Borrower Attitudes, Lender Attitudes and Sannong Agricultural Loan Policy in Rural China

Rong Kong
Northwest Agricultural and Forestry University, PRC
Kongrong1996@yahoo.com

Calum G. Turvey
Cornell University, USA

Xiaolan Xu
Cornell University, USA

Fei Liu
Northwest Agricultural and Forestry University, PRC

Abstract

Purpose - This paper investigates the lender-borrower relationship as it relates to Sannong loans for agricultural and rural financial markets by Rural Credit Cooperatives and other rural lenders. This paper is motivated by recent reforms to the rural credit market designed to encourage increased lending, particularly to farmers. Little is understood about the lender-borrower relationship in rural China. This paper fills that gap.

Design/methodology/approach - In this paper we investigate relational attitudes between 120 loan officers at Rural Credit Cooperatives (RCCs) in China’s costal Shandong province, paired with a field survey using matched questions to 394 farm households in the same region. Pairing lenders’ perception towards borrowers regarding RCC microcredit lending mechanism, against borrowers’ perception towards lenders and how themselves were perceived by lenders in the same regards, we investigate the degree of disconnect between lenders and With distinct cluster groupings based on their perceptions, we analyze the influence of demographics on the borrower and lender cluster memberships.

Findings - We identify four borrower clusters and two lender clusters. Borrower clusters are segmented on credit access and satisfaction with their rural lender. We also identify two
lender clusters, segmented principally on financial incentives and lending activities. While all lenders view farming with higher regard than farmers believe they do, one cluster is clearly pro-farmer while the second is somewhat indifferent. Indifference is more related to current portfolio activities. We draw conclusions that policy initiatives should be put in place at RCCs that close the gap between lender and borrower in their credit relationship. Rural lenders should concentrate on advocating RCCs’ care and trust towards agriculture and farm households. At the institutional level, effort should be extended to train a dedicated team of loan officers that specialize in servicing farm households with standardized lending practices. This research provides financial institutions with outreach mechanisms to borrowers, while also training lenders to borrowers’ sensitivities.

**Originality/Value** – Management studies of Rural Credit Cooperatives are few. This is the first paper that we are aware of that studies farmer and lender attitudes on the same scale.

**Key Words:** Lender-Borrower relationship, Rural Credit Cooperatives, Agricultural Finance, China, Psychographic segmentation

**Introduction**

Does the recent trend to push Rural Credit Cooperatives towards commercialization, while improving RCC governance and diversifying their source of funding address the needs of farm households? This question is central not only to the theme of this paper, but more importantly to the development of rural credit in China for not only farm loans but also loans to related agricultural businesses, small and medium size enterprises, and other individual and business loans (Zhang et al, 2010; Turvey et al 2010, 2011; Guo and Jia 2009; Shen et al 2010; Ma 2004). The issue at hand is that in an effort to develop rural areas, the central government has launched a number of initiatives to promote Sannong (agricultural, rural and farmer-related) business. For instance, financial institutions are exempt from paying business tax for interest income on small loans to agricultural households. Banks are encouraged to expand their Sannong loans at a faster pace than overall loan growth and to maintain the percentage of their Sannong loans at higher levels than in the previous year. These are useful policy objectives but as reforms take place in terms of policy, regulation, and oversight at the macro level, are sufficient reforms taking place at the managerial level to meet the Sannong goals?

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To align themselves with the pace of policy reforms agricultural lenders will need to rethink past management strategies and position management and front-line lenders for the new realities that face them. A first step towards ensuring a balance between consolidation of RCCs and a growth in service provision is in managing the internal relationships between the bank, its employees and its borrowers. This is the goal of this study. This paper takes a unique approach to understanding the relationship between lenders and borrowers by focusing on the psychographic measures of lenders’ beliefs and biases towards borrowers and also borrowers’ beliefs, attitudes and biases towards lenders. Our approach is similar in scope to the idea of market segmentation within the banking sector which recognizes that there are important differences among borrowers in terms of their product and service needs, their borrowing behavior, and their attitudes towards lenders and banks. On the other side of market segmentation is lender segmentation, which recognizes that within an organization and its management hierarchy there are employees who will have differing attitudes towards borrowers and their industries for a number of reasons including rewards, incentives and knowledge base.

This study combines two matched data sets. The first, collected in Shandong in 2009 queries farm households (N=394) about their attitudes and belief’s regarding RCC lenders and lending activities. In 2011 we took the opportunity to survey 120 front-line lenders in Shandong to query them on their attitudes regarding lending to farmers and agriculture. In this survey we reversed questions asked of the 2009 farm household survey. We use cluster analysis to develop psychographic, or attitudinal segmentation of both borrowers (with four natural clusters) and lenders (with two natural clusters). These segments, we show, are endogenously determined by a number of independent variables including demographic, economic, and attitudinal factors. This study adds value to the literature by examining the direct relationship between lenders and borrowers on rural credit in China. Improvement in RCCs’ institutional efficiency would lead to increased access to credit in this underserved market2.

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2 Managers and loan officers at Shandong RCCs that we surveyed in September 2011 mentioned in interviews that, the current RCC lending environment is a “lenders’ market”. They also indicated that their RCCs have preference of lending to SMEs over farm households.
**Rural Credit in China**

Rural Credit Cooperatives (RCCs) serve as one of the major government regulated sources of agricultural credit in rural China. As the largest microcredit practitioners in China in terms of formal financial institution, RCCs play a significant role in supplying financial resources to rural economic development in China. Rural China is traditionally an underserved market for credit resources. As of February 2012, the loan-to-GDP ratio was 49% in rural areas versus 224% in urban areas. By the end of 2010, the outstanding balance of agriculture-related loans reached RMB11.8 trillion, an increase of RMB 2.63 trillion or 28.8 percent from the beginning of the year. Such growth was 5.7 percentage points higher than the average growth of all types of loans. The proportion of agriculture-related loans to total loans witnessed a 1.6 percent year-on-year growth, which signified a powerful financial support to agricultural and rural development.

As of 2010, China had 2,646 RCCs with 550,859 staff. Total assets of RCCs reached RMB6.4 trillion, representing a 13.4 percent compound annual growth rate (CAGR) from RMB 2.7 trillion in 2003; total liabilities reached RMB 6.1 trillion, representing a 12.6 percent CAGR from RMB 2.7 trillion in 2003; and total owner's equity reached RMB 279.3 billion, representing a 212.8 percent CAGR since 2003 when, system wide, RCCS reported negative equity of RMB 13.7 billion.

Recent policy has also centered on restructuring the fragmented rural banking sector. The number of RCCs dropped precipitously from 19,348 in 2006 to 2,646 in 2010, although their total assets increased steadily indicating that many of them have undergone consolidation. This period was characterized by an RCC mergers and acquisitions spree encouraged and in some cases financially sponsored by the State, with the aim of restructuring high risk RCCs.

The most recent RCC reforms are geared towards transforming credit cooperatives into commercial banks, while optimizing RCC institutional operational procedures and risk management towards a commercial banking standard. Notable is the December 2010 IPO of Chongqing Rural Commercial Bank (CRCB), the third-largest rural commercial bank in China which was established through many amalgamations of rural credit cooperatives.

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3 The other two major sources are Postal Savings Banks, and Agricultural Banks.

4 CBRC 2010 Annual Report, p.36
and unions at the village, township, county and municipal levels. This was the first small- and medium-sized rural financial institution to embark on a stock listing. With the Beijing Rural Commercial Bank, and Shanghai Rural Commercial Bank, its two strong competitors with near identical backgrounds in the consolidation of RCCs and RCCUs in the Beijing and Shanghai areas respectively, actively preparing for IPOs, it is clear that there is a significant institutional push towards large scale commercialization.

