

Microfinance beyond group lending¹

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Abstract

Microfinancing is growing in Eastern Europe, Russia and China as a flexible means of widening access to financial services, both to help alleviate poverty and to encourage private-sector activity. We describe mechanisms that allow these programmes to successfully penetrate new segments of credit markets. These features include direct monitoring, regular repayment schedules, and the use of non-refinancing threats. These mechanisms allow the programmes to generate high repayment rates from low-income borrowers without requiring collateral and without using group lending contracts that feature joint liability.

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1. Introduction

As in much of the world, microfinance programmes are growing in number and size in transition economies. Since 1994, programmes have been operating in economies as diverse as China, Albania and Russia. The principal objective of the programmes is to raise incomes and broaden financial markets by providing financial services (principally credit) to small-scale entrepreneurs who otherwise lack access to capital markets. Some of the programmes have primarily social missions, focusing on outreach to women and measuring success in terms of poverty alleviation. Others aim to promote private sector activity in the face of unemployment and under-employment. As the transition economies undergo restructuring, microfinance has been put forward as a flexible tool to help individuals exploit new opportunities.

The banking systems in the transition economies have tended to ignore the low end of the market for business loans, and restrictive banking regulations have prevented new banks from entering the market. In Eastern Europe, the legal solution has been to take advantage of co-operative laws, some of which have been in place since before the Communist period, that allow people to form finance and credit 'clubs' (Microcredit Summit, 1998). The Chinese programmes have also set up at a level below the formal banking structure and are, in many cases, operated by non-governmental organizations, rather than fully-chartered banks.

In China and the poverty-focused programmes in Eastern Europe and Russia, microfinance and 'group lending' have come to be closely associated. Group lending refers to the practice of working with clients in small groups (typically comprised of three to seven neighbours). Loans are made to individuals, but the group as a whole is held jointly liable should repayment difficulties arise. Economic theorists have been particularly interested in group lending, and nearly all of the economic work on microfinance focuses on the incentives induced by joint liability in group lending contracts, building on lending models pioneered by microfinance leaders like Bangladesh's Grameen Bank and Bolivia's BancoSol.²

These models have found considerable success in serving clients that are just starting small businesses (typically with no employees but themselves). But the programmes tend to impose limits on wealthier borrowers. As a result, both BancoSol and the Grameen Bank have abandoned group lending for their wealthier and most-established borrowers, and this turn toward individual (lender-borrower) contracts represents the leading edge of a growing split within

² Mechanisms behind the success of group lending are described by Stiglitz (1990), Varian (1990), Besley and Coate (1995), Morduch (1999b), Armendáriz de Aghion (1999), Armendáriz and Gollier (2000) and Ghatak and Guinnane (1999). The mechanisms effectively transfer screening and monitoring costs from the bank to borrowers, providing an effective way for banks to overcome adverse selection, moral hazard and enforcement problems. See Rai and Sjöström (2000), Sadoulet (1997), Morduch (1999a) and Diagne (1998) for critical perspectives.

the microfinance movement.³

The trend is also very clear in Eastern Europe and Russia. For example, Opportunity International's 'Trust Banks' for poorer households in Macedonia, Bulgaria, Croatia, Romania, Poland and Russia remain committed to group lending practices, with clients in this niche typically starting with loans well under \$1,000. Opportunity International's programmes for the less poor, however (as well as programmes supported by the European Bank for Reconstruction and Development (EBRD) in Russia, Kazakhstan and Bosnia), have embraced individual-lending as a core component of microlending.⁴ Uncollateralized loans in this niche begin at about \$2,000 and average around \$5,000.

The experiences suggest that in areas that are already relatively industrialized, the group lending model may be a poor fit for potential clients. At the same time, the experiences with group lending offer important lessons for the design of individual-based credit contracts even for wealthier clients in transition economies.

This paper has two principal objectives. First, to use new insights from the economic theory of contracts to formally characterize central mechanisms behind the new individual-based programmes. These features include direct monitoring of clients, regular repayment schedules, and the use of 'non-refinancing threats'. We illustrate these mechanisms with examples from transition economies, which in turn draw from the experiences of microfinance programmes in Asia and Latin America. Second, to illustrate fundamental similarities between programmes based on group contracts and those based on individual contracts. We argue that the success of 'group' contracts is driven partly by mechanisms that underlie individual lending programmes.

Disentangling these mechanisms is vital for the optimal design of programmes in transition economies, where microfinance is just getting rooted. The issues are particularly relevant for poverty-focused programmes in China and Eastern Europe, where experiences so far have failed to meet expectations.

2. Microfinance in transition economies

The emphasis on individual lending that is typical of the programmes in Eastern Europe and Russia is the most obvious source of difference with the typical Chinese programmes, but the difference in contractual forms parallels other differences as well. Most microfinance activity in China (and in the poverty-focused 'Trust Banks' started by Opportunity International in Eastern Europe)

³ Churchill (1999) describes early experiences with individual lending in the microfinance context. It is especially notable that members of the ACCION International network, among the earliest practitioners of group lending in Latin America, are now turning steadily toward individual lending.

