# "The Source of Flowing Water": How Targeted Poverty Alleviation Helps China's Rural Poor Access Credit

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***Abstract:*** *Based on the China Household Finance Survey (CHFS) data of 2011-2017, this paper investigated the effects of China's targeted poverty alleviation policy on rural credit access and amount using the "difference-in-differences" methodology. This study found that the targeted poverty alleviation policy increased the availability and amount of formal credit to poor households and reduced the proportion and amount of their borrowing through informal channels, and that the effects increased amid the policy's implementation over time. This paper further found that the policy effects were more significant for China's western regions, reflecting a positive role of targeted poverty alleviation in coordinating pro-poor finance across regions. Compared with poor counties, poor households from non-poor counties experienced a greater increase in their probability and amount of formal credit access, reflecting China's approach of reducing regional poverty before targeting more precisely at individual poor households. This paper also uncovered that no significant "elite capture" effect had existed in the allocation of formal agricultural credit under targeted poverty alleviation, but extremely poor households experienced no significant change in their access to formal credit. While the targeted poverty alleviation policy has helped create a sound rural credit market, it should further improve access to formal finance for extremely poor households.*

***Keywords:*** *targeted poverty alleviation, registered poor households, formal credit, informal credit, difference-in-differences (DID) model*
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## 1. Introduction

Economic development must serve the broader goal of delivering prosperity for all. The Communist Party of China (CPC) has made a solemn commitment to building a moderately prosperous society for all - including the poor. As a key element of the long-term mechanism for poverty alleviation, pro-poor finance aims to assist vulnerable groups in accessing financial products and services in specific sectors during special times (Zeng, 2007). Since 1994, the Chinese government has underscored the role of pro-poor finance in the implementation of development-oriented poverty alleviation in a succession of policy documents, including the *Seven-Year National Plan for Lifting 80 Million People Out of Poverty*, the

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**Table 1: Policies for Targeted Poverty Alleviation and Time of Enactment**

| Time of enactment | Policy | Scope |
|---|---|---|
| January 2014 | *Opinions on Innovating Mechanisms for Solid Implementation of Development-Oriented Poverty Alleviation in the Countryside* ("*Opinions 1*")[1] | (1) Increase credit issuance to poor regions; (2) Increase fiscal subsidy funds for pro-poor loans with discounted interest; (3) broaden access to microcredit loans; (4) create financial outlets in poor townships and expedite the development of creditworthy households, villages and townships. |
| March 2014 | *Guiding Opinions on Delivering Financial Services for Development-Oriented Poverty Alleviation* ("*Opinions 2*")[2] | (1) Determine the reasonable quotas of loans with discounted interest for registered poor households; (2) lower interest rates on qualified incremental relending for rural areas; (3) moderately raise the tolerance of non-performing loans (NPLs) for financial institutions in poor regions; (4) establish a pro-poor loan risk compensation fund and guarantee fund; (5) develop rural credit system and promote rural microcredit loans. |
| May 2014 | *Implementation Scheme for Creating Targeted Poverty Alleviation Mechanisms*[3] *("Scheme 1")* | (1) Issue opinions on identifying registered poor households and specifying the mechanisms for targeted poverty alleviation; (2) the "Dewdrop Project" offers pro-poor loans with discounted interest to registered poor households with students; (3) issue microcredit loans with discounted interest to poor households with certain skills and entrepreneurial intent. |
| November 2015 | *Decisions of the CPC Central Committee and the State Council on Winning the Battle of Poverty Alleviation*[4] ("*Decisions*") | (1) Create pro-poor relending to offer more favorable interest rates; (2) use fiscal funds for subsidizing loans with discounted interest and funds from some financial institutions to replenish capital for policy and development financial institutions; (3) the China Development Bank and the China Agricultural Development Bank should establish a "Pro-Poor Finance Division", respectively; (4) leverage credit funds through bridge loans to support poverty alleviation projects with stable incomes for loan repayment; (5) broaden the scope of collaterals in poor regions. |
| March 2016 | *Implementation Opinions on Promoting Pro-Poor Finance*[5] ("*Opinions 3*") | (1) Create targeted poverty alleviation financial service records for each registered household; (2) enhance rural credit system and link rural households' basic credit information with the information of registered poor households to improve the financial information database. |

*Outline for Poverty Alleviation and Development of China's Rural Areas (2001-2010)*, and the *Outline for Poverty Alleviation and Development of China's Rural Areas (2011-2020)*.

Over the years, China's central and local governments have devoted tremendous funds to subsidize pro-poor loans to poor counties designated as key recipients of state aid. By 2010, the 592 key counties for poverty alleviation had received pro-poor loans with discounted interest worth 11.61 billion yuan cumulatively with central government subsidies. Nevertheless, only 2% of poor households had received loans with an average amount of 7,985.3 yuan per household, which were far below average credit penetration and loan size (China Rural Poverty Monitoring Report, 2011). During his visit to Shibadong Village of Xiangxi Tujia and Miao Autonomous Prefecture in Hunan Province in November 2013, General Secretary Xi Jinping put forth the concept of targeted poverty alleviation for the first time. Facts have proven that sustainable funding for poverty alleviation cannot be secured solely by handing out cash and in-kind assistance to the poor on an ad hoc basis. Instead, a steady flow of poverty alleviation funds should be provided to secure the endogenous momentum for reducing and eradicating poverty. Table 1 lists key policies on pro-poor finance as part of China's targeted poverty alleviation campaign.

