Franchising Microfinance

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Abstract

Financial intermediaries worldwide are seeking mechanisms for participating in micro lending. We consider a simple model where a bank may use informed "local capitalists" as intermediaries for on-lending. But the availability of multiple credit sources provides borrowers with an incentive to default voluntarily, making the bank's on-lending mechanism a non-starter. We argue that a franchising model of on-lending that offers a commitment technology for lenders to not lend to a borrower who has defaulted on a loan from another franchisee, may be effective. Under this mechanism, the borrower is better off having both the moneylender and franchisee lenders to borrow from. Interestingly, the borrower is induced to borrow from the moneylender first even though some franchisee would have charged a lower interest rate. But if the success of such a mechanism were to attract a large number of competing banks to offer separate franchises, the market for on-lending would once again fail. These results have important policy implications.

1 Introduction

Credit rationing, due to asymmetric information as well as inadequate supply of funds for micro-credit, is considered to be a critical factor hindering economic and social progress worldwide. In this paper, we suggest an alternative mode of credit provision that could simultaneously address the two factors affecting access to credit. We explore the use of information available within the local population and consider the role of these locally-informed individuals as effective on-lenders for mainstream financial institutions. However, with the resulting availability of many potential lenders, the mechanism fails due to the risk of borrowers voluntarily defaulting. We analyze a simple contractual mechanism, referred to as Franchising, that could help address the problem. We allow for the co-existence of informed moneylenders and derive implications for lenders' interest rates, sequencing of loans and borrower welfare.

Formal financial intermediaries, such as banks, suffer from an informational disadvantage particularly with respect to small and new ventures. The consequent costs associated with adverse selection and moral hazard may prevent them from profitably extending loans to such borrowers (Stiglitz and Weiss, 1981). Credit rationing is even more severe for micro-enterprises in developing countries, where contract enforcement may also be difficult. Prohibitively high transactions costs of lending small amounts act as further deterrents. It is not surprising why many schemes to extend credit to the rural poor, including the much celebrated Grameen model, do not appear to be viable unless they are heavily subsidized by the government or charitable organizations. The reliance on subsidies clearly limits the expansion and scalability of such schemes. In India, for instance, various arms of the government offer both direct and indirect assistance in the form of subsidized interest rates on loans, requiring lending to "priority sectors" such as agriculture, promoting self-help groups (SHGs), and so on. Despite years of such efforts, significant portions of the rural poor are unable to access funds.

In such environments, the role of moneylenders in the informal sector continues to be critical in the provision of credit. They are, however, alleged to charge usurious rates of interest. The high interest rates are often attributed to the monopoly position of the moneylender arising perhaps from their informational advantage. Moneylenders are also believed to have the ability to monitor and enforce a contract thereby reducing the borrower's incentive to default voluntarily. This could be the result of repeated interaction between a moneylender and a small group of borrowers belonging

to the same community or greater proximity, allowing improved monitoring and enforcement with the help of social and/or physical sanctions.

In this paper, we argue that there exist many individuals in the neighborhood of any given borrower who possess relevant information about the borrower that is helpful in screening and monitoring the borrower. Moreover, some of these individuals may possess (possibly illiquid) collateral, such as houses, jewelry and animals, against which they could obtain loans from various formal financial intermediaries, such as banks, for on-lending to borrowers without such collateral but in need of funds. These potential lenders, let us call them local capitalists, may, however, lack the necessary enforcement technology that is available to the moneylender. They would have to rely on self-enforcing contracts to prevent the borrower from defaulting voluntarily. However, competition among such local capitalists may, paradoxically, lead to a counterproductive outcome. Following default against one lender, the borrower may approach another lender for a loan subsequently. The presence of another lender imposes a negative externality on each lender. The possibility of voluntary default by a borrower (i.e., *ex post* moral hazard) in the presence of multiple lenders without an effective enforcement technology reduces and may eliminate the lenders' incentive to offer a loan in the first place.

Thus, the risk of voluntary default against competing local capitalists adversely affects both borrowers and local capitalists who could act as potential lenders. For the borrowers, there are fewer funding sources (often, only one) as a result. Local capitalists, on the other hand, lose a potential market for making profitable loans using funds borrowed against their assets from financial intermediaries such as banks. We argue that one possible institution that can overcome these problems that arise from voluntary default is Franchising.

The borrower's incentive for voluntary default arises from each lender's inability to credibly commit to not lending to a previous defaulter. Each lender may have an incentive to lend even if the borrower has defaulted in the past against another lender. This in turn provides the borrower with the incentive to default voluntarily. However, consider a franchising contract whereby each franchisee is required to refuse credit to a borrower who may have defaulted against another franchisee. If such an arrangement can attract local capitalists as lenders belonging to the franchise, it would reduce the borrower's incentive to voluntary default. There would be fewer opportunities for getting another loan if she defaults against a lender. Each franchisee would however be allowed

to compete against other members for the borrower's business. The incentive for a local capitalist to become a franchisee would be the possibility of making a loan profitably where no such market is feasible in the absence of the franchise agreement.