Institutional Efficiency and the Lender-Borrower Relationship

One aspect of institutional and managerial efficiency that may well be overlooked in the reform process is the relationship between RCC lenders and borrowers. This is the subject of this paper. The lender-borrower relationship can be broken out into three different areas representing to some extent the evolution of thought over time. The first deals with the “lender-borrower” relationship in terms of first and second-best pareto optimal relationships (e.g. Smith 1971; Baltensberger 1976; Jaffe and Modigliani 1969; Jaffee 1971; Stiglitz and Weiss 1981, 1983). The second strand of research deals with what is referred to as “relationship banking”. Boot (2000) discusses the meaning of the term which generally refers to the advantage that a bank has in its proximity to the borrower to gather information, monitor loans and credit, and deal with agency issues as they arise. The third deals with social interactions between borrowers and lenders with a focus more on relationships rather than information gathering (e.g. Harrison 1994; Bennett and Durkin 2002; Lehmann and Neuberger 2001; Harhoff and Korting 1998; Iyer and Puri 2008; Puri, Rocholl and Steffen 2011). The current paper is more aligned with this third strand of thought in its attempt to measure attitudinal gaps in perceptions of lenders by borrowers.

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5 CRCB is the third largest rural commercial bank in China, following BRCB (Beijing Rural Commercial Bank) and SRCB (Shanghai Rural Commercial Bank), and the largest commercial bank in Chongqing. It was established through 39 rural credit unions and managed by the Chongqing Rural Credit Cooperative Union at the municipal level. In June 2008, CRCB was incorporated as a provincial-level rural commercial bank, the first one in Western China.

With its legacy as a rural credit cooperative, the bank is primarily focused on the provision of financial services to SMEs and county-area corporates/households. CRCB is a market leader in SME lending in Chongqing, with 52% of its loan book dedicated to the SME sector in 2010. Similarly, it has a dominant position in county-area business and ranks #1 in county-area lending, with 26% loan market share as of June 2010. (CRCB 2010 Interim Report)

6 Interviews with Yiting Liu and Bill Stacey, China bank analysts at Keefe, Bruyette & Woods, a financial institutions specialized research institution. And “Continuous development of new-type rural financial institutions” (CBRC 2010AR. p36, p48); “Improvement of rural finance” (CBRC 2010AR. p.49)
on a number of psychographic dimensions, against actual attitudes by lenders on the same dimensions.

From the financial institutional perspective, our focus is on managing the relationships between the customer and the bank (traditional product marketing), and between the employee and the bank (human resource) (Fernande-Aguirre et al 2003; Howcroft et al 2007). On the bank-customer side, Harrison (1994) conducted a qualitative study on psychographic segmentation that uses variables such as the individuals’ own perceived knowledge and understanding of financial services, the perceived confidence and ability in dealing with financial matters and the expressed level of interest (involvement) in financial services. With this study four distinct customer segments based on the level of knowledge and on the degree of the customers’ financial maturity could be identified. On the bank-employee side, Bennett and Durkin (2002) introduced the notion of relationship marketing and examined the optimal bank organizational culture within the bank-customer-employee triangle framework in Figure 1 (which we source from Christopher et al 1991), and concluded that the outcome of a successful implementation of an organizational development program should be the re-establishment of high levels of internalized employee commitment (diagonal line on the right side) coupled with the development of an integrated and focused strategy for customer relationship management (diagonal line on the left side). In essence, to guarantee sufficient supply in the microcredit market, clear, harmonious, and two way relationships must exist between the three points of the triangle – the bank, the employee, and the customer, as shown in the figure by the direct connections between the three points (Bennett and Durkin, 2002). In the bank marketing literature, previous studies focus on the financial services customer and the perceptions, attitudes and motivations the customer has towards financial services. The concept of psychographic segmentation involves an analysis of lifestyle characteristics, attitudes and personality (Christopher et al 1993). Psychographic segmentation attempts to address these issues since it hinges entirely on the way the customer thinks (Funk and Hudon 1988; Engel et al 1972, Punj and Stewart 1983). Psychographics look at “the inner person rather than the outward expression of the person” (Beane and Ennis, 1987, p. 22). However, according to Ziff (1971), the definition of psychographics remains a controversial one and is perhaps a main contributory factor to much of the confusion that surrounds it.
To some researchers psychographics refer to basic personality characteristics, whereas other definitions include attitudes, values and beliefs.

Ziff (1971) also stated that individuals have certain attitudes that are basic and influence their behavior in many different types of situations. Such attitudes can, therefore, provide useful information of a general nature, and a core of attitudes, needs, and values can be used to provide the basis for a meaningful segmentation (Ziff, 1971). On customer segmentation marketing companies try to segment their customers by identifying groups of persons with need structures that are as homogeneous as possible within each group and significantly heterogeneous between groups. Existing marketing research also shows that successful, continuing relationships are characterized by trust and commitment (Shemwell et al., 1994; Strandvik and Liljander, 1994; Morgan and Hunt, 1994). Commitment is promoted by satisfaction, lower quality alternatives and greater investment and can be developed by the provision of benefits superior to the alternatives, shared values, communication and goodwill (Bennett and Durkin, 2002). Levitt (1986) points out that not all relationships can, or needs to, be at the same level of intimacy or of the same duration so that characteristics depend on the extent of the actual or felt dependencies between the buyers and the sellers.

Figure 1: Triangle Relationship Among Bank, Customer and Employee (source Christopher, Payne and Ballantyne, 1991)
We find little literature dealing with identical psychographic questions in general in China or elsewhere, and virtually none on rural credit market segment. In fact there are very few applications directed towards agriculture at all. Funk and Hudon (1988) used psychographic clustering techniques in a survey study to segment the market for farm supplies in Ontario, Canada. Rosenberg and Turvey (1991) used cluster analysis and found four distinct management profiles of Ontario swine producers useful for the delivery of extension services and credit products to farmers. Howley and Dillon (2012) provides a framework for understanding the characteristics that influence the degree of indebtedness on farm businesses, based on a factor analysis of respondents mean ratings of 13 attitudinal statements. Roucan-Kane et al (2010) investigated distinct market segments for financial products for US crop and livestock commercial producers. They note that traditional segmentation by lenders is based upon the size of the farm operation but on investigation they conclude only weak linkages and recommend segmenting the farm credit market according to balance, price, convenience and service. The “balance” segment represented 67% of their sample and these farmers sought a multitude of attributes including convenience/location, customer service, price, performance, and support service.

**Data and methodology**

To measure psychographic segmentation for rural borrowers and lenders, we design the lender survey to mimic an existing borrower survey, by reverse writing the exact same questions but from the lenders’ perspective. Using this approach we identify a range of beliefs or psychographic attitudes held by farmers about lenders and then query RCC lenders on their actual attitudes towards farm household borrowers, on the same psychographic dimensions. Measurement of the attitudinal questions are based on a 5-point Likert scale (Likert, 1932) (Strongly Disagree, Disagree, Neutral, Moderately Agree, and Strongly Agree) including a neutral value which allows individuals to articulate their indifference towards a certain statement. More important is that by investigating both borrowers and lenders over the same psychographic and attitudinal dimensions we can discuss the elements of Figure 1 in its entirety rather than just one part at a time. Without a comprehensive understanding of the disconnection on the bottom of the triangle in Figure
The borrower survey, conducted in rural Shandong in 2009 was a paper survey conducted by graduate students. Students were dropped by bus at various villages, organized by an employee from a local agricultural information institute. Student adjudicators were then instructed to choose households at random, and to ignore any directional assistance from village leaders. Farmer respondents were compensated with a gift of detergent valued at approximately 10 RMB. The survey took between 45 minutes and 1 hour with the survey being completed by the student.

The lender field survey was conducted through 5 September 2011 to 10 September 2011 in three Shandong county RCCs (unidentified for confidentiality). Participating loan officers were selected by RCC management from branches across the county, one or two days prior to the assessment date, based on staff availability. Management was asked specifically to select 40 lenders from each county, showing neither favoritism nor any consideration for demographic weighting such as age, gender, education and so on. Ultimately we show no significant differences between participants on certain outcome measures that might suggest selection bias. The participant sample is comprised of loan officers with diverse experiences and qualifications, ranging from fresh college graduates, staff internally transferred from other department and had been practicing loan servicing for merely three months, as well as widely respected and experienced loan officers with ten to twenty years loan servicing experiences while receiving education at levels below college or associate degrees. These characteristics are used as endogenous determinants for the lender clusters. Loan officers were compensated for their participation with cash equivalent of salary for one workday by local RCC standard. The lender survey was designed and conducted on computer which allowed respondents to submit the survey only upon completing every question.

