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ABSTRACT

From the perspective of organizational embeddedness of agricultural-industrial complex, this paper uses binary logistic model to investigate the influencing factors of heterogeneous famers' willingness to rural land contractual management right mortgage loan through data from field research into 561 famers in Yongqiao District, Suzhou City, Anhui Province. It shows the general high willingness to rural land mortgage financing among famers. But the distinctive different level of willingness appeared in famers with different business scale. For famers operating large and medium-size land, organizational embeddedness of agricultural-industrial complex significantly influences their mortgage willingness. To further implement mortgage right of rural land, therefore, agricultural-industrial complex should be embedded and new type of agricultural management entities ought to be cultivated when the scale operation of agricultural land is advocated.

Keywords: agricultural land mortgage financing, land scale, agricultural-industrial complex, mortgage willingness, influencing factors

INTRODUCTION

Since the first promulgation of "endow farmers with the rights to land tenure, land use, land revenue, land transfer and mortgage and guarantee of contracted land use" in the Third Plenary Session of the 18th CPC Central Committee, the state council has been pushing forward the separation division mechanism of rural land ownership, contract right and management right. Nationwide pilot areas have been picked up for modes of rural land contractual management right mortgage finance and mode of land mortgage loan.

In the Central document no.1 of 2018, it is strengthened that rural contracted land management rights can be financed by financial institutions in accordance with the law and farmers are allowed to develop industrialized operation of agriculture by becoming shareholders using their contracted land-use right. In July 2015, Anhui has successfully issued its first mortgage loan of land management right in Yongqiao district, Suzhou City. Different from other pilot regions in China, scale of land management right mortgage loan has rapidly surged in Yongqiao district ever since the completion of conformation of land right and certification work. After investigation of pilot work in Yongqiao, different level of willingness to rural land mortgage financing among famers was shown as well as a more distinctively high willingness of famers operating scale land business and those who participated in the agricultural-industrial complex. Thus, it is worth further examining the inner logic and experience worthy of being widely learned. That also poses pratical importance for further perfecting rural land system reform and enriching the design of rural land mortgage products.

Previous studies mainly focus on the feasibility and necessity of launching rural land management right mortgage financing of which some scholars hold that there are many problems during the execution. The imbalance of interests among various entities of rural mortgage financing restricts implementation of this policy (Wang & Zhu, 2016). Besides, the mortgage is relatively low in demand while its financing cost is rather large (Hui, 2013). Only

famers with competency of sufficient nonagricultural income and operating profitable programs could improve their credit conditions via the rural land mortgage loans (Zhang &Yang, 2011). Even though this mortgage loan, the innovation of guarantee mode, benefits famers in pilot areas, the cumbersome process and the lack of institutional protection and constraints cannot be neglected (Yan,2008;Zeng & Wang, 2010; Wang & Guo, 2014; Huang, 2014;Lin &Shen,2015). It is also argued that famers' willingness to rural land contractual management right mortgage loan is closely related to the level of local economic development (Lin & Zhao, 2009). Through their research, Lin Lefen and Yu Cenxi (2016) find that family farms show strong participating will to the agricultural land management right mortgage loans, which is influenced by factors like age, income source, willingness of land transferring, gross area of farmland. participation of social security and satisfaction of government services (Liu Tingting et al 2013; Li Lin et al 2018).

It can be conducted that existing researches build solid foundations for further analyzing

famers' willingness to rural land contractual management right mortgage loan. Nevertheless, there is less investigation in the mortgage agriculturalwillingness combined with industrial complex and famers of heterogeneity. In fact, it is agricultural-industrial complex that partly facilitates the lightening implementation of rural land mortgage loan in Yongqiao pilot areas. Meanwhile, famers of different scales have experienced the obvious heterogeneity. The most typical one is traditional small famers and new type agricultural management entities (Lin Lefen and Shen Yini, 2016). Based on the data of filed research in Yongqiao District, the pilot area of land mortgage loan in Suzhou City, Anhui Province, this paper, from the perspective of agricultural industrial complex embedded ness. discusses influencing factors of willingness rural land contractual to management right mortgage loan of scale famers of heterogeneity. We hope that our study would make contributions to designing more targeted and universal land mortgage financing products for financial setups, alleviating financing predicament of agricultural business operation.

