



CREDIT AND TRAINING PROVISION TO THE POOR BY VERTICALLY CONNECTED NGO'S AND COMMERCIAL BANKS

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Abstract: An NGO trains potential entrepreneurs and lends them money in period 1. In period 2, those who are successful in their projects are eligible to apply for bank loans. Empowerment is defined as the amount of training which the NGO provides to each trainee, and outreach as the number of successful trainees at the end of the first period. We ask the following question: does the presence of a socially responsible agent (the NGO) ensure that the market outcome coincides with the social optimum? We find that the answer depends on the type of social objective: if the policy maker seeks to maximize the welfare of the poor, then the market correctly provides empowerment but underprovides outreach. If, on the other hand, the social planner seeks to maximize the social surplus (the sum of welfare of the poor and bank profits), then the market correctly provides both empowerment and outreach. We then assess, in the context of the model, the validity of the policy of capping microfinance interest rates that is practised in some countries. Finally, we allow the NGO and a bank to merge, and compare the resulting market outcome with the social optimum; we then apply the results to the present situation in Latin America, where banks are entering the very poor segment of the market in which NGO's operate.

Keywords: NGO, bank, outreach, empowerment

1 Introduction

How do NGO's and banks interact in the provision of credit to the poor? There is some discussion of this issue in microfinance manuals¹, newspapers and the internet. However, there is little in the form of rigorous analysis, both empirical and theoretical. McIntosh and Wydick (2005) model competition between microfinance institutions, and Conning (1999) studies an NGO's problem of maximizing outreach to the poor whilst remaining financially viable and ensuring project sustainability. Importantly for our work, it appears that no theoretical work has been done on vertical linkages between NGO's and banks, in particular on what commentators tend to refer as "graduation". This is the idea that, having started and grown on subsidized NGO credit, micro enterprises "graduate" when they have grown sufficiently and are large and financially viable enough to switch to non-subsidized, commercial bank credit. This paper is, to the best of our knowledge, a first attempt at the theory.

We model a common situation where an NGO trains (potential) entrepreneurs and lends them money. Some of these trainees succeed in that their projects do well. In this case, they have sufficient money to use as collateral and can therefore apply for a bank loan. It is not clear at all from the literature whether NGO's care about graduation, and, consequently, very little is known about what strategies they adopt, if any, to enable their clients to graduate. An example of an NGO which we know cares about graduation is the Indian NGO BYST (Business and Youth Starting Together). BYST trains prospective entrepreneurs, mainly by providing them with a business mentor, and lends them money at low interest rates and without collateral requirement. It then organizes meetings between successful programme participants and banks

¹ See for example Ledgerwood (1999).



in an effort to ensure that these participants receive credit to continue with their business enterprises².

What we do know is that policy makers are concerned about NGO clients moving on to bank loans. For example, India's National Bank for Agriculture and Rural Development is dedicating a lot of effort and resources to create linkages between self-help groups and banks (NABARD (2007)). NABARD goes as far as seeing microfinance as an instrument for graduation. The process of graduation, according to NABARD, is made up of two stages: in the first stage a poor person and potential entrepreneur moves from subsistence living to owning a microenterprise; in the second stage, his or her business grows to become a small/medium enterprise (SME).

NABARD claims that microfinance operators are unable to meet the credit needs of borrowers whose business has grown significantly, so that they are "left in the lurch". NGO's are seen as training ground for future SME entrepreneurs. In particular, NGO's are valued for their ability to nurture self-help groups (a very common form of microfinance in poor countries) and to mentor them in their relationship with banks. An important advantage of the self-help-group/bank linkage model is that the NGO makes available to the bank the client's credit and entrepreneurial history, enabling banks to select³ those candidates most likely to succeed as SME managers. As of today, there are about 800,000 self-help groups in India [with between 10 and 20 individuals in each group] who are benefiting from linkages with banks.

