

Impact Factors Analysis of Credit Demand of Rural Households in China's Poor Area

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Abstract

With micro survey data of 1323 Chinese rural households in poor area, impact factors are analysed with Probit model. Propensity score matching method is used to estimate the impact of credit on rural household welfare loss. Results indicate that education expenditure and fees for marriage service, medical expenditure and spending on house buildings have significant positive impact on credit demand. Compared with those that do not borrow money, loans significantly impact the welfare loss of rural households. Finally we give some suggestions.

Key words: *rural households; credit; probit models; propensity score matching method*

1 Introduction

Experience of rural area modernization in developed countries indicates that rural credit can improve rural households income growth when rural economics developed to some extent. Rural finance is the core of rural economics. Constructing a modern rural financial system is of great importance. Development of credit operations in China showed an obvious dual structure. Personal credit mainly serves urban residents which lead to a small amount of rural credit and less credit growth in rural area. Imperfect rural financial systems and absence of rural financial services impeded the development of credit market in rural area. Moreover, with lower income and less mortgage assets, availability of credit is really limited to rural households. Influenced by traditional consumption concept and imperfect social insurance system, rural households were reluctant to loan compared with urban residents. The research aimed to analyze which factors influenced rural household credit demand and which ones made a great degree of influence.

Since rural financial markets were often short of mortgage and auxiliary branches, execution of contracts were very difficult. Many scholars, at home or abroad, have studied development of rural finance. Hoff&Stiglitz¹considered that rural financial market was highly split. Even if in the same market financial instruments used by clients were differentiated in interest rates, mortgage amounts and resources spent on supervision and execution of contracts. Zhaoxia² studied the relationship between rural household consumption and liquidity constraints. Results showed that rural households were more likely to be constrained. Consumer credit alleviated liquidity constraints and motivated consumption growth of rural households. Huang Zuhui et al.³revealed that in sampled areas, most rural households used formal and informal

credit for the purpose of daily consumption. Rui Li et al.⁴ examined the impact of credit rationing on the net income and consumption of Chinese rural households by studying survey panel data from 1000 Chinese rural households from 2003 to 2009. Results revealed that 61.5% of Chinese rural households were rationed in the credit market; 52.0% were completely rationed and 9.5% were partially rationed. In particular Wang Juan and Li Rui⁵ estimated the extent of consumer credit constraints as well as its impact on the net income and consumption expenditure of rural households using recent survey panel data from 1000 Chinese rural households from 2005-2011.

On the basis of previous studies, the paper analyzed impact factors of rural households of China in poor area with micro survey data. The rest of the paper is organized as follows: Section 2 describes survey data sources; Section 3 is empirical analysis and section 4 concludes.

2 Data source

Data used in the paper comes from the data base constructed by our project team in 2014. Data were collected from rural households by face to face communication. Existing researches were often lack of rural household credit information in poor area. According to economic development level we randomly chose five provinces named Sichuan, Henan, Hunan, Shandong and Gansu. Altogether we surveyed 1323 households. The data base contained information on production, income, expenditures, financial credit and basic information of the village, which provided rich experience for us.

3 Empirical analysis

3.1 Impact factors analysis based on Probit model

In real world people were always faced with two choices problems. In rural credit market both households and banks needed to make a decision. Participation of rural households in credit market is determined both by their credit demand and supply of credit. Probit model is very popular in dealing with dummy explained variable. With cumulative normal distribution it avoided the infinity problem that existed in linear probability model. The general form of Probit model is as follows:

$$P(Y = 1|X) = \int_{-\infty}^{X'\beta} \phi(t)dt = \Phi(X'\beta) \quad (1)$$

$\Phi(t)$ is the distributed function of standard normal distribution. Let whether the rural household has credit be explained variable, land holdings, pure income of the family, age of households, education, size of the family, last year-end assets, whether take part in the New-Type Rural Cooperative system, whether a leader family, medical expenditure, education expenditure and durable commodity expenditure be exogenous explaining variable. Estimation results are listed in table 1. We found that credit demand was positively affected by last year-end assets, whether taking part in the New-Type Rural Cooperative system, medical expenditure, education expenditure and

lasting commodity expenditure. Pure income of the family and age of the households had a significantly negative impact on family's credit demand. Education expenditure and lasting commodity expenditure usually are very large, urgent and rigid for rural households. They had to borrow from others. When children go to college and get married, many households may borrow money for fees of these services. Although most of the households took part in the New-Type Rural Cooperative system, their medical burden hasn't been alleviated. When family members fall ill, they also need to borrow.