Variables	Definition	Impact Prediction
Will to Participate in Land Contractual Management Right Mortgage Loan	YES=1, NO=0	+
Participation in Agricultural Industrial Complex	YES=1, NO=0	+
Gender	Male=1, Female=0	—
Age	under 30=1,30-40 =2,40-50 =3, over50 =4	+
Education Background	Primary School and Below=1, Middle School=2, High School=3, College and above =4	+
Peasant Worker	YES=1, NO=0	—
Proportion of Agricultural Labor	under30% =1,30%-60%=2,60% above=3	+
Whether Have Social Relations	YES=1, NO=0	—
Proportion of Agricultural Income	Up to 10%,10%-25%=2,25%-50%=3,50% above=4	+
Loan Experiment	YES=1, NO=0	+
Land Management Scale	Continuous Variable	+
Contiguous Land	YES=1, NO=0	

Table1. Definition and Valuation

DATA, VARIABLES AND MODEL

Data Source

The data used in this study are mainly collected from the field interview and questionnaires to Yongqiao District, the pilot area for land mortgage loan, conducted by our research group from January to March in 2017. The principle of sample selection is to conduct stratified random sampling in 20 villages in Taoyuan Town, Beiyangzhai Township, Zhuxianzhuang Town and Dadian Town of Yanqiao District. A total of 600 questionnaires are distributed to farmers in the sample area. And a total of 561 valid questionnaires are obtained, with an effective rate of 93.5%.

Variable Selection

In view of actual situation of the survey area and the farmers' own factors and the family

characteristics, the selection of the variables concern four characteristics of surveyed farmers: the characteristic variable of organizational embeddedness of agricultural industrial complex, personal variables of farmers, household characteristic variables of farmers, social characteristics variables of farmers and farmland characteristics variables. The specific definitions of variables are presented in Table 1.

Characteristic Variables of Organizational Embeddedness of Agricultural Industrial Complex

Farmers may be better guaranteed with income from land exploitation in the agricultural industrial complex as an interest group, which provides counter-guarantee services for farmers, making it easier for farmers to obtain loans from Therefore, financial institutions. farmers' willingness to rural land mortgage loan appeared quite intense among those who join agricultural industrial complexes. Generally, this stronger willingness can be seen by higher evaluation of rural credit union, which means famers have higher expectation to rural land contractual management right mortgage loan.

Personal variables of Famers

The personal variables mainly include farmers' gender, age and education background. On average, men would be more likely to try land contractual management rights mortgage loans for they are more open to try new things, more adventurous than most women, the conservative risk averse who prefer family stability. Similarly, young people may be more willing to participate in the mortgage of land contractual management rights than elder people because of their higher acceptance of new things and higher risk tolerance. Education background is also accounted as a variable on the ground that educated people have wider horizons, greater ability to accept and understand new things, which lead to their stronger will to mortgage of rural and management rights.

Household Characteristic Variables of Farmers

Household characteristic variables include the proportion of agricultural labor and the proportion of agricultural income. The higher the proportion of agricultural labor in the family to the total labor force, the higher the dependence of the family on the land, and the more sensitive to the risk of land loss after land mortgage, which gives rises to lower willingness to land mortgage. Likewise, the higher the proportion of farmer's income to total household income, the more important the land is to the family, which induces weaker willingness of farmers to participate in land mortgage. Accordingly, famers may be higher in willingness to land contractual management rights mortgage when the household proportion of agricultural labor and agricultural income is lower.

Social Characteristics Variables of Famers

Social characteristics variables refer whether there is peasant worker experience, whether there are social resources, or whether there is a loan experience. Farmers having experienced in going out to work may prefer mortgage loans of land contractual management rights owning to their higher acceptance of new things. Farmers who have relatives or certain social relationships in government office are inclined to the mortgage due to better understanding of government policies, abundant social resources and relative high success rate of loan. Farmers with loan experience have greater capital needs are probably risk-appropriate who are more willing to the land contractual management rights mortgage.