The main issue that we wish to explore are the following:

- (a) The interaction between altruistic agents (NGO's) and opportunistic ones (commercial banks);
- (b) The trade-off between the number N of poor people that an NGO helps ("outreach") and the level of training ("empowerment", e) that it imparts to each person;
- (c) The role of collateral as required by banks in explaining the trade-off between N and e ;
- (d) The role of institutions in the trade-off between N and e , particularly the effectiveness of the legal system in punishing those who voluntarily default⁴;
- (e) Most importantly, whether the NGO trains too many or too few poor people relative to the social optimum (over or under provision of N), and whether it trains each one of them too much or too little (over or under provision of e).
- (f) How the under/over provision of N and e is affected by the objectives of the NGO and of society, for example whether they try to maximize the number of people above the poverty line (absolute poverty approach) or whether they seek the "greatest happiness for the greatest number" (utilitarian approach);
- (g) How the under/over provision of N and e is affected by whether the NGO has a short time horizon, so it does not take into consideration that its training helps its clients to obtain commercial loans in the future, or a long time horizon.

The connection between this paper and the literature on corporate social responsibility is that the NGO is a socially responsible agent, whilst commercial banks are not: their objective being profit maximization, they are opportunistic agents. We therefore have a model of an agent, the NGO, which adopts the stakeholder approach, whilst commercial banks adopt the stakeholder approach (see De Wit and Meyer(2004)). The question we ask is, does the presence of a socially responsible agent in a vertical relation with an opportunistic agent result in the market outcome coinciding with the social optimum; we find that, if the policy makers shares the same objective as the socially responsible agent, the answer is no.

The paper proceeds as follows. In part 2 we explain the model and solve the banks' and the NGO's problem. In part 3 we consider the social optimum, and how it compares with the market optimum. In part 4, we allow the NGO and a bank to merge, and compare the new

² See <http://www.bystonline.org>

³ We don't model this kind of selection, leaving it to a future paper on asymmetric information between NGO's and banks.

⁴ We would not want to punish, though, those who "voluntarily" default because they have to pay for necessities like a relative's operation resulting from an unforeseen medical complication. This is particularly true when private insurance is too expensive and when the public health system is too thin.



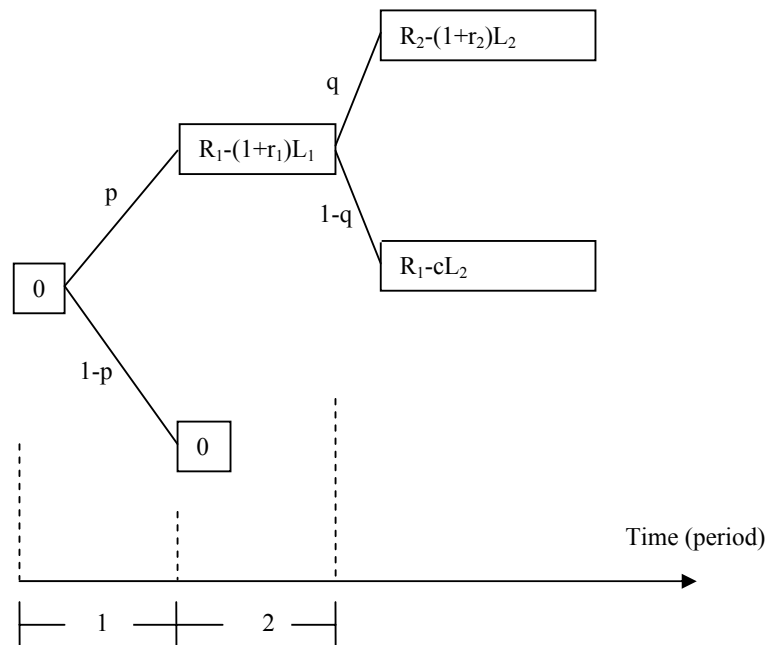
market outcome with the social optimum; we apply the result to the present situation in Latin America. Part 5 concludes and offers some avenues of further research.

2 The model

We assume that there are 2 periods, with lending and training by the NGO in period 1, and lending by the bank in period 2.

The game tree looks as follows:

Figure 1: net return to clients of NGO/banks



In period 1, an NGO trains N prospective entrepreneurs and lends them money. There are high skill and low skill trainees, whose ability is unknown to everyone (including to the trainees) at the start of the training programme. The trainees do not know their skill types as they have never before participated in a training programme of the type imparted by the NGO. The different skill types are present in the population in proportions p and $(1-p)$. At the end of the training programme (i.e. at the end of period 1), the skill type becomes known to all⁵.