[1] Source: http://www.gov.cn/gongbao/content/2014/content_2580976.htm
[2] Source: http://www.gov.cn/xinwen/2014-04/10/content_2656095.htm
[3] Source: http://www.cpad.gov.cn/art/2014/5/12/art_343_461.html
[4] Source: http://www.gov.cn/xinwen/2015-12/07/content_5020963.htm
[5] Source: http://fgk.mof.gov.cn/law/getOneLawInfoAction.do?law_id=84294

As can be learned from Table 1, the targeted poverty alleviation policy has steadily deepened credit support to farmer households over the years. After the inception of policy implementation, the *Opinions 1* and *Opinions 2* have focused credit issuance on key counties for development-oriented poverty alleviation. Through policy implementation, *Scheme 1* has called for improving the microcredit policy and extending recipients from poor regions to poor households more precisely. As the poverty alleviation campaign entered a critical stage, the central government vowed to "win the battle of poverty alleviation" and beefed up credit support to poor households. Compared with *Opinions 1* and *Opinions 2*, the *Decisions* has made relending interest rates for poverty alleviation projects more favorable and broadened the sources of pro-poor funds. The *Opinions 3* prescribed more detailed responsibilities of financial authorities to learn about the conditions of poor households and support them with formal credit. By the end of the third quarter of 2019, the balance of loans issued to registered poor populations amounted to 254.2 billion yuan. Since those lifted out of poverty were still entitled to the policy benefits, the balance of loans issued to registered poor populations and those already lifted out of poverty stood at 713.6 billion yuan (*Statistical Report on Loan Issuance by Financial Institutions*, 2019).

Based on the difference-in-differences (DID) method with microscopic data, this paper found that the targeted poverty alleviation policy would make it much more likely for registered poor households to access formal credit, increase the amount of formal credit loans available to poor households, and make it less likely for poor households to resort to informal credit. Over time, the targeted poverty alleviation policy exerted greater effects on farmer households' access to formal credit, reducing their reliance on informal finance. The conclusions remained robust after excluding the agricultural credit effects of policies on rural land requisition, the marketization of collective operating and construction land and the housing plot reform, as well as the mortgage loan policy for the use of rural contract land operation rights and farmers' housing property rights as collaterals and the sample self-selection problem, particularly for China's western regions. Overall, targeted poverty alleviation has a significantly positive effect on farmer households' access to formal credit, and has effectively restrained farmer households' participation in the informal credit market.

## 2. Literature Review and Mechanism Analysis

### 2.1 Literature Review

Over the years, underdeveloped rural credit market has left rural households with a serious credit constraint for various reasons. Stiglitz and Weiss (1981) demonstrated the economic mechanism under which reverse selection and moral hazards led to credit rationing. Stiglitz (1990) further identified information asymmetry between farmer households and banks as a major cause of credit rationing facing farmer households in developing countries. Compared with non-poor households, rural poor households faced a higher degree of information asymmetry (Rosenzweig & Binswanger, 1993; Pellegrina, 2011) with a higher non-performing loan (NPL) ratio (Ding, *et al.*, 2011; Su and Hu, 2014). Bai *et al.* (2006) argued that characterized by a low return on capital and a smaller risk appetite, the rural economy found it hard to keep up with financial mechanisms designed for urban commerce. Moreover, the lack of qualified collaterals (Ruan, *et al.*, 2003), uncertainties in agricultural production(Carter et al., 2007), among other problems, have also deterred financial institutions from issuing loans to farmers.

A direct consequence of rural credit constraint is the crowding-out effect of informal credit on formal credit. Calomiris and Rajaraman (1998) and Bose (1998) *et al.* found that farmer households in poor regions could only resort to informal finance due to the limited coverage of formal finance, which could not be substantially broadened in a short time. In their study, Li and Li (2004) stressed that Chinese farmer households relied on very few sources of loans, primarily private lending, which alone could not suffice for the financing needs of farmers. Zhu and Li (2006) found that private lending accounted for the lion's share of about 70% of annual borrowings by farmer households while loans from rural financial

institutions only accounted for 20% to 30%. For poor households, their access to formal credit was even more restricted. When faced with restricted access to formal credit, extremely poor households were more inclined to opt for expensive informal credit (Eric Osei-Assibey *et al*., 2012; Barham *et al*., 1996; Bell, 1990).

Since 1999, China's rural credit cooperatives have started to offer microcredit services to address the above problems. However, research found that from households with special privileges were able to obtain more loans while the government's low-interest loan policy did not fully achieve the expected effects - informal finance remained a key source of finance for poor households (Jin, Li, 2009; Park & Wang, 2010). Some academics have attempted to explain from such perspectives as household gross income, social network, financial knowledge, and fixed assets (Yi, 2012; Hu and Chen, 2012; Song *et al.*, 2017). There have been broad discussions on problems arising from the implementation of the targeted poverty alleviation policy (Hu, Wang, 2017), efficiency in the use of poverty alleviation funds (Kou, Lyu, 2014; Hu, Wang, 2017), and the results of poverty alleviation (Xu, Xie, 2019).

Existing studies on targeted poverty alleviation have focused on survey data of a few provinces. With more extensive data from the China Household Finance Survey (CHFS), this paper examines the effects of the targeted poverty alleviation policy on the rural credit market. Unlike most existing studies based on cross-section data, this paper employs panel data with a difference-in-differences (DID) method strictly controlling for time and individual fixed effects to evaluate the impact of targeted poverty alleviation as an exogenous policy shock. Based on existing studies that have focused on the channels and conditions of rural credit access, this paper differentiates formal credit from informal credit to examine the policy's effects on heterogenous credit behaviors, offering first-hand evidence for the credit effects of targeted poverty alleviation for poor households.

### 2.2 Mechanism of Effects

This paper considers that rural households' credit availability is influenced by the following six aspects of targeted poverty alleviation policy, as shown in Figure 1.

