

Research on the Evaluation of Financial Services Providing for Science and Technology Entrepreneurial Farmers: A Survey from 388 Sample Farmers of Districts and Counties of Chongqing and Sichuan Province

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Abstract

Rural science and technology entrepreneurship is sustainable agricultural development way which financial support is an important guarantee of rural science and technology. Based on relevant literature and questionnaire of Sichuan and Chongqing provinces, we propose a model about financial services providing for science and technology entrepreneurial farmers. The results show that per capita net income of farmers have negative impacts on financial service conditions. Education level, work experience before entrepreneurship, farmers borrowing mode, local government policies, etc., have significant impact on evaluating of financial services. But we do not find the same significant result on the factors such as age, marital status, family size, consistency in the work of the former farming venture, years of family members working on entrepreneurship and their profits. Based on the empirical results, this paper puts forward relevant policies and recommendations.

Keywords: science and technology entrepreneurship, farmers, financial services, evaluation research

1. Introduction

With the accelerating process of industrialization and urbanization in China, the shortage of resources, the contradiction between human and land are gradually highlight. According to the data of NBS (National Bureau of Statistics), by the end of 2012, China's arable land area is 1.825 billion Mus, only about 12.7% of the national territorial area. China's Per Cultivated Area is 1.4 mu, which is one-third of the world's per capita arable land area, and about 1/8 of United States'. To break through the bottleneck of resource constraints, the best way is to rely on agricultural science and technology innovation and the application level, to speed up the pace of agricultural modernization. Therefore, to promote rural science and technology entrepreneurship and speed up the transformation of agricultural scientific and technological achievements to productivity, can make China's agricultural development breakthrough of cultivated land resource constraints and to ensure a steady supply of agricultural products; And it has important strategic significance to cultivate new type of agricultural management system, promote transformation and upgrading of agricultural management, and realize the agricultural modernization development. Despite China's financial institutions has achieved a major breakthrough in the recent years, the reform of the rural financial service lagging situation has not been improved significantly. Farmers as weak economic agents, their demand for financial services is very difficult to satisfy. this paper aims is to find out the main factors that effects the financial services of science and technology of entrepreneurial farmers, and to provide the effective countermeasure to solve Resource constraints problems in the process of urbanization. At the same time, this paper is also trying to practice the document spirit of Central first document in 2013 - to foster new type of agricultural management main body, cultivating new type of professional farmers. The research idea of this paper is based on the background and the present situation of China's urbanization, to design the Farmers science and technology venture financing questionnaire from the individual characteristics, economic ability, investment and financing situation. Through the research of farmers from more than 30 village and the industrial park in Sichuan and Chongqing province, especially the research of entrepreneurial farmers demand for financial services, this paper would make empirical evaluation of financial

services status of science and technology entrepreneurial farmers, which would provide the reality basis and policy support to Ease of resource constraint problem in urbanization.

2. Literature Review

The transformation of economic growth pattern from relying on agricultural to industrial, not only make the standard of peasants' income increase, but also make the rural financial market have corresponding changes. Financial activities has become an indispensable part of villagers' daily life. (Zhang, 2000) .Attaches great importance to science and technology research of entrepreneurial farmers' financial services status has great significance to promote economic development, narrow the income gap between urban and rural areas and the dual economic structure. To solve this problem, the research of Chinese scholars on rural finance can be divided into two perspectives: Firstly, it is to research the rural financial supply and demand and the development obstacles from the perspective of sociology. Such studies are mainly focused on issues like rural formal and informal finance, policy finance, financial structure, financial supply and demand, microfinance market and defects associated with these problems and the rural financial system development, etc (Lu & Deng, 2005; Zhao, 2007; He, 2009; Zhang & Jiang, 2011; Liu & Xiu, 2014; Liu & Feng, 2014). Jingzhong Ye, Yanjie Zhu and Hongping Yang (2004) believe the main object of formal financial are farmers who are rich, have high social capital. However, the poor peasant households obtain financial support from the informal financial channels. Secondly, this paper will study the economics meaning of rural financial services in perspective of quantitative analysis. Shan Lu, Keshen Jiang (2010) found that farmers financial service demand presents the characteristics of multi-level, diversified, financing difficulties, based on the survey of 216 peasant households in Lianyungang, China. Yuan Zhang (2013) believe that China's current financial system has many imperfections in such aspects as financial policy, financial services, which severely restricted the development of the farmers. Jinling Sun (2013) put forward some strategies to promote financial reform and the folk financial development after analysis the questionnaire of Migrant workers' financial demand and service. Gao Jing, Zhang Yingliang (2013) Using Logistic and Probit regression method, through an empirical analysis of the business survey to 518 farmers, found that the social capital has significant impact on Farmers to identify entrepreneurial opportunities. By using Probit model, Xiong Xueping, Ruan Hongxin, etc (2007) Analyzes the main factors influencing the farmer credit demand in China. Results show that the influence factors of farmers' financing needs and the actual loan amount are mainly the type of economic activity, arable land, the farmer's age and cultural level, and the types of economic activity and the arable land are the most significant factors.