**Psychographic Segmentation and Cluster analysis**

We use cluster analysis to identify possible homogeneous subsets from a heterogeneous sample of objects (in our case, lenders and borrowers). This is the approach suggested by Ziff, (1971) for borrower segmentation but we use the same approach to
segment lenders as well. The Two-Step Cluster Analysis procedure is an exploratory tool designed to reveal natural groupings (or clusters) within a dataset that would otherwise not be apparent. The algorithm employed by SPSS (V19) assumes variables to be independent so that a joint multinomial-normal distribution can be placed on both categorical and continuous variables and by comparing values of a model-choice criterion across different clustering solutions, the two-Step procedure can automatically determine the optimal number of clusters. Thus the two-step procedure (using SPSS) can detect the number of natural clusters without pre-specification. In principle each cluster is distinguished from another by a maximum distance measure in such a way that each cluster is distinct and heterogeneous from another, while certain attributes are common to all members within a cluster.

Once the natural clusters are identified, the borrower and lender cluster membership variables are used as dependent variables in logistic and linear regressions each to assess how a set of demographic predictors influence the cluster membership of farm household borrowers, and of front-line loan officers. The linear regression with each cluster being the dependent variable with the same predictors is stipulated as:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \mu \]

And the logistic regression function is

\[ E(Y|X) = \frac{1}{1 + e^{-Y}} \]

where \( X_i \) (i = 1, 2, ..., n) are the independent variables. We include \( n = 23 \) for the borrower regressions and \( n = 17 \) for the lender regressions.

**Summary of Farmer/Borrower Characteristics**

We report summary statistics for all independent variables used in the regressions in Tables 1 and 2. Of 394 household surveys, 286 had complete information for cluster analysis. Among these 286 farm households the average age of borrowers is 49, with the oldest respondent being 77 years old and the youngest being 20 years old. 53 percent of the respondents (151 persons) are male, and 47 percent (135 persons) are female. For 121 households (42.3 percent of the 286 observations), farming is their major household
operation. The respondents have been farming for 23 years on average, with the maximum and minimum being 60 years and no farming experience. Respondents would receive 160,570 yuan (USD 25,516) on average if they were to sell all assets (home, land, livestock, agriculture produce, etc.). The 286 farm households on average have 3.3 mu (0.6 acre) of land. They hold on average 22,867 yuan (USD 3,634) of loan borrowed from formal financial institutions, with the maximum being 5,050,000 yuan (USD 802,479). They also hold an average 2,206 yuan (USD 351) of familial loans borrowed from friends and relatives, with the maximum being 200,000 yuan (USD 31,781). On average, respondents receive 4,100 yuan (USD 652) per mu from main crop, received 23,373 yuan (USD 3,714) income in the past 12 months from all sources including part time labor and remittances.
Table 1: Summary Statistics for Borrower Categorical Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>135</td>
<td>47.2%</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>151</td>
<td>52.8%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>286</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed university/college</td>
<td></td>
<td>6</td>
<td>2.1%</td>
</tr>
<tr>
<td>Some university/college</td>
<td></td>
<td>21</td>
<td>7.3%</td>
</tr>
<tr>
<td>Completed high school</td>
<td></td>
<td>129</td>
<td>45.1%</td>
</tr>
<tr>
<td>Some high school</td>
<td></td>
<td>41</td>
<td>14.3%</td>
</tr>
<tr>
<td>Completed elementary school</td>
<td></td>
<td>35</td>
<td>12.2%</td>
</tr>
<tr>
<td>Some elementary school</td>
<td></td>
<td>31</td>
<td>10.8%</td>
</tr>
<tr>
<td>Never went to school</td>
<td></td>
<td>23</td>
<td>8.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>286</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Farming major operation</strong></td>
<td>Whether farming is the major household's operation or not?</td>
<td>Yes</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>165</td>
</tr>
<tr>
<td><strong>Member RCC</strong></td>
<td>Are you a member of RCC?</td>
<td>Yes</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>263</td>
</tr>
<tr>
<td><strong>Member Group Guarantee</strong></td>
<td>Are you a member of a Group Guarantee?</td>
<td>Yes</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>205</td>
</tr>
<tr>
<td><strong>Quality of land</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td></td>
<td>68</td>
<td>23.8%</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>73</td>
<td>25.5%</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td>135</td>
<td>47.2%</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>10</td>
<td>3.5%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>286</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Relatives_loan</strong></td>
<td>Have borrowed from relatives</td>
<td>Yes</td>
<td>138</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>148</td>
</tr>
<tr>
<td><strong>Friends_loan</strong></td>
<td>Have borrowed from friends</td>
<td>Yes</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>209</td>
</tr>
<tr>
<td><strong>RCC_loan</strong></td>
<td>Have borrowed from RCC</td>
<td>Yes</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>230</td>
</tr>
<tr>
<td><strong>Bank_loan</strong></td>
<td>Have borrowed from Bank</td>
<td>Yes</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>273</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>286</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
### Table 2: Summary Statistics for Borrower Continuous Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>N</th>
<th>Percent</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>How many years have been farming</td>
<td>286</td>
<td>100.0%</td>
<td>48.6</td>
<td>10.7</td>
<td>20.0</td>
<td>77.0</td>
</tr>
<tr>
<td>Year farming</td>
<td>How much will you get (in RMB) if you sell all your assets (home, land, livestock, agriculture produce etc.)</td>
<td>286</td>
<td>100.0%</td>
<td>23.0</td>
<td>14.4</td>
<td>0.0</td>
<td>60.0</td>
</tr>
<tr>
<td>Assets if sell (×1000)</td>
<td></td>
<td>286</td>
<td>100.0%</td>
<td>160,570</td>
<td>152,968</td>
<td>10.0</td>
<td>800,000.0</td>
</tr>
<tr>
<td>Total land size (mu)</td>
<td></td>
<td>286</td>
<td>100.0%</td>
<td>3.3</td>
<td>3.2</td>
<td>0.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Loan from FI (×1000)</td>
<td>Loan from formal institutions</td>
<td>286</td>
<td>100.0%</td>
<td>22,867</td>
<td>298,645</td>
<td>0.0</td>
<td>5,050,000.0</td>
</tr>
<tr>
<td>Loan from FR (×1000)</td>
<td>Loan from friends and relatives</td>
<td>286</td>
<td>100.0%</td>
<td>2,206</td>
<td>14,457</td>
<td>0.0</td>
<td>200,000.0</td>
</tr>
<tr>
<td>Income/mu of main crop (×1000)</td>
<td>The income per mu of the main plants</td>
<td>286</td>
<td>100.0%</td>
<td>4,100</td>
<td>7,727</td>
<td>0.0</td>
<td>45,000.0</td>
</tr>
<tr>
<td>Household income in past 12m (×1000)</td>
<td>What was the total household income in the past 12 months from all sources including part time labor and remittances?</td>
<td>286</td>
<td>100.0%</td>
<td>23,373</td>
<td>20,769</td>
<td>0.0</td>
<td>80,000.0</td>
</tr>
<tr>
<td>Family size</td>
<td></td>
<td>286</td>
<td>100.0%</td>
<td>4.2</td>
<td>1.3</td>
<td>1.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Farm labor</td>
<td></td>
<td>286</td>
<td>100.0%</td>
<td>2.0</td>
<td>0.9</td>
<td>0.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Labor work outside</td>
<td></td>
<td>286</td>
<td>100.0%</td>
<td>0.9</td>
<td>0.9</td>
<td>0.0</td>
<td>4.0</td>
</tr>
<tr>
<td>No. ppl older than 65</td>
<td>Number of old people, age over 65</td>
<td>286</td>
<td>100.0%</td>
<td>0.4</td>
<td>0.7</td>
<td>0.0</td>
<td>3.0</td>
</tr>
<tr>
<td>No. ppl younger than 12</td>
<td>Number of children, age less than 12</td>
<td>286</td>
<td>100.0%</td>
<td>0.8</td>
<td>0.9</td>
<td>0.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Sample: 394; included observations: 286
Summary of Lender Characteristics

Lender characteristics are provided in Tables 3 and 4 and summarized here. Among the 103 observations, we have 35, 35, and 33 loan officers from Shan Xian, Cao Xian, and Cheng Wu counties, respectively. 38 of the 103 observations (36.9 percent) are female and 65 (63.1 percent) are male. The average age among the 103 lenders is 34, with the maximum and minimum being 48 and 21. They have been working as a loan officer for an average of 4.6 years, with the maximum and minimum being 25 years and zero (those who just started the job as a loan officer). They have received an average of 2.8 years’ agriculture related formal training, with the maximum and minimum being 25 years and no training at all.

