

# A Comparative Analysis of the Use of Microfinance and Formal and Informal Credit by Farmers in Less Developed Areas of Rural China

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*Based on household survey data, this article shows that farmers' demand for credit in poor areas of rural China has increased significantly in recent years, and credits from various sources are used differently in production and consumption. For example, microfinance is used primarily in livestock and non-agricultural investments, formal credit is often used in crop production, and informal credit is largely used to meet farmers' consumption requirements. Developing a complementary system with various financial channels in rural China, particularly for non-governmental microfinance, is crucial for meeting farmers' rising demand for credit in both production and consumption.*

**Key words:** Microfinance, formal credit, informal credit, rural China

## 1 Introduction

Credit plays an important role in agricultural and rural development. Indeed, access to credit can enhance the risk-bearing capacity of farmers and help them invest in profitable and riskier production projects with higher potential returns rather than less risky but inefficient projects (Diagne et al., 2000). Credit can also be a powerful instrument to help the rural poor escape the 'vicious circle' of poverty by enhancing their investments and, in the end, increasing their income (Coleman, 1999; Khandker and Faruque, 2003).

The rural finance market in many less developed countries is often segmented and characterised by dual financial systems in which formal and informal finances co-exist. Previous studies have shown that formal credit differs from informal credit in its utilisation; informal credit is mainly used to meet consumption demands, while formal credit is focused on production and investment activities (Bao Duong and Izumida, 2002; Jia et al., 2010; Kochar, 1997; Okurut et al., 2005; Zeller, 1994).

However, institutional lenders are generally unwilling to provide service to small-scale farm households, particularly those in poor areas. This so-called 'market failure' in rural credit results from the high risks related to agricultural production and information asymmetries (Binswanger and Rosenzweig, 1986), the lack of enforcement for loan contracts (Hoff and Stiglitz, 1990), and the small amount of credit demanded by the poor

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(Johnston and Morduch, 2008). To solve this problem, many developing countries have attempted to alter traditional credit models and adapt their financial institutions.

One innovation is microfinance. Originating in Bangladesh in the 1970s, microfinance has become an effective tool for meeting credit demand in many developing countries. Some reports indicate that, in 1997, microfinance met the credit demands of 13.5 million people world-wide; this number rose to 113.5 million in 2005, of which 82 million were the poorest when they took their first loan (Zhang et al., 2010).

It is assumed that the demand for credit in rural China is immense, given that China has the largest number of farmers in the world (Han, 2007). Unlike other developing countries, state-owned formal financial institutions such as the Agricultural Bank of China (ABC) and the Rural Credit Co-operative (RCC) dominate institutional lending in Chinese rural economies.<sup>1</sup> These formal institutions are subsidised by the government to support agricultural production through favourable loans (Huang et al., 2007; Jia and Guo, 2008). However, the effects of formal credit are inconclusive. On the one hand, there is evidence of these credits being used mainly in production activities, while some farmers also use them for non-productive activities such as medical and educational expenditures (Xie and Xu, 2006). On the other hand, Wen and Wang (2005) demonstrated that increases in loan disbursements from institutional lenders have not always succeeded in increasing agricultural production or farmers' income.

Recently, microfinance programmes have developed to fill the gap between the largely unmet demand and the fragmented credit market in rural China. Previous studies have demonstrated that microfinance programmes operated by non-governmental organisations (NGOs) in some poor areas of China helped rural households increase their incomes from both agricultural and non-agricultural sectors (Li et al., 2004; Park and Ren, 2001). For example, Park and Ren found that 47% and 27% of NGO microfinance loans were used in farming and self-employment, respectively.

However, there is a lack of literature on comparative analyses of the utilisation of credit from various financial sources in China. For a long time, NGO microfinance has been considered a standing competitor to formal financial institutions and a potential risk to financial stability (Zhang, 2006). Thus far, little effort has been made to examine how farmers use different sources of credit to meet their production and consumption needs. Some questions therefore arise. Do farmers invest more in agricultural production or non-farm activities when they receive loans from microfinance compared with other formal and informal credits? Has microfinance played a more important role in production than in consumption, compared with other financial sources? Answers to these questions are crucial not only for rural financial lending institutions, but also for national policies on whether China should largely promote emerging microfinance institutions.

The aim of this article is to conduct a comparative study of farmers' utilisation of microfinance and formal and informal credits in poor areas of rural China. Specifically, we focus on two objectives. First, we examine the use of credits from different sources (i.e. microfinance, formal financial institutions, and informal financial networks). Second, we analyse the relationship between sources of credit and usage.

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1. Although RCCs began issuing microcredit in the early 2000s, most of these loans required group guarantees, but not the group lending scheme of the Grameen type. In other words, the microcredit programme of RCCs in rural China was not in the original Grameen style.

The rest of the article is organised as follows. Section 2 describes the data used in this study. Section 3 presents a basic statistical summary of the credit status of sampled households and a descriptive analysis of the utilisation of various forms of credit. Section 4 uses a regression analysis to examine the relationship between utilisation and credit sources, followed by a brief discussion of credit forms in Section 5, while Section 6 concludes.

## 2 Data and sampling

The following methods were used to select study areas when we conducted the survey in 2010. First, we selected research areas where microfinance from the China Foundation for Poverty Alleviation (hereafter CFPA microfinance) was operating. The CFPA microfinance programme is the largest NGO microfinance programme in China.<sup>2</sup> Second, we selected counties where the CFPA microfinance programme has provided similar credit services since 2005. The programme started its pilot microfinance service in poor rural areas of Sichuan, Shanxi, Guizhou, and Fujian provinces between 2000 and 2004. In these first four years, CFPA microfinance was a government charity project, capital was highly subsidised and the business was run as a government project. From 2006 to 2010, outreach increased from 10 counties in 2006 to 39 counties in 2010. Loan disbursement of CFPA microfinance saw a twelvefold increase (from 47 million yuan in 2006 to 569 million in 2010). By the end of 2013, there were 171,468 active clients (<http://www.cfpamf.org.cn/>).