In the second period, the fraction p of trainees who are successful approach a bank and apply for a loan. The bank can distinguish the successful trainees from the unsuccessful ones as the success or failure of their project is observable. At this point a further separation takes place. The bank faces high and low skill borrowers, whose ability is unknown to everyone (including to the borrowers) at the start of the second period. The borrowers do not know their skill type as

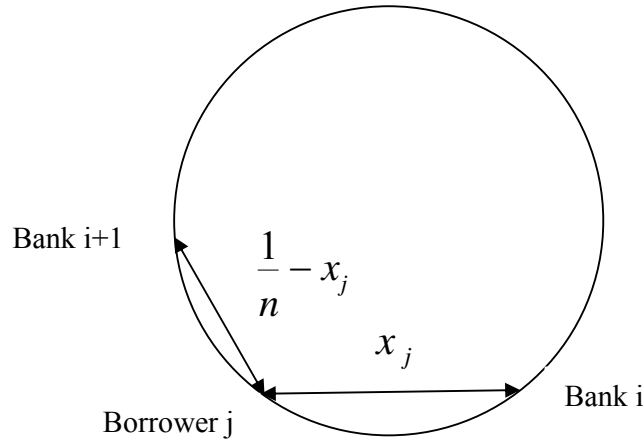
⁵ In practise, there is an important complication. Many people who successfully pass the first stage never wish to proceed any further. This may be because they have obtained what they wanted, namely an increase in the flow of income for their families, or because they are risk averse. The class of people who proceed to the second stage is altogether different: they are entrepreneurs with a keen ambition to succeed and quite possibly a risk-loving attitude. A model accounting for these different types may yield rich insights for researchers and policy makers.



they have never before managed a large, formal business, with all its requirements, and with credit from a commercial bank. The different skill types are present in the population in proportions q and $(1-q)$. At the end of period 2, the skill type becomes known to all.

Let us begin our analysis with the second period. Banks are evenly distributed around a Salop circle, with bank clients (formerly NGO trainees) uniformly distributed along it.

Figure 2: the Salop model



The distance between each bank is $1/n$. Let α be the borrower's cost of travelling 1 unit of distance to the bank (the higher α , the more differentiated the banks are from the borrower's perspective). Let the bank i 's interest rate by r_i and its collateral rate by c_i . The marginal borrower, who is indifferent between bank i and bank $i+1$, is characterized by $x_j = x_m$ and thus

$$q(R_2 - (1 + r_i)L_2) + (1 - q)(R_1 - c_i L) - \alpha x_m = q(R_2 - (1 + r_{i+1})L_2) + (1 - q)(R_1 - c_{i+1}L) - \alpha \left(\frac{1}{n} - x_m \right) \quad (1)$$

As there are customers on both sides of the bank's location, the number of borrowers is given by $2pqNx_m$, with equation 1 giving x_m .

We assume liquidation costs of collateral $\delta c_i L$. Bank profits per customer j , Π_j , are given by

$$\Pi_j = L[q(r_i + 1) + (1 - q)c_i - 1 - \delta c_i] \quad (2)$$

Bank i will maximize profits subject to the condition that there is no voluntary default. By setting the collateral rate is to prevent voluntary default. After receiving the money from the bank (i.e. "ex post"), the borrower does not default as long as the loss from defaulting (weakly) exceeds the gain:



$$(1 + r_i)L_2 \geq c_i L_2 + P \quad (3)$$

where P is the exogenous (expected value of the) penalty which a successful entrepreneur would be charged by the court if he defaulted. P measures the degree of effectiveness of a country's legal system: if the likelihood of the law catching and punishing voluntary defaulters rises, then P rises. It could also measure the cost of not being able to borrow in the future as a result of having defaulted.

