Influence Factor of Rural-Household Differentiation Behavior in Major Grain-Producing Areas

Lishuang Wang
College of Economics and Management
Shenyang Agricultural University
Shenyang, China
wangls2009@126.com

Zhanxiang Sun
Tillage and Cultivation Research Institute
Liaoning Academy of Agricultural Science
Shenyang, China
libai200008@126.com

Chunping Wang
College of Economics and Management
Shenyang Agricultural University
Shenyang, China
wchp2002@163.com

Wei Ma
College of Economics and Management
Shenyang Agricultural University
Shenyang, China
27125807@qq.com

Abstract—Objective: Using Tieling rural area survey data, this research analyzed empirically the influence factor of rural-household differentiation behavior in major grain-producing areas by Logistic regression model; Methods: Logistic Model; Results: It turned out that the highest culture degree of family members, non-agricultural employment skills, family management cultivated land area, distance to town and village economic level had significant correlation with rural-household differentiation behavior. Based on the above conclusion, the paper suggested that the government should train professional rural household, and promote part-time rural household convert into non-rural household; Conclusion: Develop non-agricultural industries vigorously, strengthen the training of non-agricultural employment skills, improve their non-agricultural employment ability, achieve more transformation of part-time rural household to non-rural household; Improve land circulation system environment, encourage non-rural household transfer land to professional rural household and realize agricultural scale operation.

Keywords-Major Grain-Producing Areas; Rural-Household Differentiation; Behavior; Influence Factor; Logistic Model

I. INTRODUCTION

In the early 1980s, China generally introduced the household contract responsibility system in rural areas. Farmers began to have the autonomy of production and operation, and became the decision-making of labor supply behavior. This small-scale decentralized management brought land fragmentation, and produced some agricultural surplus labor force accompanying the use of agricultural machinery. In order to obtain higher household income, this part surplus labor force began to engage in production activities in the non-agricultural field, and it caused the agricultural income relative decline in the family income. The phenomenon of farmers not only engaging in agricultural production but also engaging in non-agricultural production was known as part-time farming. Rural-household differentiation referred to the pure rural household engaged in agriculture gradually converted into part-time rural household and non-rural household, and formed pure rural household, part-time rural household and non-rural household occurring together.

Regarding the cause of rural-household differentiation, domestic scholars have done related research. Zhaorong Dong (1996) thought that rural-household differentiation influencing factors mainly included rural household operating environment and rural household internal factors[1]. Wenhua Sun (2008) thought that education and age are important factors of rural household human capital which determined different rural household labor opportunity cost difference and differentiation direction[2]. Based on the background of external market and social conditions change Xianbao Li (2013) thought that rural reform had laid a solid foundation, rural factor market gradually perfect had created conditions, and urbanization and industrialization rapidly proceeding provide a means for rural-household differentiation[3]. The research above mostly analyzed rural-household differentiation behavior influence factor from the qualitative perspective, not conducted empirical validation, and especially the research on rural-household differentiation behavior of major grain-producing areas was still in the blank. Therefore, through 220 rural household questionnaire of Tieling, the article had researched tempirically rural-household differentiation behavior influence factor of major grain producing areas, and the purpose is to provide policy suggestions for ensuring national food security and increasing rural household income.

II. DATA SOURCES AND SAMPLE STATISTICS

A. Data Sources

According to different research objects, different scholars had different division for rural household types[4-6]. Refer to the rural household types classification method

of rural fixed watch points, according to the proportion of non-agricultural income in 0-20%, 20%-50%, 50%-80%, 80%-100%, the article divided rural household into pure rural household (including small rural household and professional rural household.), part-time rural household I, part-time rural household II, and non-rural household.

The data was from rural household questionnaire survey of Changtu county Liaoning province during November to December, 2013. Changtu was the national famous large agricultural county, the northeast's largest peanut base, the largest grain production base, livestock and poultry production processing base. In 2012, the land area was 4 million mu, and grain output reached 2.76 billion kg in Changtu. Due to the developed agricultural product processing industry, the rural-household differentiation phenomenon is obvious. The investigation adopted method of questionnaire and interviews, selected four towns, five villages in every town, 12 questionnaires in every village, sent 240 questionnaires, took back 220 effective questionnaires, questionnaire efficient reached 91.67%. The questionnaire content mainly included rural household characteristics, rural household resources allocation, external economic environment, rural household differentiation types.