In 2005, CFPA microfinance became independent (from the government) and converted itself into a NGO microfinance institution providing loan services; its legal status was identified as a not-for-profit nongovernmental organisation. This institutionalised microfinance service was implemented in 2006 in five counties in two provinces (Table 1). Although the CFPA had expanded its microfinance service to 26 counties by early 2010, we considered only the above-mentioned five counties in this study, because we wanted to control the heterogeneity of being established in different years. This control allowed us to maximise the number of observations from 2006 to 2009.

Finally, we selected counties that met the following criteria: (i) it has group lending, one of the major characteristics of microfinance; (ii) it is a nationally designated poverty county, since this study focuses on poor rural China. Three of the five counties meet the above conditions, namely, Huaian (HA) in Hebei Province, and Xinbing (XB) and Qingyuan (QY) in Liaoning Province. From counties XB and QY we randomly selected one of the two, XB, to be scrutinised in this study.

The selection of townships and villages was conducted as follows. Within each county, we selected 20 villages where CFPA microfinance was operating (hereafter referred to as microfinance villages or MF villages). Meanwhile, we also included an additional 20 villages that were not covered by CFPA microfinance as a comparison group (hereafter referred to as non-MF villages). In HA county, the size of townships was large and CFPA

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2. CFPA is registered with the Ministry of Civil Affairs and is under the supervision of the State Council Leading Group Office of Poverty Alleviation. To keep this study consistent with existing studies, we use the term *microfinance* (rather than *microcredit*) even though it does not provide saving and insurance products. The term microfinance is officially used by the institution and has been widely referred to, for example in the MIX network (<http://www.mixmarket.org/>).

microfinance coverage was not intensive. We therefore selected 2 townships, and in each township we randomly selected 10 villages with CPFA microfinance and 10 villages without it. We did not choose to cover more townships to construct a microfinance–non-microfinance comparison. We aimed to have better control of local production and consumption environments, and indeed there were not many townships in HA that had both CFPA microfinance villages and non-CFPA microfinance villages. In XB county the size of townships was relatively small (fewer than 12 villages per township, on average), while the average outreach of the village for CFPA microfinance was large (46% in 2007 and 75% in 2009). Accordingly, we randomly selected 20 villages with CFPA microfinance from 2 townships and 20 villages without CFPA microfinance from another 2 townships (thus 10 villages per township).

**Table 1: Five CFPA microfinance branches established in 2005**

County	Outreach 2009 (%)		Products	Designated poverty county
	Townships	Clients		
HA	82	8.8	Group lending	Yes
CJ	11	2.5	Group lending	No
SP	47	2.2	Individual lending	No
XB	100	9.7	Both group & individual lending	Yes
QY	93	6.9	Both group & individual lending	Yes

Source: Authors' survey.

Rural households were randomly selected in both CFPA microfinance villages and non-microfinance villages. In each of the CFPA microfinance villages, we randomly selected 20 households. We first requested a client list from CFPA microfinance's county branches and after grouping all the clients into two categories – first-time borrower in 2006-7 and first-time borrower in 2008-9 – we then randomly selected 10 farmers in each of the categories. If the number of clients was fewer than 10, we selected all of them. In total, there were 749 households from CFPA microfinance villages, with an average of nearly 19 samples per village. In each of the non-microfinance villages, we increased our samples per village to at least 30 households so that we had more non-microfinance households for a comparison group. In the end, 1,246 households were randomly selected from 40 non-microfinance villages, with an average of 31 samples per village. Our sample totalled 1,995 households from 80 villages.

Table 2 verifies that the randomly selected villages and households were comparable in many indicators prior to the service of CFPA microfinance. For example, when examining household characteristics (land size, age and education of household head) and village characteristics (for example, average income per capita in village), we find no statistically significant difference between the microfinance and non-microfinance villages in 2005 before CFPA microfinance was launched.

For each selected household, a questionnaire-based survey was conducted. We asked each farmer whether or not his/her family had received loans in the previous 5 years (2005-9) from any of the following sources: (a) CFPA microfinance; (b) formal credit institutions (i.e., ABC, ADPC, RCC, PSBC, VTB, RMF, and other formal credit institutions); (c)

informal networks (i.e., relatives, friends, usury, co-operative, supplier, or other individuals that do not rely on formal contractual obligations enforced through a codified legal system). The definition of informal credit is the same as that used in Jia and Guo (2008) and Turvey and Kong (2010).

**Table 2: Characteristics of sampled households and villages, 2005**

	Microfinance villages (N=40)	Non-microfinance villages (N=40)
Household sample	749	1,246
Household level		
Area of cultivated land (ha)	0.23	0.25
Household head's age (years)	46.8	49.3
Household head's education (years)	7.5	7.2
Village level		
Average income per capita (1,000 yuan)	2.7	2.8
Village with paved road (1=yes; 0=no)	0.5	0.7

Source: Ibid.

Whenever credit access was identified, we further asked for the details of each individual loan (for example, utilisation, maturity, interest rate, repayment, etc.). In addition, we also collected demographic characteristics for all household individuals and their employment status, land size, crop farming, livestock husbandry, and value of household assets.

The survey data show that there were a total of 4,999 loans borrowed by 1,995 households between 2006 and 2009. Not all rural households had loans during our survey period; 15% of households had no credit records in the samples from 2006 to 2009. Of the 4,999 loans, 1,202, 1,238, and 2,559 were from CFPA microfinance, formal financial institutions, and informal sources, respectively.

### 3 Microfinance and other rural credits

CFPA microfinance operates differently from formal credit institutions such as the RCC. In each village of outreach, CFPA microfinance establishes an office in either a grocery shop or the village's administrative office, where it is convenient for the applicants to meet the loan officer. To apply for CFPA microcredit, the applicant should provide his/her basic information, as well as information on other applicants in the group. After receiving the application, the loan officer visits all the members in the group, screens out loanable applications, and presents his/her findings to the credit committee at each county branch. If approved, the clients receive the loans and begin to repay them. However, to apply for credit from an RCC in the study area, the farmers have to travel to the RCC's office in the township or county capital. The application and approval procedure takes much longer than in microfinance institutions. The applicants are also often asked to revisit the RCC's office to submit additional documents and guarantees, thus causing weeks of delay from the proposed dates of approval. Previous empirical studies have shown that the prohibitive

transaction costs of small-scale loans and a lack of social networks constrain Chinese farmers from obtaining credit from institutional lenders such as RCCs (Han, 2007; Jia et al., 2010; Zhang, 2008).