⁴ Opportunity International has been a leading microfinance provider in Eastern Europe, serving just under 90,000 clients in 1998.

either directly follows the lending model of the Grameen Bank or is based on similar concepts. According to the model, borrowers sort themselves into groups of five. First, two members of the five-person group get loans. If they repay on time, the next two get loans, and finally the fifth gets a loan. The process continues in turn as long as performance is satisfactory, but when a member defaults, all five are barred from borrowing in the future. In principle, this mechanism can allow microfinance programmes to generate high repayment rates, even from clients that had traditionally been thought to be too risky – and that are too poor to offer collateral. Table 1 shows that, to the surprise of many, microfinance programmes in China can claim average repayment rates above 90 per cent, and the group lending mechanism is often pointed to as a key to such successes (all but two of the programmes use groups).

Since the borrowers are not required to put up collateral, the creation of joint liability is relied on to induce sanctions that help to discipline borrowers. The sanctions may be fairly subtle, induced by peer pressure from fellow villagers rather than by the direct actions of the programmes. The sanctions may involve, for example, the loss of an errant borrower's reputation in the community, social isolation, restrictions on access to inputs necessary for business, or, in rare cases, the use of physical force.

The hope is that harnessing these kinds of incentives will help the programmes to overcome the segmentation and rationing in rural credit markets that prevent households from borrowing as much as they would like – or from borrowing at all. Typically, zero-interest loans from relatives and friends remain an important source of funds in poor rural areas, dominating loans from banks in China, but availability is limited (Park, 1999). The new microfinance programmes aim to shift the balance and increase access to finance.

Group lending in practice, however, has both benefits and costs. One complaint is that attending group meetings and monitoring group members can be too costly, especially where houses are not close together. In two of the three Chinese programmes studied by Park and Ren, for example, 8 per cent of clients had to walk more than an hour to get to meetings. On average, attending meetings and travel time took just over 100 minutes.⁵ A second complaint is that loan terms are limited by what the group feels that it can jointly guarantee, so clients with growing businesses or those who get well ahead of their peers in scale may find that the group contract bogs everyone down (Madajewicz, 1999). Third, under some conditions, borrowers may collude against the bank and undermine the bank's ability to harness 'social collateral' (Besley and Coate, 1995).⁶ A fourth issue is that group lending can be costly to implement, and neither the Grameen Bank, the bulk of Chinese programmes, nor the poverty-focused programmes of

⁵ The data are from a preliminary analysis of a survey of three programmes completed by Albert Park and Ren Changqing.

⁶ For more on the scope for collusion in group lending, see also Laffont and N'Guessan (1999) and Laffont (2000).

Eastern Europe are fully covering costs (Morduch, 1999a). By 1998, the Opportunity International programmes in Eastern Europe, for example, covered just 56 per cent of full financial costs, with the hope of covering all costs by 2005 (Microcredit Summit, 1998). Several of the Latin American affiliates of ACCION International are covering their full costs (or nearly doing so), but they tend not to serve as poor a client base and are moving away from group lending.

These limitations, coupled with the ability to reliably secure collateral from borrowers, led the Russian and Eastern European programmes with wealthier clients to focus instead on individual 'lender-borrower' contracts. The Russian programme (the microenterprise programmes of the Russian Small Business Fund) follows the model of the German consulting firm Interdisziplinäre Projekt Consult GmbH (IPC), drawing on experiences with individual lending contracts in Peru, El Salvador, Bolivia and Uganda (Churchill, 1999).⁷

When judged by repayment rates, the record of the Russian and Albanian programmes is as good or better than the Chinese programmes. In 1996, arrears were just 4 per cent in the Russian programmes (Wallace, 1996), 3.4 per cent in the urban programmes of the Albanian Development Fund, and below 1 per cent in the rural ADF programmes (Benjamin and Ledgerwood, 1999). Achieving financial sustainability has been a greater struggle. The Russian and Albanian programmes are pushing to make profits, but with annual interest rates at 10 per cent and inflation at 17 per cent, the rural Albanian programmes are far from making ends meet (Benjamin and Ledgerwood, 1999; data are for 1996).

Collateral requirements play a part in achieving the high repayment rates. In rural Albania, tangible assets such as livestock, land and housing are put up (in addition to any assets purchased with loans), and the programmes have been vigilant in enforcing agreements if clients fail to repay. In urban Albania, a borrower's home or business is typically required as collateral (Benjamin and Ledgerwood, 1999). In Russia, the IPC concept is followed: the salvage value of collateral is far less important than the judgement that the pledged items should be particularly problematic for households to give up. Thus, household items may be considered as collateral if they have sufficient personal value for borrowers (Zeitinger, 1996; Churchill, 1999).