B. Sample Statistics

The In 220 samples, small rural household was 40 which accounted for 18.18%, professional rural household was 23 which accounted for 10.45%, part-time rural household Iwas 68 which accounted for 30.91%, part-time rural household II was 73 which accounted for 33.18%, non-rural household was 16 which accounted for 7.27%; Householder average age was 47 in which 46～60 years old accounted for 49.09%; Cultural degree of elementary school and junior high school were the vast majority (56.37%); non-agricultural employment skills was 86 which accounted for 39.09%; family labor quantity of 2～3 was 162 which accounted for 73.64%; family cultivated land area of 10～50 mu was 150 which accounted for 68.18%; distance to town of 10～50 km was 127 which accounted for 57.73%; village economic level of 10000～30000 yuan was118 which accounted for 53.64%. The basic situation of rural household sample were shown in table 1.

III. VARIABLE SET AND MODEL BUILDING

A. Variable Set

Based on the existing research[7-10], the independent variables was divided into rural household characteristics, rural household resources allocation, external economic environment, specifically including householder age, the highest culture degree of family members, non-agricultural employment skills, family labor quantity, family cultivated land area, distance to town and village economic level. Rural-household differentiation type "small rural household, professional rural household, part-time rural household I, part-time rural household II, and non-rural household" was the dependent variable, and Logistic regression model was used to quantitative analysis. Variables were defined in table 2.

TABLE 1 RURAL HOUSEHOLD SAMPLE BASIC SITUATION

Variable	Option	Sample	Proportion(%)
Rural household differentiation types	Small rural household	40	18.18
	Professional rural household	23	10.45
	Part-time rural household I	68	30.91
	Part-time rural household II	73	33.18
	Non-rural household	16	7.27
Householder age	Less than 30 years old	23	10.45
	30～45 years old	73	33.18
	46～60 years old	108	49.09
	More than 60 years old	16	7.27
The highest culture degree of family members	Less than primary school	43	19.55
	Primary school	59	26.82
	Junior high school	65	29.55
	More than junior high school	53	24.09
Non-agricultural employment skills	Yes	86	39.09
	No	134	60.91
Family labor quantity	0～1 people	9	4.09
	2～3 people	162	73.64
	More than 3 people	49	22.27
Family cultivated land area	Less than 10 mu	29	13.18
	10～50 mu	150	68.18
	More than 50 mu	21	9.55
Distance to town	Less than 10 km	38	17.27
	10～50km	127	57.73
	More than 50km	55	25.00
Village economic level	Less than 10000 yuan	7	3.18
	10000～30000 yuan	118	53.64
	More than 30000 yuan	95	43.18

B. Model Building

This research adopted Logistic regression model for quantitative analysis rural-household differentiation type selection influencing factors. Rural household characteristics, rural household resources allocation, external economic environment were independent variables, and rural household differentiation types （y） was dependent variable. The function in (1):

y = f (Rural household characteristics, rural household resources allocation, external economic environment) + random perturbed variable   (1)

If rural household chose small rural household or professional rural household or part-time rural household Ior part-time rural household II or and non-rural household, the dependent variable was 1, if not, the dependent variable was 0. The basic form of model was as follows:

$$P(y=1)=\frac{Exp(b_0+b_1x_1+\mathbf{L}+b_jx_j)}{1+Exp(b_0+b_1x_1+\mathbf{L}+b_jx_j)} \quad (2)$$

In (2), the probability of rural household choosing one of the five rural-household differentiation types behavior above was p（y=1）, if not, the probability was $1-p$（y$=0$）; b_0 was constant term; x_j were factors of affecting rural household differentiation behavior; b_j was partial regression coefficient of x_j.