Each bank maximizes total profits, i.e. the number of borrowers $2pqN x_m$ (where x_m is given by equation 1) multiplied by profits per borrower (equation 2), subject to (4):

$$\Pi_i = pqN \left\{ \frac{1}{n} - \frac{1}{\alpha} \left\{ q[(R_2 - (1+r_i)L_2) - (R_2 - (1+r_{i+1})L_2)] + (1-q)[(R_1 - c_i L) - (R_1 - c_{i+1} L)] \right\} \right\} * \\ * L[q(r_i + 1) + (1-q)c_i - 1 - \delta c_i] \\ s.t. \quad (3) \quad (4)$$

If $\delta=0$, the result is a linear combination of c_i and r_i , not specific values of these variables. However, if $\delta>0$, then each bank would want to minimize c_i (and maximize r_i); in this case, (4) is binding. In equilibrium, $r_i = r_{i+1} = r_{i-1} = r$ and $c_i = c_{i+1} = c_{i-1} = c$. The solutions are

$$r = \frac{\alpha}{Ln} + \frac{\left[\delta \left(1 - \frac{P}{L} \right) + \frac{P}{L} (1-q) \right]}{1-\delta}, \quad c = \frac{\alpha}{Ln} + \frac{1 - \frac{qP}{L}}{1-\delta} \quad (5)$$

Note that the interest rate which banks charge increases with $(1-q)$ because this implies a greater risk of default, which must be compensated by a higher interest rate for banks to break even.

What is the NGO's objective? We assume the NGO adopts an absolute poverty approach whereby it wants as many people as possible to get across the poverty line λ . In other words, the NGO wishes to maximize pN , where pN is the number of successful trainees in the first period. For simplicity, we assume that, if the bank financed project does not succeed, a successful trainee in period 1 will obtain a flow of income from his or her period 1 investment equal to his flow of income in period 2; in other words, a machine bought in period 1 thanks to a positive project outcome will yield the same return across periods⁶.

To make the link explicit with the terminology of microfinance and also with the capabilities literature, We call the amount of training per person e "empowerment", and the number of successful trainees at the end of the first period pN outreach. Empowerment is useful in increasing the proportion of successful trainees, i.e. in increasing outreach.

Consider now what happens in period 1. The NGO receives an amount m of donated money⁷. We suppose that the NGO can borrow from the banking sector⁸. Then it can borrow at

⁶ We also do not allow NGO clients to spread interest payments over both periods.

⁷ Many, if not most, NGO's rely primarily on funds from donors based in rich countries as a source of income.



the start of period 1 on the strength of the inflow of cash in the form of interest payments at the end of the first period. For simplicity and to avoid introducing elements that are not central to our analysis, we assume that the NGO does not need to deposit collateral with the banks, and that it pays a fixed rate of interest r_0 to the banks of zero. Then the budget constraint of the NGO is

$$m + pNL_1(1 + r_1) = N(L_1 + e) \quad (6)$$

The right hand side of the equation shows the expenditure per trainee, which is the sum of the loan given to each trainee and the cost of training, times the number of trainees. The left hand side shows total income.

We assume that project success in period 1 is defined as achieving a return on investment which puts the entrepreneur above the poverty line λ , i.e. $R_1 > \lambda$. How much money does the NGO wish to leave its successful clients with, via its choice of interest rate? The answer depends on the objective of the NGO.

If the NGO's time horizon is short and so it does not care about making it possible for its clients to obtain commercial loans in the second period, then it simply leaves its clients with λ , the poverty line. Thus, $R_1 - (1 + r_1)L_1 = \lambda$. If clients apply for bank loan and their project fails, then, as a result of losing the collateral, they will fall below the poverty line. This goes against the NGO's objective. However, this need not bother the NGO: the NGO may reason that if entrepreneurs choose to run the risk of falling below the poverty line, they indicate that running such a risk is more attractive for them than to stay with a constant level of income given by the poverty line.

If, on the other hand, the NGO's time horizon is long and hence it is concerned with making sure that no client falls below the poverty line at the end of the second period, then it will make sure that the client with the greatest transport costs in period 2 will not fall below the poverty line if the bank financed project turns out unfavourably. It will leave them with just enough to make it possible for the successful clients to pay the banks' collateral and incur transport costs and still be at the poverty line. In this case, $R_1 - (1 + r_1)L_1 = \lambda + cL_2 + \frac{\alpha}{2n}$. We can summarize the attitude of the NGO as follows.

$$R_1 - (1 + r_1)L_1 = \lambda + \varphi \left(cL_2 + \frac{\alpha}{2n} \right), \quad \text{where } \varphi \in [1,0] \quad (7)$$

In words, if the NGO's time horizon is long, then $\varphi=1$; if short, $\varphi=0$.