Specifically, the targeted poverty alleviation policy has influenced poor households' access to

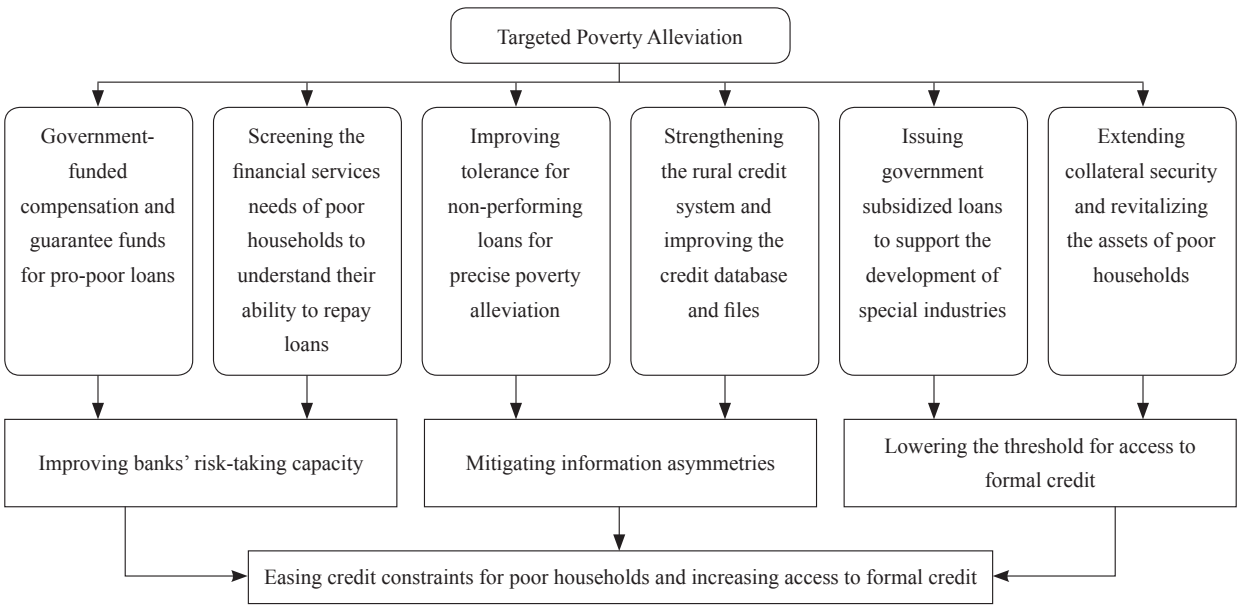


**Figure 1: Mechanism of Targeted Poverty Alleviation Policy's Effects on Credit Availability for Poor Households**

formal credit in the following ways: First, the targeted poverty alleviation policy has raised banks' risk tolerance. Before the policy came into effect, banks were exposed to significant default risks given the uncertainties in poor households' loan repayment (Yin *et al.*, 2014; Ding *et al.*, 2011). Banks tended to avoid issuing microcredit loans to farmers considering their limited operating incomes and incomplete credit rating information, which meant poor return and could present systemic risks to the banks. After the policy came into effect, the government created financing guarantee institutions in poor regions and encouraged and guided qualified guarantee institutions to provide credit guarantees for targeted poverty alleviation projects, thus raising banks' risk tolerance.

Second, the targeted poverty alleviation policy has eased the problem of information asymmetry facing banks. The scattered operations of smallholders had increased the cost for banks to search for information about individual farmer households and could not generate economies of scale. After the policy came into effect, financial institutions had to learn about the basic conditions, labor skills, asset composition and financial needs of poor households and create a financial service archive for targeted poverty alleviation for each household. Grassroots Party organizations, first Party secretaries at villages and rural prosperity champions took the initiative to learn about the conditions of poor households, participated in their credit rating, created a system of credit indicators for poor households, and improved their electronic information archives. Such information helped financial institutions determine poor households' creditworthiness. Furthermore, the problem of information asymmetry was further addressed by designating creditworthy households, villages, and townships.

Third, the targeted poverty alleviation policy has substantially lowered the threshold for farmer households to access formal credit. The government has broadened the scope of collaterals for pro-poor loans, allowing farmer households with limited assets to receive credit support from formal financial institutions. For the credit market, there is a relationship of substitution between formal credit and informal credit (Jin and Li, 2015), and a sufficient supply of formal finance will crowd out informal finance (Jain, 1999). Normally, there is a lag effect of public policy (Li and Cong, 2006; Chen, 2004): As the goal of poverty alleviation is closer to completion with the progression of time, central and local governments ramp up pro-poor fiscal input, and pro-poor finance keeps increasing. Hence, we put forth the following research hypotheses:

Hypothesis 1: The targeted poverty alleviation policy has increased the probability and amount of farmer households' access to formal credit;

Hypothesis 2: The targeted poverty alleviation policy has reduced the probability and amount of farmer households' access to informal credit;

Hypothesis 3: The effects of the targeted poverty alleviation policy on credit channels and amount for poor households will increase over time.

## 3. Research Design

### 3.1 Data Sources

Data employed in this paper is from the China Household Finance Survey (CHFS) conducted by the China Household Finance Survey and Research Center of the Southwest University of Finance and Economics (SWUFE) from 2011 to 2017. The CHFS data is representative as it is consistent with data from the National Bureau of Statistics (NBS) in terms of the age structure of sample populations, urban and rural demographic structure and gender ratio (Gan *et al.*, 2015). Since the targeted poverty alleviation program was initiated in 2014, this paper designates data of 2013, 2015 and 2017 as panel data, which covers 5,203 farmer household samples with 15,609 observations from 194 counties (districts and prefectural cities) of 29 provinces, autonomous regions and municipalities.