We develop a simple model to formalize this notion of franchising. The model allows competition between an independent moneylender and many local capitalists who lend as a single bank's franchisees. We find that a borrower would continue to obtain credit from the moneylender, albeit at a lower-than-monopoly interest rate, even when some local capitalist franchisee would have been willing to lend at a lower interest rate. It is only after the borrower is forced to default on the moneylender that he uses the option of borrowing from local capitalist franchisees. Also, we show that the borrower welfare is higher if a moneylender is present in addition to local capitalists as potential franchisee lenders.

We then consider the possibility of competition among formal financial institutions for offering franchises. In the extreme case with unfettered competition among banks to offer franchises, strategic default again becomes feasible and the market for credit through franchising fails, leaving only the usurious moneylender. This suggests that there may be no reason to encourage competition amongst banks in offering franchises. In fact, some monopoly power - exclusive territorial rights, for instance - for each bank may be a desirable policy.

The rest of the paper is organized as follows. The next section provides a brief review of the related literature followed by Section 3 that lays out the formal model. In Section 4, we determine the equilibrium when there is competition among potential lenders in the informal market. In Section 5, we allow for the possibility of franchising. In Section 6, we discuss several extensions of the model. Section 7 concludes the paper.

2 Literature Review

Our paper is broadly related to two strands of economics literature. First, there is a burgeoning literature on microfinance, where asymmetric information between formal finance institutions and borrowers adversely impacts the ability to enforce the contract. It identifies alternative mechanisms, such as peer monitoring, group lending with joint liability, various dynamic incentives, to address the problem e.g., Ghatak (1999, 2000), Ghatak and Guinnane (1999), Ghosh and Ray (2001),

Stiglitz (1990), Armendáriz de Aghion (1999), Besley and Coate (1995), to name a few. These papers largely ignore the possibility of other costs incurred, in the form of collusion among group members and continued monitoring by lenders (Armendáriz de Aghion and Morduch, 2000). The continued lack of profitability of even the very successful microfinance institutions (MFIs) and their dependence on donor funds and socially conscious investors willing to accept a financial loss are further evidence of a lack of long-term sustainability of mechanisms discussed in the literature (Morduch, 1999). Furthermore, unlike our paper, these papers ignore competition as another reason for strategic default.

Another set of papers (e.g., Bubna, 2005, Jain, 1998, Jain and Mansuri, 2003) recommend linking formal institutions with the better-informed informal institutions to get around the asymmetric information problem. Such a linkage also lies at the heart of our paper. However, these papers too ignore the impact of competition or the potential agency problems in case the informal lenders are hired as agents of the formal institutions. We propose that informed local individuals with collateral become *principals* in the financial intermediation chain.

A second related strand of the literature considers the possibility of multiple sources of loans. Similar to our paper, work by Bizer and DeMarzo (1992) and Parlour and Rajan (2002) also consider moral hazard and externalities in an environment permitting multiple financial contracts. However, there are some key differences. In Bizer and DeMarzo (1992), borrowers have the right to offer a contract, not the lender. Such an assumption in our paper would eliminate the moneylender's monopoly power, critically impacting the results. In addition, unlike Parlour and Rajan (2002), they do not allow for the possibility of strategic default, which is the source of moral hazard in our paper. Parlour and Rajan (2002) consider the impact on loan contracts when borrowers take loans simultaneously from multiple lenders. However, in our paper, loans are taken sequentially and there is no issue of debt priority since the loans do no overlap. Most importantly though, both papers assume that lenders are identical and focus only on borrower behavior. In our paper, the focus is on the role of lenders when they differ in their lending costs as well as enforcement technology.

A paper by McIntosh and Wydick (2005) considers the role of competition among lenders without any overlapping loans. They focus on the type of borrowers (with high or low collateral) who get funded when competition among lenders increases. They show that due to competition, MFIs that are unable to lend to the high collateral borrowers must therefore rely on grants. In

addition, they do not consider the possibility of strategic default. In our paper, all borrowers are similar but lenders are all profit-maximizers with different enforcement technologies. Strategic default lies at the heart of the problem with increased competition among lenders even without asymmetric information about borrower types. Nor is there any asymmetric information about the identity of borrowers who default. Our paper focuses on the problem of credible commitment on the part of lenders as well as the feasibility of funding even in the absence of borrower collateral.

Finally, a paper by Varghese (2005) considers a model with borrower types as well as strategic default. In this environment, it determines a separating equilibrium when there are competing banks (without other informal lenders), and compares it to an alternative scenario when the bank forms a link with a single moneylender. Our paper differs from this along several important dimensions. To begin with, our focus is primarily on strategic default, rathen than ex ante asymmetric information regarding borrower types. So, we are not concerned with the sorting problem. More importantly, we allow for a bank to link up simultaneously with many competing informal lenders rather than just one as in the Varghese study. We therefore allow for competition in conjunction with linkages, not just one or the other.

3 The Model

We assume a local area, *e.g.*, a small village economy, with three sets of players - borrowers, moneylenders with enforcement technologies, and local capitalists with (possibly illiquid) collateral against which they can borrow funds from financial intermediaries to potentially lend to borrowers with no collateral. All players are risk neutral.

