Research on the Risk of Default on Farm-Related Loans and the Identification of Default Motives

Yanni LIU* and Yaqing HU

School of Economics and Management, Northwest University, Xi'an, China; lyn@nwu.edu.cn; huyaqing@stumail.nwu.edu.cn

* Corresponding author: lyn@nwu.edu.cn

Abstract: Based on the data from 2017 Financial Household Survey, this paper presents an empirical analysis of questionnaire data from 5,390 farming households, using logit and probit binary choice models to derive the factors that significantly affect farming households' loan default. The study found that the factors significantly affected farmers' loan default behavior including internet, credit cards, phone type, smart phone, online shopping, father's education, debt, trust and attention to financial information. Other factors including mother's education, parents' political status, farm income, happiness, choice of return, risk of investment project, total household assets, total household income and total household consumption have no significant impact on farmers' loan default. Among these factors, total farm income, trust and family happiness were found to be passive factors and the remaining variables were found to be active factors. Besides, household network infrastructure including internet, credit card, phone type, smart phone and online shopping were found to have a greater impact on loan default based on marginal effects. Through the analysis of factors that affect loan default, we can better propose corresponding measures to deal with the frequent default of farmers, which is conducive to understanding farmers' loan needs and improving the quality of banks' loans.

Keywords: farm loans; default risk; active default; passive default

JEL Classification: D12

1. Introduction

The issue of rural farmers' development has always been the most fundamental challenge for Chinese society, and financial support for rural areas is indispensable for achieving leapfrog development of rural areas and farmers. Due to the innate vulnerability and sensitivity of farm households, their resistance to natural and market risks is very weak. These underlying risks have dealt a huge blow to financial risks in rural areas, already leading to a huge gap between rural areas and urban residents at all times. Therefore, exploring the internal and external constraints faced by farm households in rural areas is crucial to the sustainability of financial development in rural areas.

According to the China Rural Household Finance Development Report (2016) "*the balance of loans to rural households at the end of 2016 was 70,846 billion yuan, accounting for 6.6% of all loans, an increase of 15.2% over the balance of loans at the beginning of the year and an increase of about 20.4% since 2007. In addition, the amount of non-performing loans related to agriculture by*

rural credit cooperatives amounted to RMB 2,161 billion." The agricultural non-performing loan rate of rural credit cooperatives has remained high for years and the frequency of loan defaults by farmers has led financial institutions to become increasingly stringent in rationing loans to farmers, who have been denied access to loans. The production and consumption level of farmers has decreased. Generally speaking, financial institutions judge the occurrence of default by farmers built on two aspects. On the one hand, it is based on farmers' subjective efforts to repay loans. Farmers with different subjective consciousness characteristics choose to default on loans or keep the contract. On the other hand, farmers face various natural and investment risks, and are unable to repay their loans due to numerous risks. Farmers' loan default can be divided into Farmers' active default and farmers' passive default according to various risks faced by different farmers and willingness to repay. Farmers' active default refers to the default of farmers' subjective will. It refers to that farmers are unwilling to repay even if they have the ability to repay. Farmers' passive default refers to farmers' default caused by facing various uncertain risks. The loan transactions between financial institutions and farm-related enterprises or farmers are based on profit maximization for both parties. When financial institutions are unable to fully grasp the household's economic conditions, they generally assume that the farmer will actively default on the loan, concluding that the worst-case scenario is that the farmer will not be able to repay the loan. The farmer will not repay the loan even if he or she has the income funds to do so. The financial lending institution will screen the loan based on this behavior strategy which ignores the fact that the farmer passively defaults. Failure in loan rationing policies can greatly increase the probability of loan default by farmers.