Because they rely on collateral requirements, the urban Albanian and Russian programmes also tend to serve much richer clients than the Chinese programmes.⁸ Loan sizes are typically used to proxy for borrower incomes, yielding a rough comparison of the financial positions of clients in the three countries.

⁷ For an interesting theoretical analysis and field work on Guatemala, where both individual and group loans are observed, see Sadoulet (1997).

⁸ Opportunity International has introduced a loan product for individual borrowers that requires a third-party guarantor in place of collateral. These loans are in the \$2,000–4,000 range. Their larger loans require collateral (Microcredit Summit, 1998).

Table 1. Microfinance in China: Descriptions of selected programmes

Province	Main funder	Total loans (last pd.)	Typical loan size (yuan)	Repayment rate (%)	Repayment schedule	% female borrowers	Group lending contract?
Qinghai	AUSAID, Australia	14,099	400–1000	98	6–12 month term	47.2	yes
Sichuan	Caritas, Germany	313	200–1,500	91.8	Every 10 days, starting after 20 days	87	yes
Xinjiang	CIDA, Canada	1,120	500–1000	100	Six monthly instalments	100	yes
Hebei	Chinese sources	777	800–1000	100	Every two weeks, starting at week five	86	yes
Sichuan	Chinese sources	315	1000–2000	96.6	Two six-monthly instalments	98	yes
Hebei, Henan, Shaanxi.	Ford Foundation, Grameen Trust, Canada Fund.	N/A	500–2000	99	Weekly, starting at third week	90	yes
5 provinces	Ford Fdn., Asia Fdn., Oxfam HK.	N/A	100–3000	100	Monthly, starting at third month	100	yes
Jiangxi	Germany	450	500–2000	95	Variable, payment at end	30	no
Sichuan, Anhui, Qinghai, Guizhou.	Int'l Fund for Agricultural Development	40,000	100–3000	95	1–6 years	30	guaranteed by village committee
Guizhou	Int'l Crane Fdn., Trickle-Up Fdn.	1,015	200–2000	100	3 month term, full payment at end	loans to households	no
Hebei	Private int'l donors	1,237	300	100	8 month term, one or two instalments	25	yes
Guizhou, Guangxi, Yunnan.	Oxfam, HK	1,300	150–1000	80+	3 months to 3 years	70	yes
Yunnan	Salvation Army, local sources.	255	800–2,500	N/A	1 year term, monthly instalments	100	yes
12 provinces	UNICEF, local sources.	27,065	600–800	90–95	3–12 month term, monthly instalments	100	yes
Western regions	Heifer Project Int'l.	N/A	200–1000	90	3 year term, 3 instalments	42	yes
Sichuan	World Bank	551	1000–2000	100	1 year term, 34 instalments	38.4	yes
Ningxia	World Food Programme	1,230	1000	100	1 year term, 2 instalments	100	yes

Source: Adapted from *Chinabrief* (1999). Data are from a survey distributed in February 1999. The data do not cover all microfinance programmes in China. US\$1 = 8.3 yuan.

Table 1 shows that loan sizes in China start as low as \$25 and reach as high as \$360. In contrast, data from the mid-1990s show that average loan sizes were around \$2,500 in Russia, and most clients were traders with 1–3 employees (Zeitinger, 1996). By 2000, loans for the EBRD-supported microloan programmes in Russia and Bosnia averaged \$5–6,000.⁹ Table 2 shows that average loan sizes in rural Albania were \$450, and in urban areas the average was \$2,447.

Table 2. Albanian Development Fund: selected indicators, 1996

Indicator	Rural	Urban
Number of loans outstanding	6,859	494
Average disbursed loan size	\$450	\$2,447
Maximum loan size	\$1,000	\$200,000
Average loan size as a percentage of <i>per capita</i> GDP	54	279
Average loan term (months)	31	10.5
Average interest rate on loans	10% per year	2% per month
Average inflation rate	17%	17%
Percentage of portfolio in arrears	N/A	3.4%
Percentage of portfolio at risk	0.09%	7.4%
Typical repayment schedule	Annual	Monthly
Typical loan use	Livestock purchase (70%), agriculture (9%), trade (5%)	Trade, small business, small manufacture
Target group	'Poor' households	Unemployed, private entrepreneurs
Lending methodology	Individual	Individual
Collateral	Flexible, guarantee from neighbours	Required
Percentage female clients	Loans registered in name of household	23%

Source: Tables 2 and 6 and text of Benjamin and Ledgerwood (1999).

Thus, while it has advantages when serving the very poor, group lending is clearly not the only way for microfinance to succeed in transition economies. The ability to secure collateral helps the individual-based programmes, and the success of microfinance programmes in general, and of individual programmes in particular, is also linked to particular methods of gathering information, monitoring loans and enforcing contracts.