In every period, a borrower without any collateral and without any funds of her own, needs \$1 to fund a project. In the next period, the project generates a gross payoff, R, with probability p, and 0 otherwise. The project is a positive NPV project, $\frac{pR}{1+r^f} > 1$ where all risk-neutral agents discount future cash flows at the risk-free rate r^f. Let r^d denote the discount rate adjusted for the condition that the positive payoff R is obtained only with probability $p < 1$. Thus

$$1 + r^d = \frac{1 + r^f}{p}. \tag{1}$$

The only contract that moneylenders can offer is a standard loan contract. For each borrower, there is a single moneylender in the village with two distinctive characteristics. One, he has the

ability to enforce the loan contract.[1] We define enforcement as the ability of the moneylender to impose a cost on the borrower, explicit or implicit, either through social sanctions or physical sanctions, equal or greater than what is owed to him by the borrower. This ensures that the borrower obtains no benefit from voluntarily defaulting against the moneylender. Second, the moneylender incurs zero fixed cost of screening and monitoring the borrower.

There are a number of local capitalists in the local area who own assets that they can pledge as collateral to borrow from banks at the risk-free rate. However, they do not have an enforcement technology of the type that is available to the moneylender. In addition, each such local capitalist incurs a unique cost of screening and monitoring the loan (let us call it transaction cost of lending) to a given borrower every time he enters into a loan contract with the borrower. Local capitalists are differentially familiar with a borrower. The more familiar is the local capitalist, the lower is his transaction cost. Note that these costs are specific to the borrower. In other words, a local capitalist will have different transaction costs for different borrowers. Without any loss of generality let us denote these costs as

$$0 < c^1 < c^2 < c^3 < .....$$

(For simplicity, we will not carry any notation denoting the borrower.) One way to think about this is that the transaction cost is based on the distance between the lender and the borrower. Lenders incur a cost of monitoring to ensure that the funds are being used for the declared purpose. So, the closer the borrower, the lower the transaction cost. The moneylender is the extreme form where he incurs no transaction cost and is also able to prevent a willful defaulter from enjoying the spoils of default.

We assume that project return, success probability, discount rates and lenders' transaction costs are all common knowledge. We further assume that borrowers have limited liability and funds that the borrower does not commit to a project cannot be laid claim upon in case of loan default. In other words, enforcement costs are implicitly assumed to be prohibitive for the local capitalists. The borrower can consume the funds after defaulting voluntarily but cannot default and invest these funds in future projects (in essence become her own banker for future projects).[2] We also

[1] See Hoff and Stiglitz (1998) for a model with endogenous enforcement costs and effects of subsidies that might reduce these costs.

[2] See Chowdhry (1991).

assume that a borrower cannot have multiple loans at any point in time. So, borrowing may take place sequentially without concerns about debt priority.

In case the project fails, the borrower would be forced to default. However, a borrower can also default voluntarily when the project is successful. We assume that lenders cannot identify the reason for defaulting. Each lender chooses never to re-lend to a borrower who has defaulted on his loan to him.[3]

In every period, there are two stages. In stage one, a lender decides whether to lend to a specific borrower or not, and what interest rate (r) to charge. Then the borrower decides whether to undertake the project. If she decides to undertake the project, she chooses the lender to borrow from. In stage two, payoffs are realized and a borrower decides whether or not to default on the loan. The same game can be repeated over multiple periods for every borrower.

Borrower's participation constraint is simply that the total amount owed, the principal payment of 1 plus the interest payment of r amount owed cannot exceed the gross payoff from the project. Formally,

$$1 + r \leq R.$$

Lenders' participation constraints are that they must expect to recover the amount owed plus the transaction cost of making the loan, c. For the moneylender $c = 0$. For local capitalists c is positive. Let $r^0(c)$ denote the minimum interest that a lender must charge to break-even (make zero expected profits). Thus $1 + r^0(c)$ represents the total cost making a loan of 1 to the borrower. For the money lender, the total cost of lending is given by

$$1 + r^0(0) = 1 + r^d. \tag{2}$$

For a local capitalist with transaction cost c,

$$1 + r^0(c) = (1 + r^d)(1 + c). \tag{3}$$

It is easy to see that

$$r^0(0) < r^0(c^1) < r^0(c^2) < r^0(c^3) < .....$$

[3]This can be supported by a reputation argument in which a lender deviating from this policy might be flooded with defaults by his other borrowers.

Lenders' participation constraints, then, are that the interest charged must be such that it exceeds the cost of lending. Formally,

$$1 + r \geq 1 + r^0(c). \tag{4}$$

4 Competition without Franchising

In this section, we explore the outcome when the moneylender and local capitalists are able to compete with each other to offer loans.

4.1 A Monopolist Moneylender

We assumed that for every borrower, there exists a moneylender with zero transaction cost of lending and an enforcement technology. Suppose moneylender is the only lender willing to make a loan to the given borrower. In this case, because he is a monopolist, he will extract all the surplus possible and charge an interest rate r^M such that

$$1 + r^M = R.$$

This fits in well with the observation that borrowers in many cases face a monopolist moneylender who charges usurious rates on interest. So the borrower has a net payoff of 0. The entire surplus that the moneylender enjoys is due to his monopoly position since in a competitive market, he would have charged $r^0(0)$ and not suffered any voluntary default given his enforcement technology.

4.2 Many Local Capitalists as Potential Lenders

Now suppose that in addition to the moneylender, there exist many local capitalists who could potentially lend to the borrower. Let us look at borrower's incentives.

