

An Empirical Study of Factors Influencing the Willingness of Peasant Households for Family Farm Operation——An Analysis based on the Survey of 360 Peasant Households in Hubei

E.Fang. XIAO

Economic and Management School, HuaZhong Agriculture University, Wuhan, China

Economic and Management School, Hubei Engineering University, Xiaogan, China

ABSTRACT: Developing appropriate scale farmland operation is an important way to promote the peasants' income and to realize sustainable development in the rural areas. Based on the theory about returns to scale, the paper constructed a binary logit model to analysis the willingness and influencing factors of peasant households by using the data of 360 peasant households in Hubei. It shows that, about 48.6% peasant households had the willingness to expand the existing land scale and to operate family farms. The willingness was mainly affected by the current occupation of the household, the proportion of non-farm income in the family income, the area of the household contracted farmland, the difficulty to transfer a certain scale land, and whether he had ever rented or agented land from others and etc. Therefore, to promote the development of land scale operation in Hubei's agriculture, we should actively promote the circulation of agricultural land and meanwhile speed up the transfer of rural surplus labor force effectively; and we should push optimization of the allocation of agriculture production factors, so as to achieve long-lasting and efficient use of agricultural land.

KEYWORD: family farms; scale operation; willingness; transfer of agriculture land; influence factors

1 INTRODUCTION

The Household-Responsibility System implemented in rural China in the late 1970s has created great agricultural production performance which amazed the world. However, in recent years, along with the process of industrialization, urbanization and agricultural marketization, a series of problems brought by the small peasant economy under HRS has come into being. Such as land fragmentation, "small peasants" are difficult to butt joint "big market", carbon emissions increased year by year in the countryside, which has severely restricted the increasing of peasants' income, the promotion of agricultural efficiency and the rural sustainable development. As a prevail trend, some agricultural scale management subjects such as family farms realized functional optimization in the evolution of the rural systems by recombination of production factors and optimized configuration, then they had got high attention from governments and academia (Yangfen,2009). The central document NO.1 in 2013 was also made clear that, "We hast uphold the principle of voluntary compensation , guide the rural land contractual management rights orderly transfer , encourage and support the land transfer to professional investors, family farm, farmer cooperatives, and develop various forms of moderate

scale management." Now many research on family farms discussed around the definition and feature (John,1936, Qiang et al.,2013), the development mode and type(Gaofei,2012, Zuhai & Ting, 2013), the mechanism of production and the future direction (Jianhua & Qiao,2013), the performance evaluation and measure(Weijia & Lichun,2009, Yuntao,2009), the influence factor and the determine of scale (Xiwen,2013, Yueming,2006). Some study take the provincial or area as the research scope has also begin to emerge (Kunxiao,2012).Internationally, There were a number of studies around farmland system and the family farm development efficiency(Monika & Leopold,2013,Oduol et al.,2006), the development route, direction and influence factor (Julie,2013,Oszmianska,1997, Balmann et al.,1996), the labor supply and the management decision-making arrangements (Weiss,1999, Awudu et al., 2000) by using the methods of case analysis, econometric analysis and so on. These Means that, the studies root on microscopic perspective are getting more attention; to develop family farms and other forms of scale operation not only has been limited by the regional macro policy environment and the area objective reality, but also has closely related to the micro farmers' operation.

As a national strategy of "central rise" leader, Hubei's agriculture occupies very important strategic position in the provincial economy. However, in recent years, along with the process of industrialization, urbanization and urban-rural integration, a large number of rural surplus labors in Hubei were off to town, many rural began to appear "hollowing out" and "aging", which objectively requires redistribution of the right of using existing farmland. More over, Hubei showed obvious agricultural transformation characteristics, family farms and other new agricultural operation main body has begun to appear, and developed rapidly. According to the 2013 Chinese economic times and countermeasure report: By the end of 2012, only in Wuhan city, Hubei province, there were 167 family farms. Since 2013, the government of Hubei has adopted various policy measures to promote the development of family farms, which lead to the family farms' development more strongly around the whole province. But in the investigations, we found that their development were influenced by farmland scale obviously; and the mechanization of agricultural production and modernization coexist with the loss of arable land, the agricultural production performance declined and the phenomenon such as farmland "abandoned". Therefore, it is necessary to speed up the implementation of family farms and other forms of moderate scale operation in Hubei. The existing practice shows that farmers' willingness is an important prerequisite for scale operation such as family farms(Shasha &Yansui,2011).But this was seldom seen in the existed related literature about family farms, the research about the willingness of Hubei's peasant households for family farm operation was more scarce. In view of this, this study based on the data of Hubei peasant household sample survey viewed labor productivity as the evaluation criteria, combined with the microcosmic individual risk utility theory, to empirical analysis the peasant households' scale operation willingness of family farm and its influencing factors, which has important theoretical significance and practical significance.