Table 3 summarises Chinese household credit by loan source from 2006 to 2009. Three obvious features are demonstrated by the data. First, microfinance expanded rapidly over this time period, indicating farmers' strong demand for credit provided by CFPA microfinance (column 1). Second, the average loan size increased over time and the growth was faster for microfinance and informal credit than for formal credit. Further, CFPA microfinance sets a cap on loan amounts of 20,000 yuan for group lending. The average microfinance loan size increased by 2.18 times, from 2,612 yuan in 2006, to 5,693 yuan in 2009; the increases were 1.68 and 2.35 times for formal and informal credit, respectively (last row, Table 3). Third, informal channels were the main source of credit. Not only was informal credit the most popular source in terms of loan quantity, but the loan amount was also the largest in each year, reflecting difficulties in farmers' access to formal finance in the study areas.

**Table 3: Average number of loans per household and loan size, 2006–09**

Year	MF		FFI		IFN	
	No. of loans per household	Average loan size (yuan)	No. of loans per household	Average loan size (yuan)	No. of loans per household	Average loan size (yuan)
2006	0.05	2612	0.21	8479***	0.34	9013***
2007	0.21	3544	0.21	9167***	0.39	10448***
2008	0.25	4806	0.20	12946***	0.45	13350***
2009	0.29	5693	0.20	14215***	0.52	17164***
Total	0.80	4647	0.83	11135***	1.71	12988***
2009/2006	5.64	2.18	0.93	1.68	1.55	1.90

Notes: (i) Sample size is 1,995 in each year. MF refers to CFPA Microfinance; FFI refers to formal financial institutions; IFN to informal networks; (ii) to test the differences between MF and FFI, as well as the differences between MF and IFN, a t-test is conducted. \*\*\* represents significance at the 1% level.

Source: Ibid.

In villages where CFPA provided microfinance services, the incidence of formal and informal credit provision was relatively low. In Table 4, we compare the credit status of CFPA microfinance villages with non-microfinance villages. The results reveal that in MF villages only 7% and 15% of households borrowed through formal and informal channels, respectively. These figures were lower than those for non-MF villages (21% and 32%, respectively), which indicates that households in MF villages might be unable to obtain credit through formal and informal channels. Given the sampling methods that aimed to achieve comparability in income and production environments between MF and non-MF villages, and given that both groups of villages are located in the nationally-designated poverty counties, one explanation for lower formal and informal credit provision in the CFPA MF villages is that poverty-alleviation loans such as CFPA microfinance targeted from 2006 to 2009 the villages where availability of both formal and informal credits was relatively low. When we further compare the characteristics of MF and non-MF villages,

we find that the major difference between them is rural infrastructure. In other words, more than 70% of non-MF villages had paved roads, a figure that was only about 50% in MF villages (see Table 2).

However, the demand for credit increased steadily in MF villages. As shown in Table 4, the percentage of households owing credit increased from 28% in 2006 to 71% in 2009 in microfinance villages, while this rate increased only from 45% to 58% over the same period in non-MF villages. The fastest growth rate was in microfinance. Interestingly, although the share of households with credit from formal financial institutions was lower in MF villages (7%) than in non-MF villages (21% in 2006), this rate increased in MF villages and fell in non-MF villages between 2006 and 2009. Thus, microfinance does not appear to be squeezing out credit provided by formal financial institutions. Furthermore, the expansion of informal finance was minor in MF villages (9%, column 4) while expansion was robust in non-MF villages (15%, last column, Table 4). This implies that the CFPA microfinance programme not only meets farmers' demand for credit, but may also facilitate farmers' ability to access formal credit and help them avoid excessive use of informal credit.

**Table 4: Sources and amount of farmers' credit in MF and non-MF villages, 2006 and 2009**

	MF villages				Non-MF villages		
	Total	MF	FFI	IFN	Total	FFI	IFN
Households with credit (%)							
2006	28	10	7	15	45	21	32
2009	71	57	9	24	58	18	47
Average loan size (yuan)							
2006	6794	2612	9420***	8483***	8814	8299	9158
2009	9448	5693	12655***	17103***	16478	14689	17182

Notes: To test the differences between MF and FFI, differences between MF and IFN in MF villages, and also differences between FFI and IFN in non-MF villages, a t-test is conducted. \*\*\* represents significance at the 1% level.

Source: Ibid.

Notwithstanding the small loan size provided by microfinance, it nevertheless greatly mitigates the credit constraints of poor people. The data and statistical analysis show that the loan size for microfinance was significantly smaller than for formal and informal credit in both 2006 and 2009 (rows 3-4, Table 4). This is what we might expect, given the nature of microfinance.

We also surveyed farmers' perceptions of the advantages and disadvantages of loans from various lending sources by asking the question 'To whom would you go for loans first?' Fully 65% of farmers in the microfinance villages responded that CFPA microfinance would be their first choice. By comparison, their informal network was considered to be the foremost lending source for farmers in non-MF villages (Table 5). When we asked farmers about the advantages they perceived for microfinance over informal credit, 37% in the microfinance villages said that credit through an informal network committed them to psychological and physical costs. Some admitted that they

often also assisted the lenders with farming or other activities as an expression of gratitude. Others mentioned that to please the lenders they make every effort to deliver a grateful message to them (Table 5). The indigenous trust and social ties found in rural communities in China were found to be an important driving force that may crowd out microcredit (Turvey and Kong, 2010). Our study, however, finds that informal credit, even without an interest rate, is by no means costless. Such a reciprocal loan through informal credits from friends and relatives always implies the obligation of returning some sort of favour.