⁹ Personal communication with Michael Taylor, EBRD, April 17, 2000.

With regard to information gathering, the Russian microlending programme relies heavily on staff visits to applicants' businesses and homes, rather than just on business documents (Zeitinger, 1996). In rural Albania, applicants must often obtain a loan guarantee and character reference from a member of the local 'village credit committee'. Thus, even where group lending is not used, novel mechanisms are in place to generate information. Documentary evidence tends to be de-emphasized relative to standard banking practices and local character assessments gain prominence.¹⁰

Still, while good information gathering is a necessary condition for the success of microfinance programmes, it is not sufficient to ensure contract enforcement and prevent strategic default. Even if loan officers do a good job of eliciting information at the screening stage (before the loan is given) and at the monitoring stage (after the loan is made), loan officers still face the problem of enforcing debt repayments once the returns on borrowers' investments have been realized. To get around the problem of enforcement, nearly all microfinance institutions also rely on dynamic incentives. These mechanisms complement the use of social sanctions in China and of collateral requirements in Russia and Albania.

Dynamic incentives boil down to the threat not to refinance a borrower who defaults on debt obligations. The threat is enhanced by promising to extend steadily larger loans over time to good customers. Because borrowers typically desire larger and larger loans, the promised increases enhance the borrowers' loss from being cut off. This mechanism and related programme features are described more specifically below.

3. Non-refinancing threats

In considering these issues further, we analyse the case of an individual debt contract between a bank and a borrower, and we assume that the bank has all the bargaining power. The essence of the problem and its solution translate directly to microfinance practices. The formalization follows Bolton and Scharfstein (1990) closely, and provides an organizing framework to describe a variety of programme features.

In order to capture such a 'non-refinancing threat', we consider a simple two-period model. A loan of size D can be extended by the bank to the borrower at the beginning of each period, and we assume that the borrower has no other source of funding. In each period, the borrower uses the current loan to invest in a project which yields a total return, π , with probability, p , and zero with complementary probability, $1 - p$.

¹⁰ Churchill (1999) describes similar monitoring and information-collection mechanisms in individual lending programmes run by the Alexandria Businessman's Association in Egypt, ADEMI in the Dominican Republic, the Cajas Municipales of Peru, Financiera Calpiá of El Salvador, and the Bank Rakyat Indonesia.

To make things simple, we first assume that p is exogenous, i.e., there is not a moral hazard problem with respect to the borrower's effort in undertaking the project. The only moral hazard problem is at the repayment stage. Specifically, we assume that the borrower can 'take the money and run' after investment returns have been realized.

In order to prevent the borrower from taking the money and running in period 1, the bank can threaten not to extend a new loan. In that case, the borrower cannot finance the second-period investment. The sequence of events is as follows: In period $t=1$, a loan of size D is extended to the borrower. The borrower invests D and obtains a first-period investment return. The borrower then decides whether or not to default on the first-period debt obligation. In period $t=2$, the bank decides whether or not to refinance the borrower. If the bank does extend a new loan D , the borrower invests and obtains a second-period return.

Under the threat of not being refinanced, if the borrower defaults she gets:

$$\pi + \delta v \pi \tag{1}$$

where δ is the discount factor and v is the probability of being refinanced by the bank ($0 \leq v \leq 1$). The borrower will thus only default strategically when her return realization is high. Assuming the return realization is high both in the first and second periods, the maximum the borrower can pocket is π in the first period and $\delta\pi$ in the second period, conditional upon the lender extending a new loan (which occurs with probability v). We assume that the borrower cannot self-finance a second-period project in the event of default in the first period.

If instead the borrower decides to repay, she gets:

$$\pi - R + \delta\pi, \tag{2}$$

where R is the borrower's debt obligation. This is because a borrower who decides to repay in the first period will have to subtract the repayment R from her first-period return π . The bank will in turn automatically decide to extend a second-period loan (i.e., will set $v = 1$) in order to reward the borrower for her 'good' behaviour. (We will show below that this is indeed an equilibrium strategy for the bank.) Once the borrower obtains her second-period return, she will default on her second-period debt obligation with certainty since the bank cannot, in this limited horizon model, reward the borrower with a new loan anymore. This in turn implies that the borrower's second period return is simply $\delta\pi$, just as in equation (1) for the case where $v = 1$.¹¹

¹¹ This may be unrealistic in practice, but the model is useful in showing the improvement in first-period performance. The model also rests on the assumption that the bank can credibly commit to provide the second-period loan, even though it anticipates the default. In an infinite horizon model with a sufficiently large discount factor δ , strategic defaults will never be observed in equilibrium (this is given by the folk theorem; Fudenberg and Maskin, 1986).

