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Does the Financial Literacy of Householders Affect Household Credit Constraints? —Evidence from China

Zhao Juan[a,b]

a. School of Business, Linyi University, Linyi, China
b. Center for International Education, Philippine Christian University, Manila, Philippines

Abstract: Financial literacy has gained increasing importance as a policy objective in many nations. While a substantial body of research has explored the influence of financial literacy on household financial behavior, there remains a limited body of literature examining household credit constraints through the lens of financial literacy. This paper aims to address this gap by analyzing the impact of householders' financial literacy on household credit constraints, leveraging data from the 2017 China Household Finance Survey (CHFS2017), and employing Probit regression analysis. Our findings underscore a significant relationship between higher levels of financial literacy and the alleviation of credit constraints within households. In essence, householders possessing enhanced financial literacy are better equipped to mitigate credit constraints. This underscores the potential of improving financial literacy to alleviate credit constraints and, subsequently, advance financial inclusion.

Keywords: financial literacy, credit decision-making, credit constraints

1. Literature review

Currently, the financial market operates with inherent imperfections, leading to varying degrees of financial exclusion among participants. This imperfection creates barriers that prevent certain households from accessing the credit they require. The primary reasons behind this phenomenon can be outlined as follows:

Supply-Demand Imbalance: The supply and demand for financial products and services are currently imbalanced. Formal financial institutions like banks often impose additional conditions that limit the accessibility of financial products and services for specific target groups.

Limited Understanding of Formal Institutions: Many individuals lack a comprehensive or unbiased understanding of formal financial institutions. They may hold unilateral beliefs that they will be rejected when applying for credit from these institutions. Consequently, they self-exclude from the formal financial market.

Research has consistently demonstrated that financial literacy plays a pivotal role in household credit decision-making. Higher levels of financial literacy empower individuals to make informed decisions, diversify their sources of financing, optimize their financing structures, enhance financial stability, and improve their resilience to financial risks.

The "Consumer Financial Literacy Survey and Analysis Report" (2021) published by the People's Bank of China highlights a prevalent inadequacy in the financial literacy of Chinese residents, particularly among those with lower levels of education and income. This deficiency significantly contributes to credit constraints faced by Chinese households.[1]

This paper aims to address this issue by analyzing data collected in the 2017 China Household Finance Survey (CHFS2017). Our central research question investigates whether individuals with higher levels of financial literacy are more likely to alleviate credit constraints imposed by formal financial institutions. To answer this question, we calculate a financial literacy score through principal component analysis and employ the Probit regression analysis model, Instrumental Variable Estimation (ivProbit), and Wald estimation. Our findings indicate that individuals with greater financial literacy are indeed more likely to mitigate credit constraints. Therefore, improving financial literacy can effectively alleviate credit constraints and promote financial inclusion.

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Corresponding email: sdtym@163.com (Zhao Juan)
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The structure of the paper is as follows:
Section 2 reviews relevant literature on the impact of financial literacy and factors influencing credit constraints.
Section 3 establishes the theoretical framework and outlines our research hypothesis.
Section 4 describes our research methodologies.
Section 5 presents the financial literacy score used in our study, along with descriptive analyses and results.
Section 6 conducts robustness tests.
The final section provides conclusions and recommendations.