The literature on farm lending can be discussed from three perspectives. The basis for the delineation is based on differences in survey data. The first perspective is based on enterprise loan data from state-owned banks to show the impact of factors such as farm-related enterprise characteristics and loan contracts on loan default. Yin et al. (2014) showed that the relationship between agriculture-related loan contracts, benchmark interest rates and loan default. It concluded that loan amount and loan duration all had significant effects. Others used corporate loan data from state-owned banks to analyse loan default caused by information asymmetry problems between bank lenders and enterprises (Liang & Wen, 2019; Yin & Gan, 2011; Duan, 2020; Li et al., 2013). He et al. (2015) explained the influence of the internal equity structure of rural commercial banks on their operational risk and performance. Allen and Gregory (2002) as well as Thomas et al. (2011) explained the internal operation of relationship-based lending and explored the loan default caused by the principal-agent problem of credit officers.

The second perspective is based on the level of development of rural areas and macroeconomic policies, showing that the level of urbanization is inversely related to loan default. The higher the level of regional economic development, the lower the loan default. It is mainly from theoretical analysis. Empirical studies are scarce. The level of provincial financial competition has a significant impact on credit risk (Zhou, 2017; Lin & Xie, 2017). Wang and Lu (2011) showed that relationship between the level of rural financial development and the urban-rural income gap. Zhang and Du (2017) proved that its impact

on credit risk of farm loans mainly from macroeconomic indicators. Andrew et al. (2017) showed that the impact of firm characteristics, regional sector and macroeconomic variables on credit risk default.

The third perspective is based on the household farming questionnaire, discussing the impact of various factors on loan default, such as the credit limit of farm households, the loan supply of financial institutions, the household demographic characteristics of farm households and the economic status of households. Some scholars showed that the financing situation of Chinese farmers was facing serious credit constraints (Ding & Qin, 2014; Zhu & Li, 2006). Some scholars analyzed the relationship between the size of farmers' credit and loan interest rates, and advocated interest rate marketization and diversification of farmers' income. Besides, some scholars also concluded that financial institutions should strengthen the review of farmers' eligibility before borrowing based on the records of maturing small loans from rural credit cooperatives (Zhang & Jian, 2017; Yao & Wang, 2018; Adeniyi & Olufemi, 1982). Wu and Song (2016), Amare and Bekabil (2008) as well as Chen et al. (2021) showed that most farmers have higher demand for informal institutional borrowing and insufficient demand for effective formal credit. Ron and Oliver (2012) showed that some differences in the size of credit rationing and the degree of loan default among farmers compared to non-farm entrepreneurs. Shoaib (2019) as well as María et al. (2019) studied credit default delete maize cultivation in agricultural production and compared the benefits of non-agricultural income diversification and agricultural credit management risk.

Overall, the first perspective focuses on the information asymmetry among financial lenders, farm-related enterprises and farmers. Financial institutions are unable to detect that farm-related enterprises do have active defaults. However, it ignores the passive default behavior of farmers. The second perspective focuses on indicators including the overall level of regional economic development. The level of financial development in rural areas reduces the likelihood of passive default by farmers and compensates for the natural financial vulnerability of farmers in rural areas. However, this type of indicator ignores the motivation of farmers to actively default. The third perspective focuses on the impact of influencing factors including farmers' personal characteristics, family network infrastructure and economic characteristics of farm households on loan defaults through empirical research from specific farm household loan defaults, but they do not distinguish between the active and passive nature of factors that influence farm household loan defaults.

2. Methodology

2.1. Independent Samples T-test and Hypothesis Testing

Farmers engaged in agricultural activities depend on the weather and are thus subject to extreme weather conditions, while those engaged in non-agricultural activities are also exposed to investment risks due to market competition and policy changes. Farmers therefore adjust their consumption expenditure and loan repayment expectations in line with the various risks they face. As for the distinction between active and passive motivational attributes of farmers' default, Su and Hu (2014) argued that investment risk is a non-controllable factor for farmers and