The borrower decides to repay if

$$\pi + \delta v \pi \leq \pi - R + \delta \pi . \quad (3)$$

This incentive compatibility constraint simply says that the bank should make sure that the borrower's pay-off is at least as large when she does not default as when she defaults.

If the bank can credibly carry out the threat not to refinance in case of default (i.e., the bank sets $v = 0$), the borrower will fear losing access to a second-period return realization, preventing strategic default. This, in turn, implies that the maximum interest rate that the bank can charge is $R = \delta \pi$. In other words, $\delta \pi$ represents the borrower's opportunity cost of not repaying her first-period debt obligation R . And it will not be profitable for her to repay more than that opportunity cost.

The bank, on the other hand, maximizes R subject to the above incentive compatibility constraint (3), and to the borrower's individual rationality constraint:

$$p(\pi - R + \delta \pi) \geq 0. \quad (4)$$

This constraint says that a non-delinquent borrower must find it profitable to enter into an arrangement with the bank. With probability p , a non-delinquent borrower who is 'lucky' (i.e., who has a high return realization) will have net payoffs of $\pi - R$ in the first period and $\delta \pi$ in the second period. This total net pay-off must be positive for a non-delinquent borrower to agree to enter into a debt agreement with the bank.

The optimal solution is for the bank to fully carry out the threat not to refinance delinquent borrowers (i.e., to set $v = 0$) and to set $R = \delta \pi$. In doing so, the bank addresses the fear that the borrower will 'take the money and run' (also referred to as the *ex post* moral hazard problem) and thereby maximizes income. Microfinance programmes can do the same, but may opt to share surpluses in keeping with social objectives.¹²

3.1 Additional sanctions

The bank can do even better by imposing collateral requirements, as in the case of Russia and Eastern Europe, and/or by inducing social sanctions as in the case of group lending (Besley and Coate, 1995). We capture these sanctions through a variable W . Examples of such sanctions include loss of reputation, exclusion from the village community, and so on.

¹² See Armendáriz de Aghion (1999) for an *ex post* moral hazard approach in microfinance involving group lending. See Diagne (1997) for an argument that the optimal v should be greater than zero. In the context here, the risk neutrality of borrowers means that the bank can set $v = 0$ without concern for the risk borne by borrowers.

Take $v = 0$ which, again, is the optimal strategy from the bank's standpoint. Then, in the presence of additional sanctions W , the borrower's incentive compatibility constraint becomes:

$$\pi - W \leq \pi - R + \delta\pi \quad (5)$$

or, equivalently,

$$-W \leq -R + \delta\pi \quad (6)$$

which, in turn, implies that the bank's income will be

$$R = \delta\pi + W \quad (7)$$

(assuming that this is less than the borrower's revenue π , since limited liability implies that the borrower cannot be forced to pay the bank more than the value of her investment). Without additional sanctions (i.e., if $W = 0$), R would be equal to $\delta\pi$, so with social sanctions the bank is now able to charge a higher interest rate while not fearing a higher probability of default.

The same framework allows re-interpretation of the variable W not as sanctions but as positive inducements for repayments – as carrots not sticks. In this case, suppose that the bank can establish the reputation for providing loans of increasing size over time to those borrowers who meet their debt repayment obligations. Then, the above incentive constraint becomes:

$$\pi \leq \pi - R + \delta\pi_2 \quad (8)$$

where $\pi_2 > \pi$. Then the bank could extract up to: $R = \delta\pi_2 = \delta\pi + \delta(\pi_2 - \pi)$.

Positive inducements to repay include BRI's use of rebates (equal to one quarter of interest payments) to clients with perfect repayment records over a six month period (Churchill, 1999, p. 65). Other programmes provide preferential access to loans (or speedier approvals) to clients with a history of on-time payments.

An important inducement is access to a flow of loans that increase in size over time, and this is a feature of all the programmes considered above. In the basic model, incentives hinge on simply being re-financed at the same level, but, in principle, appropriate incentives can be maintained even when subsequent loan sizes are smaller than initial loans. The value of re-financing is greater, however, when the subsequent loans are larger, and we can thus use W to stand in for the net present value of future loans of increasing size over and above the net present value of loans that remain constant at the initial size. This captures the idea of

'progressive' or 'stepped' lending such that loan sizes grow over time conditional on satisfactory performance.¹³

Finally, rather than being interpreted as sanctions, we can think of the variable W as proxying for the probability of being re-financed by a rival lender. Suppose that the borrower can secure refinancing by a second lender with probability v_2 . Then the above incentive constraint becomes

$$\pi + \delta v_2 \pi \leq \pi - R + \delta \pi. \quad (9)$$

Thus, the greater the likelihood v_2 of re-financing by a second lender, the weaker will be incentives to repay the first lender, and therefore the lower the maximum repayment R that can be extracted by the first lender. Problems associated with competition are already starting to be seen in Bolivia and Indonesia, but they are not yet large concerns in the transition economies under consideration.