In terms of education, 67 lenders (65.0 percent out of the 103 observations) have an associate degree, 24 lenders (23.3 percent) have a University bachelor degree, 9 lenders (8.7 percent) have a high school degree, 2 lenders (1.9 percent) received graduate school degrees, and 1 lender (1.0 percent) received a middle school degree. We obtain lenders’ compensation measured by their monthly after-tax income. 49 lenders (47.6 percent) receive after-tax income of RMB3,000 – 5,000 (USD477 – 795) per month, 47 lenders (45.6 percent) receive after-tax income less than RMB3,000 (USD477) per month, 6 lenders (5.8 percent) receive after-tax income of RMB5,000 – 7,000 (USD795 - 1,112) per month, and 1 lender (1.0 percent) receives after-tax income higher than RMB9,000 (USD1,430). As for lending performance, on average, the average loan amount held by their typical client borrowed from friends, relatives, or other informal sources is 139,806 yuan (USD22,216), with the maximum and minimum being 3,400,000 yuan (USD540,283) and zero. Among all received applications, on average lenders rejected 10% of the loans, with the maximum and minimum being 80% and zero;
Table 3: Summary Statistics for Lender Categorical Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>County</td>
<td>Shan Xian</td>
<td>35</td>
<td>34.0%</td>
</tr>
<tr>
<td></td>
<td>Cao Xian</td>
<td>35</td>
<td>34.0%</td>
</tr>
<tr>
<td></td>
<td>Cheng Wu</td>
<td>33</td>
<td>32.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>103</td>
<td>100.0%</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>38</td>
<td>36.9%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>65</td>
<td>63.1%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>103</td>
<td>100.0%</td>
</tr>
<tr>
<td>Education</td>
<td>Graduate school</td>
<td>2</td>
<td>1.9%</td>
</tr>
<tr>
<td></td>
<td>University bachelor</td>
<td>24</td>
<td>23.3%</td>
</tr>
<tr>
<td></td>
<td>Associate degree</td>
<td>67</td>
<td>65.0%</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>9</td>
<td>8.7%</td>
</tr>
<tr>
<td></td>
<td>Middle school</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>103</td>
<td>100.0%</td>
</tr>
<tr>
<td>Monthly after-tax</td>
<td>Higher than</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>income</td>
<td>RMB9,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RMB5,000 - 7,000</td>
<td>6</td>
<td>5.8%</td>
</tr>
<tr>
<td></td>
<td>RMB3,000 - 5,000</td>
<td>49</td>
<td>47.6%</td>
</tr>
<tr>
<td></td>
<td>Less than RMB3,000</td>
<td>47</td>
<td>45.6%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>103</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Sample: 120; included observations: 103.
<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percent</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>103</td>
<td>100.0%</td>
<td>34.0</td>
<td>7.4</td>
<td>21.0</td>
<td>48.0</td>
</tr>
<tr>
<td>Years of formal training in agriculture related area</td>
<td>103</td>
<td>100.0%</td>
<td>2.8</td>
<td>5.0</td>
<td>0.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Years working as a loan officer</td>
<td>103</td>
<td>100.0%</td>
<td>4.6</td>
<td>5.5</td>
<td>0.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Average loan amount held by typical client borrowed from friends, relatives, or other informal sources (×1000)</td>
<td>103</td>
<td>100.0%</td>
<td>139,805.8</td>
<td>446,382.5</td>
<td>0.0</td>
<td>3,400,000.0</td>
</tr>
<tr>
<td>Percentage loans YOU rejected among all received applications</td>
<td>103</td>
<td>100.0%</td>
<td>0.1</td>
<td>0.2</td>
<td>0.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Percentage loans YOUR RCC rejected among all received applications</td>
<td>103</td>
<td>100.0%</td>
<td>0.1</td>
<td>0.2</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Percentage loans ACQUAINTED LOAN OFFICERS rejected among all received applications</td>
<td>103</td>
<td>100.0%</td>
<td>0.1</td>
<td>0.2</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Percentage loan amount actually lent to borrower/total amount requested in latest quarter</td>
<td>103</td>
<td>100.0%</td>
<td>0.5</td>
<td>0.3</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Approximated percentage loans made in past 12 months to: Farm households for crops/livestock</td>
<td>103</td>
<td>100.0%</td>
<td>0.4</td>
<td>0.3</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Approximated percentage loans made in past 12 months to: Farm households for forestry</td>
<td>103</td>
<td>100.0%</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Approximated percentage loans made in past 12 months to: Urban households</td>
<td>103</td>
<td>100.0%</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Approximated percentage loans made in past 12 months to: Non-farm individuals (professional like lawyers, doctors, etc.)</td>
<td>103</td>
<td>100.0%</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Approximated percentage loans made in past 12 months to: Individual businesses</td>
<td>103</td>
<td>100.0%</td>
<td>0.2</td>
<td>0.2</td>
<td>0.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Sample: 120; included observations: 103.
Segmentations of borrowers and lenders obtained from cluster analysis

Our investigation centers on clustering across matched psychographic responses by both borrower and lender. We identified four distinct borrower clusters according to the attitudes in the first column of Table 5 and 2 distinct lender clusters according to the attitudes in the first column of Table 6. These are discussed in this section.

Borrower clusters

We obtain four clusters for Shandong household borrowers, with each representing a different degree of agreement on their attitudes towards services and products provided by local rural credit cooperatives. As shown in Table 5, we define the four borrower clusters as follows based on their individual attributes measured by mean and median scores:

Cluster 1: “Unsatisfied Constrained” customers. This borrower cluster (n=5) is distinguished from other clusters in that both the mean and median scores for ability to get credit is 1.0 for both production and consumption. They give the lowest scores among the four clusters for the questions that ask whether the borrower perceive that “local RCC or Bank cares about the welfare of farmers” “local RCC or Bank cares about me and my household” “loan products from RCC or Bank are flexible enough” “local RCC or Bank will provide loans to agriculture even when there is a downturn in the agricultural economy”, and they can “find suitable channels to get help or to file complaints if not satisfied with the financial services provided by the RCC or Bank”. Despite this they don’t question the general services provided by the RCC. Nonetheless, this group has strong feelings about whether urban and other banks should be permitted into rural areas, that services should be expanded and believe strongly that a dedicated government lending institution should be available for farmers. We therefore define these 5 customers as being “constrained”. Although they may not quibble about bank services their view of banks’ dedication to farmer is low and this perception is likely due to constraints on credit access. Of note is that this cluster is the smallest of all clusters in numbers. That such a small number of farmers show uniform indifference across all attributes is in itself worthy of note.
Cluster 2: “Satisfied Constrained”. This borrower cluster (n=85) is also credit constrained in production and consumption but differs from cluster 1 in that members do not generally link constraints to lenders’ attitudes towards agriculture. They score high on psychographics related to whether RCC cares about them or agriculture and moderately agree that services and flexibility of bank services or products are adequate. Although constrained, this group does not appear to hold that against the banks. Nonetheless, they have moderate to strong agreement on questions regarding new banks and services for agriculture and also see a role for a government lending agency.