2. Literature Review

Financial literacy is a critical tool for rectifying cognitive biases among individuals and increasing demand for credit within households. Noctor et al. [2] were among the first to define financial literacy, asserting that it equips households with the knowledge necessary for making optimal financial choices and managing funds. Building upon this foundation, subsequent scholars have continued to refine the concept of financial literacy. Kim [3] posits that financial literacy encompasses financial knowledge essential for individuals to participate effectively in modern financial markets and understand a wide array of financial products. This perspective is shared by scholars such as Servo and Kaestner.[4]
The widely accepted definition of financial literacy within the academic community is that proposed by the OECD (2011). According to the OECD, financial literacy encompasses various dimensions, including financial knowledge, skills, awareness, attitudes, and behaviors. [5] These dimensions collectively inform individuals' ability to navigate personal financial issues, make optimal financial decisions, and enhance their overall well-being.
Credit constraints, as defined by Huang et al., denote the inability of households to effectively meet their credit needs in the present or the future [6]. These constraints can be categorized into supply constraints and demand constraints, examining the issue from the perspectives of both supply and demand.
Credit Supply Constraints arise due to factors such as the risk of asymmetric information, adverse selection, or inherent limitations within financial institutions. In such cases, financial products or services offered by these institutions fail to adequately fulfill the requirements of loan applicants.[7]
Credit Demand Constraints, on the other hand, pertain to situations where individuals involuntarily forgo some or all financial products or services due to transaction costs, service quality, or perceived risk factors.
Early research on household credit constraints, particularly among farming households, often centered on the challenges faced by farmers in securing credit from formal financial institutions. Scholars generally concurred that farmers encountered credit constraints when applying for loans from such institutions. These constraints often stemmed from factors like the absence of collateral and guarantee mechanisms. [10] Additionally, farmers' limited income sources, which primarily depended on agricultural activities, also contributed to their credit constraints.[9]
From the perspective of credit supply, financial institutions imposed high credit barriers, employed overly complex lending processes, exhibited low lending efficiency, and sometimes demonstrated poor customer service, all of which were significant reasons for farmers experiencing credit constraints.[11]
More recent research has expanded the understanding of credit constraints by considering the development of the digital economy and the subjective attributes of householders, such as their financial knowledge and skills. It has been found that these subjective factors can also alleviate credit constraints imposed by financial institutions.[12][13]
In summary, both domestic and international scholars have extensively analyzed credit constraints, with a predominant focus on objective factors affecting credit behavior, particularly among farmers, and the perspective of a limited supply of financial products and services by financial institutions. However, there is relatively limited literature that examines household credit constraints from the vantage point of financial literacy. This paper bridges this gap by utilizing the 2017 China Household Finance Survey (CHFS2017) Database to investigate the influence of householders' financial literacy on credit constraints. It introduces a fresh perspective for understanding the factors contributing to household credit constraints in China, offering a valuable complement to existing research in this field.

3. Theoretical Analysis and Research Hypothesis

The constraint on residents' credit demand is generally caused by the following two factors: firstly, the insufficient supply of financial products and services leads to an imbalance between supply and demand. Financial institutions, to choose more high-quality customers and avoid credit risks, raise the limitation for

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financial market participation and exclude some residents from the financial market. Secondly, residents are limited by their lack of financial knowledge and cannot fully understand the risks and benefits of the financial market. Financial literacy can affect household credit arrangements. The improvement of financial literacy will enable households to optimize the source of loan funds, improve the possibility of obtaining credit from formal financial institutions, and choose more favorable loan strategies [14],[15]. Households with higher levels of financial literacy will participate in risk markets, making their investment portfolios more reasonable [16], and will also avoid financial risks by participating in the insurance market [17]. Households with lower financial literacy are constrained by more formal financial institutions when participating in the financial market, and these households must turn to informal financial institutions with higher credit costs [13]. Meanwhile, households with lower financial literacy may experience excessive debts due to excessive use of borrowing tools, resulting in the inability to pay the debts on schedule [18]. In short, households with high financial literacy can make the best credit decisions based on changes in the financial market to alleviate financial constraints. Therefore, this paper proposes.

Hypothesis: Householders with higher levels of financial literacy are more likely to mitigate the credit constraints of formal financial institutions.

4. Research Methodology

4.1 Data sources

The data for this study was sourced from the 2017 China Household Finance Survey (CHFS2017), conducted by Southwestern University of Finance and Economics. The survey encompasses various data related to demographics, household assets and liabilities, insurance and security, as well as expenditure and income. To suit the research objectives, the initial step involved defining the measurement dimension of householders' financial literacy levels.