Land Characteristics Variables of Farmers'

The land characteristic variables cover the land management scale and whether the land is contiguous. Generally speaking, larger farmland management requires greater capital flow in the business process. Thus famers who run large scale land in high financing needs are more will to mortgage the land for funds. Furthermore, in contiguous land, the larger the size of the plot, the more farmers would invest to improve the operating efficiency. So a whole piece of land may be more likely to be mortgaged.

Model

This paper aims to analyze the impact of various influencing factors on farmers' willingness to participate in land mortgage loans.

Note dependent variable, "Farmers' Willingness to Rural Land Management Right Mortgage Loans"(Y), as binary choice model, belonging to binary discrete choice model. A famer is encountered with choice of willing to engage in the land mortgage, 1 if he wills, 0 otherwise. x_i represents all kind of influencing factors to his choice. $Y = f(x_1, x_2, x_3, ..., x_n) + u$

Note that probability of famers' willing to engage in the land mortgage $P(y=1|x_i) = P$, then probability of famers' unwilling would be 1-P:

Here comes equation:

$$\ln\left(\frac{p}{1-p}\right) = \operatorname{logit}(p) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + u$$

which can be expressed as:

$$P = \frac{\exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n)}{1 + \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n)}$$

Note that x_i (i = 1, 2, 3, ..., n) as explanatory variable, β_0 as constant, β as partial regression coefficient of explanatory variable, namely the change of logit(P) caused by one unit change of x_i when other influencing factors remain unchanged; μ as stochastic error.

ANALYSIS OF DESCRIPTIVE STATISTICS

Analysis of Basic Characteristic of Sampling Famers

It can be seen the male-dominant family economic life in rural villages in China, for the 461 of our surveyed households are male, accounting for 82.2% of the total sample. 78.6% of our sample is famer at 40- 60 years old, among which famers of 50 years old or above account for the highest sample proportion, 43.1%. These farmers usually run large contracted land with rich experience in production and management. Generally low educational level can also be inferred according to our sample where 75.7% famers finished primary and junior high school education while 24.3% farmers hold diplomas of high school education and above. 52.2% of samples are households where family labor reaches to 5 or more people, indicating farmers' households are large in scale. But in stark contrast, 47.5% of surveyed households rely on merely 1 family agricultural labor. Only 35% families have more than 3 agricultural labors. There is almost no sample full of agricultural labor in a rural family, as young people approximately choose to work outside the home as main source of family income. 37.9% surveyed famers monthly gain 30,000 and 45.1% between 30,000 -50,000, which means most of the sample households are middle-income families. Only 6.8% of the sample households, mainly those concentrated in large grain farmers and agricultural production cooperation have annual incomes of more than 100,000. In terms of income structure, proportion of agricultural income is small, about 40.9% farmers' agricultural income takes up between 11% and 25%, and only 21% account for more than 50%. As for social relations which the vast majority of sample farmers do not have access to, only 13.4% have relatives working in government departments or financial institution. 310 households have loan experience, accounting for 55.4% of surveyed sample. They borrow money mostly from their friends for farming and children's education. since most of them lack of effective collateral for loans from formal financial institutions despite their financial needs.

Analysis of the Scale of Land Management and the Combination of Agricultural Industrialization

There shows the huge gap among farmers in different business scales with which surveyed farmers are of significant heterogeneity. The largest land area owned by surveyed farmers can reach 980 mu, with the minimum of merely 1 mu. Specifically, small-scale farmers with a land area of less than 10 mu account for 57.4% of the total sample, 27.63% of medium-sized farmers with a land area of 10-50 mu, and 14.97% of the larger-scale farmers accounted. Table 2 illustrates descriptive statistics of farmers' land scale.