**Table 5: Farmers' perceptions of applying for credit from various sources (%)**

	Microfinance villages	Non-microfinance villages	
		Received credit	No credit
To whom will you go for loans first?			
CFPA microfinance	65	0	0
Formal credit institutions	3	13	9
Informal network	31	84	84
Advantages of CFPA microfinance			
Being fast and convenient	84	–	–
No obligation to others	37	–	–

Source: Ibid.

#### 4 Utilisation of credits: a descriptive analysis

In this Section we provide descriptive statistics on credit utilisation by farmers. We first group credit usage into three major categories: agriculture, non-agriculture, and living expenses. Under each category, we further divide them into two sub-groups in agriculture, three sub-groups in non-agriculture, and seven sub-groups in living expenses. The data are presented in Table 6.

Our data show that farmers mostly requested credit from CFPA microfinance when they wanted to make investments in agriculture, especially in livestock, while loans borrowed through informal sources were mostly used for living expenses. As shown in Table 6, only 8% of microfinance loans were used for living expenses, but the figure was 60% for informal credit. Microfinance mainly supported agriculture (69%) but this rate was only 21% for informal credit. In addition (not reported in Table 6), due to small loan sizes, more than 90% of microfinance loans were for single usage (or used in one single sub-sector). By contrast, nearly 20% of both formal and informal credits were used in two or more sub-sectors.

Within the agricultural sector, microfinance met farmers' particular demand for investments in livestock husbandry compared with the other two credit sources. We further classify loan use in agriculture into crop farming and livestock raising, with the former mainly referring to production input purchases such as fertiliser, pesticides, agricultural plastic film, seed, and others, and the latter including purchasing feeds, breeding stocks and investing in livestock fittings. Our survey data show that the microfinance loans used in livestock husbandry accounted for 37% of all loans, while the shares of formal and informal



credits used in livestock husbandry accounted for only 17% and 10% of all loans, respectively.

**Table 6: Credit utilisation by source, 2006–9 (%)**

	Microfinance	Formal financial institutions	Informal financial network
<b>Agriculture</b>	<b>69</b>	<b>56</b>	<b>21</b>
Crops	32	39	11
Livestock	37	17	10
<b>Non-agriculture</b>	<b>23</b>	<b>28</b>	<b>19</b>
Wholesale and retail	13	11	6
Transportation	6	8	5
Other services	4	3	2
<b>Living expenses</b>	<b>8</b>	<b>20</b>	<b>60</b>
Health care	2	2	13
Education	4	6	10
Housing	1	7	12
Wedding or funereal	0	1	15
Daily expenditure	1	2	6
Others	0	2	4
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Ibid.

The shares used in the non-agricultural sector for microfinance, formal credit, and informal credit were 23%, 28%, and 19%, respectively. Although credits from all three channels mainly supported wholesale and retail businesses, microfinance comprised relatively more loans (13%) than others (11% for formal and 6% for informal credit). This is understandable, since rural wholesale and retail businesses normally require relatively small initial or working capital that can be quickly turned over. Features of microfinance such as small loans and short repayment periods (less than one year) are well-suited to the capital flow of wholesale and retail business.

Consistent with other studies (for example, Park and Ren, 2001), we found that microfinance was rarely considered by farmers as a means of financing consumption expenditures. As Table 6 shows, only 8% of microfinance loans – compared with 60% of informal and 20% of formal loans – were requested to meet the needs of farmers' living expenses. In terms of the composition of consumption use, the top two ranked uses of microfinance were education (mainly for children's schooling) and medical expenditures. By contrast, informal loans to cover living expenses were mostly used for weddings, funerals, health care and housing expenditures. Once again, the inherent characteristics of microfinance make it difficult to satisfy expenditure needs that require large volumes of capital, such that they have to be financed through informal and formal credit channels.

Utilising CFPA microfinance differs from existing microfinance Grameen-type schemes. For example, the Grameen Trust (GT) has established two Grameen Microcredit Companies in China's poorest areas. The size of the average loan extended by this company was 10,000 yuan, and most of the loan activities were in non-agricultural sectors such as

pharmacy, taxi operations, barber shops, hotels, and tea stalls (Sen, 2012). The GT microcredit requires monthly repayments, and thus also fits with a credit demand that is able to generate quick turnovers.

Loan characteristics indeed vary across different sources, and microfinance meets farmers' needs for investments in projects with small working capital and quick turnovers. For example, CFPA microfinance used group lending that is similar to the model used by the Grameen Bank in Bangladesh; its average annual nominal interest rate reached 18.3% from 2006 to 2009 (Table 7). This rate fits with existing studies that show that demand is very inelastic at the higher interest rates with smaller loans, whereas lower interest rates lead to more elastic credit demand (Turvey et al., 2012).<sup>3</sup> Secondly, because it is small, rapidly accessible, and flexible collateral (group formation), CFPA microfinance meets demands for investments of small amounts in farming (purchases of seed, fertiliser, or feedstuffs for livestock farming) and in non-agriculture (wholesale and retail business). As shown in Table 7, both CFPA microfinance and informal credit generally last less than one year, but formal credit is by and large used for mid- or long-term investments (row 1). Likewise, the repayment frequency for microfinance loans is higher than that of formal credit (a 97.4% monthly/quarterly repayment rate versus a 4.9% rate for formal credit; Table 7, row 2). The average time cost for accessing CFPA microfinance is only 4.5 days, while the figure is around 52 days for institutional lending; given its availability and convenience, microfinance is obviously welcomed by farmers.

**Table 7: Characteristics of loans from different sources**

	Micro-finance	Formal financial institutions	Informal financial network
Loan maturity (months)	11.9	20.2***	9.6
Annual rate of interest <sup>a</sup>	18.3	10.2***	12.1***
Repayment schedule (%)			
Monthly/quarterly repayment	97.4	4.9	0
Terminal repayment	2.6	95.1	19
No repayment scheme	0	0	81
Time costs of receiving money since application (days)	4.5	52.4***	6.3*
Collateral (%)			
Joint liability of group lending	100	22.8	0
Mortgage (by house, person, deposits, or others)	0	41.9	0.4
No specifications	0	35.3	99.6

Notes: (a) Approximately 93% say that credit did not specify an interest rate. \* and \*\*\* denote statistical significance of the mean difference from microfinance at the 10% and 1% levels, respectively.