International academic research on rural financial are mainly concentrated on currency borrowing. Rural financial services refer to financial products and services to the rural provided by formal financial institutions and informal financial institutions. In the 1970 s, Long (1968) He thinks that farmers money lending decision is the maximum profit choice, under the condition of existing production. And he puts forward that farmers money lending behavior depends on the peasant household's appetite for risk and profit and interest rates. Through the questionnaire survey of three villages in Icrisa, India, Pal (2002) used the Multinomial regression model to analyze the influence factors of peasant household borrowing, He found that the following factors has significant impact on farmers borrow lending possibility from the formal and informal departments of borrowing: The land value, wage income, whether has any overdue loans, the demand for consumer loans and access to the interest-free loans and so on. Nunung Nuryartono et al. (2005) found that, in Sulawesi area of Indonesia, Only 21.15% farmers can borrow money from the formal financial institutions, And only 18.11% peasant household have no credit constraints. By building the Probit model, Found that the human capital (such as the age, education level of the head of household), wealth, and risk tolerance and other factors have significant impact on farmers' opportunity to get formal financial credit.

In view of the above research situation, at the same time, in order to enrich and perfect the predecessors' research results, this paper made microcosmic research deeply on the questionnaire, combined with empirical analysis method, established econometric model, and analyzed various factors that may affect the financial services of farmers in the process of science and technology entrepreneurship. It hopes to get the latest experience results.

3. Description and Research Hypothesis of Questionnaire

3.1 Questionnaire Design and Investigation

According to the design method of psychology and management scale, comprehensive analysis and summary of related research at home and abroad, the research group designed the research questionnaire of Science and technology entrepreneurial farmers' evaluation of financial services. Research group took the preliminary investigation on hongyanping village, Changzhou street, rongchang county, Chongqing by using the Preliminary questionnaires. There are 50 Preliminary questionnaires in total, and get 39 effective questionnaires. Through a

modification on the results of the investigation and improvement, the research group got the formally questionnaire. Then, research group carried the formal investigation and interviews on the representative area using the formal questionnaire. These areas include: SanHe Township Stone county, Panshi township Yunyang county, Longhe county Changshou city, Qinggang township Bishan county, and these areas are belong to Chongqing, one of the four Direct-controlled municipality in China; the following areas are belong to Sichuan province. The research group has 20 specialized trained investigators. This project has a total of 450 questionnaires and there are 418 taken back. There are 388 effective questionnaires, and the effective rate is 86.2%.

3.2 Research Hypothesis

Based on the research achievements and entrepreneurial farmers' preliminary analysis of the financial services evaluation, this paper put forward the following hypothesis

3.2.1 Control Variable

The farmer's individual characteristic variables: (1) Gender: According to the concept of psychology, male is born optimistic, and many men have more experiences and more contact to the financial services business than women; whereas, women tend to be conservative. Therefore, men have positive correlation with financial services while women have negative correlation. (2) Age: The younger entrepreneurial farmers have more contact of the financial sector and the service. They are easier to do positive evaluation; and older farmers are rarely involved in the financial. They think that financial is sacred and complex, which makes their evaluation of the financial services negative correlation. (3) Degree of education: Different education level directly affects the entrepreneurial farmers' understanding of the financial policy, financial business process and related procedures. The higher the degree, the higher the pass rate of their loan application. So farmers' education level and their financial services evaluation have positive correlation relationship. (4) Marital status: Marriage can make the relational network more widely. Farmers will treat friends and relatives who is entrepreneurial success as idol. This to a certain extent can beautify their impression of the financial industry. So the entrepreneurial farmers who have married tend to make positive evaluation on financial services.

