outside labor service is a primary source for non-agricultural income, and the more family members in peasant households for outside labor service and the longer the time of outside labor service, the higher the net per capita income of the household and the smaller the possibility to fall into poverty. (2) Education length is significant at the level of 10% and its coefficient is negative, which indicates that education level has a positive effect on poverty. Thus, improvement of education level helps to reduce impoverishment rate, which coincides with the theoretical anticipation. Both of the two variables that reflect the health condition of the family members pass the significance test, and the variable of critical disease or disability is significant at the level of 1%. Health condition of family members, especially health condition of major labor force, may have the following two influences upon income of peasant households. On one hand, poor health condition of family members and

impaired major labor force directly affect income of the households. On the other hand, if the health condition of the family members is poor, especially when family members suffer from critical disease or physical disability, those who loss the labor competence not only have no access to obtain income, but also need other family members to take care of them, in addition to a large amount of medical care expense, which may occupy the labor time of other family members and lead to a decline of income. Thus, health condition of family members has a significantly positive effect upon poverty. (3) Effects of family size, religious belief and skill training are not significant. According to empirical analysis, the more the family population size, the more possible it is to fall into poverty (Chen Guangjin, 2008). From the empirical results, this verifies the empricial analysis, but does not have a statistic significance. Effect of religious belief is also not significant, which may be due to the fact that the proportion of families in the survey sample is low that have religious believes and their expense on religious activities is not high. The variable whether family members participate in skill training is not significant to impoverishment rate. Possibly, the proportion of peasant households in the sample regions participating in skill training is low and 69.2% of peasant households interviewed who have accepted skill training think that skill training has not had any help to production and living of the family. This proves that the skill training offered by the government is flimsy and is not able to suit demands of peasant households, so the effect of skill training on poverty is not significant.

4.2.3 Policy system of the nation has effects upon poverty of peasant households

Basically corresponding with what has been anticipated by the authors, policy system factor has significant effects upon decline of the possibility of poverty. (1) Medical care is significant at the level of 5% and medical care has significant influences upon peasant households in minority areas with frequent occurrence of endemic disease and infectious disease to alleviate burden on medical care. (2) Disaster relief and subsidy of poverty alleviation projects are negatively correlated with poverty of peasant households. This variable is significant at the level of 10% and has a negative coefficient. Thus, it is proved that poverty alleviation policy carried out by the country has significant effects on reduction of poverty of peasant households. (3) Effects of new type of rural cooperative medical care system on poverty of peasant households are not significant. This might be due to the fact that this medical security measure is proposed for all sorts of groups, not merely for poverty-stricken families, and its mutual aid feature is not obvious. Thus, this system is still open for further improvement.

5. Conclusions and policy suggestions

5.1 Research conclusions

Based on the survey in the 541 peasant households in poverty-stricken minority counties in Sichuan Province, this paper employs the binary Probit Model regression analysis method to analyze factors that affect poverty of peasant households. Authors get to the following major conclusions:

5.1.1 Policy system factor has significant effects upon decline of possibility of impoverishment among peasant households

Policy supporting and poverty of peasant households have significant negative correlation, which proves that policy supporting helps to reduce impoverishment rate of poverty and improvement of medical security system and poverty alleviation policy system have critical effects on reduction of poverty of peasant households.

5.1.2 Human capital has significant effects upon poverty of peasant households

Education level and outside labor service have negative effects upon poverty of peasant households, which almost coincides with what has been anticipated. Thus, it is proved that education level and outside labor service have important effects on decline of the impoverishment rate of peasant households. However, the health condition is positively correlated with poverty of peasant households, and poor health condition is an important influential factor for poverty of peasant households. Thus, human capital is still a key factor that restrains peasant households from getting rid of poverty.

5.1.3 The terrain of the village and natural disaster will significantly affect poverty of peasant households and the direction of the effects is positive

Adverse topographic condition and frequent natural disaster in minority areas are still important factors that cause poverty of peasant households.