Let V_n denote the present value of borrower's surplus when there are n possible local capitalists she could potentially borrow from sequentially after each successive default. If the borrower does not default voluntarily, then with probability p, the project returns R, the borrower repays $(1+r_n)$ and she is in the same situation as before. With probability $(1-p)$, the project returns zero, the borrower is forced to default and she now has only $n-1$ opportunities left for defaulting. Formally,

$$V_n = \frac{p\{R - (1 + r_n) + V_n\} + (1 - p)V_{n-1}}{1 + r^f}.$$

Clearly, $V_0 = 0$ since there are no further credit opportunities to borrow from local capitalists. Whether the moneylender is still available to borrow from after exhausting all possible opportunities to borrow from local capitalists does not affect V_n since the borrower's surplus is zero when the moneylender is the last possible source of loans. Solving, we get

$$V_n = \frac{R - (1 + r_n)}{r^d} + \left[\frac{(1-p)}{(1-p) + r^f}\right] V_{n-1}. \tag{5}$$

The first term in the above expression represents the present value of the surplus $R - (1 + r_n)$ in perpetuity discounted at r^d which can be thought of as the risk-free rate adjusted for the probability of default by the borrower. With only 1 potential lender (i.e., $n = 1$), the borrower will choose not to default if what she owes to the lender $(1 + r_1)$ is smaller than the value V_1 from not defaulting. Formally, this condition is expressed as

$$(1 + r_1) \leq V_1 = \frac{R - (1 + r_1)}{r^d}.$$

Simplifying, we get

$$(1 + r_1) \leq \frac{R}{1 + r^d} \leq V_1. \tag{6}$$

Combining this with lenders' participation constraint (4), we get

$$1 + r^0(c) \leq \frac{R}{1 + r^d}. \tag{7}$$

This gives us our first proposition.

Proposition 1 *If every local capitalist's cost of lending $1 + r^0(c^i) > \frac{R}{1+r^d}$, then the borrower will only be able to borrow from the monopolist lender who will extract all surplus.*

Financial intermediaries such as banks may be characterized by high transaction costs of lending (partly caused by asymmetric information) and no technology to enforce loan contracts such that (7) is violated. These constraints on lending may explain why the intermediaries are unable to loan to borrowers in the absence of collateral without suffering losses caused by frequent defaults by borrowers. We assume that there exist many local capitalists who possess relevant local information about any given borrower such that their transaction cost c is small enough that condition (7) is satisfied. We will now show that the mere presence of many such local capitalists does not guarantee that they will be willing to lend to the borrower with no collateral.

We derive a condition for the borrower not defaulting voluntarily when she has two opportunities for defaulting before exhausting all sources of credit from local capitalists. Substituting $n = 2$ in (5), we get

$$V_2 = \frac{R - (1 + r_2)}{r^d} + \left[\frac{(1-p)}{(1-p) + r^f}\right] V_1$$

which implies that

$$V_2 - V_1 = \frac{R - (1 + r_2)}{r^d} - \left[\frac{r^f}{(1-p) + r^f}\right] V_1.$$

Since $V_1 \geq \frac{R}{1+r^d}$ from (6), we get

$$V_2 - V_1 \leq \frac{R - (1 + r_2)}{r^d} - \left[\frac{r^f}{(1-p) + r^f}\right] \frac{R}{1 + r^d}.$$

The term $V_2 - V_1$ represents the penalty of defaulting voluntarily when there are two opportunities to borrow from local capitalists because by defaulting voluntarily, the borrower forgoes one of the two opportunities. When $n = 2$, the borrower will choose not to default if

$$(1 + r_2) \leq V_2 - V_1 \leq \frac{R - (1 + r_2)}{r^d} - \left[\frac{r^f}{(1-p) + r^f}\right] \frac{R}{1 + r^d}.$$

Simplifying, we get

$$(1 + r_2) \leq \frac{1}{1 + r^f} \left[\frac{R}{1 + r^d}\right].$$

Again, combining this with lenders' participation constraint, we get

$$1 + r^0(c) \leq \frac{1}{(1 + r^f)} \left[\frac{R}{1 + r^d}\right]. \tag{8}$$

Proposition 2 *Assume that there exist many local capitalists with costs of lending* $1 + r^0(c)$ *such that*

$$\frac{1}{(1 + r^f)} \frac{R}{1 + r^d} < 1 + r^0(c) < \frac{R}{1 + r^d}.$$

Lending by local capitalists, even though individually feasible, is not an equilibrium outcome.

Proof: The condition on cost of lending satisfies (7) but violates (8). In this case, any of these local capitalists will be willing to lend to the borrower if he knew that the borrower will not get an opportunity to borrow again from any other (current or future) local capitalist. But no local capitalists wants to be the first to offer the loan because he knows that the minimum interest rate that he must charge to recover his costs are so high that the borrower has an incentive to default

on the loan offered by the local capitalist and then subsequently borrow from the another (current or future) local capitalist. So, lending by local capitalists, even though it is feasible, is not an equilibrium outcome.■

5 A Franchising Solution

Lending by local capitalists fails to occur in equilibrium because of a coordination failure on the part of these potential lenders. Each local capitalist has an incentive to make a loan to the borrower who may have defaulted against another local capitalist lender. If it were possible for local capitalists to credibly commit to not extend credit to a borrower who has defaulted on another lender's loan, the borrower would effectively face a single typical local capitalist lender and will have an incentive not to default voluntarily.