3.2.2 Explaining Variable

According to gaps and deficiencies of previous research, this paper tries to explain the evaluation of financial services mainly from the two related variables: farmer's economic capacity and investment and financing situation.

The farmer's economic capacity variables: (1) Family pure income per capita: Family income is negatively related to the evaluation of financial services. The more income of the family, the lower likelihood of loan and the dependencies and requirements for financial institutions is lower. (2) Family size: The bigger family has greater overhead, and greater demand for financial support. However, the bigger family has more labor force, and creating more value, which reduces the demand for financial to a certain extent. Therefore, family size of science and technology entrepreneurial farmers has uncertain Evaluation of financial services. (3) Family farmland: cultivated area has positive correlation to the farmers' evaluation of financial services. If the cultivated area is greater, the scale of farmer entrepreneurship would be greater and the money it needs would be higher. If the money is not enough, farmers would tend to loans from financial institutions. (4) Whether be engaged in agriculture before starting a business or not: In China, the farmers have very low income, and generally cannot get support from financial institutions. This situation has negatively correlation to the evaluation of financial services. (5) Ever has engaged in non-agricultural work or not before starting a business or not: the farmers who have non-farm work experience have widely knowledge, which makes them understand well with the preferential policies related to financial services. This has positively related to the evaluation to financial services.

The farmer's investment and financing variables: (1) the cost of obtaining the scientific and technological achievements: According to the principle that profit = benefits – cost, the higher the cost, the lower profits Entrepreneurial farmers can get. This has negatively related to the evaluation of financial services. (2) The capital support from the government and of the financial institutions: the greater Support from government and financial institutions, the better evaluation of financial institutions the farmers would give. This is positively correlated to the evaluation of the financial services. (3) The history of family science and technology entrepreneurship: the longer history of family entrepreneurship, the more contact they have with the financial institutions, and the most reliable of the family will be to the financial institutions. Therefore, this has positive correlation relationship with the farmer' evaluation. (4) Business income in recent four years. (If business is less than four years, counted from the beginning): the higher Business income, the less dependent on financial

institutions, this makes the farmer do a negative evaluation of the financial services; However, if the financial institutions provide great support to the farmers in the beginning of entrepreneurial, the entrepreneurial farmers with high income will do positive evaluation on financial services. So the business benefits and the evaluation of farmers on financial services have uncertain relationship. (5) Private lending mode: If the borrowing way of entrepreneurial farmers was mainly self-financing, friends support or investment partners, they tend to do a negative evaluation of the financial services; If the venture capital of science and technology entrepreneurial farmers is mainly from the financial institution, farmers will do positive evaluation on financial services. (6) Get help from financial institutions: if the technology entrepreneurial farmers obtain the national relevant financial policy encouragement, support of local government, capital loans of Banks and other financial institutions provide, the help of the cooperatives and scientific research institutions and the financial information of Local media, their evaluation on financial services would be very high. (7) The difficult level of borrowing money from the financial institutions when starting technology entrepreneurship: the easier to get loans, the more tend to make positive evaluation to financial services.