### 3.2 Model Specification and Variable Definition

Referencing Nunn & Qian (2011), this paper employs the difference-in-differences (DID) method to test the effects of the targeted poverty alleviation policy on farmer households' credit behaviors with Model (1) specified as follows:

$$y_{it} = \alpha + \beta \cdot TPA_{it} + \gamma \cdot X_{it} + u_i + v_t + \varepsilon_{it} \quad (1)$$

Where, subscript $i$ is farmer household, and $t$ is time. $y_{it}$ is the explained variable of farmer household $i$ in period $t$, which primarily includes access to formal agricultural credit, the amount of formal agricultural credit obtained, access to informal agricultural credit, and the amount of informal agricultural credit obtained. If a surveyed household has outstanding agricultural loans from banks/credit cooperatives, the value of formal agricultural credit is 1; otherwise, it is 0. The amount of formal credit is identified jointly by the initial amount of loans and the balance of loans.[6] Similarly, if a surveyed farmer household has outstanding agricultural loans from private lenders, the value of informal agricultural credit is 1; otherwise, it is 0. The amount of informal credit is jointly identified by the initial amount of loans and the balance of loans. Considering that the explained variables of access to formal agricultural credit and access to informal rural credits are bivariate, those variables are estimated with a linear probability model (LPM) in Model (1)'s regression.

$TPA_{it}$ (Targeted Poverty Alleviation) denotes whether a farmer household was registered as a poor household in year $t$.[7] At the inception of the policy's implementation, poverty identification by local governments and villages was distorted but higher levels of government were unaware of such deviations; with the involvement of third parties such as village work groups and social organizations, subsequent poverty identification became more accurate (Hu and Wang, 2017; Lu and Li, 2016). For the above problems, we believe that after the enactment of the *Measures for the Development-Oriented Poverty Alleviation Work Performance Evaluation for Provincial-Level Party Committees and Governments*[8] by the CPC Central Committee and the State Council in February 2016, the 22 provinces and autonomous regions in China's central and western regions have all introduced third-party evaluation, and after the registration of poor households was required, county-level poverty alleviation offices would perform verifications and disqualify those that could not meet the criteria for registered poor households. Hence, we believe that those identified as poor households in both rounds of survey in 2015 and 2017 are identified more accurately. Poor households identified in both rounds of survey in 2015 and 2017 are thus identified in this paper as the treatment group, and those not identified as poor households in both rounds of survey are identified as the control group. For the treatment group after the policy took effect, i.e. $TPA_{it}$=1, i.e. $TPA_{it}$=1 for poor households in 2015 and 2017; $TPA_{it}$=0 for non-poor households as the control group; $TPA_{it}$=0 for poor households before the policy came into effect. $X_{it}$ is other control variables that change with time and influence farmer households' credit behaviors. $u_i$ and $v_t$ respectively denote the fixed effect of individual farmer households and the year-fixed effect. Coefficient $\beta$ denotes the impact of the targeted poverty alleviation policy on poor households' credit access and the amount of credit received by them, and is the core parameter of this paper.

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[6] CHFS questionnaire asked Question 1: "Currently, does your family still have an outstanding loan from banks/credit cooperatives? (Options: (1) Yes; (2) No); if the surveyed household answers (1) Yes, proceed to ask Question 2: How much money is still owed on the loan? Question 3: In which year did your family borrow this loan? And Question 4: How much of this loan did you borrow? This paper uses Questions 3 and 4 to define the amount of formal credit obtained by respondents in the current phase. If there is no newly borrowed loan in the current phase, the outstanding amount of the loan is defined as the amount of formal credit in the current phase based on the respondent's answer to Question 2. Referencing Liu *et al.*'s (2014) method, if the farmer household's loan in the year exceeds 0 or the farmer household's answer to Question 1 is (1), access to formal credit in the year is 1; otherwise, it is 0. Informal credit has the same definition with formal credit.

[7] CHFS questionnaire asked "Is your family a poor household?" By national regulations, a rural household with per capita income below a certain level may apply for the designation of poor household. They need to complete the *Poverty Handbook* before deliberated and announced by the village committee as a poor household and further confirmed by the township government.

[8] Source: http://www.gov.cn/xinwen/2016-02/16/content_5041672.htm.

Given the possible correlation between formal credit and informal credit, this paper performs an estimation based on Mohieldin & Wright's (2000) Biprobit model to arrive at the joint effects of targeted poverty alleviation on formal credit and informal credit. Model (2) is specified as follows:

$$\begin{cases} \Pr(y_{Fit}=1) = \alpha_F + \beta_{F1} treated_i \times post_t + \beta_{F2} treated_i + \beta_{F3} post_t + X_{it}\gamma_F + \varepsilon_{Fit} \\ \Pr(y_{Iit}=1) = \alpha_I + \beta_{I1} treated_i \times post_t + \beta_{I2} treated_i + \beta_{I3} post_t + X_{it}\gamma_I + \varepsilon_{Iit} \end{cases} \quad (2)$$

Where, $y_{Fit}$ is whether a farmer household has access to formal rural credit, $y_{Iit}$ is whether a farmer household has access to informal rural credit, and $treated_i$ is whether a farmer household is poor: $treated_i$=1 denotes poor households, and $treated_i$=0 denotes non-poor households. $post_t$ denotes whether a year is after the implementation of the targeted poverty alleviation policy: $post_t$=1 refers to years after the enactment of the targeted poverty alleviation policy, and $post_t$=0 denotes years before the enactment of the policy. $\beta_{F1}$ and $\beta_{I1}$ are the estimated coefficients of the targeted poverty alleviation policy for formal and informal credit. $X_{it}$ is other control variables. Given the possible correlation between farmer households' access to formal credit and informal credit, we assume that the disturbance terms $\varepsilon_{Fit}$ and $\varepsilon_{Iit}$