In this paper, principal component analysis was employed to derive the financial literacy levels of the sampled householders. Subsequently, these levels were subjected to empirical analysis in conjunction with individual characteristic variables of householders, household-related variables, and credit constraint variables, among others. To ensure data quality, households without loan demand, as well as outliers, extreme values, and missing data points in the variables under consideration, were excluded. This rigorous data-cleaning process resulted in the retention of 12,463 valid samples.

4.2 Data Analysis

For data analysis, Stata version 16.0 was utilized. Descriptive statistics, including means, standard deviations, and the range of values (minimum and maximum), were computed to provide an overview and validate the financial literacy levels of householders and the extent of household credit constraints.

4.3 Research method and model setting

This paper adopts the regression analysis method and the Probit model. When the dependent variable is a binary discrete variable, that is, a variable with only 0 and 1, it is not applicable to the simplest linear regression model, because the linear regression model may lead to homoscedasticity and heteroscedasticity. Compared to the Logistic model, the Probit model has more free assumptions can obtain more statistically significant regression results, and has stronger explanatory power for economics. The dependent variable of this paper is whether there is a credit constraint, which belongs to a binary discrete variable. Therefore, this paper uses the Probit model. The Probit model is set as follows:

$$Y=\beta\_0+\beta\_1\ fliteracy+\beta\_2\ X+\varepsilon \qquad (1)$$

Where, Y is the dummy variable and the dependent variable, which specifically refers to credit constraints. When households have credit needs and are unable to obtain credit from formal financial institutions due to various reasons, they are subject to credit constraints. If there is a credit constraint, it is recorded as "1", otherwise it is recorded as "0". Where, fliteracy is financial literacy which is the core independent variable, and X is the control variables, β_0 is a constant term, β_1 and β_2 is the parameter to be estimated, ε is the error term.

5. Empirical Results and Analysis

5.1 Variable Descriptions

1. Financial literacy: Financial literacy is the core independent variable of this paper. There is no standard framework for measuring financial literacy. Referring to the practices of existing literature [19] and combined with data from the CHFS2017, the financial literacy level of sample householders is measured from five dimensions: householders' attention to economic and financial information, calculation of interest rates, understanding of inflation rates, householders' judgment of stock and fund market risks, and householders' risk preferences. The various indicators and their assigned values are shown in Table 1.

Table 1: Dimensions of Householders' Financial Literacy Indicators

Measurement dimensions of financial literacy		Assignment
Financial literacy	Degree of attention to economic and financial information	According to the degree of attention to economic and financial information, the values are 1-5 from low to high
	Calculation of interest rates	The correct answer is 2, the incorrect answer is 1, and cannot be calculated as 0
	Understanding of inflation rates	The correct answer is 2, the incorrect answer is 1, and the others are 0
	Understanding of the market risks of stocks and funds	All answered correctly as 3, answered incorrectly as 2, only heard of one type as 1, never heard of it as 0
	Householder's risk preference	Preference for high risk=5, slightly higher risk=4, average risk=3, slightly lower risk=2, aversion risk=1, unknown=0

his paper utilizes Stata 16.0 and employs principal component analysis to compute the financial literacy levels of householders. The Kaiser-Meyer-Olkin (KMO) value, which stands at 0.7617, surpasses the threshold of 0.6, signifying the suitability of principal component analysis. Based on the criterion that eigenvalues should be greater than or equal to 1, a factor, denoted as financial literacy, can be extracted. Descriptive statistics pertaining to householders' financial literacy levels are presented in Table 2.

2: Credit Constraint: The dependent variable in this study is credit constraint, denoting the restrictions or limitations imposed on households when seeking credit from formal financial institutions like banks, leading to an inability to secure credit or meet their credit requirements. This paper identifies households that cannot access credit from formal financial institutions such as banks as being subject to credit constraints.