2 DATA AND METHOD

2.1 Data

We used data from our survey in Xiantao, Jianli, Hanchuan, Tianmen, Xiaonan, Dawu and other areas in Hubei during March to June 2013. We gathered 360 peasant households' sampling survey data from 21 town 97 village. Firstly, we gave out a total of 402 questionnaires, after rejecting invalid 42 questionnaires, 360 valid questionnaires were recycled, and the effective rate of the questionnaire was 89.55%. Our survey include basic information

of peasant households, the basic production situation, operation willingness of family farms, and influence factors affect the farmers to expand business of family farms, etc. The results of the survey showed that: (1) the aging phenomenon among the agricultural labors was relatively common, 56.1% of the farmers aged 50 or older and the young labors under the age of 40 accounted for only 15.0%. (2) The average total population was 5.13 per household and the average agricultural labor was 1.83 per household. (3) The average agriculture land was 9.1 ha per households and 1.77 ha per people. (4) The annual average income was 11346.27 yuan, and this was higher than the average peasant income around the whole Hubei province in the same period, according to the government net of Hubei, which was 7851.7 yuan. (5) The employment trend was of obvious diversification, and the proportion of non-agricultural income was 74.69% of per households' year income, which means that the farmers' off farm activities was very common. (6)The proportion for the head of households' employment type "mainly in agriculture", "mainly in construction and industrial", and "mainly in business and service sector" was respectively accounted for 61.4%, 25.8% and 12.5%. (7)The small-scale farmers whose farmland area under 5 ha accounted for 34.44%, and 89.17% under 15 acres, while large-scale farmers whose farmland area over 20 ha account for only 5% or so. These means that land fragmentation phenomenon was very serious, while the agriculture seriously lack of scale management. (8) About 48.6% peasant households had the willingness to expand their current land scale, while there was 51.4% peasant households had no willingness to do so or had no care. The detail can be seen in table 1.

Table 1. Structure of the sample households' farmland area

Contracted land area of the family	The number of households	Proportion (%)	Accumulative proportion (%)
0-0.33ha	124	34.44	34.44
0.33-0.67ha	142	39.44	73.89
0.67-1ha	55	15.28	89.17
1-1.33 ha	21	5.83	95.00
More than 1.33ha	18	5.00	100.00
Sum.	360	100	34.44

Source: Authors' own calculations based on 2013 family farm survey.

2.2 Methodology

In view of the discussing above, we choose Logit regression model to analysis the factors influencing the peasant household's willingness to operate family farms, which was widely used in micro econometrics.

Logit regression model is suitable for the dependent variable in the case of classification variables and independent variables can be all qualitative and quantitative variables, or a combination of qualitative and quantitative variables (Taiyang, 2005). According to the definition of Binary logistic regression model, the dependent variable is “willing to expand existing scale and operate family farms or not”, when the peasant household choose “will”, then assign the value “1”; otherwise assign the value “0”. X_1, X_2, \dots, X_n are the factors influence the willingness of peasant households to operate family farms, including the personal qualities, family background, economic characteristics of households, external factors, had ever cultivated land from others or not, etc. Which can be divided 5 classes, a total of 11 variables. Given β_0 is a intercept and $\beta_1, \beta_2, \dots, \beta_n$ are the regression coefficients before factors. After taking logarithm, the linear relation between probability function and each influence factor can be expressed as follows:

$$\text{Logit}f(p) = \ln\left(\frac{f(p)}{1-f(p)}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + \varepsilon$$

Where p represents the probability, which the peasant household who will expand the existing scale and operate family farms. And $f(p)$ is the concrete form for the Logistic regression equation, that's

$$f(p) = \frac{e^p}{1+e^p} = \frac{e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}{1 + e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}$$

The description for each variable is as table 2.