financial institutions, and that effort is a controllable factor for farmers and non-controllable for financial institutions. They therefore found exposure to investment risk as a passive cause of farm household default and effort as an active factor of farm household default. Among the 17 influencing factors selected, for each influencing factor is divided into active and passive. However, the active and passive nature of each influencing factor is artificially divided, so its basic description of the variable is not objective. Here, we can use the sample data of the difference between farmers influenced by this factor to make default and non-default decision, and use the idea of hypothesis testing, to derive the general the final decision of the farmer under the influence of this factor. If the overall mean of defaulting farmers under the influence of a factor is greater than the overall mean of non-defaulting farmers, we can infer that the factor is an active default factor. This is because under the influence of this factor, farmers can choose to default or not to default, but the sample can verify the overall behavior. Most farmers choose to default under the influence of this factor, so we can objectively consider this factor as the active factor influencing farmers to default. This method of distinguishing between active and passive default factors is more scientific and objective than artificial subjective division. In addition, the remaining variables reflect the passive motivation of farmers to default.

After the SPSS analysis was completed, the study used independent sample t-test to determine the influence of various independent variables on farmers' default behavior, and the results showed that the sample mean of the defaulted farmer variable was greater than the sample mean of the non-defaulted farmer variable including internet, credit card, phone type, smart phone, online shopping, education(mother), education(father), status(mother), status(father), debt, trust, finance information, choice on investment, lnasset, lnincome, lnconsump. while the sample mean of the defaulted farmer for farm income and happiness was not greater than the sample mean of the non-defaulted farmer, so we can make the original assumptions about all variables based on the basic information of the sample data hypotheses and alternative hypotheses, where the hypotheses for all variables except for farm income and happiness. Let denote μ_{1i} represents the overall mean of the independent variable among defaulting farmers and μ_{2i} represents the overall mean of the independent variable among non-defaulting farmers, thus the original hypothesis is:

$$H_0: \mu_{1i} \leq \mu_{2i} \tag{1}$$

and the alternative hypothesis is:

$$H_1: \mu_{1i} > \mu_{2i}(i = 1,2,3,4,5,6,7,8,9,10,12,14,15,16,17,18) \tag{2}$$

As for farm income and happiness, the original and alternative hypotheses are:

$$H_0: \mu_{1i} \geq \mu_{2i} \tag{3}$$

$$H_1: \mu_{1i} < \mu_{2i}(i = 11,13) \tag{4}$$

Based on the Levene's variance equivalence test, the hypothesis test from Table 1 shows that internet, credit card, phone type, online shopping, education(mother), education(father), status(mother), status (father), debt, farm income, finance information, choice on investment, lnasset, lnincome, lnconsump differences are presented at the 0.01 level of significance. Factors including smart phone and happiness are at the 0.05 level of significance; and trust is presented at the 0.05 level of significance. Only the original hypothesis of trust cannot be rejected and the overall mean of trust among defaulting farmers is not greater than the overall

Table 1. Hypothetical test

Variable	Number	Mean	Significant Two-Tailed	Significant
internet(x_1)	729	0.8861	0.000	0.000
	4,661	0.6413	0.000	
credit card(x_2)	729	0.5542	0.000	0.000
	4,661	0.2678	0.000	
phone type(x_3)	729	0.9973	0.007	0.000
	4,661	0.9850	0.000	
smartphone(x_4)	729	0.1920	0.017	0.000
	4,661	0.1442	0.028	
online shopping(x_5)	729	0.8162	0.000	0.000
	4,661	0.5372	0.000	
education(mother)(x_6)	729	0.2126	0.000	0.000
	4,661	0.1068	0.000	
education(father)(x_7)	729	0.3278	0.000	0.000
	4,661	0.1927	0.000	
status(mother)(x_8)	729	0.0960	0.000	0.000
	4,661	0.0571	0.001	
status(father)(x_9)	729	0.2565	0.001	0.000
	4,661	0.2038	0.002	
debt(x_{10})	729	12.3539	0.000	0.000
	4,661	3.0965	0.000	
farm income(x_{11})	729	1.0658	0.000	0.000
	4,661	2.4040	0.000	
trust(x_{12})	729	0.0658	0.180	0.008
	4,661	0.0536	0.212	
happiness(x_{13})	729	0.1454	0.040	0.000
	4,661	0.1764	0.030	
finance information(x_{14})	729	0.1385	0.000	0.000
	4,661	0.0931	0.001	
choice on investment(x_{15})	729	0.1742	0.000	0.000
	4,661	0.1212	0.000	
lnasset(x_{16})	729	14.0974	0.000	0.000
	4,661	13.1740	0.000	
lnincome(x_{17})	729	11.2593	0.000	0.703
	4,661	10.8352	0.000	
lnconsump(x_{18})	729	11.3004	0.000	0.007
	4,661	10.5411	0.000	

mean of trust among non-defaulting farmers. Therefore, farm income, trust and happiness are passive default factors and the remaining variables are active factors.