**Table 2: Descriptive Statistics**

| | | All Samples | | | Poor households | | |
|---|---|---|---|---|---|---|---|
| | Variable | Observations | Mean | Standard deviation | Observations | Mean | Standard deviation |
| Explained variables | Formal rural credit | 15,609 | 0.057 | 0.231 | 1743 | 0.045 | 0.207 |
| | Informal rural credit | 15,609 | 0.143 | 0.350 | 1743 | 0.206 | 0.405 |
| | Logarithm of the amount of formal rural credit | 15,609 | 0.513 | 2.229 | 1743 | 0.336 | 1.773 |
| | Logarithm of the amount of informal rural credit | 15,609 | 1.236 | 3.214 | 1743 | 1.706 | 3.537 |
| Concerned variables | TPA | 15,609 | 0.075 | 0.263 | 1743 | 0.666 | 0.472 |
| Control variables | Attribute of household head | | | | | | |
| | Age | 15,609 | 53.571 | 12.055 | 1743 | 55.328 | 12.588 |
| | Age squared/100 | 15,609 | 30.151 | 13.246 | 1743 | 32.196 | 14.039 |
| | Marital status | 15,609 | 0.917 | 0.276 | 1743 | 0.814 | 0.390 |
| | Male household head | 15,609 | 0.899 | 0.301 | 1743 | 0.893 | 0.310 |
| | Length of education | 15,609 | 7.300 | 3.335 | 1743 | 5.892 | 3.621 |
| | Risk appetite | 15,609 | 0.094 | 0.291 | 1743 | 0.071 | 0.256 |
| | Risk aversion | 15,609 | 0.738 | 0.440 | 1743 | 0.784 | 0.411 |
| | Household attribute | | | | | | |
| | Household size | 15,609 | 4.048 | 1.838 | 1743 | 3.951 | 2.042 |
| | Household labor force | 15,609 | 2.473 | 1.310 | 1743 | 2.182 | 1.325 |
| | Number of household members with Party membership | 15,609 | 0.143 | 0.371 | 1743 | 0.092 | 0.316 |
| | Household possession of housing property | 15,609 | 0.974 | 0.160 | 1743 | 0.945 | 0.228 |
| | Logarithm of household assets | 15,609 | 11.861 | 1.354 | 1743 | 11.061 | 1.446 |
| | Logarithm of household income | 15,609 | 9.511 | 3.117 | 1743 | 9.175 | 2.602 |
| | Logarithm of household consumption | 15,609 | 9.938 | 0.800 | 1743 | 9.668 | 0.842 |

conform to the joint normal distribution, marked as $\varepsilon_{Fit}, \varepsilon_{Iit} \sim BVN(0,0,1,1,\rho)$.

According to relevant literature, this paper has introduced the following control variables: the attribute of household head, the attribute of household, the fixed effect of time, and the fixed effect of farmer households. The attribute of the household head includes: age of household head (Attanasio *et al*., 2002) and its quadratic term (Bodie *et al*., 1992), gender of the household head (Jianakoplos & Bernasek, 1998), marital status (Yin *et al*., 2015), length of education (Guiso *et al*., 1996), risk appetite and risk aversion (Wu *et al.*, 2016). The household attribute includes: household size, household labor force (Jin and Li, 2009), the number of household members with Party membership, whether the household has housing property, total household assets, household gross income, and total household consumption. Table 2 lists the descriptive statistics of all variables.

## 4. Empirical Results and Analysis

Table 3 shows the impact of targeted poverty alleviation on farmer households' access to formal and informal credit estimated with Model (1). Columns (1-3) are the impact of targeted poverty alleviation on access to formal credit. Take Column (2) for instance, the targeted poverty alleviation policy has increased the probability of poor households' access to formal credit by 1.93%. Column (3) estimates the dynamic effects of targeted poverty alleviation with $Treated{\cdot}year_{2015}$ as the effect one year after the policy's enactment and $Treated{\cdot}year_{2017}$ as the effect three years after the enactment of the policy. Over time, the targeted poverty alleviation policy had a growing impact on formal credit. One possible reason is the existence of the policy's lag effect (Chen, 2004). Another possible reason is that the policy effect was yet to materialize as townships completed poor household identification in 2015 as they were

**Table 3: Impact of Targeted Poverty Alleviation on Credit Availability**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| VARIABLES | Formal rural credit | Formal rural credit | Formal rural credit | Informal rural credit | Informal rural credit | Informal rural credit |
| TPA | 0.0212** (0.0104) | 0.0193* (0.0105) | | -0.0239 (0.0180) | -0.0288 (0.0181) | |
| $Treated{\cdot}year_{2015}$ | | | 0.0044 (0.0106) | | | -0.0170 (0.0198) |
| $Treated{\cdot}year_{2017}$ | | | 0.0345*** (0.0129) | | | -0.0407* (0.0209) |
| Constant term | 0.0590*** (0.0020) | -0.0024 (0.0578) | -0.0116 (0.0580) | 0.1549*** (0.0034) | 0.1837* (0.0918) | 0.1909** (0.0919) |
| Control variable | Not controlled | Controlled | Controlled | Not controlled | Controlled | Controlled |
| Fixed effect of year | Controlled | Controlled | Controlled | Controlled | Controlled | Controlled |
| Fixed effect of farmer households | Controlled | Controlled | Controlled | Controlled | Controlled | Controlled |
| Number of cross sections | 5,203 | 5,203 | 5,203 | 5,203 | 5,203 | 5,203 |
| Sample size | 15,609 | 15,609 | 15,609 | 15,609 | 15,609 | 15,609 |
| R-squared | 0.0041 | 0.0067 | 0.0075 | 0.0132 | 0.0196 | 0.0197 |

Notes: (1) Numbers in parentheses are clustered robust standard errors with farmer households as cluster variable; (2) *, ** and *** denote significance levels of 10%, 5% and 1%, respectively; (3) control variables primarily include: the attribute of household head (age, age squared, marital status, gender, length of education, and risk appetite), household attribute (household size, number of children, number of elderly persons, labor force, the ratio of family members in poor health, housing property ownership, number of family members with Party membership, whether any family member is at leadership position, logarithm of household assets, logarithm of household incomes, and logarithm of household consumption).