Cluster 3: “Dissatisfied customers”. This borrower cluster (n=62) is generally dissatisfied with rural credit institutions. Not only do they believe that lenders do not care about them or agriculture, they also have negative views on services and product flexibility. Members are not totally constrained but there is moderate disagreement that they can obtain adequate production or consumption credit. While they moderately agree that expanding access to credit would be a good thing, they differ from clusters 1 and 2 in that they are less emphatic about the role of a government institution for agricultural lending. These generally unsatisfied customers see more of a role for urban banks and other private sector lenders than traditional rural lenders or government.

Cluster 4: “Satisfied customers”. This borrower cluster (n=80) differs from the other three clusters in that they can generally get access to needed production and consumption credit. Consequently they look upon the lenders with favor, with moderate to strong agreement that lenders care about them and agriculture. They do not question bank services and are satisfied with lending products. Of all four clusters, this group has lowest scores when it comes to setting up urban banks; they still agree with the proposition but not as emphatically. However they do have moderately strong agreement with the development of a dedicated government run bank for agriculture.
### Table 5: Attributes of Four Borrower Clusters

<table>
<thead>
<tr>
<th>Attribute</th>
<th>1 Unsatisfied Constraned</th>
<th>2 Satisfied Constraned</th>
<th>3 Dissatisfied Customers</th>
<th>4 Satisfied Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Median</td>
<td>Mean Median</td>
<td>Mean Median</td>
<td>Mean Median</td>
<td>Mean Median</td>
</tr>
<tr>
<td>Local RCC or Bank views agriculture/farming as being important.</td>
<td>3.00 3.00</td>
<td>3.82 4.00</td>
<td>2.65 2.50</td>
<td>4.04 5.00</td>
</tr>
<tr>
<td>Local RCC or Bank cares about the welfare of farmers.</td>
<td>2.00 2.00</td>
<td>3.64 4.00</td>
<td>2.38 2.00</td>
<td>3.66 5.00</td>
</tr>
<tr>
<td>Local RCC or Bank cares about me and my household</td>
<td>2.00 2.00</td>
<td>3.05 3.00</td>
<td>2.12 2.00</td>
<td>3.60 4.00</td>
</tr>
<tr>
<td>Loan products from my local RCC or Bank are flexible enough to meet my ability to repay when I sell my products/at harvest etc</td>
<td>2.00 2.00</td>
<td>3.46 4.00</td>
<td>2.31 2.00</td>
<td>2.45 2.00</td>
</tr>
<tr>
<td>Local RCC or Bank will provide loans to agriculture even when there is a downturn in the agricultural economy</td>
<td>2.00 2.00</td>
<td>3.51 4.00</td>
<td>2.22 2.00</td>
<td>3.94 4.00</td>
</tr>
<tr>
<td>Satisfied with the lending practices of my RCC or Bank</td>
<td>4.00 4.00</td>
<td>3.99 4.00</td>
<td>2.31 2.00</td>
<td>4.33 5.00</td>
</tr>
<tr>
<td>Satisfied with the services provided by my RCC or Bank</td>
<td>4.00 4.00</td>
<td>4.01 4.00</td>
<td>2.29 2.00</td>
<td>4.55 5.00</td>
</tr>
<tr>
<td>I can find suitable channels to get help or to file complaints if I am not satisfied with the financial services provided by my RCC or Bank</td>
<td>2.00 2.00</td>
<td>3.20 4.00</td>
<td>2.18 2.00</td>
<td>2.82 2.00</td>
</tr>
<tr>
<td>There should be at least one Government regulated source of agricultural credit dedicated to providing loans to farming whether the agricultural economy is good or bad.</td>
<td>4.00 4.00</td>
<td>3.96 4.00</td>
<td>2.95 3.00</td>
<td>3.83 4.00</td>
</tr>
<tr>
<td>Allowing urban or city banks to set up bank branches in rural areas is a good idea</td>
<td>4.00 4.00</td>
<td>4.16 4.00</td>
<td>3.44 4.00</td>
<td>3.70 3.00</td>
</tr>
<tr>
<td>Encouraging banks or RCCs to set up more ATMs, POS, cellphone banking in rural areas is a good idea</td>
<td>5.00 5.00</td>
<td>3.89 4.00</td>
<td>3.54 3.50</td>
<td>3.91 4.00</td>
</tr>
<tr>
<td>Able to borrow needed amount of money from Banks or RCC for consumption, education and health purposes</td>
<td>1.00 1.00</td>
<td>1.98 1.00</td>
<td>1.93 2.00</td>
<td>3.11 3.00</td>
</tr>
<tr>
<td>Able to borrow needed amount of money from Banks or RCC for farming and business purposes</td>
<td>1.00 1.00</td>
<td>2.03 1.00</td>
<td>1.78 2.00</td>
<td>3.24 3.00</td>
</tr>
</tbody>
</table>
Lender clusters

We obtain two clusters for Shandong RCC lenders. Based on the attributes of each, as shown in Table 6, we label them as follows:

Cluster 1: Indifferent lenders (n=65), with similar mean and median scores for all questions. Lenders in this cluster tend to be less pro-agriculture and have other lending preferences beyond farm households, as they give on average lower scores for all the questions than lenders in Cluster 2, except for the two questions that ask whether the lender thinks it is a good idea to allow urban or city banks to set up bank branches in rural areas, and to encourage banks and RCCs to set up more ATMs, POS, and mobile banking.

Cluster 2: Farmer-friendly lenders (n=55), with similar mean and median scores for all questions. Lenders in Cluster 2 tend to be pro-agriculture and are friendly to farm households, as we observe their scores are higher than Cluster 1 in all regards, except for the two questions regarding encouraging more branches to be set up by their competitors, where they give lower scores than lenders in Cluster 1.
### Table 6: Attributes of Two Lender Clusters

<table>
<thead>
<tr>
<th>TwoStep Cluster Number</th>
<th>1 Indifferent Lenders</th>
<th>2 Farmer-Friendly Lenders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>Do you think that agriculture/farming is crucial?</td>
<td>3.69</td>
<td>4.00</td>
</tr>
<tr>
<td>Your RCC cares about the well-being of farmers</td>
<td>3.98</td>
<td>4.00</td>
</tr>
<tr>
<td>Your RCC cares about the borrower and his/her household</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Do you think your RCC provides loan products that are flexible enough to meet farmers’ ability to repay when they sell their products/at harvest etc.?</td>
<td>2.89</td>
<td>3.00</td>
</tr>
<tr>
<td>Your RCC will provide loans to agriculture even when there is a downturn in the agricultural economy</td>
<td>3.11</td>
<td>3.00</td>
</tr>
<tr>
<td>Do you think your RCC is doing well in the lending practices?</td>
<td>3.55</td>
<td>4.00</td>
</tr>
<tr>
<td>Do you think your RCC is doing well in the services it provides?</td>
<td>3.77</td>
<td>4.00</td>
</tr>
<tr>
<td>Do you think borrowers can find suitable channels to get help or to file complaints if he/she is not satisfied with the financial services provided by your RCC?</td>
<td>3.77</td>
<td>4.00</td>
</tr>
<tr>
<td>Do you think that there should be at least one Government regulated source of agricultural credit dedicated to providing loans to farming, whether the agricultural economy is good or bad?</td>
<td>3.58</td>
<td>4.00</td>
</tr>
<tr>
<td>Do you think that it is a good idea to allow urban or city banks to set up bank branches in rural areas?</td>
<td>3.15</td>
<td>3.00</td>
</tr>
<tr>
<td>Do you think that it is a good idea to encourage banks and RCCs to set up more ATMs, POS, as well as mobile banking, in rural areas?</td>
<td>4.20</td>
<td>4.00</td>
</tr>
<tr>
<td>Do you think farmers could obtain needed amount of money from Banks or RCCs for consumption, education and healthcare purposes?</td>
<td>2.48</td>
<td>2.00</td>
</tr>
<tr>
<td>Do you think farmers could obtain needed amount of money from Banks or RCCs for farming and business purposes?</td>
<td>3.52</td>
<td>4.00</td>
</tr>
</tbody>
</table>
Regression results

Having identified borrower and lender clusters the next part of the investigation is to determine whether there are any unique attributes that are endogenous to, or can explain their varied beliefs. In this section we report results from both Linear and Logistic regressions. Ours is not intended to be a predictive model but an explanatory model. Thus for ease of interpretation we discuss only the linear model but note that identical statistical inference was obtained from the logistic regressions, although as is normally expected some levels of significance differ. However, one of the properties of using the linear model across all four cluster groups is that the net sum of the least squares regression coefficients is zero (0) so that a marginal response that is negative by one cluster group must be offset by one or more positive responses in other cluster groups. This property derives from the fact that the clusters are mutually exclusive and exhaustive. An additional consideration in interpreting the values is that for some variables not all of the coefficients are significantly different from zero but one or more will be. In these cases the variables that are not individually statistically different from zero will be jointly statistically different from zero. In such instances we treat the coefficients as unbiased estimates and report the coefficients at their estimated value rather than their statistical value (B=0.0). However, for variables that are statistically significant we also provide the probability (p) value.