2.2. Logit and Probit Model

We investigate the status of farm-related loan default based on the household finance survey data of Southwest University of Finance and Economics, using binary discrete variables as the dependent variable. In this paper, we use the latest survey data in 2017 and visit farmers' households and local financial institutions to find that farmers are reluctant to mention their household financial default. In order to examine the various influencing factors behind farmers' loan default, we select various variables that can reflect farmers' default behaviour for empirical analysis. In order to study the various influences behind the default behaviour of farmers, we selected various variables that reflect farmers' default behaviour for empirical analysis. Therefore, the following basic least squares regression model (5) is built.

$$y = \beta_0 + \beta_1 internet + \beta_2 credit\ card + \beta_3 phone\ type + \beta_4 smartphone + \beta_5 online\ shopping + \beta_6 edu(mother) + \beta_7 edu(father) + \beta_8 status(mother) + \beta_9 status(father) + \beta_{10} debt + \beta_{11} farm\ income + \beta_{12} trust + \beta_{13} happiness + \beta_{14} finance + \beta_{15} choice + \beta_{16} lnasset + \beta_{17} lnincome + \beta_{18} lnconsump \quad (5)$$

Before the empirical test of variables, we first predict the coefficient symbol of each variable. Through the previous knowledge and the distinction criteria between the initiative and passivity of factors affecting farmers' loan default determined in Table 1, we can predict the coefficient symbol direction of each variable, and then test the correctness of the symbol direction through the empirical results. Indicators related to the family's network and communication infrastructure include the number of smart phones, online shopping, the Internet and the type of mobile phones, which reflect the openness of family members. At the same time, there are a large amount of financial knowledge and financial opportunities on the Internet, and farmers can make small loans through access to the Internet. Meet the loan needs of farmers in order to better carry out production and consumption, which is conducive to the increase of farmers' family income. Therefore, the coefficient sign is expected to be negative. The education level of the father or mother will affect the family's loan choice. Generally speaking, the higher the education level, the more comprehensive the understanding of loan knowledge. Therefore, the family's income and expenditure will be reasonably distributed, and the loan default will not occur. Therefore, the education level is inversely proportional to the loan default expectation. Generally speaking, the political status of parents is that the political consciousness of Party members and cadres is relatively high, and the probability of loan default is reduced. Farmers' trust in strangers can affect farmers' choice of loan institutions. There are more and more informal loan institutions. Farmers who are easy to trust others are easy to borrow from informal loan institutions for production and consumption. However, informal institutions have high loan interest rate and immature loan operation, which is higher than the loan default rate of formal institutions. Happiness means that farmers will not repay the loan by reducing the current consumption level, which is called the habit effect of consumption. Therefore, the coefficient symbol is expected to be positive. The higher the farmers' attention to financial information, the greater the probability

of investment and financial management. However, various financial information is good or bad, farmers' financial knowledge is weak, and they are easy to be cheated. Therefore, the coefficient symbol is expected to be positive. The coefficient directions of household assets, liabilities, income and other indicators are similar to previous studies and will not be explained.