required to complete such work before October 2014 under the *Implementation Scheme for Creating a Working Mechanism for Targeted Poverty Alleviation*[9] released by the State Council in May 2014. Columns (4-6) are the policy's effects on informal rural credit. Results suggest that while the policy exerted a positive effect on formal credit, it also reduced farmer households' informal credit. As can be observed from results in Column (6), in the third year after the policy's enactment, the amount of informal credit obtained by poor households fell by 4.07%, suggesting an increasing substitutive effect of formal credit on informal credit. Since large-sum loans expose private lenders to significant default risks, some private loans carry exorbitant interest rates (Gan *et al*., 2015). The informal credit market is fraught with risks, and the existence of usury and underground banks are unfavorable to China's rural financial market stability and the health of the rural economy (Wu *et al*., 2016). In this context, the targeted poverty alleviation policy was enacted to promote the healthy and stable development of the rural financial market.

Table 4 provides the regression results of Model (2), which suggests that $\rho$ is significant at the 1% level. Hence, there is a correlation between disturbance terms $\varepsilon_1$ and $\varepsilon_2$, demonstrating the necessity of using the Biprobit model for estimation. Columns (1-2) report the policy's overall impact, and Columns (3-4) are the policy's dynamic effects. Similarly, the policy had a significantly positive effect on farmer households' access to formal credit, and the policy of 2017 had a particularly positive effect on formal rural credit. Regression results suggested that the targeted poverty alleviation policy had a significantly positive effect on farmer households' formal credit, but the effect on informal credit needs to be further observed.

**Table 4: Effect of Targeted Poverty Alleviation on Access to Formal Credit and Informal Credit: Biprobit**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Variables | Formal rural credit | Informal rural credit | Formal rural credit | Informal rural credit |
| *Treated·post* | 0.2701**<br>(0.1336) | -0.0466<br>(0.0856) | | |
| *Treated·year*$_{2015}$ | | | 0.0517<br>(0.1615) | -0.0093<br>(0.0972) |
| *Treated·year*$_{2017}$ | | | 0.4486***<br>(0.1457) | -0.0866<br>(0.1005) |
| *Treated* | -0.1657<br>(0.1137) | 0.2092***<br>(0.0700) | -0.1657<br>(0.1138) | 0.2089***<br>(0.0700) |
| *post* | -0.1990***<br>(0.0455) | -0.2512***<br>(0.0325) | -0.1991***<br>(0.0455) | -0.2512***<br>(0.0325) |
| Constant term | -3.9783***<br>(0.5481) | -0.9447***<br>(0.3568) | -4.0095***<br>(0.5485) | -0.9372***<br>(0.3570) |
| Control variable | Not controlled | Controlled | Controlled | Controlled |
| Fixed effect of county | Controlled | Controlled | Controlled | Controlled |
| Sample size | 15,609 | 15,609 | 15,609 | 15,609 |
| rho | 0.3578*** | | 0.3600*** | |
| Chi2 | 159.336 | | 161.281 | |

Notes: (1) Numbers in parentheses are clustered robust standard errors with county as cluster variable; (2) *, ** and *** respectively denote significance at the 10%, 5% and 1% levels; (3) all regressions have controlled for the household-level variables, the attribute of household head, and the fixed effect of county.

[9] Source: http://www.cpad.gov.cn/art/2014/5/26/art_50_23765.html

**Table 5: Impact of Targeted Poverty Alleviation on Credit Amount**

| | Formal agricultural credit amount | | | Informal agricultural credit amount | | |
|---|---|---|---|---|---|---|
| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
| TPA | 0.2251** (0.0960) | 0.2043** (0.0967) | | -0.1945 (0.1566) | -0.2287 (0.1574) | |
| *Treated·year*$_{2015}$ | | | 0.0661 (0.0996) | | | -0.1251 (0.1711) |
| *Treated·year*$_{2017}$ | | | 0.3440*** (0.1147) | | | -0.3334* (0.1840) |
| Constant term | 0.5342*** (0.0195) | 0.0723 (0.5532) | -0.0126 (0.5553) | 1.3397*** (0.0307) | 1.0529 (0.8418) | 1.1166 (0.8438) |
| Control variable | Not controlled | Controlled | Controlled | Not controlled | Controlled | Controlled |
| Fixed effect of year | Controlled | Controlled | Controlled | Controlled | Controlled | Controlled |
| Fixed effect of farmer household | Controlled | Controlled | Controlled | Controlled | Controlled | Controlled |
| Number of cross sections | 5,203 | 5,203 | 5,203 | 5,203 | 5,203 | 5,203 |
| Sample size | 15,609 | 15,609 | 15,609 | 15,609 | 15,609 | 15,609 |
| R-squared | 0.0075 | 0.0095 | 0.0102 | 0.0090 | 0.0157 | 0.0159 |

Table 5 is the estimated results of the targeted poverty alleviation policy's impact on the amount of formal credit and informal credit. As can be seen from Columns (1-3), the policy had a significantly positive effect on poor households' amount of formal credit. Take Column (2), for instance, the policy's enactment was followed by an increase in the amount of formal credit received by poor households by 20.43%. Column 3 indicates a growing intensity of the policy's effect on the amount of formal credit granted to poor households over time. In the third year after the policy took effect, the amount of formal credit to poor households rose by 34.4%. Columns (4-6) are the empirical results of the targeted poverty alleviation policy's impact on informal credit. As can be seen from Column (5), the change in farmer households' access to informal credit was insignificant soon after the policy took effect. In the third year after the policy's enactment, however, the targeted policy reduction policy started to influence the amount of informal credit more significantly with a 33.34% reduction in the amount of informal credit received by poor households.