Suppose that training increases the probability that the NGO project succeeds:

$$p = \beta e^\gamma, \quad \gamma < 1 \quad \text{and} \quad p \leq 1 \quad (8)$$

⁸ This is not a critical assumption: in a model with many periods, the NGO could simply use interest received from trainees trained in a previous period to train trainees in the current period. Which ever way we look at it, because the interest is received with a delay of one period, we need to discount the interest received.



R_1 and R_2 are fixed (for example at 120% of L_1 and L_2).

The NGO's problem is then

$$\begin{aligned} & \text{Max}_{N, e, r_1} pN \\ & \text{s.t. (5), (6), (7), (8)} \end{aligned} \quad (9)$$

Let us consider the solutions to this problem. r_1 is used by the NGO to ensure that its clients achieve the poverty line λ if the NGO has a short time horizon ($\varphi=0$), or $\lambda+cL_1$ if the NGO has a long time horizon ($\varphi=1$). This implies that r_1 is lower if the NGO has a long time horizon:

$$r_1 = \frac{\left[R_1 - \lambda + \varphi \left(cL_2 + \frac{\alpha}{2n} \right) \right]}{L_1} - 1, \quad \varphi \in [0,1] \quad (10)$$

From the NGO's budget constraint (6),

$$N = \frac{m}{L_1 + e - p(1 + r_1)L_1} \quad (11)$$

The optimal empowerment level from the NGO's point of view is therefore

$$e = \frac{\gamma L_1}{1 - \gamma} \quad (12)$$

Intuitively, empowerment e (training per head) rises with L_1 , to achieve an expected return in excess of the cost of the investment L_1 . Empowerment also rises with γ , reflecting a greater return on investment (reduced diminishing returns to investment). Interestingly, empowerment is not affected by the interest rate; however, a higher interest rate implies a greater outreach (see 11).

That the level of empowerment is not affected by the interest rate can be seen by simplifying the NGO's problem as follows:

$$\begin{aligned} & \text{Max}_{e, n} \frac{\beta e^\gamma m}{L_1 + e - \beta e^\gamma [(1 + r_1)L_1]} \\ & \text{s.t (7)} \end{aligned} \quad (13)$$

Simplifying further by dividing the top and bottom of (13) by e^γ , we have



$$\begin{aligned} \text{Max}_{e, r_2} \frac{\beta m}{L_1 e^{-\gamma} + e^{1-\gamma} - \beta[(1+r_1)L_1]} \\ \text{s.t. (7)} \end{aligned} \quad (14)$$

Where r_1 is given by (10). It is clear that maximizing (14) involves minimizing its denominator, so that only L_1 and γ affect e , contrary to what one might expect⁹.

Proposition 1. Consider an increase in the level of effectiveness of the legal system in punishing (unjustifiable) voluntary default (higher P). Then, in the case of an NGO with a long time horizon, the number N of poor people trained increases, but the level of empowerment e provided by the NGO remains unaffected. In the case of an NGO with a short time horizon, N and e are both unaffected.

Proof. That $de/dP = 0$ is clear from (12). As for N , note from (5) that a higher P reduces c ; from (10) with $\phi=1$, a lower c causes r_1 to rise, which, using (11), makes N fall.

Intuitively, if the legal system becomes more effective, as reflected in a higher penalty charge P for those who voluntarily default, the banks can afford to lower the collateral they demand from borrowers. This means that the NGO is able to lower the level of wealth it leaves its clients with after they successfully complete the training programme; this lower required level of wealth enables the NGO to raise the interest rate it charges to its clients, generating more resources for the NGO with which to train more people.