The independent variables are listed in Tables 7 and 8 and are self-explanatory. The dependent variables are cluster identifications. For example a regression for cluster 1 has as the dependent variable a 1.0 if the respondent belonged to cluster 1 and 0 otherwise. Initial tests using discriminant analyses and multinomial logit indicated that running separate cluster regressions was appropriate.

We start with the borrower cluster regressions. Of the 28 continuous and categorical variables listed in Table 7, seven were not significant for any of the four regressions. These include years farming, loan amounts from friends and relatives (which differs from whether they borrowed from friends or relatives), family size, whether they hired farm labor, whether household labor worked off the farm, high school completion or some elementary school education (but other educational levels were significant),
For cluster 1 there were 15 significant variables at the 10% level or better based on the linear model. We must keep in mind that this cluster included only 5 members in total and as a cluster were identified as being indifferent on all counts to bank services. Cluster 2 had 8 significant variables, cluster 3 had 6, while cluster 4 had 11 significant variables.

*Age, gender, family, Years Farming and Education*

As indicated years farming are jointly statistically equal to zero, but the age of the respondent seemed to matter for cluster 4 (B=0.0051, p=0.026) which indicated that the older one is the more likely that they will be a member of the satisfied borrower group. All other cluster variables indicated the opposite with the largest negative influence being cluster 2 (B= -0.0031). We also find significance in gender (1= male, 0=female) with being male more likely to influence membership in clusters 3 and 4 relative to clusters 1 (B=-0.041, p=0.052) and 2. We find no evidence that family size is a significant matter but we do find statistical meaning for number of elderly and number of children in the household. Households with higher numbers of elderly and children are less likely to be in cluster 1, and more likely to be in cluster 3. Cluster 2 membership decreases in likelihood with respect to elderly and positive with children while cluster 4 is more likely associated with having elderly in the house while decreasing with the number of children.

We also include education as fixed effect dichotomous variables. These are measured relative to no formal education. Interestingly the likelihood that a member is in cluster 1 is largest for no formal education. Membership in cluster 2 increases in likelihood with increasing education as is cluster 3. Cluster 4 membership is similar to cluster 1 in that membership decreases in probability with increased education.

*Asset Values and Land Size*

Asset values are measured by a self-reported number representing what the respondent believed he or she would receive if all assets were sold. This combined with land size represents economic scale. Only cluster 4 has a positive coefficient (B=.000365, p=.021) suggesting that those with more assets can obtain credit easier and generally appreciate lending services. That the coefficient for clusters 1, 2 and 3 (B=-0.000232, p=0.096) are all negative suggests that lower asset values may be constraining and at least
with clusters 1 and 3 a general dissatisfaction with lenders. Land area is not so clear cut since it is positive for both cluster 2 (which is constrained) and 4 (which is not constrained). However, Chinese farmers operate under a system of usufruct land use rights which cannot generally be mortgaged or used for collateral.

**Formal and Informal Credit**

Six variables capture the relationships between formal, informal and familial lending between friends and relatives. We specify in the survey that Formal Institutions include RCC, ABC, Postal Savings bank, and commercial banks excluding the previous three types of financial institutions; Informal Sources include Community Mutual Fund/Loan, NGO, Money lenders, Pawn shop, Credit Only Loan Company (non-deposit) Institution, and other loan sources. The variables include the amounts (in RMB) of formal and informal lending; binary variables that capture whether familial credit is obtained from a friend or a relative (relative to none); and binary variables to capture whether a loan is from a Rural Credit Cooperative or other formal lending institution such as the Agricultural Bank of China (ABC) (relative to none). In addition we include a variable which indicates whether the farmer was part of a group guarantee (joint liability guarantees with 2-3 other farmers).

Loans from formal institutions were significant for all four clusters, while loan amounts for informal loans were not significant on either. However higher loan amounts are most indicative of membership in clusters 1 (B=0.000073, p<0.001) and 4 (B=0.000142, p<0.001) but between the two cluster 4 has the higher likelihood. The result is consistent with the constraints of cluster 2 (B=-0.00015, p<0.001) and the less constrained cluster 3 (B=-0.000065, p=0.033) with the lesser being with cluster 3. That a higher loan value is associated with cluster 1 is interesting because it suggests that cluster 1 members (of which there are only 5) actually have access to credit but cannot get the amount of credit they need. In contrast, the likelihood of membership in clusters 2 and 3 falls as formal credit increases. These results are strengthened by the Group Guarantee variable. This is positive for cluster 4 (B=0.235, p=0.001) and negative for all other groups with it being least likely that a member of cluster 1(B=-.117) will also be part of a group guarantee. The group guarantee in the Chinese context is a joint and several liability mechanism whereby a borrower-farmer will recruit other farmers to provide a group guarantee as a partial
substitute for asset collateral. Use of the group guarantee by lenders is not mandatory and each RCC has some flexibility in how and when it is used. Thus it is possible that farmers can receive a loan with alternative conditions to a group guarantee.

The two formal lending dummy variables identify whether RCC or other lending is used. Both variables are negative for cluster 1 (B=-0.133, p=0.002 and B=-0.168, p=0.026) and cluster 4 (B=-0.092, and B=-0.255, p=0.15), while both are positive for clusters 2 (B=0.205, p=0.003 and B=0.343,p=0.019) and 3 (B=0.02 and B=0.08). These are basically control variables to identify preferences for a home-bank. In most cases these are mutually exclusive since farmers borrow (in most cases) from RCC or ABC but not both. Thus for cluster 1 even though group membership is associated with higher loans, dissatisfaction observed in Cluster 1 holds for both lender types. That is, farmers who borrow from RCC are less likely to be a member of cluster 1 relative to those who do not borrow from either. Cluster 4 is more problematic because the results suggest that group 4 membership falls if borrowing is from RCC or other bank, whereas the cluster description is for a farmer who faces no credit constraints and is satisfied with the formal lender. But these variable types (binary) are mutually exhaustive across groups so what is really being captured here is that whether a farmer borrows from RCC or other financial institution is far more influential in defining clusters 2 and 3 than clusters 1 and 4. It is also interesting to note the self-reinforcing nature of the bank types with the signs on both being either positive or negative. Thus, except for the observation that the absolute value on coefficients for other bank loans (non RCC) are generally larger than for RCC loans the characteristics that define each cluster are influenced in the same way; If a borrower is satisfied with RCC there is also cluster satisfaction with other banks and vice versa.

We include dummy variables for borrowing from friends or relatives to examine whether or not there are substitution effects between familial loans and whether or not there is reliance on friends or relatives. Borrowing from friends and relatives is more likely associated with clusters 2 and 3 rather than 1 and 4. Hence, cluster 1 members who can obtain formal credit, but not as much as they would like, are not likely to rely on familial lending. Likewise for cluster 4 who are not credit constrained.
**Income effects**

We include two measures of income. The first is farm income from the main crop grown and the second is total household income from all sources in the past 12 months including wage income and remittances. Cluster 4 membership is positively influenced by both variables while cluster 1 membership is decreased by both. Thus cluster 1 members are likely lower income households while cluster 4 members are higher income households from farm and non-farm sources. This suggests that whatever constraints that cluster 1 farmers face it is likely due to constraints on income generation, whereas the unconstrained cluster 4 members can support the loan from cash flow. Cluster 2 membership increases with agricultural income but decreases with all household income, while cluster 3 memberships is positively influenced by all household income and negatively influenced by farm income. This may explain why cluster 2 farmers are satisfied with agricultural lending while cluster 3 members are not; one of the differences appears to be on the role that farm versus non-farm income plays.