TABLE 2 RURAL-HOUSEHOLD DIFFERENTIATION BEHAVIOR INFLUENCE FACTOR VARIABLES

Category	Variables	Mark	Variable Definition
Rural household differentiation types	Small rural household	y	Yes=1；No=0
	Professional rural household		Yes=1；No=0
	Part-time rural household I		Yes=1；No=0
	Part-time rural household II		Yes=1；No=0
	Non-rural household		Yes=1；No=0
Rural household characteristics	Householder age	x_1	Numeric variables
	The highest culture degree of family members	x_2	Numeric variables
	Non-agricultural employment skills	x_3	Yes=1；No=0
Rural household resources allocation	Family labor quantity	x_4	Numeric variables
	Family cultivated land area	x_5	Numeric variables
External economic environment	Distance to town	X_6	Numeric variables
	Village economic level	X_7	Village family average net income annual

IV. RESULTS AND ANALYSIS

A. Model Run

The article analyzed rural household differentiation behavior related data with Logistic regression model by SPSS16.0 statistical software. It put independent variables into the regression model, and got the non-standard coefficients. The model test result was significant, and it was shown in table 3 and table 4.

B. Results Analysis

1) Rural household characteristics variables

The highest culture degree of family members and non-agricultural employment skills existed significant influence for rural-household differentiation behavior. The higher culture degree of family members, the more possibility of becoming professional rural household, part-time rural household II and non-rural household, the less possibility of becoming small rural household. The reason was that the rural household with higher education had higher ability to accept new things, and had higher success rate of outside employment or development scale agriculture. On

TABLE 3 LOGISTIC MODEL PARAMETER ESTIMATION OF RURAL HOUSEHOLD DIFFERENTIATION TYPE

Variables	Model I small rural household	Model II professional rural household	Model III part-time rural household I
Householder age	0.615(0.234)	0.458(0.143)	0.843(0.182)
The highest culture degree of family members	-1.216*(0.056)	0.683***(0.006)	-1.453(0.246)
Non-agricultural employment skills	-0.427**(0.014)	-1.673(0.176)	1.645(0.168)
Family labor quantity	-1.634(0.138)	0.624(0.269)	0.849(0.163)
Family cultivated land area	-3.416(0.106)	1.726**(0.038)	0.825**(0.027)
Distance to town	1.205(0.241)	1.604(0.216)	2.372(0.318)
Village economic level	-1.652**(0.038)	1.725(0.271)	1.583(0.352)
Constant term	0.753(0.335)	0.981(0.146)	1.275(0.128)
-2Log likelihood	89.625	91.458	89.725
Nagelkerke R^2	0.343	0.328	0.384
Sig.	0.000	0.000	0.000

Notes: *, **, ***are respectively significant under 10%, 5% and 1%levels. The numeric in parentheses is the corresponding P.

TABLE 4 LOGISTIC MODEL PARAMETER ESTIMATION OF RURAL HOUSEHOLD DIFFERENTIATION TYPE

Variables	Model IV part-time rural household II	Model V non-rural household
Householder age	-1.216(0.156)	-1.527(0.227)
The highest culture degree of family members	0.615** (0.034)	0.825**(0.027)
Non-agricultural employment skills	3.416***(0.006)	0.843**(0.036)
Family labor quantity	0.743 (0.162)	0.942(0.157)
Family cultivated land area	-0.472(0.214)	-1.645(0.168)
Distance to town	-1.634***(0.005)	1.453**(0.064)
Village economic level	1.652**(0.038)	1.583**(0.027)
Constant term	0.753(0.335)	1.275(0.128)
-2Log likelihood	91.657	89.567
Nagelkerke R^2	0.382	0.358
Sig.	0.000	0.000

Notes: *, **, ***are respectively significant under 10%, 5% and 1%levels. The numeric in parentheses is the corresponding P.

the contrary, the rural household with lower education depent on the land strongly, and they had no strength to expand land scale because of lacking science and technology knowledge. The higher non-agricultural employment skills, the more possibility of becoming part-time rural household II and non-rural household, the less possibility of becoming small rural household. The reason was that the rural household who had non-agricultural employment skills were more likely to enter the non-agricultural fields and obtain higher income. On the

contrary, the rural household who had no non-agricultural employment skills obtained income from the land, and they had greater reliance on land.