3: Control Variables: Drawing on relevant Chinese and foreign research [20],[18], this study includes the following control variables, primarily encompassing family-related factors, individual characteristics, and regional attributes. Family factors encompass whether the household owns residential property and family size. Individual characteristics consist of the householder's age, gender, marital status, educational attainment, party (or Youth League) membership, physical health status, and employment status. Regional attributes mainly consider whether the household resides in a rural area and whether it is in China's eastern regions.

5.2 Variable Definition and Descriptive Statistics

Table 2 furnishes definitions for all variables and presents their corresponding descriptive statistics. For this paper, the age of householders is restricted to fall between 18 and 60 years old, reflecting the typical age range for credit application. The average age of the sample is 48.09 years. Among the sample, 61.38% of households express a need for credit, yet only 37.18% of them have successfully secured credit from formal financial institutions. Notably, 23.16% of households encounter varying degrees of constraints when applying for loans from formal financial institutions such as banks.

Table 2: Variable Definition and Descriptive Statistics

Variable	Variable code	variable description	Mean	Std. Dev.	Min	Max
Credit constraints	constraint	Constrained=1, Unconstrained=0	0.24	0.43	0.00	1.00
financial literacy	fliteracy	Calculated by principal component analysis method	0.23	0.97	-1.51	2.70

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age	age	Age of household head	48.09	8.19	19.00	60.00
age2	age2	The square of householder's age /100	23.80	7.46	3.61	36.00
gender	gender	male=1，female=0	0.83	0.37	0.00	1.00
education	education	Assigned from 1 to 9 in order from illiterate to doctor	3.64	1.62	1.00	9.00
party	party	Party member or league member=1, others=0	0.51	0.50	0.00	1.00
health	health	The values from good to bad are 5-1 in order	3.50	0.98	1.00	5.00
marriage	married	Married and cohabiting=1, others=0	0.92	0.27	0.00	1.00
housing	house	Housing=1, no housing=0	0.92	0.27	0.00	1.00
work	work	With work=1, without work=0	0.85	0.36	0.00	1.00
Household size	hsize	Actual resident population	3.70	1.43	1.00	20.00
rural	rural	Rural=1, urban=0	0.35	0.48	0.00	1.00
area	area	Eastern Province=1, others=0	0.48	0.49	0.00	1.00

To gain a more intuitive understanding of the distribution of householders' financial literacy, this paper lists the distribution of financial literacy levels with different individual characteristics of householders. From the data in Table 3, it can be found that the financial literacy of householders under 45 years old is significantly higher than that of householders over 45 years old. The financial literacy of householders with a college graduate or above is significantly higher than that of the other two education categories. Unlike many literatures, the mean financial literacy of male householders in this paper is slightly lower than that of female householders. This may be explained by the fact that although the proportion of male householders in traditional households is high (accounting for 83.3% of the total sample), female householders are generally dominant in the process of family investment and financial decision-making, thus possessing richer financial knowledge, skills, and experience. It is also possible that the sample size of female householders is too small.

Table 3: Financial Literacy Levels of Householders with Different Individual Characteristics

Householders' characteristics / Financial literacy	**age**		**gender**		**education**			**area**	
	18-45	46-60	male	female	middle school and below	High school and associate degree	College graduate and above	Eastern	others
Mean Financial Literacy	0.573	0.063	0.225	0.266	-0.082	0.576	1.199	0.212	0.158
Observations	4114	8349	10386	2077	7593	3742	1128	5971	6492

Table 4 reports the percentage of householders' financial literacy level and their relationship with credit constraints. From Table 4, credit constraints from formal financial institutions such as banks are negatively correlated with financial literacy levels. The above analysis simply indicates that there is a certain correlation between the householders' financial literacy level and household credit constraints. The specific impact coefficient is estimated by the Probit regression model.