Source: Ibid.

Formal and informal credits serve different segments of the rural credit market in China. The data and statistical analysis show that formal credit is dispersed in large amounts and over a relatively longer term (Tables 4 and 7). Although the nominal rate of

3. The interest rate for a CFPA microfinance loan is not regulated relative to formal credit such as RCC and others.

interest for formal credit (10.2% annually, Table 7) is statistically significantly lower than that for microfinance, farmers must wait an average of 52.4 days to receive loans from the time of application. As such, formal credit is mostly suited to farmers' investments in farming and non-agricultural businesses that demand lump-sum capital. For informal credit, most of the loans were reciprocal credit through informal networks (relatives and friends) that specified no interest. However, some informal credit requested interest and specified repayment schemes. The time costs for informal credit are minor (6.3 days on average) but such accessibility is not completely costless; informal credits between friends and relatives often imply the obligation of returning favours, as shown in Table 5 and in earlier discussion. Unless farmers' liquidity is constrained in consumption usage, farmers would not commit themselves to such an obligation (Jia, et al., 2010). The rural credit market in China is thus segmented by various types of usage.

## 5 Multivariate regression analysis

Because many factors may simultaneously affect farmers' decision-making when requesting a loan, multivariate analysis is needed. In this Section, we specify a multivariate model that seeks to examine the relationship between loan sources and utilisation. We then estimate the model and present the main results.

### 5.1 Model specification and estimation

The basic model we use to examine the relationship between credit sources and utilisation is specified as follows:

$$Y_{ijt} = a_1 + \gamma USAGE_{ikt} + \varphi Z_{it} + a_1 T + e_{ijt} \quad (\text{Model 1})$$

where the dependent variable  $Y_{ijt}$  in Model 1 represents whether or not the  $i^{th}$  farmer obtained loans, as well as the loan amounts from the  $j^{th}$  channel ( $j=1$  for CFPA microfinance,  $j=2$  for formal financial institutions,  $j=3$  for informal financial network) in year  $t$  ( $t=2006, 2007, 2008, \text{ and } 2009$ ).

As the key group of explanatory variables,  $USAGE_{ikt}$  is a set of dummy variables with a value of 1 or 0 that indicates credit being utilised in crop farming ( $k=1$ ), livestock raising ( $k=2$ ), non-agricultural sectors ( $k=3$ ), and living expenses ( $k=4$ ), respectively. For example, when a loan is requested for crop farming, then  $USAGE_{i1t}$  equals 1, and 0 otherwise. If a loan is used for raising livestock,  $USAGE_{i2t}$  equals 1, and 0 otherwise. Coefficient  $\gamma$  thus denotes the marginal difference in the probability of requesting loans from microfinance, formal financial institutions, or informal financial networks for Chinese smallholder farmers in less developed areas when they require credit for various needs, holding all else constant.

Other control variables included in the vector  $Z_{it}$  reflect household demographics and village characteristics. For example, *population* measures the member size of a household, *education* measures the years of formal education attained by the head of a household, and *village leader* identifies household member(s) who are village leaders, while also acting as a dummy variable with a value of 1 (yes) or 0 (no). Moreover, *cultivated land area* is measured in hectares per household, *assets* reflect household wealth and are measured as

per capita durable consumption assets, including housing assets, furniture and other durable consumption assets with values of more than 500 yuan. We also include a village-level variable, *village with paved road*, to reflect the transportation infrastructure in the villages. Our longitudinal data include four years between 2006 and 2009. Accordingly, we create a variable, *T* or time trend, which ranges from 1 (when the year is 2006) to 4 (when it is 2009); *T* measures the changes in credit access over time. It is possible that credit use might differ by region. Therefore we include a county dummy variable, *HA county*, in the models. A summary of these variables is provided in Appendix A.

Given that not all informal credit in the samples specified interest in the loan contract, when estimating Model 1 we separate informal credit into loans with and without specified interest. The dependent variables  $Y_{ijt}$  thus include a set of nominal outcomes of microfinance ( $j=1$ ), formal credit ( $j=2$ ), informal credit with an interest rate ( $j=3$ ), and informal credit without an interest rate ( $j=4$ ). This extension is called Model 2.

To estimate the relationship between the sources of credit and credit utilisation, we estimate Model 2 by using Multinomial Logistic Regressions (MLR), and the results of marginal effects (ME) are shown in Table 8. The model fits well with the estimation because it also allows us to investigate explanatory variables for the chosen alternative over the other alternatives. In this estimation, we specify formal credit as the base category. Because the coefficient of MLR can be viewed as the probability of alternative  $j$  over the base category, we transform the odds ratios to relative-risk ratios (RRR), and present the results in Table 9.<sup>4</sup> To estimate the relationship between the loan amounts and credit utilisation, we estimate Model 2 by using Tobit and present the results in Table 10.

## 5.2 Estimated results

The results of the regression analysis for the relationship between credit sources and credit usage demonstrate that the models are capable of producing results that are reasonable and consistent with our descriptive analysis (Tables 6 and 7). The estimated coefficients for many control variables are also statistically significant with the expected signs. For example, the positive sign of *Time trend* (column 1, Table 8) reveals the increased demand for microfinance in the sample villages. The negative sign of *Time trend* (column 2, Table 8) denotes some factors that were related to time trend restricting farmers' access to institutional lenders in the study areas during 2006 and 2009. Such a finding is consistent with existing studies (Han, 2007; Jia et al., 2010). In addition, the estimated coefficient for the *HA county* dummy variable is negative and statistically significant (Table 8, column 2), which shows regional differences of farmers' accessing credit from various sources.