As it can be seen in table 1: the related variables and interpretation according to the Assumptions and questionnaire statistics

Table 1. Table of explained variables, control variables and the explaining variable

	implication	Unit/nature	assumed affect direction
explained variable Y	whether be satisfied with the current service provided by financial institutions or not	Likert Sacle: Very dissatisfied =1, Very Satisfied =5	
control variables (Z)			
<i>sex</i>	Gender	Dummy variable: female=0, male=1	+
<i>age</i>	Age	Annum	-
<i>education</i>	Education level	Annum	+
<i>married</i>	Marital status	Dummy variable: Unmarried, widowed, divorced=0, married=1	+
<i>income</i>	Family annual per capital income	Dummy variable: Less than 5000RMB=0, others=1	-
<i>famnum</i>	family size	Number	+/-
<i>agriarea</i>	Family farmland	Mu	+
<i>farming</i>	Be engaged in agriculture or not before starting a business	Dummy variable: no=0, yes=1	-
<i>non-farm</i>	Ever has engaged in non-agricultural work or not	Dummy variable: no=0, yes=1	+
<i>cost</i>	the cost of obtaining the scientific and technological achievements	Dummy variable: less then 10000=0, others=1	-
explaining variable (X)			
<i>loan</i>	The proportion of venture capital from financial institutions	Chinese dollars	+
<i>year</i>	The history of family science and technology entrepreneurship	annum	+
<i>income</i>	Business incomes in recent years	Chinese dollars	+/-
<i>mode</i>	Venture capital mode of borrowing	Dummy variable: self-raised =0, Financial institutions lending =1	+
<i>support</i>	the financial help and support come from the relevant institutions, and the average point of five supports methods	Likert Sacle: none =1, a lot=5	+
<i>easy-level</i>	Difficult level to obtain the loan	Likert Sacle: very hard=1, very easy=5	+

3.2.3 Specification of Model and Variable Descriptive Statistics

According to the article research hypothesis, the author set the following linear regression model as the empirical econometric model:

$$Y = \alpha'Z + \beta'X + \varepsilon$$

Y is the explained variable, which represents the evaluating standard of science and technology entrepreneurial

farmers for financial services. Z is the control variable, including the gender, age, level of education, and marital status of technology entrepreneurial farmers. X is the explaining variable. It includes the economic capacity and investment and financing conditions and other factors of technology entrepreneurial farmers, and it is considered as the main influence factor to decide the technology entrepreneurial farmers' evaluation of financial services. α and β are coefficient vector of Control variables and explanatory variables, and they represent the marginal impact of control variables and explanatory variables to explained variable Y , ε is the other factors which is not considered in the model. It is assumed to be zero mean independence with the variance of the normal distribution $\varepsilon \sim N(0, \sigma)$. Table 2 is the descriptive statistics of explained variable and control variables, which comes from the questionnaire.

Among the samples of the research group get, after excluding four missing value, there are 12 people choosing "very dissatisfied", accounting for 3.2%; 58 people choosing "not satisfied", accounting for 15.4%, 257 choosing "general", accounting for 68.2%, 47 choosing "satisfied", accounting for 12.5%, and 3 choosing "very satisfied", accounting for more than 0.8%. The standard deviation is 0.657. The evaluation score of technology entrepreneurial farmers to financial service is between not satisfied and general, below the neutral value (3) 0.1 points. This means that most of the science and technology entrepreneurial farmers think that China's current financial institutions service is close to the medium.

All samples, there are 242 male, accounting for 63.5%, and 139 female, accounting for 36.5%. Their average age was 39.1 years, the biggest is 71 years old and the smallest is 18 years old. There are nine people without education, accounting for 2.4%. there are 32 people have primary education, accounting for 8.4%; people with Junior high school education are 159, accounts for 41.7%; people with senior high school education are 143 people, accounting for 37.5%; people with university education are 30, accounting for 7.9%; and people with postgraduate education are 8, accounting for 2.1%. the education level will be expressed in the following way, the unit is annum: illiteracy =0, primary education =6, junior high school education =9, senior high school education=12, College graduate or bachelor degree =15.5, Graduate and above =19, the average education level of the Sample are 10.38 years, which is the junior middle school to high school education level. Marital status variables are divided into two virtual variables: unmarried and married, single includes Single, divorced or widowed. The Unmarried virtual variable have 34 people, accounted for 8.9%, married have 347 people, accounted for 91.1%. Other variables have similar treatment as education level and married status. Look at the table 2.