 Table2. Descriptive statistics of farmers' land scale

Land Scale (Mu)	Minimum (Mu)	Maximum (Mu)	Average (Mu)	Standard Deviation
10 mu or less	1	9.5	6.4	3.68
10-49 mu	10	48	25.6	8.27
50 mu and above	50	980	350. 2	98.84

Source: According to field research data in 2017

As of 2017, more than 200 agricultural enterprises, 700 agricultural cooperatives and 1,000 family farms in Yanqiao District of

Suzhou City have joined the new agricultural industrial complex, covering an area of 10% of the total land area of the city. Among them,

32.1% of the agricultural industry agricultural engaged in the farmer's land management right mortgage loan counter-guarantee model, providing financing loans for 180 farmers.

Analysis of the Willingness to Mortgage of Agricultural Land of Heterogeneous Farmers

The survey find that sample farmers' scale of land management polarized, since the obvious division in the area of contracted land owned by farmers. In the process of land transfer in Baqiao District, there are differences in circulation scale and circulation degree among each township. Small-scale farmer land is decentralized when large-scale professional large households coexist with family farms, and there are also differences in financing needs and financing scale of these households with multiscale contracted business. Based on this, this paper analyzes farmers' willingness to farm land management rights mortgage loans from the perspective of different business scales, as shown in Table 3.

 Table3. Farmers' willingness to rural land management rights mortgage loans (Unit: %)

Area (Mu)	Up to 10	10-50 Mu	50 Mu above
Proportion of those who know the mortgage	33.9	61.4	66.7
Proportion of those who will engage in mortgage	36.5	77.8	98.6

Source: According to field research data in 2017

It can be induced from data in Table 3 that with the expansion of the land management scale, famers would concern and understand of rural land mortgage policy, showing an increasing willingness to participate in it. In the survey, it is also found that famers operating small land management would not attempt to dabble in the mortgage financing.

But when their land management scale extends, especially when their main income comes from land management, they would pose exclusive interest to land policy in that the larger the scale of operations, the more cash flow required daily and the stronger the willingness to participate in land mortgages.

Certainly, it needs to be further investigated which factors account for the distinct financing willingness of farmers with different land management scales.

Analysis of the Empirical Results of the Factors Affecting the Willingness of Heterogeneous Farmers to Participate in Farmland Mortgage Financing

This paper uses binary logistic regression model to analyze farmers' willingness to land contractual management mortgage finance via SPSS21.0 software.

Focusing on the differences in heterogeneous famers' willingness as well as reasons for that, we further use group regression to analyze the factors affecting the willingness of farmers with different land scale. Therein, impact of the agricultural industrial complex on the willingness of heterogeneous farmers to land mortgage loans would be emphasized. The qualified model fitting results are depicted in Table 4.

Impact of Organizational Embeddedness of Agricultural-Industrial Complex

As an innovative organization out of the development of local agro-industry, the agricultural industry complex has unique advantages in the integration of production, supply and marketing, especially for the production and operation of large-scale farmers. Its significant impact on medium and large-scale farmers' willingness to rural land mortgage financing can be spotted from the regression results.

Though impact on small-scale farmers has not passed the test. its positivity proves organizational embeddedness of agriculturalindustrial complex works differentially on farmers with different land-scale operation. In the operation mode of agricultural-industrial complex, which namely "agricultural enterprises + cooperatives + family farms", the large grain farms are responsible for the production of safe and reliable agricultural products to the leading enterprises in the complex. In return, the leading enterprise will be delegated collectively with the right of land management and ensure the counter guarantee of loans from financial institutions for famers operating contractual land when they have financial needs. Generally speaking, the larger the contracted land, the higher the possibility of obtaining the loan of complex may have. So the degree of famers' willingness tends to be increasingly high.