The results reveal that, compared to informal credit, microfinance is much more likely to be used in production investments. The estimated coefficients are statistically significant (rows 2 and 3, column 1, Table 8), which implies that when demand exists for credit to invest in livestock farming and non-agriculture, farmers are inclined to borrow from every source except their informal network without specified interest. Examining the results of relative-risk ratios in Table 9, we find that the coefficients are positive and larger than one

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4. The RRR measures the relative odds of credit access from source  $i$  rather than from  $j$  ( $j$  is the base category). If the coefficient is larger than one, it means that a one-unit increase in the variable associated with the relative odds of credit access to  $i$  is larger than the odds of credit going to  $j$ .

(rows 2 and 3, column 1), suggesting that farmers would prefer microfinance rather than formal credit institutions to finance livestock farming and non-agricultural activities.

**Table 8: Marginal effects of multivariate analysis estimating the relationship between farmers' credit access and loan utilisation during 2006 and 2009 using multinomial logistic models**

	Borrowed from this source			
	Microfinance (1)	Formal credit (2)	Informal credit with interest (3)	Informal credit without specified interest (4)
Stated credit utilisation				
Crops	-0.05*** (-2.94)	0.16*** (11.59)	-0.01 (-1.39)	-0.10*** (-6.56)
Livestock	0.17*** (10.51)	0.03 (1.49)	0.03*** (3.41)	-0.22*** (-11.46)
Non-agriculture	0.08*** (4.31)	0.06*** (2.89)	0.03*** (3.28)	-0.17*** (-7.49)
Living expenses	-0.25*** (-15.83)	-0.02 (-1.63)	0.04*** (5.41)	0.23*** (16.43)
Population	-0.01 (-1.64)	0.001 (0.47)	-0.001** (-1.96)	0.01* (1.95)
Education	0.001** (2.09)	0.00 (0.45)	0.001* (1.77)	-0.01*** (-3.13)
Village leader	-0.06*** (-4.33)	0.03** (2.42)	0.01 (1.63)	0.02 (1.45)
Assets (1,000 yuan)	0.002* (1.83)	0.003** (1.97)	0.001 (0.88)	-0.01*** (-3.40)
Time trend	0.06*** (11.66)	-0.04*** (-8.98)	0.00 (1.46)	-0.02*** (-3.74)
Village with paved road	-0.11*** (-9.09)	0.10*** (6.54)	-0.02*** (-2.77)	0.03** (2.23)
HA county	0.02** (1.99)	-0.32*** (-23.06)	0.001 (0.99)	0.29*** (24.91)

Notes: The number of observations is 4,999. Pseudo R2 is 0.276. Absolute values of t statistics are shown in parentheses. \*, \*\*, and \*\*\* represent significance at the 10%, 5%, and 1% levels, respectively.

Source: Ibid.

Farmers mostly rely on informal networks to finance living expenses when facing liquidity constraints; the coefficients of *Living expenses* are significantly positive in Table 8 (row 4, columns 3 and 4) and are positive (but larger than one) in Table 9 (row 4, columns 2 and 3). The coefficient is negative for microfinance (row 4, column 1, Table 8) and positively larger than one (row 4, column 1, Table 9), implying that the probability of borrowing from microfinance to finance living expenses declines even when formal credit is chosen as the base category.

**Table 9: Relative-risk ratios (RRR) of multivariate analysis estimating the relationship between farmers' credit access and loan utilisation during 2006 and 2009 using multinomial logistic models**

	Borrowed from this source		
	Microfinance	Informal credit with interest	Informal credit without specified interest
Stated credit utilisation			
Crops	0.33*** (-7.70)	0.29*** (-5.77)	0.29*** (-10.65)
Livestock	2.27*** (5.37)	1.60* (1.76)	0.39*** (-6.33)
Non-agriculture	1.17 (0.87)	1.52 (1.36)	0.39*** (-5.30)
Living expenses	0.28*** (-8.66)	4.29*** (6.43)	2.86*** (9.92)
Population	0.94 (-1.33)	0.85* (-1.86)	1.02 (0.57)
Education	1.02 (0.96)	1.04 (1.24)	0.98* (-1.68)
Village leader	0.62*** (-4.04)	1.15 (0.73)	0.94 (-0.64)
Assets (1,000 yuan)	0.99 (-0.10)	0.99 (-0.21)	0.96** (-2.89)
Time trend	1.74*** (11.80)	1.40*** (3.79)	1.15*** (3.65)
Village with paved road	0.31*** (-8.87)	0.36*** (-4.81)	0.67*** (-3.30)
HA county	5.92*** (13.42)	8.88*** (10.57)	15.92*** (22.32)

Notes: (i) Formal credit is specified as the base category. The relative-risk ratio (RRR) is thus interpreted as the relative odds of choosing credit source  $i$  ( $i=1$  for microfinance,  $i=2$  for formal credit,  $i=3$  for informal credit with specified interest and  $i=4$  for informal credit without specified interest), rather than formal credit. Also, as for Table 8.

Source: Ibid.

Decomposing informal credit into two channels (i.e., with and without specified interest) allows us to examine the distinctions of farmers' credit access through various informal channels. The results show that the coefficients are significantly positive (in rows 2 and 3, column 3, Table 8), but the figures are consistently negative (in rows 2 and 3, column 4, Table 8). This implies that informal financial networks that charge interest are used for production investments in livestock farming and non-agricultural activities, but that informal networks without specified interest are mostly utilised to fund living expenses. The coefficient is also larger for informal networks without interest (row 4, column 4, Table 8) than the coefficient of informal credit with specified interest (row 4, column 3). This implies that, when compared to informal credit that charges interest, the

magnitude of correlation between credit used for living expenses and the selection of a loan source is smaller than that for informal networks without specified interest.