Table 2. Descriptive statistics of variables

Variables	sample number	average value	standard deviation	Minimum	maximum
<i>Y</i>	377	2.923	0.657	1	5
<i>sex</i>	381	0.635	0.482	0	1
<i>age</i>	381	39.137	10.037	18	71
<i>education</i>	381	10.383	3.096	0	19
<i>married</i>	381	0.911	0.285	0	1
<i>income</i>	362	0.649	0.478	0	1
<i>famnum</i>	379	4.074	1.309	0	12
<i>agriarea</i>	327	3.572	5.556	1	100
<i>farming</i>	364	0.590	0.492	0	1
<i>non-farm</i>	363	0.711	0.454	0	1
<i>cost</i>	373	0.365	0.482	0	1
<i>loan</i>	381	37208.567	2.336	0	4000000
<i>year</i>	380	3.463	4.212	0	40
<i>income</i>	381	116208.748	2.103	0	3200000
<i>mode</i>	330	0.270	0.444	0	1
<i>support</i>	375	3.021	0.666	1	5
<i>easy-level</i>	377	2.379	0.849	1	5

4. The Empirical Results and Analysis

According to the empirical econometric model, this article did regression analysis with the SPSS17.0 software. As it is cross section data, the author carried the heteroscedastic analysis on the model, and the result showed

that heteroscedasticity had no significant effect, which means that regression result is reliable. As it can be seen in table 3.

Table 3. Regression analysis results

Control/explanatory variables	Coefficient	standard deviation	T – statistic	probability
<i>sex</i>	0.018	0.074	0.319	0.750
<i>age</i>	0.042	0.004	0.682	0.496
<i>education</i>	0.138**	0.011	2.511	0.013
<i>married</i>	-0.032	0.122	-0.554	0.580
<i>income</i>	-0.166***	0.077	-2.888	0.004
<i>famnum</i>	0.055	0.027	0.986	0.325
<i>agriarea</i>	-0.002	0.005	-0.035	0.972
<i>farming</i>	0.007	0.073	0.115	0.908
<i>non-farm</i>	0.124**	0.078	2.199	0.029
<i>cost</i>	0.055	0.073	0.964	0.336
<i>loan</i>	0.082	0.000	1.365	0.173
<i>year</i>	-0.006	0.008	-0.090	0.928
<i>income</i>	0.033	0.000	0.522	0.602
<i>mode</i>	0.162***	0.079	2.928	0.004
<i>support</i>	0.253***	0.059	4.349	0.000
<i>easy-level</i>	0.380***	0.046	6.416	0.000
constant term	0.892***	0.309	2.885	0.004
The number of samples	244			
R-squared	0.353	Adjusted R-squared :		0.307
F-statistics	7.726	Prob > F	0.000	

Note. PS: *means 10% significant,**means 5% significant,***means 1% significant.

The regression analysis results show that:

- (1) Among the individual characteristic variables of Science and technology entrepreneurial farmers, *sex*, *age* and marital status have no significant relationship with the farmers' Evaluation of financial services.
- (2) The education *level* of science and technology entrepreneurial farmers has a significant positive impact on their Evaluation of financial services. One year added to farmers' education, the increase of its evaluation on financial services will increase 0.138 points.
- (3) What worth noting is that, the *famnum*, *agriarea* and whether the entrepreneurial farmers are engaged in farming work or not have no significant effect on the evaluation of financial service.
- (4) Family pure income per capita has A significant negative correlation with its Evaluation of financial services. The evaluation of financial services of Science and technology entrepreneurial farmers whose Family pure income per capita is more than 5000rmb is lower than the farmers whose Family pure income per capita is less than 5000rmb. The points are 0.166.
- (5) Having non-farm work experience before starting a business have positive correlation with science and technology entrepreneurial farmers' evaluation on financial services. Comparing with the entrepreneurial farmers without non-farm experience, farmers with non-farm experience have about 0.124 higher points on the evaluation of financial services.
- (6) Among the investment and financing variables of technology entrepreneurial farmers, the cost of obtaining the scientific and technological achievements, the amount of money that entrepreneurial farmers can borrow from financing institutions, The history of family science and technology entrepreneurship, and the income of family science and technology entrepreneurship in recent years have no significant effect on the farmers evaluation of financial services.
- (7) The private lending mode of technology entrepreneurial farmers have significant impact on their evaluation of financial services. The evaluation on financial services of entrepreneurial farmers whose venture capital mainly comes from financial institutions is 0.162 higher than the farmers' whose venture capital is mainly from

private lending.