Table 2 Variables in the model

Classification	Variables	Descriptions	Character of variables	Mean	SD
Dependent variable	Y-Do you have the willingness to expand the existing scale and operate family farms?	"1"=Yes; "0"=No	Dummy variable	0.486	0.4998
Personal qualities	X_1 -age (years old)	"1"=20-30; "2"=30-40; "3"=40-50; "4"=50-60; "5"=More than 60	Dummy variable	3.58	1.068
	X_2 -education	"1"= Primary school and below; "2"=Junior high school; "3"=Senior high school; "4"= Junior college; "5"=undergraduate and above	Dummy variable	1.81	0.822
Family background	X_3 -number of labor force	The number of agricultural labor force in the family	Discrete variable	1.83	0.755
	X_4 -total population	Family population	Discrete variable	5.13	2.00
Economic characteristics of households	X_5 -current occupation	"1"= Mainly engaged in agriculture; "2"= Mainly engaged in industry and construction industry; "3"= Mainly engaged in the business and services	Dummy variable	1.51	0.71
	X_6 -the proportion of non-farm income	Proportion of non-farm income of the aggregate income of families	Continuous variable	0.64	0.33
Resource endowment of the farmland	X_7 - The area of the household contracted farmland	The area of the household contracted farmland	Continuous variable	9.10	8.41
	X_8 -the complexity to circulate certain scale farmland	"1"=Very easy; "2"=Easy; "3"=So so; "4"=Difficult; "5"=Very difficult	Dummy variable	3.36	1.11
Other factors	X_9 -Do you had ever rented or agent land from others?	"1"=Yes; "0"=No	Dummy variable	0.46	0.57
	X_{10} - Had your family member ever accepted the professional training or guidance about agricultural technique	"1"=Never; "2"=A little; "3"=A lot	Dummy variable	2.47	0.54

3 RESULTS AND ANALYSIS

3.1 The influence from the peasant household's personal qualities to the scale operation

The peasant households' personal qualities such as age and education, etc. had less significant influence on the willingness for scale operation, and their influence direction were inconformity. Among them, the influence from age was positive, and the older the weaker of willingness because of physical power and vigor. They operate existing small scale farmland just for rations or as pensions. But it is worth mentioning that in the interview we found that young people were also not willing to engage in agriculture for the low income and other causes. These cause us to think a question: “Who will engage in agriculture in the future?” Meanwhile, the influence from education was negative because of the higher of the level of education, the more opportunities to engage in non-agricultural industries, and the lower expected utility to expand the scale and operate family farms, so the more reluctant to expand the existing scale. In view of the rural population in our province generally did not have a high educational level at present, and their education were more concentrated in the junior middle school level and below, so the influence were not too obvious.

3.2 The influence from family background on the willingness to scale operation

Family background factors such as the number of agricultural labor force and the total population in the family had less significant positive influence on the willingness for scale operation. And contrast to the total population in the family (sig.=0.666), the influence from the number of agricultural labor force (sig.=0.182) were more intense. That's mainly because agriculture is an industry based on households in the traditional sense of agriculture, and the peasant households' family background had very important influence on their operation scale. As the saying goes, many people are better for farming! But influenced by the mechanization and modernization in agricultural production and the generalized hired-labor phenomena, the works from the peasant households' background are weakening. At the same time, with the surplus rural labor continuously move into cities and towns, fewer and fewer people are willing to stay in the countryside and engaged in agriculture, so the influence from the actual number of agricultural labor force in the family will be more direct on the willingness of scale operation.

3.3 *The influence from the economic characteristics of peasant households on the willingness to scale operation*

The economic characteristics, such as the current occupation, the proportion of non-farm income in the total household income, both had significant negative effect on the peasant households' scale operation. Among them, the current occupation had significant influence at the level of 5% ($\text{sig.}=0.033<0.05$), and the proportion of non-farm income in the total household income had significant influence at the level of 1% ($\text{sig.}=0.000<0.01$). This is mainly because that the willingness to expand the existing scale and operate family farms will not only be affected by the comparative return between agriculture and non-agricultural industry, but also by the various risk caused by expanding operate scale. As a rational economic man, peasant households are generally risk-averse, who will make rational choice between the utility expectations which obtained from expanding existing scale with larger natural risk, market risk, technology risk and the utility expectations obtained from non-agricultural industries with relatively small risk. So at the present if a peasant who engaged in non-agricultural industries, the more proportion whose non-agricultural income accounted for the whole household income, the lower the utility expectations of expanding scale. Therefore, the less the peasant household will expand scale and operate family farms.