Table 4: Relationship between Percentile Values of Financial Literacy and Credit Constraints

Percentile of financial literacy level(Z)	**1(Z≤25%) low**	**2(25%< Z≤50%)**	**3(50%< Z≤75%)**	**4(Z>75%) high**
Credit constraints	0.313	0.268	0.216	0.170

As a core independent variable, financial literacy may have endogeneity, which may lead to model estimation errors. On the one hand, if households have credit constraints when applying for credit from formal financial institutions, householders may strengthen their learning of financial knowledge through different channels, thereby improving their personal financial literacy level and mitigating financial constraints. This establishes a causal relationship between financial literacy and credit constraints. However, it's important to acknowledge the potential presence of missing variables or measurement errors in variable selection, which could result in model estimation errors. In light of existing literature, this paper introduces "the average educational level of householders in the same community" as an instrumental variable for estimation. In general, higher educational levels among householders lead to faster and more effective mastery of financial knowledge and skills, greater sensitivity to financial information, and deeper financial understanding. When householders within a community have higher educational levels, communication among them becomes more frequent, providing more avenues for acquiring financial information and facilitating effective information exchange. This mutual learning enriches households' financial knowledge and enhances their financial skills. Importantly, the average educational level of householders in the same community remains unaffected by individual households. Therefore, "the average educational level of householders in the same community" serves as an exogenous instrumental variable.

6. Empirical Results

Table 5 presents the empirical findings. In column (1), we analyze the impact of householders' financial literacy on credit constraints. The regression results indicate that an increase in the financial literacy level significantly alleviates credit constraints, with a substantial effect of 18.59%, highly significant at the 1% level. Column (2) introduces control variables to column (1), revealing that although the coefficient between householders' financial literacy and credit constraints has decreased, a negative correlation persists. For each unit increase in householders' financial literacy, the probability of households mitigating credit constraints from formal financial institutions increases by 7.31%. In column (3), instrumental variable estimation is applied, and the results are displayed. Utilizing "the average educational level of householders in the same community" as the instrumental variable for financial literacy, the Wald test yields a result of 65.05, indicating a highly significant endogeneity of financial literacy at the 1% level. The first-stage F-statistic is estimated at 370.20, signifying that the instrumental variable estimation is not weakened. In summary, the regression outcomes in columns (1), (2), and (3) consistently demonstrate that the coefficient direction and statistical significance between householders' financial literacy and credit constraints remain unchanged, affirming a significantly positive relationship between householders' financial literacy level and the likelihood of alleviating credit constraints from formal financial institutions. Consequently, the hypothesis is substantiated.

Table 5: The Impact of Financial Literacy on Credit Constraints

Variable	（1） Probit1	（2） Probit2	（3） ivProbit
Financial literacy	-0.1859*** (-14.5276)	-0.0731*** (-4.8170)	-1.2409*** (-7.1346)
Control variables	No	Yes	Yes
Observations	12463	12463	12463
First stage estimated F-value	—	—	370.20
T value of Instrumental variable estimation	—	—	12.41
Wald test value	—	—	65.05
P value	—	—	0.0000

* p < 0.1, ** p < 0.05, *** p < 0.01； Z values are in parentheses. Same as below.

7. Robustness Test

To test the above regression results, this paper conducts robustness tests from two aspects.

6.1. Using score aggregation method to measure financial literacy

To enhance the robustness of our analysis, we conducted an additional test by altering the measurement method of the main independent variable. In this test, we recalculated the financial literacy indicator using the financial literacy score aggregation method proposed by Lusardi et al. [21]. This method measures the level of financial literacy by aggregating scores from various dimensions of financial literacy.

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Subsequently, we performed Probit and ivProbit regressions on households' credit constraints from formal financial institutions. The estimated results are presented in Table 6. These regression outcomes affirm that an increase in financial literacy significantly enhances households' ability to alleviate credit constraints imposed by formal financial institutions. Notably, the results from this robustness test remain highly significant at the 1% level.