3 The social optimum

How do the market levels of e and N compare with the socially optimal levels? We assume that the social planner's objective is the same as the NGO's, to facilitate the comparison and avoid obtaining results which depend on discrepancies in preferences¹⁰. This means that both the NGO and the policy maker take an absolute approach to poverty, i.e. they want to get as many people across the poverty line as possible. The social planner's objective differs from the NGO's only in that the social planner always has a long time horizon, whilst the NGO's time horizon may be short or long.

What is the source of inefficiency in this model, which implies that the market outcome and the social planner's outcome may not coincide? It is that the NGO is unable to extract the full returns from its training. There are two sources of return which the NGO does not capture. The first is the second period surplus to the entrepreneur in the good state, after repaying the loan and paying interest to the bank. The second is profits of the banks. We allow the policy maker to appropriate both surpluses via lump sum taxation. In the case of a utilitarian approach, we allow the social planner to appropriate bank profits.

We assume that the social planner allows the market to determine the values of r_2 and c according to equation (5), and will determine r_1 . However, these variable are mere transfer

⁹ This results is obtained also if the NGO maximizes the expected utility of trainees. However, in this case a 0 payoff in the period 1 bad state is required. If the payoff was positive (negative), empowerment would rise (fall) with the interest rate.

¹⁰ Discrepancies in preferences may be very important, but we wish to focus on issues of economic efficiency.



payments across agents, and do not affect the total return, which the policy maker appropriates by taxing successful entrepreneurs and banks; there is one exception, however: liquidation costs depend on the collateral and these are not transfer payments, since liquidation costs are merely “lost” without any agent appropriating them. Taking into account the average transport cost of period 2 borrowers $\frac{pN\alpha}{4n}$ and the liquidation cost of collateral δcL_2 , the budget constraint of the policy maker is

$$m + pN \left[(R_1 + L_1) + qN(R_2 + L_2) + (1 - q)(R_1 - \delta c_2) - \frac{\alpha}{4n} \right] = N(L_1 + pL_2 + e) \quad (15)$$

(15) shows income on the left hand side and expenditure on the left hand side. Re-arranging, we have

$$N = \frac{m}{L_1 + e - p \left[(2 - q)R_1 + L_1 + qR_2 - \delta c_2 \right] + (q - p)L_2 - (1 - q)\delta c - \frac{\alpha}{4n}} \quad (16)$$

The social planner’s problem is

$$\begin{aligned} & \underset{N, e, r_1}{\text{Max}} pN \\ & \text{s.t. (5), (7), (8), (15)} \end{aligned} \quad (17)$$

The problem simplifies thus:

$$\begin{aligned} & \underset{e, r_1}{\text{Max}} \frac{\beta e^\gamma m}{L_1 + e - \beta e^\gamma \left[(2 - q)(R_1) + L_1 + qR_2 + (q - p)L_2 - (1 - q)\delta c - \frac{\alpha}{4n} \right]} \\ & \text{s.t. (7)} \end{aligned} \quad (18)$$

r_1 is given by (10), again, does not depend on e , and is the same as the NGOs’, since we are assuming that the NGO and the social planner share the same objective. The term in square brackets in (22) contains but r_1 , but is larger to include taxation receipts. Following our discussion of Proposition 1, the term in square brackets in the denominator of (22) is irrelevant in determining e . It follows that the socially optimal e is the same as the market’s, i.e. (12). N will be bigger, however, reflecting the extra resources which the social planner has at its disposal via taxation.

Proposition 2. The NGO correctly provides empowerment e (training per head), but it underprovides outreach (i.e. it trains too few people, N) relative to the first best social optimum.



Proof. For e , by solving (18) and comparing with (12); for N , by comparing (16) with (11) for given e .

Since the policy maker's r_1 is the same as the market's, a policy of capping r_1 or subsidizing it below its market level would be unwise. This is a policy sometimes implemented in poor countries, for example in India under the Integrated Rural Development Programme and in the Philippines up to 1981 (Armendariz de Aghion and Murdoch, 2005).

Proposition 3. The interest rate of a microfinance NGO should not be capped or subsidized.

Proof. (11) applies to both the NGO and the social planner, and the values of R_1 , c and λ are the same.