One mechanism for such a credible commitment would be the institution of franchising. Suppose that there exists an external player offering a franchise to all potential lenders including local capitalists. The terms of the franchise are that no franchisee can offer a loan to a borrower who may have defaulted against any franchisee lender. However, there is no restriction on the interest rate that any participating franchisee may charge.

It is obvious that each local capitalist would have an incentive to join the franchise, given that he does not make a loan in the absence of such a mechanism. Assume that the moneylender does not obtain the franchise. (We can later demonstrate that this is indeed the moneylender's optimal decision.) So, a default against the local capitalist franchisee does not preclude the moneylender from extending another loan to the borrower, and vice versa. With local capitalists as franchisees, effectively, there is only one possible opportunity to borrow from local capitalists.[4] With the moneylender as the other borrowing possibility, the borrower has two chances to default before getting shut-off completely from the market for loans.

The borrower can approach the moneylender and local capitalist franchisees in two possible sequences. One is to borrow from a local capitalist first and in the event of a non-voluntary default, go to the moneylender as the last resort. The second possible sequence is to borrow from the moneylender first and in the event of a non-voluntary default, go to a local capitalist franchisee

[4]This can be generalized to an endogenously determined and finite number of allowable defaults as in Chowdhry (1991).

as the last resort.

We have seen earlier that if the moneylender is borrower's only lending source, he acts as a monopolist and charges her an interest rate r_1^M to extract all the surplus. Formally,

$$1 + r_1^M = R. \tag{9}$$

The subscript 1 on the interest rate indicates that the borrower has one chance to default before exhausting all borrowing opportunities.

On the other hand, if the borrower has already defaulted on the moneylender and local capitalist franchisees are the only sources left for borrowing, there will be Bertrand competition among the local capitalists and the local capitalist with the smallest transaction cost to the borrower, c^1, will lend and charge an interest rate that prevents the local capitalist with the next smallest transaction cost, c^2, from offering the loan and making a positive profit. Formally,

$$1 + r_1^1 = 1 + r^0(c^2). \tag{10}$$

At this interest rate local capitalist with the smallest transaction cost c^1 will expect to make a positive profit whereas all remaining local capitalists with transaction costs greater than or equal to c^2 will make non-positive profits.

Let $X(r, c)$ denote the present value of the profits made by a lender charging an interest rate of r and transaction cost c. Then,

$$X(r, c) = -(1 + c) + \frac{p\{(1 + r) + X(r, c)\}}{1 + r^f}.$$

The term $1 + c$ represents the total upfront costs of making a loan of 1. With probability p, the borrower will repay $(1 + r)$ next period and the lender will be in identical situation. The payoff next period is discounted at the risk-free rate. Solving for $X(r, c)$, substituting from (1), (3) and simplifying, we get

$$X(r, c) = \frac{(1 + r) - [1 + r^0(c)]}{r^d}.$$

The expression above has a simple intuitive interpretation. The lender collects $(1+r)$ every period whereas the cost of making the loan is $[1+r^0(c)]$. This difference between the two is lender's surplus in perpetuity which is discounted at the default-risk adjusted rate r^d. Thus, for the moneylender lending last, from (9)

$$X(r_1^M, 0) = \frac{R - [1 + r^0(0)]}{r^d}, \tag{11}$$

and for the local capitalist with transaction cost c^1 lending last, from (10)

$$X(r_1^1, c^1) = \frac{[1 + r^0(c^2)] - [1 + r^0(c^1)]}{r^d} = \frac{1 + r^d}{r^d}(c^2 - c^1) > 0. \tag{12}$$

Let r_2^M denote the interest charged by the moneylender, if he decides to lend first and the borrower has two opportunities to default before exhausting all sources of credit. Then,

$$X(r_2^M, 0) = \frac{(1 + r_2^M) - [1 + r^0(0)]}{r^d}. \tag{13}$$

Similarly, let r_2^1 denote the interest charged by the local capitalists with the smallest cost, c^1, if he decides to lend first and the borrower has two opportunities to default before exhausting all sources of credit. Then,

$$X(r_2^1, c^1) = \frac{(1 + r_2^1) - [1 + r^0(c^1)]}{r^d}. \tag{14}$$

We now examine lenders' incentives to lend first rather than wait for the borrower to default and then lend. Let $Y(r_1, c)$ denote the present value of a lender's expected profits, if he waits for the borrower to default against the first lender, which happens with probability $(1 - p)$. With probability p, the borrower repays the loan to the first lender in which case the lender who waits is in exactly the same situation.Then,

$$Y(r_1, c) = \frac{pY(r_1, c) + (1 - p)X(r_1, c)}{1 + r^f}.$$

Solving for $Y(r_1, c)$, we get

$$Y(r_1, c) = \theta X(r_1, c), \tag{15}$$

where

$$0 < \theta \equiv \frac{(1 - p)}{r^f + (1 - p)} < 1. \tag{16}$$

Notice that θ is high if the probability of default $(1 - p)$ is high. The lender's cost of waiting is smaller if the borrower is more likely to default. Similarly, θ is higher for smaller r^f – the smaller the risk-free rate r^f, the smaller is the cost of waiting.