## 5. Robustness Test

We have employed the following methods for a robustness test to ensure the reliability of our main conclusions. The first step was to exclude the impact of other policies during the same period. During the period of the policy's enactment, two other policies were introduced that might influence the credit amount accessed by farmer households, i.e. *Opinions on Rural Land Requisition, the Marketization of Collective Operating and Construction Land, and the Housing Plot Reform* (hereinafter the "Three Lands" policy[10]) and the *Guiding Opinions on the Pilot Programs of Mortgage Loans with the Rural Contract Land Operation Rights and Rural Housing Property Rights as Collaterals* (hereinafter the "Two Rights" mortgage loan policy[11]). After excluding farmer household samples in the pilot counties (cities/districts) for the above policies, the conclusions remained robust. After excluding those samples, we performed a nearest neighbor matching at the 1:4 ratio using the PSM method and the

[10] Source: http://www.npc.gov.cn/npc/xinwen/2015-02/28/content_1906228.htm
[11] Source: http://www.gov.cn/zhengce/content/2015-08/24/content_10121.htm

results after matching remained robust. In the third step, we performed a placebo test with a virtual policy implementation time point of 2012 and found that before the enactment of the targeted poverty alleviation policy, there was no significant difference between poor and non-poor households in terms of their formal and informal agricultural credit access and amounts. Fourth, this study also replaced the method for identifying the explained variables to test the impact of targeted poverty alleviation on the increment of formal and informal credit,[12] and found that the targeted poverty alleviation policy had significantly reduced informal agricultural credit.

# 6. Further Analysis

## 6.1 Heterogeneity Analysis of China's Eastern, Central and Western Regions

Over the years, the countryside in China's central and western regions was less developed, and China's rural financial development was highly uneven and spatially dependent (Ding *et al*., 2014; Lü *et al*., 2012; Liu, 2012). This paper has evaluated the effects of China's targeted poverty alleviation policy across regions with results shown in Table 6, where Columns (1-6) and (7-12) show the policy's effects on farmer households' formal credit and informal credit access and amounts. We found that in the third year after the policy's enactment, the policy's effects were more significant for China's western regions as compared with the eastern and central regions. This implies that the policy has played a significant role in promoting balanced development of access to finance for poor households across regions.

## 6.2 Heterogeneity Analysis of Whether Farmer Households Were from Poor Counties

In implementing the *Seven-Year National Plan for Lifting 80 Million People Out of Poverty* since 1993, China has identified 592 state-level poor counties. We have divided farmer households into two groups based on whether they were located in state-level poor counties to more precisely compare

**Table 6: Effects of Targeted Poverty Alleviation Policy on Farmer Households' Access to Credit in China's Eastern, Central and Western Regions**

| | Formal rural credit | | | Informal rural credit | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Variables | Eastern | Central | Western | Eastern | Central | Western |
| $Treated{\cdot}year_{2015}$ | -0.0136<br>(0.0252) | 0.0043<br>(0.0127) | 0.0215<br>(0.0194) | 0.0253<br>(0.0458) | -0.0264<br>(0.0297) | -0.0254<br>(0.0324) |
| $Treated{\cdot}year_{2017}$ | -0.0349<br>(0.0251) | 0.0283*<br>(0.0160) | 0.0754***<br>(0.0242) | -0.0168<br>(0.0469) | -0.0193<br>(0.0353) | -0.0535*<br>(0.0317) |
| | Amount of formal agricultural credit | | | Amount of informal rural credit | | |
| | (7) | (8) | (9) | (10) | (11) | (12) |
| Variables | Eastern | Central | Western | Eastern | Central | Western |
| $Treated{\cdot}year_{2015}$ | -0.0730<br>(0.2065) | 0.0503<br>(0.0848) | 0.2061<br>(0.2002) | 0.2155<br>(0.3907) | -0.1063<br>(0.2632) | -0.2816<br>(0.2797) |
| $Treated{\cdot}year_{2017}$ | -0.3198<br>(0.1969) | 0.4052***<br>(0.1193) | 0.7149***<br>(0.2291) | -0.1499<br>(0.4143) | -0.0580<br>(0.3083) | -0.5248*<br>(0.2799) |

[12] The CHFS questionnaire survey is conducted once every two years. Hence, this paper defines the increment of formal credit as formal agricultural credit obtained during the survey period or in the preceding year, i.e. the increase of formal credit in 2013 is defined by formal credit amount obtained in 2012 and 2013. The increase of formal agricultural credit is defined by whether a farmer household had obtained formal agricultural loan in the survey period or the preceding year. The increase and amount of informal credit are defined similarly with those of formal credit.

**Table 7: Heterogeneity Analysis of the Targeted Poverty Alleviation Policy's Effects on Whether Farmer Households Were from State-Level Poor Counties**

| | Formal rural credit | | Informal rural credit | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Variables | Poor counties | Non-poor counties | Poor counties | Non-poor counties |
| $Treated{\cdot}year_{2015}$ | 0.0015<br>(0.0205) | 0.0073<br>(0.0120) | -0.0275<br>(0.0363) | -0.0135<br>(0.0236) |
| $Treated{\cdot}year_{2017}$ | 0.0303<br>(0.0232) | 0.0342**<br>(0.0177) | -0.0401<br>(0.0359) | -0.0433*<br>(0.0262) |
| | Amount of formal rural credit | | Amount of informal rural credit | |
| | (5) | (6) | (7) | (8) |
| Variables | Poor counties | Non-poor counties | Poor counties | Non-poor counties |
| $Treated{\cdot}year_{2015}$ | 0.1360<br>(0.1981) | 0.0413<br>(0.1126) | -0.2056<br>(0.3043) | -0.0817<br>(0.2100) |
| $Treated{\cdot}year_{2017}$ | 0.4116*<br>(0.2230) | 0.3162**<br>(0.1333) | -0.2587<br>(0.3105) | -0.3962*<br>(0.2334) |