Table 2. Variable expected symbol

Variable	Coefficient Expected Sign
a default loan	-
internet	negative
credit card	negative
phone type	negative
smart phone	negative
online shopping	negative
education(mother)	negative
education(father)	negative
status(mother)	negative
status(father)	negative
debt	positive
farm income	negative
trust	positive
happiness	positive
finance information	positive
choice on investment	negative
lnasset	negative
lnincome	negative
lnconsump	positive

This paper is based on the questionnaire data of farm households in rural areas, and the dependent variable is the existence of outstanding bank loans of farm households, so the actual data obtained are binary discrete variables, and the general linear probability model cannot explain the binary discrete variables, so here we choose logit and probit models for analysis, in the general linear probability model.

$$y_i = \begin{cases} 1 \ there\ is\ a\ default\ loan \\ 0 \ there\ is\ no\ default\ loan \end{cases} \tag{6}$$

$$E(y_i) = p_i \tag{7}$$

Among them, it is only true when the value of p_i is between (0,1), otherwise there will be a contradiction, so we assume that there is an unobserved latent variable y_i^*, which has a linear relationship with x_i, that is:

$$y_i = \begin{cases} 1, y_i^* > 0 \\ 0, y_i^* \le 0 \end{cases} \tag{8}$$

$$y_i = 1 - F(-x_i'\beta) + \mu_i \tag{9}$$

The type of F distribution function determines the type of binary selection model. When the distribution function obeys the logical distribution, the corresponding binary selection model is the Logit model. When the distribution function obeys the standard normal distribution, the corresponding binary selection model is a Probit model. In addition, we also considered the marginal effect of x_i and $p(y = 1|x)$.

2.3. Data Source and Variable Selection

The data used in this paper come from the 2017 China Household Finance Survey data set, which contains three data sets, namely the household part, the individual part and the regional part. In this paper, the household and individual datasets are selected and combined, from which areas with rural household registration are selected to analyse the loan default problem of rural households in household finance. The selected indicators relate to individual and household characteristics, household borrowing and debt status, asset status, income status, household expenditure status, financial risk knowledge, and internet infrastructure. As the household and individual data set contained a large number of invalid questionnaires, 5,390 valid questionnaires were obtained after eliminating invalid questionnaires. This paper focus on the descriptive statistics of the 5,390 valid questionnaires. Table 3 shows the specific meaning of each variable, which is from the household financial data set. The data set used in this article contains many variables. The sample statistical description of a single variable is omitted here. It is easy to understand the meaning of the indicators of household network and communication infrastructure, assets, income and consumption, but the following indicators need to be explained here. For example, parents' education level and parents' political outlook are ordered variables. The classification order of education level is: 1 - no school, 2 - primary school, 3 - junior high school, 4 - senior high school, 5 - technical secondary school, 6 - Junior College, 7 - undergraduate, 8 - Master, 9 - doctor. The order of political outlook is: 1 - members of the Communist Youth League, 2 - members of the Communist Party of China, 3 - democratic parties and other parties, and 4 - the masses. Other ordered variables also include the type of mobile phones and the number of smart phones. The classification order of attention to economic and financial information is: 1 - very concerned, 2 - very concerned, 3 - general, 4 - little concerned, 5 - never concerned. The selection and classification order of investment project risk and return is: 1 - high risk and high return projects, 2 - slightly high risk and slightly high return projects, etc. Due to limited space, only the first few items are listed here. Farmers' trust in strangers is measured by investigating farmers' answers to five different questions: "very trust", "comparative trust", "general trust", "distrust" and "very distrust". Similarly, the investment choice of farmers is measured by investigating the income and risk choice of farmers for investment projects from high to low. Farmers' attention to financial information is measured from high to low. The above indicators have an impact on Farmers' loan default.