3.2 Incentives for optimal *ex ante* effort

So far we have focused on incentives to repay loans when projects are successful. The framework can be extended to consider problems that arise when the probability of success is endogenous.¹⁴ That is, we will assume that the borrower can choose p . The sequencing is now: first the lender proposes a debt contract with a pre-specified repayment schedule R to the borrower, then the borrower makes her effort choice (which is akin to choosing p). Next, returns are realized and repayments are made. The borrower, however, could instead default on her debt obligation. In that case, she loses access to future refinancing with probability $1 - v$ and faces additional social sanctions W .

Let

$$c(p) = k \frac{p^2}{2} \quad (10)$$

be the non-monetary cost of effort incurred by the borrower, where k is a fixed cost factor and the quadratic form captures the increasing marginal cost of effort.

The borrower chooses p so as to

$$\max_p p(\pi - R + \delta \pi) + (1 - p)(\delta v \pi - W) - c(p). \quad (11)$$

¹³ Progressive lending also enables the lender to test the borrowers with small loans at the start in order to screen out the worst prospects before expanding the loan scale (Ghosh and Ray, 1997).

¹⁴ Conning (1998) considers the combination of *ex ante* and *ex post* moral hazard in the Bolton-Sharfstien framework. We treat the problems separately to simplify the exposition.

By the first order condition we get:

$$\pi - R + \delta\pi(1 - v) + W = pk, \quad (12)$$

which implies an equilibrium effort level yielding

$$p = \frac{\pi - R + (1 - v)\delta\pi + W}{k}. \quad (13)$$

(This equilibrium holds whenever the right hand side of (13) is smaller than 1, which we assume without a major loss of generality.)

Note that the equilibrium probability p is (i) decreasing in the borrower's debt repayment obligation R (since the higher the repayment requested by the bank, the smaller the residual returns to effort and therefore the smaller the borrower's effort); (ii) increasing with the social sanction W in case of default; and (iii) decreasing with the probability of gaining access to future refinancing in case of default.

Anticipating this equilibrium effort response, the bank will choose *ex ante* first to set $v = 0$ (to never refinance a defaulting borrower) and to propose a repayment schedule R which maximizes its expected repayment revenue. Expected revenue is the product of the repayment probability $p(R)$ and the amount repaid R , yielding:

$$\max_R p(R) \cdot R = \left(\frac{\pi - R + \delta\pi + W}{k} \right) R, \quad (14)$$

subject to $R \leq \pi$.¹⁵

The first order condition for this maximization programme yields that at the optimum $R = \pi - R + \delta\pi + W$, so the optimal repayment schedule is

$$R^* = \frac{\pi(1 + \delta) + W}{2} \quad (15)$$

(assuming again that this is less than the borrower's revenue π because of limited liability). The schedule R^* is an increasing function of social sanctions W , project returns π , and the discount factor δ . As above, exploiting the dynamic nature of the relationship allows the bank to charge a higher interest rate R without exacerbating moral hazard. In the same way, these dynamic incentives are a key to microfinance practice – enhanced by carrots and sticks as described above.

¹⁵ This constraint is a limited liability constraint, indicating that the borrower cannot pay interest charges that are larger than the total project return.

4. Regular repayment schedules

We now turn to one of the least remarked upon – but most unusual – features of most microfinance credit contracts. This is the requirement that repayments must start nearly immediately after disbursement and proceed regularly thereafter. In a standard business loan offered by a commercial bank, the borrower gets the money, invests it, and then repays in full with interest at the end of the term (or perhaps with a limited number of interim instalments). But at pure Grameen-style banks in China, terms for a year-long loan are determined by adding up the principal and interest due in total, dividing by 50, and starting weekly collections a couple of weeks after the disbursement. Table 1 shows the variety of schedules used in practice in the Chinese programmes, ranging from weekly to annual payments and showing a willingness to adapt to local circumstances. Programmes in Eastern Europe and Russia also tend to be flexible in the formula, but they do not stray far from the idea of collecting regular repayments in small amounts, often monthly and well before projects are expected to bear their first fruit. The rural Albanian Development Fund programmes are an exception, with annual repayment instalments.

Insisting on weekly repayments means that the bank is effectively lending partly against the household's stream of outside income, not just the proceeds from the risky project.¹⁶ This is good for the bank and for diversified households.¹⁷ For example, if before borrowing the household has a net income flow of $\$z$ per week after expenses, the microfinance programme can lend an amount $\$L < \$50z$ with the confidence that the household will have resources to repay even if the project fails. Strikingly, in most of the programmes in Churchill's (1999) survey, repayment capacity is estimated without taking into account expected revenues from the loan in question.