In assessing the generality of Proposition 3, it is worth remembering our assumption that the NGO's and the policy maker coincide in wanting to maximize the number of poor people who (just) cross the poverty line.

Up to now, we have not allowed empowerment e to affect any of the second period variables. However, q could well increase with empowerment, and α should fall as people become better able to compare the services of banks, increasing competition among banks.

Suppose that q stays constant and that α falls with e , so that $\alpha = \frac{1}{p} = \frac{1}{\beta e^\gamma}$. Then (18) is

modified as follows:

$$\begin{aligned} \text{Max}_{e, n} & \frac{\beta e^\gamma m}{L_1 + \frac{1}{4n} + e - \beta e^\gamma [(2-q)(R_1) + L_1 + qR_2 + (q-p)L_2 - (1-q)\delta c]} \\ \text{s.t.} & (7) \end{aligned} \quad (19)$$

The socially optimal value of e is now

$$e = \frac{\gamma \left(L_1 + \frac{1}{4n} \right)}{1 - \gamma} \quad (20)$$

Compared to e of the NGO (see (12)), the social planner's e is greater. This is because the social planner tries to achieve a return to training per head in excess not only of the cost of the loan, but of borrowers' transport costs in the banking sector as well. The NGO has no incentive to do so because it cannot appropriate via taxation the extra returns to the banks and banks' client. Note that an increase in the number of banks reduces transport costs and hence the degree of underprovision of empowerment.

Finally, consider a policy maker who, instead of being concerned exclusively with the welfare of the poor, is concerned with maximizing the social surplus, that is, the sum of welfare of the poor (i.e. the number of entrepreneurs who cross the poverty line) and bank profits. Bank sector profits $n\Pi$ are given by inserting the solution values of r_2 and c (see (5)) into the expression for bank profits (4), the formula being



$$n\Pi = \frac{pqN\alpha(1-\delta)}{n} \quad (21)$$

Thus, the policy maker's problem is

$$\begin{aligned} \underset{N, e, r_1}{\text{Max}} \quad & pN \left(1 + \frac{q\alpha(1-\delta)}{n} \right) \\ \text{s.t.} \quad & (5), (6), (7), (8) \end{aligned} \quad (22)$$

The problem simplifies to:

$$\begin{aligned} \underset{e, n}{\text{Max}} \quad & \frac{\beta e^\gamma m [1 + q\alpha(1-\delta)]}{L_1 + e - \beta e^\gamma [(1+r_1)L_1]} \\ \text{s.t.} \quad & (7) \end{aligned} \quad (23)$$

This problem has exactly the same structure as the original one of the NGO, (see (13)). Hence N and e will be the same as the NGO's, leading to the following proposition.

Proposition 4. If the social planner aims to maximize the social surplus, meaning the sum of welfare of the poor and of bank profits, the NGO correctly provides both empowerment e and outreach N.

Proof. From recognizing that (23) has the same structure as (13), so that the solution N and e are the same.

4 NGO-bank mergers

In Latin America there is a trend at present for commercial banks to expand their operations by offering credit to very poor people, this being the niche market of microfinance NGO's (see Chowdri (2004)). This move can take one of two forms: (a) Either a bank relies on the assistance of foreign advisors like ACCION to obtain knowledge about the new market they wish to enter, or it acquires a financial organization serving the poorest segment (not necessarily an NGO)¹¹. A bank's motivation is usually profits; however, considering that the move would be towards a market segment that is not obviously profitable (Armendariz de Aghion and Murdoch (2005)), there may be other motivating factors at play of a social justice nature.

Our model allows us to consider the second form of expansion into the poorer segment of the market, that is, by acquisition of the NGO. For this purpose, we consider a merge between one bank in the Salop circle and the NGO. The new group may either of two objectives – indeed in practise it is likely to have a hybrid of these two objectives. The first is to maximize

¹¹ Such mergers/acquisitions are often motivated by issues of informational asymmetry: the bank obtains highly trained staff familiar with the bank history of clients, whilst NGO's obtain cheaper access to credit.



profits; this is likely to be the dominant objective in practise. The second is to maximize the welfare of the poor as the NGO originally intended; this is less likely in practise but of theoretical interest.