3.4 *The influence from resource endowment of the farmland on the willingness to scale operation*

The area of the household contracted farmland has a positive significant influence on the willingness of farmers to expand scale, and has statistical significance at level of 1% ($\text{sig.}=0.004<0.01$). Under the background that rural land fragmentation in our province, it's very difficult to enhance the unit production of land. So the peasant households had to expand existing scale for a higher return. This has been especially obvious in our province for the land resources in Hubei are very scarce, which is consistent with the theory of scale economies in production theory. Meanwhile, at 5% significance level, the difficulty for the peasant households to transfer a certain scale land to expand existing scale and family farm had significant negative influence on the willingness for scale operation ($\text{sig.}=0.031<0.05$). That's because in order to improve the agricultural comparison income, we have to follow a specialized, standardized and moderate scale road of modern agriculture. And a prerequisite for these is transferring a certain size land and stabilizing the right of farmland in a relatively long period. Therefore, the more difficult to transfer a certain scale farmland, the weaker the willingness of

the peasant households to expand the scale and operate family farms.

3.5 *Other influence factors on the willingness to scale operation*

Besides the above, whether a peasant household had ever rented or agented others' arable land, and whether he had ever accepted the professional training or guidance about agricultural technique, and etc., also had impact on the willingness of peasant household to scale operation. Among them, whether a farmer had ever rented or agented others' farmland had significant positive effect ($\text{sig.}=0.000<0.01$).

That's because generally speaking, the peasant households who had ever rented or agented others' farmland usually had enough agricultural labor and a higher agricultural efficiency per unit area. But the existing land scale is too small, or it is relatively easy to transfer to a certain scale of farmland from others, so they had more willingness to expand scale and operate family farms for higher scale efficiency (Shanlang, 2006). Whether the peasant households had received professional training had positive influence on the willingness for scale operation, but it's not very significant at the level of 5%. That's because receiving professional training can enhance the peasants' encourage, skills and experience, and then promote the efficiency improvement of agricultural scale operation. But in reality, peasants in our province rarely accepted professional agricultural training, even so, the effect of the training will be at a discount greatly due to their own qualities and other reasons, so although the peasants who had received professional training would have more potential and willingness to expand the operation scale, but there was no strong relationship between them.

4 CONCLUSIONS AND SUGGESTIONS

4.1 *Conclusions*

Developing agricultural moderate scale operation such as family farms is an important pathway to improve the peasants' income, enhance agricultural efficiency and promote rural sustainable development. Now the rural of Hubei is on the key stage of transformation, it's imperative to promote agricultural land moderate scale operation. The survey based on 360 peasant households of Xiantao, Jianli, Hanchuan, Tianmen, Xiaonan, Dawu and other areas showed that, there were about 48.6% investigated peasant households had the willingness to expand the existing scale and operate family farms, and more than a half peasant households will not expand the scale or don't care.

We established Binary logit regression model based on the theory of returns to scale and expected utility theory of risk, and probed the influence factor of the willingness to expand the existing scale and operate family farms. It showed that, the peasant households' qualities and the background of family had less significant influence on the willingness for scale operation. But the more the households engaged in the non-farm industries, the higher proportion of non-farm income accounted for the family income, and the scarcer of the farmland resource, then the weaker of the willingness to expand the scale and operate family farms. And the bigger the families had contracted land area, the stronger the willingness to expand the existing scale. The peasant households who had ever rented or agented farmland from others had more intense willingness to scale operation, and to strengthen professional and technical training to the peasant households was helpful to promote the farmland scale operation.

4.2 Suggestions

The government should innovate and improve farmland circulation mechanism and policy continuously to realize scale operation of farmland by guiding actively and encouraging through land subcontracting, exchange, transfer, stock cooperation and other forms. Under the premise of comprehensively considerate the main factors influencing the willingness of peasant household to scale operation, the new subjects of agricultural management such as family farms, professional cooperatives, "leading enterprises + peasant households", and etc. should be actively cultivated, and the farmland should be encouraged to concentrated to them. In addition, to promote the development of farmland moderate scale operation in Hubei, we should also accelerate the transfer of rural surplus labor effectively to non-agricultural sectors, hasten farmland circulation further, and promote scientifically the optimization of the agricultural production factors' configuration on the basis of market rules, so as to realize the long-term land use efficiently and a sustainable development of agriculture.