**Table 10: Marginal effects of multivariate analysis estimating the relationship between loan amounts and loan utilisation during 2006 and 2009 using Tobit models**

	Credit amount from this source (1,000 yuan)			
	Microfinance	Formal credit	Informal credit with interest	Informal credit without specified interest
	(1)	(2)	(3)	(4)
Stated credit utilisation				
Crops	-0.05 (-0.59)	3.14*** (6.67)	-0.05 (-0.31)	-4.14*** (-8.30)
Livestock	1.08*** (11.27)	0.67 (1.36)	0.63*** (2.90)	-6.11*** (-6.81)
Non-agriculture	0.83*** (7.58)	3.84*** (4.83)	1.31*** (4.68)	-1.97* (-1.93)
Living expenses	-1.29*** (-13.32)	-0.87*** (-2.58)	0.81*** (4.09)	6.99*** (12.18)
Population	-0.03 (-1.20)	0.21 (1.39)	-0.11 (-1.21)	0.70*** (3.11)
Education	0.02** (2.05)	0.06 (1.14)	0.02 (0.50)	-0.19*** (-2.58)
Village leader	-0.31*** (-4.35)	1.09*** (3.04)	0.39** (2.54)	0.87 (1.56)
Assets (1,000 yuan)	0.014** (2.06)	0.21** (2.53)	0.016 (0.91)	0.21** (2.07)
Interest rate	-5.76 (1.69)	-30.57*** (-7.82)	0.18*** (4.02)	
Time trend	0.43*** (14.86)	-0.83*** (-5.99)	0.12 (1.50)	0.17 (0.99)
Village with paved road	-0.58*** (-8.95)	2.18*** (4.86)	-0.51*** (-2.81)	1.47*** (3.33)
HA county	-0.15** (-2.35)	-7.48*** (-11.24)	0.17 (0.99)	6.51*** (10.32)

Notes: As for Table 8.

Source: Ibid.

Loan amounts from different sources vary across loan utilisation. As shown in Table 10, farmers are inclined to borrow more from microfinance than from other sources if they invest in livestock farming. Although the coefficients are both positive and significant (columns 1 and 2), the magnitude of the coefficients for microfinance is smaller than for formal and informal credit when investing in non-agriculture. In addition, the coefficient of interest rates for microfinance (5.76, column 1) is smaller than that for formal credit. This implies that the demand for credit is highly inelastic at the higher interest rates with smaller loans, whereas lower interest rates have more elastic demand for credit (Turvey et al., 2012).

Household wealth affects farmers' access to credit from various sources, and the coefficient of *Assets* is smaller for microfinance than that for formal credit (Tables 8 and 10). Compared with poorer CFPA microfinance borrowers, wealthier clients tended to borrow more from formal credit institutions. In addition, the regression results show that the coefficients of *Village with paved road* are negative (column 1, Table 8), implying that CFPA microfinance was instrumental in villages where road infrastructure was poor. The CFPA microfinance is more inclusive than from formal financial institutions.

## 6 Conclusion

This study examined the relationship between farmers' demand for credit from various sources and the credit utilisation in poor rural areas in China. It shows that farmers' demand for credit has risen significantly in recent years, but the use of formal finance appears to be stagnating in the areas studied. In its place, informal lending has become a primary source of credit for the poor. In addition, credits from various sources are used differently in production and consumption. While informal credit is largely used to meet farmers' consumption expectations (for example, health care, education, housing, and social activities), credit from microfinance, being small and flexible, provides farmers with more capital to invest in both agriculture, particularly livestock husbandry, and non-agriculture. Credit from formal financial institutions tends to be invested more in crop production by farmers. Hence, developing a complementary system with various financial channels in rural China is critical for meeting farmers' rising demand for credit in both production and consumption.

Microfinance in the parts of China we studied clearly fills a gap that other formal and informal sources do not. In some parts of the developing world, microfinance providers seem to be becoming more commercially orientated (Christen and Drake, 2002; Cull et al., 2009). Concern is growing, however, that such a process may exclude poor populations. This study of NGO microfinance in China shows that NGO microfinance does not exclude the poor, and actually promotes production investments in poor areas.

The policy question is, then, whether microfinance provision can be expanded across rural China. The obstacle is the supply of funds to lend. Under current rules, designed to protect savers, the CFPA cannot take savings deposits and hence is limited to its initial capital endowment plus whatever expansion can be funded from profits on lending. Worldwide it is quite common that savings are not allowed in microfinance institutions for reasons of prudential regulation (CGAP, 2006).

This is a pity, since in many countries simple savings vehicles with locally-based formal institutions are much appreciated (Rutherford, 2006; 2011). Recent experimental studies show that poor households have the desire and capability to save through microfinance when the product is designed carefully and the bias is removed (Rutherford, 2011).

It would be good if China were to try — at least perhaps as an experiment — to allow microfinance providers to offer savings vehicles. In other countries such as Indonesia (Seibel et al. 2010), very large sums have been mobilised from rural savings, well in excess of prudent lending, suggesting that there can be large and unmet demand for savings facilities in rural areas. China's impressive economic growth since the late 1970s has been



marked by a willingness to experiment (Rodrik, 2008): allowing the CFPA to take in deposits might be well worth a trial.