Table 1 Estimation results of Probit model

Variable	coefficient	Standard error
land	-0.0005	0.0022
income	-0.1908	0.0948
age	-0.0096	0.0056
assets	0.1008	0.0565
education	-0.0157	0.0227
New-Type Rural Cooperative system	0.5916	0.2812
education expenditure	0.00008	0.00002
A leader family	0.0342	0.2076
Family size	0.0334	0.0371
Education expenditure	0.00009	0.000012
lasting commodity expenditure	0.00005	0.00002
constant	-0.4486	0.9757

3.2 Average treatment effect analysis based on Propensity Score Matching method

We use propensity score matching method to estimate the impact of credit on rural households consumption expenditure. The method was first proposed by Rosenbaum and Rubin in 1983 and then widely used in the field of labor economics. In our analysis, for arbitrary household i , let $(Y_i(1), Y_i(0))$ denote the latent consumption expenditure of the family, where $Y_i(1)$ represents consumption expenditure if household loans otherwise the consumption expenditure is $Y_i(0)$. Let $D_i \in (0, 1)$ represents the states of the household, where $D_i = 1$ denotes that the household do loan, otherwise the household doesn't. Propensity score is defined as $P(X) \equiv \Pr(D = 1 | X) = E(D | X)$. Thus average treatment effect can be calculated as

follows:

$$\begin{aligned}
 ATT &= E\{Y_{1i} - Y_{0i} \mid D_i = 1\} = E[E\{Y_{1i} - Y_{0i} \mid D_i = 1, p(X_i)\}] \\
 &= E[E\{Y_{1i} \mid D_i = 1, p(X_i)\} - E\{Y_{0i} \mid D_i = 0, p(X_i)\} \mid D_i = 1]
 \end{aligned}
 \tag{2}$$

We use the nearest matching, radius matching and kernel matching to calculate average treatment effect. The rule of nearest matching is $C(i) = \min_j \|p_i - p_j\|$, where $C(i)$ represents the collection of households that don't have loans but have the nearest propensity score with household i . Accordingly rule for radius matching is $C(i) = \{\|P_i - P_j\| \leq r\}$. After matching Becker and Ichino(2002) gave the following formula to calculate ATT:

$$ATT^M = \frac{1}{N^T} \sum_{i \in T} Y_i^T - \frac{1}{N^T} \sum_{j \in C} \omega_j Y_j^C
 \tag{3}$$

The ATT formula for kernel matching is

$$ATT^k = \frac{1}{N^T} \sum_{i \in T} \left\{ Y_i^T - \frac{\sum_{j \in C} Y_j^C G\left(\frac{p_j - p_i}{h_n}\right)}{\sum_{k \in C} G\left(\frac{p_k - p_i}{h_n}\right)} \right\}
 \tag{4}$$

Picture 1 gives the distribution of propensity score for both households that have loans and don't have loans. We found that the matching results were comparatively satisfied.

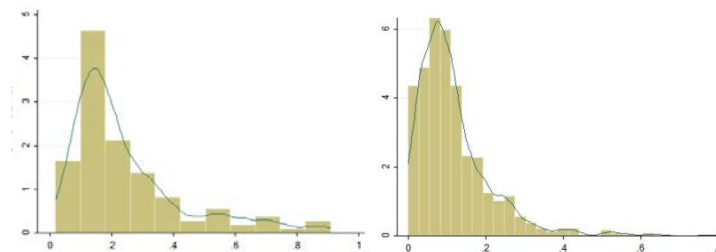


Fig.1 Distribution pictures of propensity score

Using above mentioned three formulas, the results of ATT are listed in Table 2.

Table 2 Results of ATT

Methods	ATT
Nearest matching	14633.49 (3265.62) ***
Radius matching	17189.56 (3607.15) ***
Kernel matching	14345.95 (3404.75) ***

It's obvious that loans will significantly improve households consumption expenditure.

4 Conclusions

With micro survey data of rural households in China, the paper empirically analyzed the impact factors of credit demand and its welfare loss for rural households in poor areas. Probit models and propensity score matching method were used in the paper. Our results revealed that rural people in poor areas often borrowed money for expenditures of their children's marriages and education, buying houses and fees for medical services. Compared with households that don't loan, credit significantly improves household consumption expenditure. Based on our results, we suggest that governments should establish more efficient financial systems and rural social insurance systems in countryside. Meantime banks should improve financial services and design various financial instruments to alleviate credit rationing of rural households.

Since the restriction of our project fund, in this paper we only used samples from five provinces in China. Large samples are needed for further study.

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