We qualify this further by including a variable to capture whether agriculture is the major source of income. This is most significant for cluster 4 (B=0.234 p<0.001) and is negative for cluster 1 (B=−0.099, p=0.001), cluster 2 (B= −0.090), and cluster 3 (B= −0.045).

Land quality also matters. The greater marginal influence appears to be on cluster 1 (B=−0.221, p<0.001) which suggests that cluster 1 is more likely associated with low quality land. This is consistent with the low farm income profile for this cluster. Cluster 3 membership is most influenced by higher quality land (B=0.119, p=0.001), followed by cluster 2 membership (B=0.094, p=0.12) and least by cluster 4 (B=0.007). Cluster 3 is interesting because this cluster’s membership also decreases with farm income or increases with decreasing farm income. This combination of high land quality and low income suggest that cluster 3 members may be technically inefficient when it comes to agricultural activities, perhaps because household income which includes wage labor and remittances is positive. On the other hand land quality and farm income are complimentary for clusters 2 and 4. These two clusters showed higher levels of satisfaction with rural lenders and this may simply be that they are more closely tied to the land and efficient production than clusters 1 and 3 which showed higher levels of lender dissatisfaction.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cluster 1 Moderately agree</th>
<th>Logistic p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.000235</td>
<td>.830</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.040755</td>
<td>.052</td>
</tr>
<tr>
<td>Year farming</td>
<td>-0.001088</td>
<td>.266</td>
</tr>
<tr>
<td>Assets if sell (×1000)</td>
<td>-0.000040</td>
<td>.480</td>
</tr>
<tr>
<td>Total land size (mu)</td>
<td>-0.07723</td>
<td>.087</td>
</tr>
<tr>
<td>Loan from FI (×1000)</td>
<td>0.00073</td>
<td>.000</td>
</tr>
<tr>
<td>Loan from FR (×1000)</td>
<td>0.00004</td>
<td>.994</td>
</tr>
<tr>
<td>Inv./mu of main crop (×1000)</td>
<td>0.001872</td>
<td>.292</td>
</tr>
<tr>
<td>Hh inc. in past 12m (×1000)</td>
<td>-0.004462</td>
<td>.000</td>
</tr>
<tr>
<td>Family size</td>
<td>-0.004105</td>
<td>.628</td>
</tr>
<tr>
<td>Farm labor</td>
<td>0.008518</td>
<td>.374</td>
</tr>
<tr>
<td>Labor work outside</td>
<td>0.013256</td>
<td>.232</td>
</tr>
<tr>
<td>No. p.pl older than 65</td>
<td>-0.002211</td>
<td>.859</td>
</tr>
<tr>
<td>No. p.pl younger than 12</td>
<td>-0.008345</td>
<td>.372</td>
</tr>
<tr>
<td>Edu completed univ/college</td>
<td>-0.369373</td>
<td>.306</td>
</tr>
<tr>
<td>Edu completed highschool</td>
<td>-0.074258</td>
<td>.059</td>
</tr>
<tr>
<td>Edu completed elementary</td>
<td>-0.053814</td>
<td>.058</td>
</tr>
<tr>
<td>Edu some elementary</td>
<td>-0.039443</td>
<td>.202</td>
</tr>
<tr>
<td>Edu never school</td>
<td>0.000000</td>
<td>.000</td>
</tr>
<tr>
<td>Farming major operation</td>
<td>-0.099338</td>
<td>.001</td>
</tr>
<tr>
<td>Member RCC</td>
<td>0.016107</td>
<td>.564</td>
</tr>
<tr>
<td>Member Group Guarantee</td>
<td>-0.116884</td>
<td>.000</td>
</tr>
<tr>
<td>Quality of land</td>
<td>-0.220801</td>
<td>.000</td>
</tr>
<tr>
<td>Relatives Loan</td>
<td>-0.255791</td>
<td>.000</td>
</tr>
<tr>
<td>Friends loan</td>
<td>-0.096819</td>
<td>.000</td>
</tr>
<tr>
<td>RCC loan</td>
<td>-0.132815</td>
<td>.002</td>
</tr>
<tr>
<td>Bank loan</td>
<td>-0.167597</td>
<td>.026</td>
</tr>
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</table>

Obs. Total 394, excluded 108, effective 286. Likelihood Ratio Chi-Square = 644.8 and 322.8 for linear and logit regressions with Cluster 1, 105.9 and 100.5 with Cluster 2, 27.7 and 84.4 with Cluster 4, all significant at the .05 level.
Regression Results for Shandong lenders

We report results for both Linear and Logistic regressions for lenders in Table 8. The dependent variable is the indifferent lender Cluster 1=1 and pro-farmer lender cluster 2 = 0.

We find no significant difference in cluster groupings between either county membership, gender, age, years of formal training in an agriculturally related area (which could include formal education, as well as workshops and other training) or years working as a loan officer. These results suggest that the mix of lenders between the three counties are the same for each cluster. Likewise, whether a lender is young or old, is new or experienced does not seem to matter in terms of cluster placement. One explanation for this could be the top-down management of the RCCs relative to the RCCU which operates administratively from the county seat. Newly recruited lenders have virtually no choice in where they are placed since that decision is made at the RCCU level rather than by local RCC management. Furthermore, from our discussions with lenders there is virtually no room for lateral mobility so that once placed, a request to be moved to another office would be unthinkable. Thus these null results may be related to stickiness in placement, and limited exposure to more diverse borrower types may cloud the psychographic judgments. To control for some of this we include a knowledge question to gain an opinion on what percentage of farmer loans are from friends or relatives (usually around 60%) but find even at this scale of knowledge there is no statistical difference between the two groups.

Historically, RCC loan officers have been undereducated with a great effort in recent years to hire college or university graduates to fill positions. Ironically, we find that relative to loan officers with only middle school education, more educated lenders are more farmer-friendly. Typically, lenders of lower education would have been hired before reforms in 2003 and many had the entirety of their careers with the RCC, but as we did not find evidence of an age bias between the two clusters we cannot be stereotypical. Lenders with graduate degrees (usually in finance, economics or agricultural economics) tend to be most farmer friendly and less indifferent (B=-0.858, p=0.004).

But we also see that there are monetary incentives. Relative to lenders earning less than 3,000 RMB/month the highest earners of more than 9,000 RMB/month are more
likely to be indifferent and less farmer friendly (B=0.334, p=0.052). The other two groups are more likely to be farmer friendly. This result can source from several factors. Some lenders were from RCCs at the county seat which tend to be larger communities with more non-farm lending opportunities while others reside at offices at the smaller village level with a mostly farm clientele. As one female lender with a degree in political economics told us, it was a “suppliers market” meaning that at this larger seat there was enough demand from non-farm sources. Higher earners, under the personal responsibility system’s bonus scheme would have more opportunity to make larger and safer loans, providing larger and safer bonus pools.

We also asked questions on credit allocation. When asked about the percentage of loans the lender rejected in a year, the percentage of loans rejected by the RCC as a whole, the percentage of loans rejected by an acquainted loan officer and the percentage of loans rejected in the past quarter we find no statistical difference between the groups. These are important observations for they suggest that whether one is indifferent farm lending or pro-farmer this is not determined by loan rejection rates. In other words, whether a lender is pro-farmer or indifferent does not appear to be judged by differentiated lending practices or attenuated rejection rates.