Table 3. Variable meaning – Part 1

Variable	Variable Meaning
internet	whether to use the internet (Yes=1,No=0)
credit card	whether to use a credit card(Yes=1,No=0)
phone type	phone type 1-smart phone, 2-non smart phone, 3-no mobile phone
smart phone	number of smartphones 0-5, 6-10, 11-15, 16-20
online shopping	whether to shop online (Yes=1,No=0)
education(mother)	mother's education (1-9) 1 - no school, 2 - primary school, 3 - junior high school, 4 - senior high school, 5 - technical secondary school, 6 - Junior College, 7 - undergraduate, 8 - Master, 9 - doctor
education(father)	father's education 1 - no school, 2 - primary school, 3 - junior high school, 4 - senior high school, 5 - technical secondary school, 6 - Junior College, 7 - undergraduate, 8 - Master, 9 - doctor
status(mother)	mother's political outlook 1 - members of the Communist Youth League, 2 - members of the Communist Party of China, 3 - democratic parties and other parties, 4 - the masses
status(father)	father's political outlook 1 - members of the Communist Youth League, 2 - members of the Communist Party of China, 3 - democratic parties and other parties, 4 - the masses
debt	total liability
farm income	total agricultural income
trust	trust in people you don't know 1 - very trust, 2 - relatively trust, 3 - general trust, 4 - not very trust, 5 - very distrust
happiness	Happiness 1 - very happy, 2 - happy, 3 - generally happy, 4 - unhappy, 5 - very unhappy
finance information	attention to financial information 1 - very concerned, 2 - more concerned, 3 - general, 4 - little concerned, 5 - never concerned

Table 3. Variable meaning – Part 2

Variable	Variable Meaning
choice on investment	choice of return and risk of investment project 1 - high risk and high return projects, 2 - slightly high risk and slightly high return projects, 3 - average risk and average return projects, 4 - slightly low risk and slightly low return projects, 5 - unwilling to take any risk, 6 - don't know
lnasset	logarithm of total assets
lnincome	log total income
lnconsump	log total consumption

3. Results

3.1. Logit and Probit Model Estimation Results for Each Variable

Table 4 shows the estimation results of all variables. It has advantages in estimating the influence of binary discrete variables on dependent variables in binary selection model.

Table 4. The binary regression analysis of farmers' default probability – Part 1

A default loan	Dependent variable: (1 = yes,　0 = no)	
	Logit model	Probit model
finance information	0.0828*	0.0403*
	(1.890)	(1.740)
return on investment	-0.0243	-0.0123
	(-0.670)	(-0.640)
credit card	0.444***	0.264***
	(4.310)	(4.780)
internet	0.454***	0.217***
	(2.840)	(2.790)
phone type	-0.440**	-0.196**
	(-2.180)	(-2.080)
smartphone	-0.0938**	-0.0577**
	(-2.160)	(-2.500)
online shopping	0.508***	0.265***
	(3.910)	(4.070)
education(mother)	0.0192	0.0124
	(0.430)	(0.510)
education(father)	0.0977**	0.0539**
	(2.460)	(2.500)
status(mother)	-0.0895	-0.0398
	(-1.120)	(-0.910)

The superscript ***, **, * are significant at the level of 1%, 5% and 10%, respectively. The t-statistic is in brackets.

Table 4. The binary regression analysis of farmers' default probability – Part 2

A default loan	Dependent variable: (1 = yes, 0 = no)	
	Logit model	Probit model
status(father)	0.0909	0.0510*
	(1.570)	(1.670)
trust	-0.0986*	-0.0507*
	(-1.840)	(-1.800)
happiness	0.0137	0.00633
	(0.420)	(0.370)
lnincome	0.0215	0.0135
	(0.910)	(1.110)
farm income	-2.02e-06	-1.00e-06
	(-1.450)	(-1.580)
lnasset	-0.00680	0.0123
	(-0.170)	(0.580)
lnconsump	0.0172	0.0186
	(0.230)	(0.470)
debt	2.78e-06***	1.07e-06***
	(15.24)	(17.58)

The superscript ***, **, * are significant at the level of 1%, 5% and 10%, respectively. The t-statistic is in brackets.

3.2. Binary Regression Analysis of Farmers' Default Probabilities

From the logit and probit regression results of the binary regression analysis of farmers' default probability in Table 4, it can be seen that the factors that significantly affect farmers' bank loan default behavior include internet, credit cards, phone type, smart phone, online shopping, father's education, debt, trust and financial information. In contrast, mother's education, parents' political affiliation, farm income, happiness, choice on investment, total household assets, total household income and total household consumption are not significant for farm loan default. The opposite sign of the coefficients is found in the graph for internet, credit cards, online shopping, parents' education, mother's political affiliation, trust, and total household income. Next, we delve into the analysis of the effects of the individual independent variables.