Independent Variables	Small Scale (Up to 10 Mu)		中等规模户(中等规模户(10-50 Mu)		Large Scale (Over 50 Mu)	
	Regression	Significance	Regression	Significance	Regression	Significance	
	Coefficient	Level	Coefficient	Level	Coefficient	Level	
Participation in Agricultural Industrial Complex	0.154	0.174	0.289*	0.053	0.471**	0.022	
Gender	0.536**	0.027	0.222	0.157	0.251	0.386	
Age	-0.464*	0.059	-0.575**	0.019	0.750	0.358	
Education Background	0.342**	0.018	0.695**	0.010	0.745	0.149	
Peasant Worker	0.004	0.984	0.387	0.482	0.944	0.188	
Proportion of Agricultural Labor	-0.789***	0.009	-0.246**	0.035	-0.192**	0.010	
Proportion of Agricultural Income	0.018	0.894	0.227	0.131	0.475	0.192	
Whether Have Social Relations	1.300	0.254	0.929**	0.019	0.587	0.248	
Loan Experiment	0.942	0.990	0.614	0.988	0.730**	0.020	
Contiguous Land	0.015	0.301	0.156**	0.027	0.333**	0.018	
Constant	-3.806	0.196	-7.068	0.030	0.884	0.995	
Log Likelihood	-52.851		-53.113		-57.420		
Chi-Square Test Value	88.201		86.436		87.283		
GFI	0	.432	0	.439	0.4	425	

Table4. Regression Results of Heterogeneous Famers' Willingness to Land Mortgage

The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Impact Results of Individual Characteristics of Farmers

The gender factor passed the statistical significance testing and the regression coefficient was positive in the small-scale farmers, but it failed in terms of medium and large-scale farmers.

The reason might be that sample deviation, which means fewer women in the sample of surveyed famers, caused the unobvious result. The regression coefficient of age factor was negative in the small and medium-scale farmers while did not exist in the testing to large-scale farmers.

That indicates that for small and medium-scale farmers, their willingness to land mortgage loans becomes lower as their ages increase. The factor of education background of farmers got the positive statistical significance in small medium-scale farmers, but came to nothing the test in large-scale farmers, which may be the result from deviations caused by sample selection.

Impacts of Household Characteristics of Farmers

The regression coefficient of proportion of agricultural labor force has represented as negative in the statistical significance testing to small, medium and large-scale farmers. In spite of different scales of land management, famers would not engage in land mortgages when the proportion of agricultural labor is high for the huge degree of dependence on farmland. Factors of agricultural income and peasant worker have no coefficient in that proportion of agricultural income is generally small in the sample and surveyed farmers basically have experience as peasant worker for living.

The Impact of the Social Characteristics of Farmers

The regression coefficient of social relation variable in medium scale famers reached significant level and emerged as positive one, while there is slightly no effect in the small and large-scale farmers. Medium scale farmers are more likely to be affected by social relations.

Their willingness to land management rights mortgage loans will increase when they access to social relations which brings about increasing possibility of getting loans from financial institutions. The regression coefficient of loan experience in large-scale households appears to be positive. For these famers, land management rights mortgage loan would be another alacritous new thing they would try, for their relatively better understanding and familiarization with the bank's policy and procedure.

MAIN CONCLUSIONS AND POLICY RECOMMENDATIONS

Based on the field research in Baqiao District of Suzhou City, Anhui Province, align with the local pilot operation of land management rights mortgage loan, this paper empirically analyzes the factors influencing the willingness of farmers with different business scales to the policy, especially the effect from organizational embeddedness of agricultural industry complex. Finally, we arrive at two main conclusions:

- discrepancy of the degree • The of understanding and willingness to participate strengthens with increasing business scale varies among famers operating different scale land management. The more extended management scale the famer operates, the profound understanding more and willingness he evinces.
- The organizational embeddedness of agricultural industry complex significantly impacts on medium and large-scale farmers for it reinforces farmers' risk-resisting ability, boosting up their willingness to rural land mortgage financing

Accordingly, we put forward the following policy recommendations in order to further promote the implementation of rural land mortgage policy and successfully put mortgage right of agricultural land into effect:

- Further improve transaction market environment for land transferring. Valuation technique of rural land contractual management rights would especially be accentuated to better solve disposal problems in land transferring and land mortgage.
- Further encourage land transferring and facilitate scale operation of farmland. New agricultural management entities especially

will be supported and cultivated.

Further improve the interest linkage mechanism of agricultural industrial complex, combine the land transfer with the organizational innovation in embeddedness. So that more farmers' risk- resisting will be strengthened amid capacity organizational embeddedness, together with innovated rural land mortgage system, promoted ultimately rural industry development and effectively implemented rural revitalization strategy.

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