the effects on credit access for farmer households in poor counties and those in non-poor counties. In comparing the results in Column (1) and Column (2) of Table 7, it can be found that the policy effects were stronger for non-poor counties, and the policy's effects on formal agricultural credit are also consistent with prior results. To some extent, this indicates a relationship of mutual substitution between the establishment of state-level poor counties and the designation of farmer households as poor households with respect to their access to formal finance, which is possibly due to the central government's increasing transfer payments to poor regions (Ma *et al.*, 2016). Farmer households in state-level poor counties saw their income and consumption grow at a significantly faster pace compared with those from non-poor counties (Wang, 2008, Meng, 2013). Compared with non-poor regions, poor farmer households in poor regions would find it more convenient to access pro-poor finance such as microcredit. In a comparison of results in Columns (3) and (4), the targeted poverty alleviation policy had a greater restrictive effect on informal finance for farmer households in non-poor regions compared with those in poor regions, as can be explained by the results in Columns (7) and (8). The above empirical results indicate that the targeted poverty alleviation policy would extend policy support to farmer households left out from the previous poverty alleviation policy, reflecting China's approach to poverty alleviation that focused on addressing regional poverty before targeting more precisely at individual poor households.

### 6.3 Whether the "Elite Capture" Effect Exists in Targeted Poverty Alleviation

Wen *et al*. (2016) found that in the agricultural credit market, some "elite farmer households" had obtained more agricultural credit resources driven by self-interest (Park *et al*., 2002). Referencing Wen *et al*.'s (2016) method, this paper compares the distribution of pro-poor loans in poor counties and non-poor counties to identify whether the elite capture effect exists. We divided farmer households in poor counties and those in non-poor counties into five groups by their annual incomes in 2013. Table 8 shows the regression results after classification by the above method. Column (3) of Table 8 shows that in poor counties, the policy's target group was primarily middle-income households. As shown in the results of Column (7), in non-poor counties, most of the agricultural loans were issued to lower-income households. In both poor and non-poor counties, there was no significant change in the high-income group's access to formal credit. This explains that no significant "elite capture" effect had occurred

**Table 8: Test of the "Elite Capture" Effect of the Targeted Poverty Alleviation Policy**

| | Explained variable | Explanatory variable | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|---|
| | | | Below 20% | 20%-40% | 40%-60% | 60%-80% | Above 80% |
| State-level poor counties | Access to formal credit | TPA | -0.0221 (0.0611) | 0.0276 (0.0319) | 0.0573** (0.0249) | -0.0321 (0.0384) | 0.0222 (0.0413) |
| | Amount of formal credit | TPA | 0.2579 (0.5476) | 0.4255 (0.3094) | 0.4829** (0.2325) | -0.1651 (0.4567) | -0.1583 (0.4537) |
| | | Sample size | 203 | 203 | 203 | 203 | 204 |
| | | Number of cross-sections | 609 | 609 | 609 | 609 | 612 |
| | | | (6) | (7) | (8) | (9) | (10) |
| Non-poor counties | Access to formal credit | TPA | 0.0087 (0.0226) | 0.0624*** (0.0206) | -0.0312 (0.0329) | 0.0276 (0.0275) | -0.0172 (0.0486) |
| | Amount of formal credit | TPA | 0.0856 (0.2055) | 0.4088** (0.1864) | -0.0443 (0.2648) | 0.2468 (0.2843) | -0.0372 (0.5312) |
| | | Sample size | 837 | 838 | 837 | 837 | 838 |
| | | Number of cross-sections | 2511 | 2514 | 2511 | 2511 | 2514 |

during the implementation of the targeted poverty alleviation policy. However, the results of Column (1) indicate no significant improvement in access to formal credit for low-income family households in poor counties. That is to say, access to formal finance still needs to be further improved for extremely poor households.

## 7. Conclusions

Targeted poverty alleviation is of great importance to eradicating poverty and promoting social harmony, stability and development. Pro-poor finance is a critical component and instrument of targeted poverty alleviation. Based on the difference-in-differences (DID) method with micro survey data from the China Household Finance Survey (CHFS), this paper found that targeted poverty alleviation policy would help increase poor farmer households' formal credit access and amount and reduce the proportion and amount of their loans from informal channels. Furthermore, this paper has excluded the effects of the "Three Lands" policy and "Two Rights" mortgage loan policy on farmer households' credit, thus excluding the problem of sample self-selection. After replacing the definition of the explained variable, the results remained robust. This study also examines the policy's heterogeneous effects across regions and between poor and non-poorer counties. Empirical results suggest that the policy's effects were stronger for poor households in non-poor counties in China's western regions. In addition, this study found that no significant "elite capture" mechanism had existed in the allocation of credit resources for poor households, but the extremely poor households were yet to be supported by formal credit.

In the long run, this paper offers the following policy implications from the perspectives of government, financial institutions, and poor households: First, all levels of government should strive to improve the risk of compensation and sharing mechanism based on the actual conditions of microcredit lending. While the government may set up a special account of risk compensation funds at the banks to support pro-poor finance, poor counties and poverty alleviation departments may implement differentiated interest discount policies based on the creditworthiness and poverty depth of

poor households. Second, while improving the agricultural credit system, financial institutions should continue to step up credit support to extremely poor households and issue more microcredit loans after credit evaluation to generate local growth capabilities. Lastly, poor households should make the most of credit funds to earn more incomes, be aware of the importance of credibility, and enhance their income-earning capabilities under the support of pro-poor loans. As the saying goes, "prosperity rests with fellow-townsman's hard work". After receiving proper credit, poor households should make the most of it, repay the loans, and better themselves, contributing to winning the last battle of fighting poverty and completing the "last mile" of targeted poverty alleviation.

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