The role of Microcredit in Rural China: The impact of social capital and gender and the effects of increased access to credit.

Motivation

A pressing question for policy makers is whether there is a relevant role for microcredit in the spheres of development and poverty alleviation. On the one hand there are the arguments that liquidity constrained households can use credit to smooth consumption in the face of shocks and that households wishing to start small businesses or improve existing production techniques can use credit for these purposes. However, as Banerjee et al (2009, p.1) point out, a serious criticism of making microcredit loans available to poor households is that they are contributing to over-borrowing and thereby increasing the long term effects of poverty.

Although rural China has seen a marked growth in per capita incomes since the 1980s, there is still persistent rural poverty and underdevelopment. To this end it is very important to know what the effects of increased rural access to microcredit will be and, if positive, how to facilitate this. The issue of offering and monitoring microcredit in rural China is plagued with complications. Park (2001, p.41) points out that the remoteness of the rural poor and the desire of the state to play a prominent role in all development initiatives makes the process of offering microcredit costly and inefficient. There is also the more general problem of the asymmetry of information between borrower and lender which drives up costs by resulting in high default rates and instilling the need for loan providers to engage in costly monitoring processes. These high risks associated with lending encourage lenders to only offer loans with high rates of interest. This creates the ex ante problem of adverse selection where only the least risk averse people (or those with no intention of repaying) will take up loans leading to a vicious cycle of rising interest rates and poor repayment rates. There is also the ex post moral hazard associated with lending to people whom lenders cannot properly monitor and who may simply take the money and run.

Description of Policy Intervention

The intervention will be to offer microcredit loans to poor rural Chinese at a reduced rate to encourage take up. The goal of this is to observe factors affecting default rates as well as to measure the effect on an individual's long term income and asset levels of both having loans made available and taking up a loan. The policy implications for this intervention are twofold. Firstly it will directly observe measures that could be adopted by the Chinese government to make rural lenders

more financially viable. This is a serious concern considering that formal rural lenders have been rife with non-performing loans and bad debts for at least 30 years. (Lau 2008, p.3) Even close to half of the RCCs, before they were restructured in 2003, were "technically bankrupt or had negative net worth." (Ong 2013) Secondly, by identifying the effects of access to credit and the taking up of loans on China's rural poor it will be possible to justify microcredit as a programme that is (or is not) worthy of increased policy attention.

Research Question and Hypothesis

This experiment will examine how effective microcredit actually is in helping the poor. This will be measured by testing the intent to treat effect as well as the individual effect of microcredit in rural China. Concurrently, the intervention will test the effect of social capital and gender on default rates. Specifically whether choosing one's own group and/or whether groups composed of women or men only result in lower default rates. This is an attempt to shift Chinese lenders to the position that Morduch (1999, p.1588) argues is the most long term financially sustainable; that is, where lenders do not require subsidies and do not run down their capital stock over time.

This experiment will operate through the informal institutions of Rural Credit Cooperatives (RCCs), or *nóngcūn xìnyònghézuoshè (*农村信用合作社). The prevalence of RCCs throughout China makes them a good vehicle for the administration of the experiment. There were more than 35, 000 of them in 2002 and their collective deposit savings totalled Renminbi (RMB) 1.98 trillion and collective loans totalled RMB1.39 trillion. (Ong *2006*) These kinds of small and informal lending institutions have had success in other areas of the world primarily because the small social spaces in which they operate has reduced the information asymmetries between lender and borrower (Udry 1994, p.522), as well as allowing for effective peer monitoring systems through the provision of group loans. (Stiglitz 1990, p.353)

It is expected that both the access to credit and the provision of loans will have a long term positive effect on individual's income and levels of assets. It is also expected that social capital will play a large role in determining default rates as it should increase the effectiveness of peer monitoring and discourage risky behaviour. Whether gender plays a significant role is unclear, though it is assumed that women will have lower default rates than men who perhaps engage in riskier behaviour.

Experiment Design and Methodology:

As pointed out by Banerjee et al (2009, p.2), it is very difficult to distinguish the causal effects of microcredit from the selection effects, however this problem can be mitigated by conducting a randomised experiment.