2) Rural household resources allocation variables

Family cultivated land area existed significant influence for rural-household differentiation behavior. The more family cultivated land area, the more possibility of becoming professional rural household, part-time rural household I. Because of cultivated land was the foundation of agricultural production, generally speaking, the more cultivated land area, the more income from agricultural production, the more attention to develop scale effect by land circulation.

3) External economic environment variables

Distance to town and village economic level existed significant influence for rural-household differentiation behavior. The closer distance to town, the more possibility of becoming part-time rural household II, the less possibility of becoming non-rural household. The reason was that the rural household who lived near town had more non-agricultural employment opportunities, at the same time they might be facing the possibility of land expropriation compensation, so although owning stable jobs they were not willing to give up land. The more advanced village economic level, the more possibility of becoming part-time rural household II and non-rural household, the less possibility of becoming small rural household. Developed villages were close to town, or had agricultural products processing enterprises, which could provide employment opportunities for local farmers to engage in non-agricultural jobs.

V. CONCLUSIONS AND IMPLICATIONS

This research adopted Logistic regression model for quantitative analysis rural-household differentiation type selection influencing factors. It turned out that the highest culture degree of family members, non-agricultural employment skills, family cultivated land area, distance to town and village economic level existed significant influence for rural-household differentiation behavior. Among them, the highest culture degree of family members, non-agricultural employment skills, village economic level significant impact on small rural household; the highest culture degree of family members, family cultivated land area significant impact on professional rural household; family cultivated land area significant impact on part-time rural household I; the highest culture degree of family members, non-agricultural employment skills, village economic level significant impact on part-time rural household II; the highest culture degree of family members, non-agricultural employment skills, distance to town and village economic level significant impact on non-rural household.

Based on the above conclusions the article gives the suggestion. Develop non-agricultural industries vigorously, strengthen the training of non-agricultural employment skills, improve their non-agricultural employment ability, achieve more transformation of part-time rural household to non-rural household; Improve land circulation system environment, encourage non-rural household transfer land to professional rural household and realize agricultural scale operation.

REFERENCES

[1] Zhaorong Dong and Changyun.Jiang "Impact of rural-household internal factors on rural-household type selection and differentiation". *Journal of anhui agricultural university (social science edition)*, Jan. 1996, pp.37-40.

[2] Wenhua Sun. "Rural-household differentiation: microscopic mechanism and empirical analysis". Jianghai journal, Apr. 2008, pp.114-119.

[3] Xianbao Li and Qiang Gao. "Behavior logic, differentiation result and development prospects--based on the investigation of rural-household differentiation behavior in China since 1978". *Agricultural economic problems,* Feb. 2013, pp.56-65.

[4] Ge Wei. "Causes and evaluation on formation of concurrent-business farmers in China". *Journal of huazhong university of science and technology (social science edition),* Mar. 1998, pp.65-68.

[5] Xueyi Lu and Houyi Zhang. "Peasant differentiation, problems and countermeasures". *Agricultural economic problems*, Jan. 1990, pp.16-21.

[6] Xiaohuan Yan and Xuexi Huo. "Peasant employment, rural social security and farmland transfer--based on the analysis of 479 farmers in Henan province". *Agricultural technology economy*,Jul. 2013, pp.34-44.

[7] Kechun Liu and Weihua Su. "Rural-household resource endowment, transaction cost and farmland transfer behaviour--based on rural-household survey in Jiangxi province". *Statistical study*, May 2006, pp.73-77.

[8] Taiyang Zhong, Xinjin Huang and Ping Kong. "Research of farmland property rights and rural-household land leasing intention." *China's land science*, vol. 19, Jan. 2005, pp.49-55.

[9] Hengzhou Xu and Shuqin Shi. "Impact of Farmer Differentiation on Farm Households Willingness in Farmland Transference" China population resources and environment, vol. 22, Feb. 2012, pp.90-96.

[10] Tao Li, Yiguang Ye and Wenhua Sun. "Transaction cost analysis of rural collective land ownership circulation". *China's rural economy*, Dec. 2004, pp.10-15.