According to personal characteristics, the higher the father's education level, the higher the probability of default, which is contrary to common sense and existing research. According to the statistical data, the education level of fathers in rural areas accounts for the largest proportion of primary school and junior middle school education, and only two of them have master's degree. Therefore, the overall education level in rural areas is very low. The probability of loan default in rural areas is generally higher. This is a relative indicator. The education level of mothers was not significant. Those whose parents are party members usually have greater social influence in rural areas. Therefore, they will reduce the default of loans because of their face and leader status. As for indicators of trust, rural people have conservative ideas and

traditions. They are less likely to trust others outside their family, and therefore less likely to be deceived by people they do not know, and less likely to engage in risky activities. The indicator of farmers' happiness is not significant. It is classified as an active default factor, where it is generally difficult for farmers' happiness to be expressed in household economic decisions, and therefore the factor of farmers' happiness is not significant.

According to household financial characteristics, there is a negative correlation between total household assets and loan default, while there is a positive correlation between total household income and loan default. It is because that the total income of farm households includes total agricultural income, household income from wages and business income, etc. Households with diverse income sources are also more exposed to income fluctuations. Therefore, when the total household income of farmers increases, the loan default behavior will increase. The more total household assets, the more funds can be used to repay the loan, so loan default will decline. The higher the aggregate household consumption, the higher the probability of default. When the total household income remains unchanged, the more the household's existing consumption expenditures are, the less household residual income will be. For the indicator of aggregate farm income, we can learn from the descriptive statistics that in the modernization process, urbanization in rural areas has accelerated. Farm income in farm households is becoming less and less and household business income and wage income are becoming more and more, therefore, the factor of total farm income is not significant.

According to level of household risk knowledge, for financial information concern, the empirical results show that the less concerned farmers are about financial information, the higher the probability of default. For the indicator of investment risk-return choice is not significant, it is because that farmers lack professional investment financial knowledge about investment risk-return choice, and therefore knowledge about risk and return is also deficient. The indicator of whether or not to use credit cards reflects credit evaluation of financial institutions for serving customers. The empirical results show that farmers who use credit cards have a higher probability of default. Farmers who use credit cards for large consumption, the pressure to repay the loan when due is great.

According to network infrastructure characteristics, all four independent variables on network infrastructure are significant, specifically, the regression coefficient of 0.454 for the indicator of whether or not to use the Internet, which indicates that farmers' loan defaults are more influenced by whether or not farmers' households use the internet. This goes against common sense and some existing studies. In this regard, It is because that farmers have easy access to novel investment and financial management methods on the internet, and will increase their household investment and financial projects such as stocks, funds, bonds, etc. However, there are greater risks in online investment and financial projects, so there is a greater probability of default.

3.2. Analysis of Marginal Effects

The marginal effects of the independent variables were further plotted to determine which type of characteristics of the independent variables dominated the effect on the dependent variable in influencing farm loan default. As shown in Figure 1, the marginal