Randomisation will be at the county (Xiàn, 县) level rather than the village level to avoid spill over effects of close villages. The experiment will be undertaken in Qinghai and Sichuan Provinces. These represent a cross section of rural Chinese provinces which it can be assumed will yield sufficient data. The choice to test in Qinghai is because in 2011 its RCCs experienced a higher growth of deposits and loans than the average for the province's banking industry; (*China Business News* 2011a) suggesting Qinghai's RCCs are having success in encouraging take-up. Sichuan is also a potentially good source of data as it has formed a Rural Credit Union which is essentially an organised cooperation between RCCs and in 2011 had a deposits amounting to RMB504 billion (~US$80 billion) and outstanding loans amounting to RMB333 billion (~US$53 billion). (China Business News 2011b)

In these provinces, counties will be randomly assigned to be Female, Male or Control counties. The Male and Female counties will be split evenly (though randomly) into those counties where groups are formed voluntarily and those where people indicate their willingness to participate and the groups are formed by the loan provider.

The loans will be group based in the style of the Grameen Bank with the group size being minimum 6, maximum 10 people. Participants will receive an individual loan, but the peer monitoring system will operate, with default from any one member resulting in the group being locked out from RCC borrowing for 5 years. The fact that defaulters are only temporarily locked out of future borrowing should mean that risk-averse borrowers are less likely to select themselves out of the trial. Moreover, this somewhat mitigates the ethical dubiousness of the experiment's attempt to convince people to take out loans they may not be able to repay (in that they are not locked out of *all* future borrowing).

No restrictions will be placed upon how the loans must be spent. Loans will be offered by mail as well as by advertisement through Rural Credit Cooperatives in Qinghai province and through the Sichuan Rural Credit Union in Sichuan province. This should allow for a sufficient sample size to be obtained. They will be offered to previous customers or to people who meet credit requirements at the RCC's discretion. In this respect the experiment will follow the method of Karlan & Zinman (2008, p.1049) in that (1) credit facilities offer a loan at their own discretion based on their most updated risk assessment; (2) they will decide the maximum loan size to offer applicants; and (3) they

will decide the longest maturity to offer applicants (note, they do this blind to the specifications of the experiment).

In order to create an appropriate instrument to test individual effects of loans, half of the counties will randomly (i.e. not correlated with male/female or voluntary/involuntary randomisation) advertise the loans as a 'SPECIAL OFFER' for "A LIMITED TIME ONLY". This can be reasonably expected be correlated and move in the same direction as loan take up rates. The rest will advertise it simply as a standard bank loan. They will offer prospective customers a rate of interest that will be pre-determined by the cooperatives themselves, less 5% to encourage take up. The potential losses from this lower rate of interest will have to be covered by the Bank of China and the massive stockpile of foreign reserves that have been accumulated by the Chinese government.

There is also the possibility that the gender composition of the groups may affect the effectiveness of social capital in peer monitoring. This will be controlled for by interacting the two variables.

The groups will be required to make monthly repayments and have weekly meetings with their groups to encourage the effectiveness of social capital and see whether it can be utilised more effectively amongst people who have chosen their own groups.

Data Collection

3 months before the intervention, a household (HH) level survey of test and control counties will be taken. Before the intervention the survey will ask for information on: Income, Asset ownership, Employment, Consumption Expenditure, Number of Family Members in HH, Gender composition of HH, Distance to RCC (in kms) and Years of Education.

After the intervention the survey will be repeated at one, two and three year intervals to try and capture the long-term effects of the programme. The pre-intervention survey data will be designated the baseline data (i.e. at time t=0) and the survey at years one, two and three will be periods t=1, t=2 and t=3 respectively. The survey post-intervention (i.e. from period 1 onwards) will include questions about: Whether or not HH's took out a loan, the size of their loan (if any), the rate on their loan, the size of their group, the distance of HH's to other members in their loan groups and maturity of the loan.

Households will be asked about whether or not they have defaulted. If they are initially willing and then unwilling to participate in the survey it will be assumed that they have defaulted. Although this

may be a strong assumption, it would be unethical to ask for individual default data from RCC's. Rather, the estimated total default rates will be compared to RCC total statistics as a rough test of robustness. The randomised data will be stratified to ensure that there is as little heterogeneity in the model as possible.

Estimation

In order to assess the roles of social capital and gender in determining default rates, the following OLS regression model will be estimated:

$$D_{ijt} = \beta_1.G_{ijt} + \beta_2.F_{ijt} + \beta_3.G_{ijt}.F_{ijt} + \beta_4.O_{ijt} + \gamma.X_{ijt} + \varepsilon_{ijt}$$

Where:

D_{ijt} is the default rate on loans for individual (i) in county (j) in period (t)

G_{ijt} is a dummy variable denoting whether or not individual was in a group of their choosing or one assigned by the loan provider (self-chosen=1, RCC-chosen=0)

F_{ijt} is a dummy variable indicating the gender of the individual (Female=1, Male=0)

The two dummies G_{ijt} and F_{ijt} have been interacted to test if there is a joint effect (i.e. if gender plays a role jointly with social capital)

O_{ijt} is the instrumental variable which is in the form of a "special offer" which was previously explained. It is included here to see if it has an effect on default rates as this may compromise its effectiveness as an IV.