The moneylender will choose to lend first rather than wait for the borrower to default and then lend if

$$X(r_2^M, 0) \geq Y(r_1^M, 0) = \theta X(r_1^M, 0).$$

Substituting from (11) and (13) and simplifying, we get

$$1 + r_2^M \geq \theta R + (1 - \theta)[1 + r^0(0)]. \tag{17}$$

The right hand side of the above condition is a weighted average of what the moneylender will collect if he waits to lend to the borrower after she has defaulted on the local capitalist franchisee lender, R, and the smallest rate the moneylender can charge without making losses, $[1 + r^0(0)]$. The weight given to R is θ which has an intuitive interpretation as discussed before.

Analogously, the local capitalist with transaction cost c^1 will choose to lend first rather than wait for the borrower to default and then lend if

$$X(r_2^1, c^1) \geq Y(r_1^1, c^1) = \theta X(r_1^1, c^1). \tag{18}$$

Substituting from (12) and (14) and simplifying, we get

$$1 + r_2^1 \geq \theta[1 + r^0(c^2)] + (1 - \theta)[1 + r^0(c^1)]. \tag{19}$$

The right hand side of the above condition is a weighted average of the rate the local capitalist will charge when he competes with the local capitalist with the next smallest transaction cost, $[1 + r^0(c^2)]$, and the rate he can charge without making losses, $[1 + r^0(c^1)]$.

Let $V_2^{M,1}$ denote the present value of the borrower's surplus if she chooses to borrow from the moneylender first and then the local capitalist with transaction cost c^1. The surplus after defaulting on the moneylender, denoted V_1^1, is:

$$V_1^1 = \frac{R - (1 + r_1^1)}{r^d} = \frac{R - [1 + r^0(c^2)]}{r^d}. \tag{20}$$

Thus,

$$V_2^{M,1} = \frac{p\{R - (1 + r_2^M) + V_2^{M,1}\} + (1 - p)V_1^1}{1 + r^f}.$$

Simplifying and substituting from (16), we get

$$V_2^{M,1} = \frac{R - (1 + r_2^M)}{r^d} + \theta V_1^1. \tag{21}$$

Let $V_2^{1,M}$ denote the present value of the borrower's surplus if she chooses to borrow from the local capitalist with transaction cost c^1 first and then the moneylender. The surplus after defaulting on the local capitalist is zero as the moneylender extracts all the surplus from the borrower when he is the last lender. Thus,

$$V_2^{1,M} = \frac{R - (1 + r_2^1)}{r^d}. \tag{22}$$

Proposition 3 *Each borrower will choose to borrow from the moneylender first and after she is forced to default on the moneylender, she will borrow from the local capitalist with the smallest transaction cost of lending to her.*

Proof: Suppose that the local capitalist with transaction cost c^1 offers the smallest possible interest rate that is consistent with his incentive to lend first. This is when the condition (19) is satisfied as an equality:

$$1 + r_2^1 = \theta[1 + r^0(c^2)] + (1 - \theta)[1 + r^0(c^1)]. \tag{23}$$

Suppose the moneylender, competing with the local capitalist, offers an interest rate that is slightly below r_2^M that satisfies the following equation:

$$1 + r_2^M = (1 + r_2^1) + \theta \left[R - [1 + r^0(c^2)]\right] \tag{24}$$

to induce the borrower to borrow from the moneylender first. Substituting from (23) into (24) and simplifying, we get

$$1 + r_2^M = \theta R + (1 - \theta)[1 + r^0(c^1)]. \tag{25}$$

(Note, the interest rate offered by the lender offering a loan first is a weighted average of the interest it would charge if it were to lend last and the interest charged by the marginal lender, which is lender with transaction cost c^1 in this case. This result is also seen later.) It is easy to see that r_2^M given above is consistent with the moneylender's incentive to lend first as it satisfies the condition (17) because $r^0(c^1) > r^0(0)$. Substituting (24) and (20) in (21) and simplifying, we get

$$V_2^{M,1} = \frac{R - (1 + r_2^1)}{r^d} = V_2^{1,M} \tag{26}$$

$$= \frac{R - \{\theta\,(1 + r^0(c^2)) + (1 - \theta)\,(1 + r^0(c^1))\}}{r^d} \tag{27}$$

and thus the borrower is indifferent between borrowing from the moneylender first or from the local capitalist franchisee first if interest rates are chosen as specified in (23) and (24). She will choose to borrow from the moneylender first if the moneylender offers an interest rate slightly below r_2^M given by (24) which is feasible for the moneylender to offer.■

The moneylender is able to compete with the local capitalist franchisee because his transaction cost is smaller than that of the local capitalist franchisee. He is able to lower his interest enough that the borrower prefers to borrow from the moneylender first. It is easy to see that the moneylender and

the local capitalist with the smallest transaction cost c^1 make strictly positive profits in equilibrium. From (13), the moneylender makes positive profits if r_2^M exceeds $r^0(0)$ which follows clearly from (25). From (12), it follows that the local capitalist with transaction cost c^1 makes strictly positive profits. Note that if the moneylender too were to join the franchise, then there would only be one lender under the terms of the franchise. Under Bertrand competition, the moneylender would charge $(1 + r^0(c^1))$ which is lower than the interest moneylender charges without being part of the franchise, given by (25). So, it is optimal for the moneylender to not join the franchise, as we initially assumed.