5.2 Policy suggestions

5.2.1 To improve social security and poverty alleviation policy system

On one hand, to strengthen vigor of assistance and social security. As for the particular group of the old, weak, sick and disabled, we should unite all social strength for long term assistance. Meanwhile, we should combine

with poverty alleviation development to make poverty-stricken households both secured and independent. On the other hand, we ought to further carry out the poverty alleviation policy that is for each household in minority areas and provide corresponding poverty alleviation projects for poverty-stricken households. Meanwhile, we should strengthen supervision on use of funds for poverty alleviation and enable poverty-stricken households to really benefit from the policy of poverty alleviation.

5.2.2 To strengthen investment in educational training, improve the competence and quality of peasant households, stimulate transfer of labor force and encourage outside labor force

In addition to insisting on long-term high investment in education and improvement of fundamental education level, we should simultaneously strengthen vocational technical training. In light of flimsy skill training in minority areas for the time being and the situation that the skill training doesn't adapt to demands of peasant households, the government ought to organize more pertinent skill training and make more efforts in improving the quality of skill training. Besides, the government should also direct skilled households to transfer to non-agriculture and eliminate any obstructive factor in the process of transfer.

5.2.3 To rely on the poverty alleviation livelihood project of the government to pay attention to improvement of production and living condition of peasant households and improvement of the ability of peasant households to resist natural disaster

Firstly, for those poverty-stricken households living in mountainous areas and stone mountainous areas with atrocious conditions, we have to concentrate on movement to other places and provide vigorous support to economic development of the movement place for poverty-stricken households' stability. Secondly, we have to intensify living facility, disaster prevention facility and ecological protection facility construction, resolve difficulties of poverty-stricken households in production and living and improve poverty-stricken households' ability to resist natural disasters.

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Note

Note 1. Source of data: Department of Economic Development, the State Ethnic Affairs Commission: "Publicity of rural poverty supervision results in national autonomous areas in 2008 by the State Ethnic Affairs Commission". http://www.seac.gov.cn/gjmw/index.htm.

Table 1. Basic situation of distribution of effective sample regions

Region	**Ngawa Tibetan and Qiang Autonomous Prefecture**		**Liangshan Prefecture**							**Leshan City**	**Total**
	Hei shui County	Xiao jin County	De chang County	Mu li County	Gan luo County	Zhao Jue County	Yan yuan County	Yue xi County	Lei bo County	Ma bian County	
Number of samples	30	102	12	30	24	35	116	88	35	69	**541**

Table 2. Family characteristics of peasant households and proportion of peasant household poverty

Family characteristics of peasant households	***Description***	***Division based on the standard of the fixed poverty line of 1196 Yuan in 2009***			
		Poverty-stricken family (net per capita income<1196)		**Non-poverty-stricken family (net per capita income≥1196)**	
		Number (Person)	**Ratio (%)**	**Number (Person)**	**Ratio (%)**
head of household age (years old)	below 30	36	9.18	13	8.72
	31-45	187	47.7	76	51.01
	45-60	119	30.36	49	32.89
	above 60	50	12.76	11	7.38
gender of head of household	male	356	90.82	137	91.95
	female	36	9.18	12	8.05
average education degree of labor force	illiteracy or semiliterate	128	32.65	31	20.81
	primary school	118	30.10	48	32.21
	junior high school	95	24.23	21	14.09
	senior high school and above	51	13.01	49	32.89
family size	4 and below	177	45.15	86	57.72
	5	104	26.53	33	22.15
	6	77	19.64	18	12.08
	7 and above	34	8.67	12	8.05
outside labor service of the family	none	211	53.83	83	55.70
	1 person	89	22.70	45	30.20
	1 and above	92	23.47	21	14.09
whether accepting skill training	Yes	72	18.37	45	30.20
	No	320	81.63	104	69.80
health condition of family members	healthy	161	41.07	88	59.06
	chronic disease	103	26.28	30	20.13
	critical illness or disability	128	32.65	31	20.80
whether or not religious belief	Yes	129	32.91	51	34.23
	No	263	67.09	98	65.77

Table 3. Environment characteristics of peasant households and proportion of peasant household poverty