(8) During the startup, if the technology entrepreneurial farmers obtain the national relevant financial policy encouragement, support of local government, capital loans of banks and other financial institutions provide, the help of the cooperatives and scientific research institutions and the financial information of Local media, their evaluation on financial services would be very high. In other ward, the above five support method has positive influence on the evaluation of financial services. Points to the farmer's evaluation of financial services would increase 0.253 when the average support degree increases 1.

(9) The difficulty level of the technology entrepreneurial farmers to obtain startup loans have Significant positive influence on their evaluation of financial services. It will be increased by 0.38 points to the evaluation of financial institutions when it is 1 point easier to get the startup loans.

5. Policy Suggestion

From the empirical evaluation research of financial services during the farmers' technology entrepreneurship, this paper get the following results: the average family per capita income have a significant negative correlation with the evaluation of financial services; The following factors and the evaluation of financial services has significant positive correlation: the education level of Science and technology entrepreneurship farmers, whether the farmers have non-farm work experience before starting a business or not, farmers mode of private lending, whether have obtained the national relevant financial encouragement policy, the support of local government, capital loans from Banks and other financial institutions, the help of the cooperatives and scientific research institutions and the financial information provided by the local media and business loans during the period Entrepreneurship; the farmers' gender, age, marital status, family size, cultivated land area, whether be only engaged in the farming before starting a business, the cost of obtaining the scientific and technological achievements, The proportion of venture capital from financial institutions, The history of family science and technology entrepreneurship and Business incomes in recent years have no significant effect on financial service evaluation. For the empirical conclusions, this paper puts forward the following countermeasures:

Firstly, it is necessary to improve the level of farmer education and Popularizing the financial knowledge. Chinese farmers' education level is not high overall and they do not understand financial knowledge, which virtually limits the farmers to participate in the activities of credit. The government should strengthen the propaganda and education of farmers' financial knowledge. The relevant departments should through various channels to intensify popularization of rural financial knowledge, improve the farmer's financial intelligence.

Secondly, it is to improve the investment in rural financial services and to build a good platform for science and technology. It is necessary to build the financial information platform of rural science and technology entrepreneurship, to provide one stop financing, management, technology, financial and legal consulting services for technology entrepreneurial farmers. The government should set up specialized agencies to provide service for science and technology entrepreneurial farmers, help them to introduce venture investment and risk investment funds. Help them to design the future development strategy, provide a wide range of policy advisory services, promoting effective cooperation of technical service institutions and the entrepreneurs, etc. China can set up some private business finance associations to provide various financing channels information, scientific financing tutoring and the necessary financing guarantee for venture members. This can help the members get more government funding and social financial support.

Thirdly, it is to explore the feasible way of loan collateral, solving the farmers' loans difficult problems in the process of entrepreneurship. The property that Farmers can use in the mortgage of is limited. Financial institutions can try to explore mortgages mode which conform to the farmer's characteristics and providing financing support for Entrepreneurial farmers as far as they can. For example, the financial institutions can expand the scope of mortgage guarantee according to the farmers' existing assets, develop more kinds of mortgage guarantee mode, and explore the new patterns such as agricultural technology, patent, right mortgage.

Last but not the least, it is to broaden the access to rural financial services market and increase the operating entities. China should cultivate the competitive rural financial services market which can provide a strong support to science and technology entrepreneurship farmers. Rural areas should encourage the local commercial Banks to provide financial products and services according to the characteristics of the local; rural areas should develop microfinance organizations, farmers' professional co-operatives, fund peer support and other new financial institutions; to standardize and develop private finance, guide and cultivate the folk finance to become an important competitive main body in rural financial service market , can provide backup support to science and technology entrepreneurship farmers.

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