Table 6: Impact of Financial Literacy (Score Aggregation) on Credit Constraints

Variable	**Credit constraints of formal financial institutions**	
	Probit3	ivProbit3
Financial literacy	-0.020***	-0.323***
	(-4.85)	(-7.23)
Control variables	Yes	Yes
Constant term	1.421***	1.981***
	(4.03)	(4.58)
Observations	12,463	12,463
First stage estimated F-value	—	393.55
T value of Instrumental variable estimation	—	13.00
Wald test value	—	64.56
P value	—	0.0000

* p < 0.1, ** p < 0.05, *** p < 0.01； Z values are in parentheses. Same as below.

6.2. Regression analysis of financial literacy indicators by region

To further validate our findings, we employed a Probit regression analysis model to conduct robustness tests on financial literacy across different regions. The results of these tests are summarized in Table 7. Our aim was to explore whether financial literacy has varying effects on the credit constraints imposed by formal financial institutions in Eastern and western regions, taking into account regional differences. Interestingly, our tests revealed some disparities in the coefficients representing the impact of financial literacy on credit constraints between eastern and western provinces. However, it's crucial to note that, overall, the estimated coefficients for financial literacy and credit constraints align with our previous analyses. Furthermore, all regression coefficients maintain statistical significance at the 5 % level, reinforcing the consistency and robustness of our findings. The regression results are robust.

Table 7: Impact of Financial Literacy (Regional Differences) on Credit Constraints

Variable	**Credit constraints of formal financial institutions**	
	Eastern provinces	Western provinces
Financial literacy	-0.104***	-0.046**
	(-4.62)	(-2.22)
Control variables	Yes	Yes
Constant term	1.458***	1.081**
	(2.92)	(2.16)
Observations	5,971	6,492
R-sq	0.0635	0.0469

* p < 0.1, ** p < 0.05, *** p < 0.01； Z values are in parentheses. Same as below.

8. Conclusions and Policy Recommendations

8.1 Conclusions

This paper utilizes data from CHFS2017 to assess the financial literacy levels of householders and employs a Probit regression analysis model to investigate the influence of householders' financial literacy levels on their credit decisions in China. The key findings can be summarized as follows:

Firstly, the distribution of financial literacy among householders is uneven and generally modest. On the whole, there exists a positive correlation between financial literacy levels and educational attainment. Interestingly, contrary to some existing literature, this study reveals that, on average, female householders tend to have slightly higher financial literacy levels compared to their male counterparts. In terms of age, householders under 45 years old display significantly higher financial literacy levels than those aged 45 and above. Moreover, regional disparities are evident, with householders in the eastern regions of China generally exhibiting higher financial literacy levels than their counterparts in the western regions.

Secondly, through the construction of Probit and ivProbit models, this paper establishes that enhancing householders' financial literacy levels can effectively mitigate credit constraints imposed by formal financial institutions. A higher degree of financial literacy equips householders with the ability to maintain strong credit records, better grasp credit policies, and bolster their confidence in securing credit from formal financial institutions. This, in turn, enables them to alleviate credit constraints and facilitates the smoothing of consumption patterns across different periods among households.

8.2 Policy Recommendations

Drawing from the conclusions, the following policy recommendations are put forward:

Enhance Residents' Education: Improving the educational attainment of residents is crucial, as it significantly impacts their financial knowledge and understanding of financial policies. Elevating the level of education can help individuals accumulate financial knowledge, enhance financial literacy, and improve long-term decision-making abilities. Residents are encouraged to actively seek financial knowledge and skills, consciously enhancing their financial literacy to reduce credit constraints.

Promote Financial Literacy Education: Widespread financial literacy education should be encouraged, encompassing both formal financial education in schools and informal financial training in the community. Financial institutions should collaborate with educators to introduce financial literacy programs in primary and secondary schools and community settings. Leveraging modern media tools, financial institutions can deliver enjoyable and engaging financial literacy education to residents. Governments should establish a long-term framework for financial education to ensure its sustained effectiveness. Additionally, individuals' financial literacy can be elevated by improving their living environments.

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