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## References

- Bao Duong, P. and Izumida, Y. (2002) 'Rural Development Finance in Vietnam: A microeconomic analysis of household surveys', *World Development* 30(2): 319–35.
- Binswanger, H. P. and Rosenzweig, M. R. (1986) 'Behavioural and Material Determinants of Production Relations in Agriculture', *Journal of Development Studies* 22(3): 503–39.
- Christen, R. and Drake, D. (2002) 'Commercialization: The new reality of microfinance', in D. Drake and E. Rhyne (eds), *The Commercialization of Microfinance: Balancing business and development*. Bloomfield, CT: Kumarian Press.
- CGAP (2006) *Poor Peoples' Savings: Q&As with experts*. Washington, DC: Consultative Group to Assist the Poor (CGAP).
- Coleman, B. E. (1999) 'The Impact of Group Lending in Northeast Thailand', *Journal of Development Economics* 60(1): 105–41.
- Cull, R.; Demirguc-Kunt, A. and Morduch, J. (2009) 'Microfinance Meets the Market', *Journal of Economic Perspectives* 23(1): 167–92.
- Diagne, A., Zeller, M. and Sharma, M. (2000) *Empirical Measurements of Households' Access to Credit and Credit Constraints in Developing Countries: Methodological issues and evidence*. FCND Discussion Paper 90. Washington, DC: International Food Policy Research Institute (IFPRI), Food Consumption and Nutrition Division (FCND).
- Han, J. (ed.) (2007) *Survey of China's Rural Finance (zhongguo nongcun jinrong diaocha)*. Shanghai: Shanghai Far East Publishers.
- Hoff, K. and Stiglitz, J. E. (1990) 'Introduction: Imperfect information and rural credit markets: Puzzles and policy perspectives', *World Bank Economic Review* 4(3): 235–50.
- Huang, Z., Liu, X. and Cheng, E. (2007) 'Demand for Credit of Chinese Farmers' Households: Productive or consumptional? (zhongguo nonghu de xindai xuqiu: shengchanxing yihou xiaofeixing)', *Management World* (3):73–80.
- Jia, X. and Guo, P. (2008) 'Evolution of Rural Finance in China: Institutional "lock in" or gradualism?', *Savings and Development* 32(4): 279–99.
- Jia, X., Heidhues, F. and Zeller, M. (2010) 'Credit Rationing of Rural Households in China', *Agricultural Finance Review* 70(1): 37–54.
- Johnston, D. and Morduch, J. (2008) 'The Unbanked: Evidence from Indonesia', *World Bank Economic Review* 22(3): 517–37.
- Khandker, S. R. and Faruquee, R. R. (2003) 'The Impact of Farm Credit in Pakistan', *Agricultural Economics* 28(3): 197–213.

- Kochar, A. (1997) 'An Empirical Investigation of Rationing Constraints in Rural Credit Markets in India', *Journal of Development Economics* 53(2): 339–71.
- Li, H., Rozelle, S. and Zhang, L. (2004) 'Micro-credit Programs and Off-farm Migration in China', *Pacific Economic Review* 9(3): 209–32.
- Okurut, F., Schoombie, A. and Berg, S. (2005) 'Credit Demand and Credit Rationing in the Informal Financial Sector in Uganda', *South African Journal of Economics* 73(3): 482–97.
- Park, A. and Ren, C. (2001) 'Microfinance with Chinese Characteristics', *World Development* 29(1): 39–62.
- Rodrik, D. (2008) *The New Development Economics: We shall experiment, but how shall we learn?* Research Working Paper RWP08-055 (Revised Draft, July 2008). Cambridge, MA: Harvard University, John F. Kennedy School of Government.
- Rutherford, S. (2011) 'Boosting the Poor's Capacity to Save: A note on instalment plans and their variants', B. Armendáriz and M. Labie (eds), *The Handbook of Microfinance*. London: World Scientific.
- Rutherford, S. (2006) 'Why Do Poor People Save?', in CGAP.
- Seibel, H. D., Rachmadi, A. and Kusumayakti, D. (2010) 'Reform, Growth and Resilience of Savings-Led Commercial Microfinance Institutions: The case of the microbanking units of Bank Rakyat Indonesia', *Savings and Development* 34(3): 277–303.
- Sen, D. K. (2012) 'Grameen Microcredit Companies in China', *Grameen Dialogue* July: 82–4.
- Turvey, C. G. and Kong, R. (2010) 'Informal Lending Amongst Friends and Relatives: Can microcredit compete in rural China?', *China Economic Review* 21(4): 544–56.
- Turvey, C.; He, G.; Ma, J.; Kong, R. and Meagher, P. (2012) 'Farm Credit and Credit Demand Elasticities in Shaanxi and Gansu', *China Economic Review* 23(4): 1020–35.
- Wen, T. and Wang, Y. (2005) 'The Economic Effects of Government-led Agricultural Credit and Model of Fiscal Support to Agriculture (*zhengfu zhudao de nongye xindai, caizheng zhinong moshi de jingji xiaoying*)', *Chinese Rural Economy* (10):18-27.
- Xie, P. and Xu, Z. (2006) 'Public Fiscal, Financial Support to Agriculture and Rural Financial Reforms: Survey analysis based on Guizhou province (*gonggong caizheng, jinrong zhinong yu nongcun jinrong gaige*)', *Journal of Economic Research* 41(4): 106–14.
- Zeller, M. (1994) 'Determinants of Credit Rationing: A study of informal lenders and formal credit groups in Madagascar', *World Development* 22(12): 1895–907.
- Zhang, J. (2008) 'Social Capital of Rural Households and its Effect on their Credit Behavior: Empirical analysis based on the investigation in Henan province (in Chinese)', *Problems of Agricultural Economy* 9(1): 28–34.
- Zhang, W.; Li, H.; Ishida, S. and Park, E. (2010) 'China's Non-governmental Microcredit Practice: History and challenges', *Journal of Family and Economic Issues* 31(3): 280–96.
- Zhang, X. (2006) 'Solution to the Credit Rationing in Rural China: Dialogue between Xiaoling Wu and Muhammad Yunus [pojie zhongguo nongcun xiao xindai nantij]', Stockstar, China, [http://finance.stockstar.com/GA2006102400351301\\_1.shtml](http://finance.stockstar.com/GA2006102400351301_1.shtml).

**Appendix A: Descriptive statistics of the variables used in analyses**

<b>Variables</b>	<b>Mean</b>	<b>Std. Dev.</b>
Borrowed from this source (Yes=1; No=0)		
CFPA microfinance	0.24	0.42
Formal financial institution	0.25	0.43
Informal networks with specified interest	0.03	0.18
Informal networks without specified interest	0.47	0.50
Credit being utilised in activities of		
Crops	0.46	0.49
Livestock	0.19	0.38
Non-agriculture	0.11	0.31
Living expenses	0.43	0.49
Population	3.77	1.06
Household head education (years)	7.52	2.64
Village leader (Yes=1; No=0)	0.16	0.41
Assets (10,000 yuan)	2.89	3.64
Village with paved road	2.90	3.64

Note: Total number of observations is 4,999.

Source: Authors' own survey data.