Xijt is the vector of baseline characteristics for the purposes of stratification and will contain variables such as: Income level, Assets, Number of HH family members, Years of Education, Rates on Loan, Loan maturity, Size of Loan (in RMB), size of group, Distance of HH's to other members in their loan groups, Distance to Credit Union (in kms)

ε_{ijt} is the residual error term

Intent to Treat Effect

In measuring the outcome effect of loans both the intent to treat and individual treatment effects will be considered. The intent to treat effect will be captured by subtracting the expected mean income of the control group from the expected mean income of the treated group. There is initial selection bias as counties with higher rates of loan take up may have different baseline characteristics than those who don't take out a loan (in fact it is likely). There will also be time trend bias across the sample. As such we will use the difference in difference model of estimation:

	Pre-Intervention (T_t=0)	Post Intervention (T_t=1)		
	Period 0	Period 1	Period 2	Period 3
Treatment County (P_j=1)	No Exposure	One Year Exposure	Two Years Exposure	Three Years Exposure
Control County (P_j=0)	No Exposure	No Exposure	No Exposure	No Exposure

As this is a model looking at poor rural households it is insufficient to look solely at income as the dependent variable. Instead 'Total Assets', which is the summation of both income (in RMB per annum) and physical assets (measured in RMB value and converted using their market value) will be the dependent variable. This will be estimated using the model:

$$A_{ijt} = aP_j + \sum_{t=1}^{3} bT_t + \sum_{t=1}^{3} \beta P_j T_t + \delta C_j T_t + \varepsilon_{ijt}$$

Where:

A_{ijt} is the total assets variable as described above for individual (i) in county (j) at time (t)

P_j is the geographic dummy variable which will capture the initial the selection bias between regions (P_j=1 if in treatment county, P_j=0 if in control)

T_t is the time period dummy, summed across all periods post intervention, which will capture the time trend bias (T_t=0 before intervention, T_t=1 after intervention)

P_jT_t captures the intent to treat effect of the programme (reflected in β), that is to say the effect of the programme becoming available in their county on an individual's total assets

C_jT_t is a region specific variable which captures exogenous variation affecting the treated counties

ε_{ijt} is the residual error term

It is worth noting that it may also be useful to use consumption as a dependent variable to see if the programme has an effect on household consumption.

Individual Effect

In order to measure the effect of the programme in individuals who actually take out loans it is necessary to construct an instrumental variable. In this way, the Loan Variable will be estimated using the 2 Stage Least Squares (2SLS) form of specification:

1^{st} Stage: $L_{ijt} = c + \alpha.O_{ijt} + \delta.X_{ijt} + \upsilon_{ijt}$

Where:

L_{ijt} is the take-up rate of loans

O_{ijt} is a dummy variable indicating whether or not the intervention was presented as a "special offer" (if so $O_{ijt}=1$, if not $O_{ijt}=0$)

X_{ijt} is the matrix of characteristic variables

υ_{ijt} is the residual error term

Once this has been done the following model will be estimated:

2^{nd} Stage: $A_{ijt} = a + \gamma.\hat{L}_{ijt} + \varphi.X_{ijt} + \nu_{ijt}$

Where:

A_{ijt} is the total assets of individual (i) in county (j) at time (t)

$\hat{L}_{ijt}$ will capture the effect of having a loan on an individual's level of assets (captured by γ)

X_{ijt} is the matrix of characteristic variables

ν_{ijt} is the residual error term

Expected Outcomes

The intention of the experiment is to reveal information relevant to both lenders and borrowers. From the lender's perspective, understanding the role of social capital and gender and how they affect default rates is valuable to scaling up loan distribution and making lending institutions more profitable. In this case even a negative result will be useful as it will mean that lenders are not constrained by faulty lending assumptions. From a borrower's perspective, information about the effect of microcredit loans on both a region and on individuals will be valuable for their own lives as well as for regional development. This information is also relevant to policy makers intending to promote rural development and policy alleviation.

There is the possibility that institutional impediments could undermine the effectiveness of this experiment. More than this it is possible that the survey data may be skewed if insufficiently standardised methods of asset valuation are adopted. It is also clear that for the experiment to be effective it would require the complete support of the Chinese government. However it is not unreasonable when considering the Chinese government's commitment to various development programmes that this support could be relied upon.

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