utility of default for the sample of farmers, the marginal effects of the independent variables show that the use of credit cards, online shopping and internet access have the largest marginal effects on the dependent variable, and all three indicators reflect the level of internet infrastructure in rural areas, so the level of digital financial services in rural areas dominates the dependent variable in this empirical analysis. The dominant effect is therefore on the dependent variable in this empirical analysis. This provides ideas on the concentrate on the development of digital financial infrastructure in rural areas in the adoption of supportive policies for rural areas. Here we use x1 to x18 to represent the above variables.
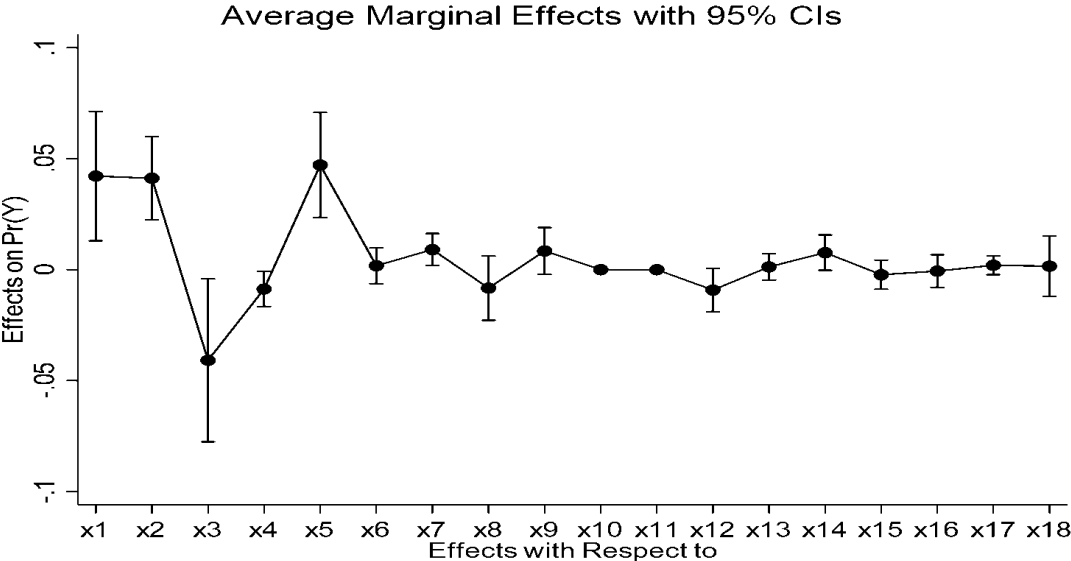
Figure 1. Average marginal effects

4. Discussion and Conclusions

Based on the household financial survey data set released in 2017, this article uses the independent sample t-test method to distinguish the active factors and passive factors affecting farmers' default, and uses logit and probit model to test the significance and marginal effect analysis of all independent variables affecting farmers' loan default. From this, we can draw three conclusions: (1) the impact of active and passive factors on Farmers' default is obviously different. Therefore, it is necessary to divide the active and passive attributes of factors affecting farmers' default, which is conducive to formulating differentiated strategies to reduce farmers' default. (2) In the empirical test of significance, among the personal characteristic factors of farmers, only the variable of father's education is significant, and the other independent variables are not significant. Among the family financial characteristic factors of farmers, only the total household debt is significant, and the other variables are not significant. As for the level of household risk knowledge of farmers, only the attention of financial information is significant. As for the characteristics of home network infrastructure, it is an independent variable, which is significant. (3) The marginal effect results show that in the impact of farmers' loan default behavior, whether farmers use credit card, online shopping and Internet have the greatest marginal impact on the dependent variable and occupy the leading role. For farmers affected by active default, psychological

care can be provided to enhance their sense of well-being and trust. For farmers affected by passive default, policy subsidies, network infrastructure development and risk education in rural areas can be provided. The government should promote the digitization of financial loan services in rural areas. Besides, Promoting the supply side structural reform and information transparency of rural credit cooperatives. The means of asset quality management should be innovated at all times, and online real-time dynamic monitoring should be implemented to reduce the occurrence of breach of contract. Farmers' cognitive ability about risk and the depth of financial knowledge affect farmers' loan default behavior. Therefore, we should promote financial liberalization in rural areas, and update the financial knowledge system and strengthen farmers' understanding of risk expectations. Educational attainment in rural areas is still low. We need to continue to implement compulsory education, especially in rural areas. It is generally accepted that the stronger the farmer's sense of well-being, the greater the level of satisfaction for themselves, the less likely they are to engage in active default. Therefore, while supporting farmers with industrial financing, it is also important to increase the happiness of farmers and the trust between them. This requires the coordination role of village cadres and the implementation of national policies. Financial policies need to be based on ensuring the basic living standards of farmers and constantly enriching the cultural and social life of farmers. It is important to ensure that all aspects of food, clothing, housing and transport are protected.

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