But when we ask of the percentage of loans made to farms for production/livestock or forestry or to urban households or to non-farm individuals (professionals) or to individual businesses we find only those with higher production loan portfolios (B=-0.578, p=0.001) and those making loans to small businesses (B=-0.687, p=0.086) are statistically pro-farmer. It would not be unusual for a lender with a small business portfolio to also lend to farmers or agriculturally related cooperatives or agriculturally related SMEs. Thus the significant indicator as to whether a lender is pro-farmer or indifferent boils down to the very simple observation that those lenders who tend to make more loans to farmers are going to me more sympathetic to farmers and more likely to believe that the RCC cares about farmers and agriculture and provides appropriate services to farmers and agriculture.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cluster 1=1</th>
<th>Moderately agree</th>
<th>Linear</th>
<th>B</th>
<th>p-value</th>
<th>Logistic</th>
<th>B</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td>County 1</td>
<td>-0.143731</td>
<td>.317</td>
<td>-0.694348</td>
<td>.339</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>County 2</td>
<td>0.049260</td>
<td>.723</td>
<td>0.231465</td>
<td>.751</td>
<td></td>
<td></td>
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<tr>
<td>Gender: Female</td>
<td>0.067244</td>
<td>.564</td>
<td>0.380230</td>
<td>.508</td>
<td></td>
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<tr>
<td>Education: Graduate school</td>
<td>-0.858180</td>
<td>.004</td>
<td>-24.549604</td>
<td>.</td>
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<td>Education: University bachelor degree</td>
<td>-0.567034</td>
<td>.000</td>
<td>-22.845761</td>
<td>.</td>
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<tr>
<td>Education: Associate degree</td>
<td>-0.526873</td>
<td>.000</td>
<td>-22.644738</td>
<td>.</td>
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<td>Education: High school</td>
<td>-0.635348</td>
<td>.003</td>
<td>-23.255667</td>
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<tr>
<td>Monthly after-tax income: Higher than RMB9,000</td>
<td>0.334232</td>
<td>.052</td>
<td>21.884223</td>
<td>.000</td>
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<tr>
<td>Monthly after-tax income: RMB5,000 - 7,000</td>
<td>-0.150111</td>
<td>.497</td>
<td>-0.817929</td>
<td>.500</td>
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<tr>
<td>Monthly after-tax income: RMB3,000 - 5,000</td>
<td>-0.175302</td>
<td>.091</td>
<td>-0.892436</td>
<td>.083</td>
<td></td>
<td></td>
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<tr>
<td>Age</td>
<td>-0.001874</td>
<td>.845</td>
<td>-0.007046</td>
<td>.910</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Years of formal training in agriculture related area</td>
<td>-0.001933</td>
<td>.860</td>
<td>-0.007046</td>
<td>.910</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Years working as a loan officer</td>
<td>0.004667</td>
<td>.694</td>
<td>0.024159</td>
<td>.692</td>
<td></td>
<td></td>
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<tr>
<td>Average loan amount held by typical client borrowed from friends, relatives, or other informal sources (×1000)</td>
<td>-0.000030</td>
<td>.790</td>
<td>-0.000143</td>
<td>.</td>
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<tr>
<td>Percentage loans YOU rejected among all received applications</td>
<td>-0.343306</td>
<td>.346</td>
<td>-1.828894</td>
<td>.331</td>
<td></td>
<td></td>
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<tr>
<td>Percentage loans YOUR RCC rejected among all received applications</td>
<td>0.095415</td>
<td>.812</td>
<td>0.785526</td>
<td>.711</td>
<td></td>
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<tr>
<td>Percentage loans ACQUAINTED LOAN OFFICERS rejected among all received applications</td>
<td>0.346647</td>
<td>.412</td>
<td>1.340847</td>
<td>.565</td>
<td></td>
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<td></td>
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<tr>
<td>Percentage loan amount actually lent to borrower/total amount requested in latest quarter</td>
<td>-0.017890</td>
<td>.898</td>
<td>-0.127281</td>
<td>.867</td>
<td></td>
<td></td>
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<tr>
<td>Approximated percentage loans made in past 12 months to: Farm households for crops/livestock</td>
<td>-0.577702</td>
<td>.001</td>
<td>-3.457237</td>
<td>.002</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Approximated percentage loans made in past 12 months to: Farm households for forestry</td>
<td>0.095681</td>
<td>.754</td>
<td>0.146946</td>
<td>.959</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Approximated percentage loans made in past 12 months to: Urban households</td>
<td>-0.063789</td>
<td>.754</td>
<td>-1.452520</td>
<td>.558</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximated percentage loans made in past 12 months to: Non-farm individuals (professional like lawyers, doctors, etc.)</td>
<td>-0.263041</td>
<td>.526</td>
<td>-1.710591</td>
<td>.474</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximated percentage loans made in past 12 months to: Individual businesses</td>
<td>-0.687392</td>
<td>.086</td>
<td>-4.235054</td>
<td>.077</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion and Conclusions

This paper employed a unique methodology to investigate certain aspects of the strategic triangle to bank marketing as depicted by the Bank-Customer-Employee triad (Christopher, Payne and Ballantyne, 1991) in Figure 1 for farmers and lenders in rural Shandong Province in China. The figure suggests a feedback dynamic in which attitudes by lenders towards borrowers can affect how borrowers view the bank; how policies employed by the bank can affect how borrowers view employees, and how the bank interacts with its employees can affect how its employees affect the borrower. Our method combined two-step cluster analysis and regression to investigate two aspects of the triangle with the first being a psychographic determination of what farmers think about lenders and the second being what lenders think about agriculture. Attitudinal questions asked of farmers were symmetrically applied to lenders. For example asking a farmer as to whether agricultural lenders care about agriculture was symmetrically rewritten to ask the lender whether he/she cares about agriculture and so on.

Based on these psychographic dimensions we identify four distinct clusters amongst farmers and two amongst lenders. Amongst the borrowers we label the clusters unsatisfied-constrained, satisfied-constrained, unsatisfied customers and satisfied customers. These four clusters separate on whether the farmers can get adequate production or consumption credit or not, and then on whether, despite the adequacy of credit, they reveal a positive or negative view of the RCC or bank.

The two cluster groupings for lenders were pro-farmer and indifferent. Attitudes towards farmers were generally good across both groups but one group tended to score higher on attitudes about care and services.

We then sought to identify whether there were any endogenous factors from farm operations and demographics, or lenders’ demographics, training or business practices that could explain why a member might be in one group or another. Linear and logistic regressions were presented with the discussion based on the linear model. It does not appear that demographics on either borrower or lender matters. What does matter is the nature of the business operations for both groups. On the farm side the regression results are more confirmatory of the cluster categorization. The satisfied customer group, for example, tends to have more assets and more income than other groups and are therefore
more likely to have the profile for obtaining credit unconstrained; and because of their income and wealth they may be treated with greater care by lenders resulting in a positive attitudes. The unsatisfied constrained cluster, with only 5 members, had lower assets and lower income but appeared to have higher debt. However the psychographic indicates that despite being able to obtain credit it was not enough, and for whatever reason this negatively affected their attitudes towards lenders and banks including RCCs. This group compares to cluster 2 members who, despite being credit constrained, have a positive attitude towards lenders. The point is that there are uniquely endogenous characteristics across groups that explain cluster membership. We do not, of course observe the specific interactions between borrower and lender, but it appears on the surface that lenders can reduce any disconnect between borrowers and lenders by not assuming that farmers are a homogenous lot and that there are farm specific characteristics that perhaps should be differentiated to ensure the borrower-employee linkage is positive.

As for the lender regression we find that the most primitive differentiating factor between the pro-farmer and indifferent clusters has to do with the volume of interaction between lenders and borrowers. If lenders portfolio is weighted more towards farming and small business these lenders tend to be more sympathetic towards farmers. A banker-employee linkage that trains lenders in agriculture, or even hires lenders with agricultural training, will not create a pro-farming workforce as a matter of course. What matters in creating positive feedback between borrower and employee and borrower and bank in Figure 1 is direct and continuous interaction between lenders and farmers. This suggests that RCCs in China can do well by maintaining and agricultural lending force that is dedicated to agriculture and related businesses and not spread amongst agricultural and non-agricultural clients. This in fact is the model used in the United States and Canada where an agricultural lender and agricultural lending are specific departments and portfolios within the bank.
References


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