Proposition 4 *The interest rate charged by the moneylender is higher than what the local capitalist will charge to lend first.*

Proof: From (24), it trivially follows that

$$1 + r_2^M > 1 + r_2^1. \blacksquare$$

The result above is interesting – it shows that the borrower prefers to borrow from the moneylender first even though the interest rate charged by the moneylender is higher than what the local capitalist franchisee would charge to lend first. The reason is that if the borrower borrows from the local capitalist franchisee first, after her first default, the moneylender becomes a monopolist and extracts all surplus from the borrower. On the other hand, when the moneylender is competing for borrower's business with the local capitalist, he has an incentive to offer a competitive interest rate.

Proposition 5 *The borrower's welfare is the highest when he is able to borrow both from the moneylender and the local capitalist franchisee, followed by when he is able to borrow only from the local capitalist franchisee, followed by when he is able to borrow only from the moneylender.*

Proof: From (27),

$$V_2^{M,1} = \frac{R - (1 + r_2^1)}{r^d}.$$

From (20),

$$V_1^1 = \frac{R - [1 + r^0(c^2)]}{r^d}.$$

From (23), it is easy to see that $r_2^1 < r^0(c^2)$ since $r^0(c^1) < r^0(c^2)$ which follows from $c^1 < c^2$. Therefore, it follows that

$$V_2^{M,1} > V_1^1 > 0 = V_1^M.$$

$V_1^M = 0$ follows from the fact that when moneylender is the only source of credit, he extracts all surplus from the borrower.■

The result above shows that even though the moneylender acts as a monopolist when he is the only source of credit for the borrower, his presence helps lower the interest rate offered by the local capitalist franchisee. A situation in which the moneylender does not exist will hurt the borrower because then the local capitalists only compete with each other with positive costs of lending whereas the moneylender enjoys zero transaction cost. If the local capitalists were provided with large enough subsidies by the government or private charities, they may be able to out-compete the moneylender for lending first to the borrower.

6 Extending the Model

6.1 Introducing Borrower Moral Hazard

In the simple model that we analyzed, we assumed that the borrower's project choice was limited to one positive NPV project with probability of success p and payoff of R when the project is successful. In this framework, since incentive compatibility conditions ensure that borrower will choose not to default voluntarily, only involuntary default occurs with probability $1-p$ and lenders choose contractual repayment rates accordingly. One could extend the model by allowing borrowers to choose from a continuum of projects with different levels of payoff R in successful states such that the probability of success is smaller for projects with larger R. To model borrowers' moral hazard in project choice, the NPV of the projects could be ranked such that riskier projects have smaller expected payoffs, pR, and consequently smaller, possibly negative, NPVs. If project choice is unobservable by lenders, the borrower now may have an incentive to shift to riskier projects after the lender sets the contractual rate. However, higher failure probability and the resulting inability to borrow again from the lender would serve to contain the borrower's incentives for choosing riskier projects. Qualitatively, this leads to same results as the ones we obtain from our simpler model.

Alternatively, we could further generalize the model to allow for *some* positive payoff - as

opposed to zero in our simple model - in states in which the borrower is forced to default. Since the moneylender is assumed to have a stronger enforcement technology - the moneylender makes sure the borrower consumes nothing in states of default whereas local capitalists can only make sure that the borrower does not get to invest the proceeds in projects - the moral hazard problem is better contained by the moneylender than by local capitalists. Similarly, allowing the moneylender to better observe the borrower's project choice will give him additional competitive advantage. This will only make our results qualitatively stronger, because we have shown that in our framework that moneylenders have a competitive advantage resulting from their lowest screening and monitoring costs. Thus generalizing the model to allow borrower moral hazard will not lead to any additional significant insights.

6.2 Introducing Borrowers with Different Risks

Our simple model assumed a single borrower type defined by the positive NPV project with probability of success p and project payoff of R when the project is successful. In this framework, since incentive compatibility conditions ensure that borrower will choose not to default voluntarily, the involuntary default, which happens with probability $1 - p$ conveys no information about the riskiness of the borrower which is common knowledge. In a more general model, one could model a continuum of borrower types defined by project success probability p - riskier borrower will have projects with smaller probability of success and smaller, possibly negative, NPV projects. When borrower type is unobservable (and *ex ante* signaling and selection possibilities are ruled out), a pooling equilibrium may initially be feasible. The incidence of (involuntary) default, however, will contain useful information about borrower type. If an incidence of (involuntary) default is sufficient to separate good borrower types (with positive NPV projects) from bad borrower types (with negative NPV projects), we may not need any institutional mechanism that allows local capitalists to collude in denying credit to a defaulter because a good borrower type will have no incentive to default *voluntarily* lest she may be pooled with bad borrower types after defaulting. If that were the case, we should observe competitive financial intermediation by local capitalists already without any need for mechanisms such as the one we are suggesting in the paper. The fact that we do not see such competitive intermediation to a large extent, except for a limited presence of moneylenders who appear to be charging usurious rate, suggests that learning about borrower type

and borrower reputation is not enough to sustain an equilibrium in which poor borrowers without collateral are able to borrow at competitive rates - the very basic premise for microfinance in the first place.