REFERENCES

- [1] Awudu Abdulai, Punya Prasad Regmi. Estimating labor supply of farm households under nonseparability: empirical evidence from Nepal. *Agricultural Economics*, 2000(22): 309-320.
- [2] Balmann, A., Odening, M., Weikard and H.-P., Brandes, W. Path-Dependence without Increasing Returns to Scale and Network Externalities. *Journal of Economic Behavior and Organization*, 1996(29): 159-172.
- [3] Gaofei Ying. A survey and reflection on how to cultivate and develop family farms in Nanhu areas. *New countryside*, 2012(6): 5-7. (In Chinese)
- [4] Jianhua Wang, Qiao Li. Dynamic and dilemma of development of family farms and construction of sustainable development mechanism in China. *Research of agricultural modernization*, 2013, 05:552-555. (In Chinese)
- [5] John.L.Buck. Chinese peasant economy (Translated by Zhang Ivlan). Beijing: Commercial press, 1936 (In Chinese)
- [6] Julie Ingram, Peter Gaskell, Jane Mills, Chris Short. Incorporating agro-environment schemes into farm development pathways: A temporal analysis of farmer motivations. *Land Use Policy*, 2013(31): 358-372.
- [7] Kunxiao Ni, Yueqin Shen. The survey and analysis to the development of family farms in Zhejiang Cixi areas. *Zhejiang agricultural science*, 2012(1): 1583-1586. (In Chinese)
- [8] Monika Pinter, Leopold Kirner. Strategies of disadvantaged mountain dairy farmers as indicators of agricultural structural change: A case study of Harau, Austria. *Land Use Policy*, 2013(2): 321-334.
- [9] Oduol J B A, Hotta K, Shinkai S, et al.. Farm size and productive efficiency: Lessons from smallholder farms in Embed district, Kenya. *Journal of the Faculty of Agriculture Kyushu University*, 2006, 51(2): 449-458.
- [10] Qiang Gao, Tongshan Liu, Xiangzhi Kong. An institution analysis of family farms: character, mechanism of occur and effect. *Economist*, 2013(6): 48-56. (In Chinese)
- [11] Oszmianska M. Role of market information in functioning of family farms. *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Rolnictwo*, 1997(137): 117-127.
- [12] Shanlang Lin. Farmers' will and behavior characteristic of the appropriate scale of cultivated land management. *Journal of Fujian normal university (philosophy and social sciences edition)* 2005(3): 15-20. (In Chinese)
- [13] Shasha Lu, Yansui Liu. Modeling analysis of suitable operating scale of agricultural land in circulation: a case study based on household surveys in lijin of Shandong. *Progress in geography*, 2011, 30(5): 600-606. (In Chinese)
- [14] Taiyang Zhong. The study on the scale operation intention and characters of peasant households. *Chinese land science*, 2005, 19(1): 49-55. (In Chinese)
- [15] Weijia Liu Lichun, Qiu. Evaluating and analysis on the operation scale of the family farms based on DEA model. *Research of agricultural mechanization*, 2009(12): 49-51. (In Chinese)
- [16] Weiss, C.R.. Farm Growth and Survival: Econometric Evidence for Individual Farms in Upper Austria. *American Journal of Agricultural Economics*, 1999, 81(1): 103-116.
- [17] Xiwen Chen. Several major problems faced by the current rural reform and development in our country. *Problems of Agricultural Economy*, 2013(1): 4-6. (In Chinese)
- [18] Yangfen Chen. An analysis of farmland scale operation intention and its influencing factors based on the peasant household survey in eastern coastal areas. *Resource science*, 2009, 31(7): 1102-1108. (In Chinese)
- [19] Yueming Xu. Analysis of restriction factor to land scale operation. *Problems of Agricultural Economy*, 2006(9): 13-16. (In Chinese)
- [20] Yuntao Guo. The capital, market and economic performance of family farms. *Journal of Guangxi university for nationalities*, 2009, 31(2): 56-61. (In Chinese)
- [21] Zuhai Chen, Ting Yang. A discussion on the mode and pathway of our family farms. *Hubei agricultural science*, 2013, 17:4282-4286. (In Chinese)