Environment characteristics of peasant households	***Description***	***Poverty-stricken family (net per capita income<1196) non-poverty-stricken family (net per capita≥1196)***			
		Number (Person)	**Ratio (%)**	**Number (Person)**	**Ratio (%)**
natural disaster	Yes No	297 95	75.77 24.23	121 28	81.21 18.79
access of highway	Yes No	350 42	89.29 10.71	144 4	96.64 3.36
distance from the town	far close	204 188	52.04 47.96	73 76	48.99 51.01
terrain of the village	mountain area others	312 80	79.59 20.14	47 102	31.54 68.46

Table 4. Variable declaration of the model and statistic description

Name of variables	**Definition of variables**	**Mean vale**	**root-mean-square error**	**Anticipated functioning direction**
Dependent variable				
poverty of peasant households (y)	0=No; 1=Yes	0.728	0.445	
Independent variables				
1. variables of environment characteristics				
terrain of the village (x_1)	0=Others; 1=Mountain area	0.765	0.424	+
distance from the town (x_2)	0= Others ; 1=Below 5 Kms	0.509	0.250	-
access of highway (x_3)	0=No; 1=Yes	0.913	0.283	-
natural disaster (x_4)	0=No; 1=Yes	0.754	0.431	+
2. variables of family characteristics				
family size (x_5)	permanent population (Person)	4.652	1.409	+
education years (x_6)	average education years of labor force (Year)	5.495	3.386	-
religious belief (x_7)	0= No; 1=Yes	0.333	0.472	+
chronic disease (x_8)	Number of family members with chronic disease (Person)	0.268	0.491	+
critical illness or disability (x_9)	Number of family members with critical illness or disability (Person)	0.140	0.411	+
outside labor service (x_{10})	Number of those working outside (Person)	0.176	0.286	-
skill training (x_{11})	Number of those trained for skills (Person)	0.392	0.953	-
3. policy system variables				
medical assistance (x_{12})	0=No; 1=Yes	0.384	0.564	-
new type of rural cooperative medical care system (x_{13})	0=No; 1=Yes	0.809	0.750	-
disaster relief (x_{14})	0=No; 1=Yes	0.532	0.521	-
subsidy of poverty alleviation projects (x_{15})	0=No; 1=Yes	0.238	0.427	-

Note: "+" signifies that explanatory variable has a positive effect upon explained variable; "-" signifies explanatory variable has a negative effect upon explained variable; "+/-" signifies that we have no means to predict the effect.

Table 5. Results of the model estimation

Variables	Model Ⅰ		Model Ⅱ	
	Estimation coefficient	**z statistic**	**Estimation coefficient**	**z statistic**
1. variables of natural environment				
terrain of the village (x_1)	0.411***	2.899	0.417***	2.957
distance from the town (x_2)	-0.114	-0.918	—	—
access of highway (x_3)	-0.227	-1.073	-0.260	-1.240
natural disaster (x_4)	0.238**	1.658	0.273**	1.797
2. variables of family characteristics				
family size (x_5)	0.115	0.702	—	—
education years (x_6)	-0.042*	-1.539	-0.047*	-1.699
religious belief (x_7)	-0.121	-0.823	—	—
chronic disease (x_8)	0.429*	1.948	0.416*	1.871
critical illness or disability (x_9)	0.157***	3.967	0.185***	4.993
outside labor service (x_{10})	-0.154**	-2.288	-0.167**	-2.467
skill training (x_{11})	-0.131	-1.575	—	—
3. policy system variables				
medical assistance (x_{12})	-0.196**	-2.065	-0.232**	-2.362
new type of rural cooperative medical care system (x_{13})	-0.104	-0.513	—	—
disaster relief (x_{14})	-0.193*	-1.920	-0.207*	-1.946
subsidy of poverty alleviation projects (x_{15})	-0.325*	-1.844	-0.319*	-1.723
Log likelihood	-281.826		-284.408	
Pseudo R2	0.432		0.433	
LR chi2(16)	94.17		95.38	
Pr>chi2	0.000		0.000	

Note: *, ** and *** respectively signify significance at the levels of 10%, 5% and 1%.