A richer model, in which both some collusion by lenders is necessary and learning about borrower types takes place, will complicate the analysis and is unlikely to affect the main results and insights that we obtain in our framework. This is not to deny that borrower default will provide useful information about borrower riskiness and indeed, institutional mechanisms that allow intermediaries to share this information will make financial intermediation more likely.

6.3 Multiple Franchisors

So far, we had assumed that there was only one possible franchisor that all local capitalists offered to join. We showed that the introduction of a franchise facilitates lending by local capitalists. Successful franchising could attract other franchisors into this market. In the limit, if there are many franchisors available, this would be equivalent to the case without franchising, whence the market may once again fail unless mechanisms to limit borrowers' access to franchisors arise. Such mechanisms may arise naturally in a competitive market. For example, franchisors may develop syndicates the primary purpose of which would be to limit borrower access to credit after default (Chowdhry, 1991). Furthermore, franchisors may develop mechanisms to share borrowers' credit histories similar to what we see in credit cards market. If endogenous competitive mechanisms are still insufficient to sustain such financial intermediation, a regulatory intervention offering monopoly power to financial institutions, such that local capitalists may not have a choice of many franchisors, may be required. Such a policy could take the form of exclusive territorial rights for banks, for instance.

7 Concluding Remarks

With growing recognition of the economic importance of those at the bottom of the pyramid, formal financial institutions need to identify effective mechanisms for participation in that sector. In this paper, we allow for the co-existence of formal and informal lenders in addressing the problem of micro-credit rationing. Local individuals are repositories of information and could serve an

important role as on-lenders in this financial intermediation process. We show that using these competing individuals for on-lending may be ineffective due to borrowers' incentive for strategic default when there exist many opportunities for borrowing. We offer franchising as one possible mechanism which would allow banks to simultaneously use local capitalists and address the market failure resulting from the risk of strategic default. Franchising ensures that the local capitalist with the smallest transaction cost for a particular borrower is able to attract her business resulting in natural segmentation of borrowers based on smallest lending costs.

Given the interest among financial intermediaries in the microcredit market, it is reasonable that expected success of a franchising mechanism would attract multiple financial intermediaries. In the limit, competition amongst a large number of franchise-offering banks would cause a collapse of the entire market for on-lending through local capitalists. Some endogenous competitive market mechanisms such as syndication and credit bureaus may arise that will limit possibilities of multiple defaults by borrowers. If market mechanisms remain insufficient to sustain such financial intermediation, a regulatory intervention offering monopoly power to financial institutions, say in the form of exclusive territorial rights for banks, may be necessary.

We also show that the borrower's welfare is higher when the moneylender continues to participate in the market. Contrary to popular rhetoric, there is an important role for moneylenders. Besides being economic agents with useful information, moneylenders offer competition to other potential lenders while also serving as an additional source of credit for otherwise credit-strapped borrowers. It would be a poor economic policy which would seek to eliminate moneylenders from the microcredit market.

In addition, we show that competition between the moneylender and many local capitalists who lend as franchisees forces the moneylender to reduce the interest rate charged to such an extent that the borrower prefers to borrow from the moneylender first even though some local capitalist franchisee would have charged a lower interest rate. It is only after the borrower is forced to default on the moneylender that he uses the option of borrowing from local capitalist franchisees. There are interesting empirical implications of this result. A number of Micro Finance Institutions (MFIs) in many developing countries have, with varying degree of success, been able to penetrate the market for microloans. Some of this success has come because MFIs, who have received subsidies from either governments or private charitable organizations, have underpriced their loans. Our model

predicts that in markets where MFIs have seen spectacular success in stealing business away from moneylenders are those in which loans have been substantially underpriced. In such markets, MFIs must not be making economic profits. Also, in these markets borrowers will go to moneylenders only when the option of borrowing from MFIs, perhaps because of prior default history, does not exist. Moneylenders will continue to charge high usurious interest rate for such borrowers. On the other hand, if there are markets where MFIs are pricing their loans to ensure that they make non-negative economic profits, our model predicts that moneylenders will drop their interest rates sufficiently to induce the borrowers to use moneylenders as a first option for borrowing. In such markets, MFI entry would precipitate a drop in the moneylenders' interest rates and MFIs are likely to attract business only from those borrowers who have exhausted the option of borrowing from the moneylender.

Not only does our model provide empirical and policy implications discussed above, our framework sketches out an implementation plan for franchising microfinance. We are encouraged by our initial discussions with Greg Casagrande, who is the founder and chairman of South Pacific Business Development (SPBD) Foundation in Samoa, and Nigel Burr, who is a member of the Board of Directors for SPBD, on plans to implement the model on the island of Savaii in Samoa. Indeed, if the implementation shows promise, the "Savaii Model," which combines the insights and wisdom of Muhammad Yunus (Yunus, 2003) with those of Hernando de Soto (de Soto, 2003), could provide a sustainable and scalable alternative to existing micro-lending models in practice today in alleviating poverty using microfinance.

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