The following formalization describes the rationale for such frequent repayments. Consider a borrowing household with disposable income x after purchasing necessities; this amount comes from 'outside' sources, not from the investment that the household is seeking microfinance funding to support. This outside income is received each week, but it decays at a discount factor d per period. For example, if the outside income is not committed to the loan repayments, it gets diverted into miscellaneous consumption expenses with

¹⁶ A former employee of a large bank in the US, now a consultant on microfinance, told an apt story to one of the authors. A group of lawyers came to the banker, hoping for a loan to support a vineyard that they had purchased in California's Napa Valley. The vineyard investment was deemed too risky for the bank to support, but the loan was nonetheless extended – but the timing and size of repayments was tied explicitly to the lawyers' expected salary instalments. The bank thus nearly eliminated its risk exposure, and the lawyers got their vineyard.

¹⁷ But it means that microfinance has yet to make real inroads in areas focused sharply on highly seasonal occupations like agricultural cultivation. Seasonality thus poses one of the largest challenges to the spread of microfinance in areas centred on rain fed agriculture, areas that include some of the poorest regions of South Asia and Africa.

probability $(1-d)$ every week. We assume that these expenses bring the household no utility, but this can be relaxed while still making the argument.

The bank must decide how many instalments ($n = 52/T$) to ask for the loan. If the loan is a year in duration, instalments may be one-time ($n = 1, T = 52$), monthly ($n = 12, T = 52/12$), or weekly ($n = 52, T = 1$), etc. The principal and interest to be repaid sums to an amount L and the transaction cost associated with each instalment is γ . The transaction cost is borne by the borrower. Assuming linear preferences with respect to income, and assuming that the loan size is no larger than the fraction of outside revenues that can be secured to repay the bank, the borrower will then choose the frequency of instalments T to maximize the size of its loan. This is its expected total payment to the bank minus its total transaction cost

$$\max_T \left\{ (1 + d + d^2 + \dots + d^T) \frac{52x}{T} - \frac{52}{T} \gamma \right\}. \quad (16)$$

The question then is: what is the optimal value of T ? If d is close to 1 (there is little decay) and γ is large, the optimal T will tend toward 52; i.e. the optimal n will tend to one. But with a high rate of decay and a relatively low transaction cost, n will tend toward 52. The latter scenario is more likely to hold in poorer households, where the opportunity cost of time is relatively low and where mechanisms to enforce financial discipline are relatively limited (Rutherford, 2000). These tendencies are reinforced by the fact that small-scale businesses like petty trading tend to generate a flow of revenue on a daily or weekly basis, making frequent collections especially desirable in the absence of satisfactory savings facilities. In wealthier households, however, opportunity costs are likely to be higher and revenue flows less frequent, militating toward less frequent loan instalments.

Regular repayment schedules may also help screen out undisciplined borrowers, as well as providing the microfinance institution with a steady flow of information on client behaviour. This information can provide loan officers with early warning about emerging problems and offer bank staff a protocol by which to get to know clients over time. In this way, personalized relationships are established, just as with local moneylenders, and a theoretical formalization of this notion would follow the treatment of repeated lending contracts described in Ghosh and Ray (1997).

A final aspect of regular repayment schedules that bears note is that they make credit contracts look much more like arrangements for saving. While households in the transition economies typically have access to financial institutions that take deposits, households are often held back by restrictions placed on accounts, lack of security, and inconvenience. The banking system in China, for example, is stable and efficient, even in rural areas, but Park (1999) still finds that rural households hold a 'surprisingly large share of wealth in cash and grain rather than deposits, belying large potential demand for savings instruments with more

attractive liquidity and return combinations'. Some observers argue that the essence of microfinance credit contracts is that, in fact, they provide a way to substitute for imperfect *savings* vehicles (Rutherford, 2000). By being able to commit to making small, regular instalments to the microfinance institution, the clients get a usefully large amount of money at their disposal, much as would happen through a regular saving plan.

5. Group lending beyond joint liability: some preliminary thoughts

We have highlighted several important mechanisms employed in typical microfinance institutions, arguing that in practice group lending with joint liability is just one mechanism driving microfinance performance. Sadoulet (1997) goes further to argue that 'social collateral' induced by group lending is not a sufficient condition to ensure high repayment rates, while Diagne (1997) describes the excessive costs of joint liability. Rai and Sjöström (2000) have shown that the circumstances under which joint liability is optimal are narrow and unlikely to hold in practice, dominated by a contract that elicits truthful information revelation from borrowers through cross-reporting schemes (in theory, information revelation does not occur via joint liability contracts alone). They argue further that most group-lending schemes fail to fully enforce the contracts, providing supportive anecdotal evidence from Bangladesh, Kenya and Malaysia. If the evidence and these theoretical arguments are right, why then do so many programmes retain the group lending structure?

Here, we suggest ways in which group lending might be helpful beyond the use of joint liability. These factors are being exploited, for example, by the Association for Social Advancement (ASA), one of Grameen Bank's competitors in Bangladesh. ASA has abandoned the joint liability aspect of group lending but retains the practice of meeting with clients in public groups, allowing the benefits described below.

First, without the ability to secure collateral, programmes may find it helpful to use the avoidance of social stigma as an inducement for clients to promptly repay loans (Rahman, 1998). The mere fact of public repayments at group meetings can strengthen the strategic use of social stigma in aid of the programmes' bottom lines, even without a formalized joint liability contract. Second, by meeting as a cluster of borrowers in scheduled locations and at scheduled times, some transactions costs for bank staff may be reduced, even if it adds to client costs as in the evidence from China cited above. Third, the group is often a useful resource through which staff can directly elicit information about errant borrowers and create pressure as needed (Ito, 1998). Fourth, group meetings can facilitate education and training, which may be particularly helpful for clients with little business experience and/or low literacy levels. The education may aid financial performance or it might be valued intrinsically as a

way to improve levels of health and knowledge.

Fifth, it is often said that the comfort of clients – many of whom have had no prior experience with commercial banks – is enhanced by encouraging them to approach the bank with their neighbours, an issue which may be particularly valuable in poorer areas of transition economies. Fugelsang and Chandler (1993) argue that the use of groups has been particularly important in attracting female clients in Bangladesh, and experience has shown that attracting female clients can, in itself, greatly improve bank performance. At the Grameen Bank of Bangladesh, for example, 95 per cent of clients are women, and they have proven more reliable than male borrowers. For example, 15.3 per cent of male borrowers were 'struggling' in 1991 (i.e., missing some payments before the final due date) while this was true for just 1.3 per cent of women (Khandker *et al.*, 1995). While men can be argumentative and non-compliant, Rahman (1998) finds that women, in contrast, tend to be much more sensitive to the verbal hostility of fellow members and bank workers when repayment difficulties arise. A similar description applies as well to socially disenfranchised borrowers of either sex. Table 1 shows that many of the programmes in China have also targeted women, although this is not so for the individual-based programmes in Albania or Russia. The Trust Banks operated by Opportunity International in Eastern Europe have also deliberately focused on recruiting female clients, raising the fraction of female clients from 20–40 per cent before the development of the Trust Banks to above 80 per cent in the Trust Banks (Microcredit Summit, 1998).

For all of these reasons, the use of groups may be important, especially in early stages and for poorer clients, but for reasons beyond joint liability. Further research is required to identify how these considerations and the other mechanisms interact with each other to affect performance and product demand.

6. Conclusion

Transition economies face a challenge in finding ways to raise incomes of low income households and broaden financial markets. Microfinance holds the promise of meeting both goals by using novel methods to lend to small-scale entrepreneurs, most of whom would have difficulty borrowing from the formal banking system.

Microfinance has been tied closely to the idea of group lending with joint liability – an attachment that remains evident both in popular accounts and in academic writings. It was Muhammad Yunus's genius to publicize his innovative bank, the Grameen Bank of Bangladesh, with reference to this contractual innovation. Replications of the Grameen Bank in China and the Trust Banks of Eastern Europe also draw on the narrative of group lending with joint liability. We have argued that, where it is used, group lending is just one part of a set of overlapping mechanisms employed to aid loan repayment rates. Moreover, it is

not obvious that it is joint liability in group lending that drives the results, and not other aspects like public repayments, facilitation of education, and participation alongside neighbours.

New programmes in Russia and Eastern Europe have demonstrated the advantages of employing individual-based contracts instead of only using group lending contracts. Unlike the group lending programmes, these new programmes require borrowers to put up collateral or find a third-party guarantor, and they serve a better-off group of clients. But unlike with standard borrower-lender relationships, the new banks use novel means to collect information and to create incentives for timely loan repayment.

Our aim has been to describe the most important of these elements. An important next step will be to collect data that allow careful quantification of the roles of these overlapping mechanisms. Gaining a further understanding of how programmes work in practice is necessary for developing innovations that can help achieve the full promise of microfinance in transition economies.

Our focus has been on the credit side, but emphasis on deposit-taking is growing. An advantage of turning to savings is that, by definition, deposit mobilization is free of concerns with adverse selection and moral hazard. However, savings mobilization raises additional issues – most important, how to provide both convenience and security, find profitable re-investment opportunities, and mitigate the potential ravages to purchasing power brought by bouts of high inflation (Morduch, 1999b). The caveats are particularly important in the Albanian context, where the weak banking system (and lack of depositor confidence) pushed many Albanians to put money into pyramid schemes in the mid 1990's rather than into banks – only to see the schemes collapse in 1997 (Benjamin and Ledgerwood, 1999). Bulgaria, too, saw a major banking crisis in 1996, as did Russia in 1998. The microfinance programmes in Eastern Europe and Russia have proven resilient so far, but, overall, the prospects for microfinance in the transition economies will be brighter as broader banking systems gain strength.

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