What if the group seeks to maximize profits? Considering the formula for bank sector profits (21), the problem the group faces is

$$\begin{aligned} \underset{N, e, r_1}{\text{Max}} \quad & pN \left(\frac{q\alpha(1-\delta)}{n^2} \right) \\ \text{s.t.} \quad & (5), (6), (7), (8) \end{aligned} \quad (24)$$

The reader will be now be familiar with the structure of the problem, which has the following solutions: r_1 as in (10), e is in (12) and N is given by

$$N = \frac{m}{L_1 + e - p(1+r_1)L_1} \quad (25)$$

Hence the group's N is the same as the N before the merger (compare (25) with (11)).

In the case where the merged entity wants to maximize the welfare of the poor, the group can use profits of the one bank to add to donations. The new budget constraint is

$$m + pNL_1(1+r_1) + \frac{pNq\alpha(1-\delta)}{n^2} = N(L_1 + e) \quad (26)$$

The group's problem is thus

$$\begin{aligned} \underset{N, e, r_1}{\text{Max}} \quad & pN \\ \text{s.t.} \quad & (5), (26), (7), (8) \end{aligned} \quad (27)$$

The solutions are as follows: r_1 is given by (10), e is given by (12) and N is given by

$$N = \frac{m}{L_1 + e - p \left[(1+r_1)L_1 + \frac{q\alpha(1-\delta)}{n^2} \right]} \quad (28)$$

Hence, N is greater than before the merger (compare (28) with (11)), as there are more funds available, but is less than the socially optimal N (given by (16)), since the group has less funds available than the policy maker.



These results lead us the following proposition:

Proposition 5. If the merged entity seeks to maximize the welfare of the poor, it succeeds in reducing the underprovision of outreach; if it seeks to maximize profits, the underprovision of outreach is unaffected. Empowerment is always optimally provided.

Proof. By comparing (11), (25) and (7) in the case of outreach; by recognizing that the group's problem has the same structure as that of the original NGO (see (14)) in the case of empowerment.

The greater provision of outreach when the group's objective is to maximize the welfare of the poor is due to the fact the group sacrifices profits in order to increase outreach.

Corollary. The government should allow the merger to take place, as it cannot result in a worse market outcome, and can result in a better one.

From the point of view of corporate social responsibility, it is interesting that the negative effect on society of a takeover of a socially responsible corporation (the NGO) by an opportunistic one (a bank) is exactly offset by the positive effect of the "externality being internalized". In other words, although the shift in objectives is socially bad, the bank now wants to help the poor in order to raise profits; furthermore, the greater number of assisted poor raises profits of all other banks, too.

We now conclude and offer some promising avenues of further research.

5 Conclusion and extensions

We constructed a model where an NGO and commercial banks are vertically related in providing credit. To the best of our knowledge, this is unexplored territory in economic literature. We made two fundamental assumptions in the model: that empowerment does not affect second period variables like the probability of project success and borrowers' cost of transport, and the NGO and the policy maker want to maximize the number of people who cross the poverty line.

We showed that empowerment is always optimally provided by the NGO, even when the NGO merges with a bank. Outreach is, however, underprovided in almost every case. The exception is given by the case where the social planner seeks to maximize the social surplus inclusive of bank profits, rather than exclusively the well being of the poor, in which case the NGO correctly provides both empowerment and outreach.

We also showed that a policy of capping NGO interest rates is unwise. This result is consistent with the conclusion found in most modern literature. Finally, we showed that the authorities should always allow a merger between the NGO and a bank to take place, as it leaves the underprovision of outreach either unaffected (if the new group maximizes profits) or ameliorated (if the new group maximizes welfare of the poor). This result may help to inform policy makers, especially in Latin America where the "downscaling" of commercial banks into the poorer segment of the market is a trend.

In general, we hope that these results will help a policy maker to decide if and how to subsidize either empowerment or outreach. Specifically, and not disregarding the limitations of the model, if a government intervenes in microfinance markets with the aim of reducing the number of poor people as much as possible and is not concerned with the profits of banks, empowerment should never be subsidized; outreach, on the other hand, should always be subsidized.



There are a number of possible lines of future research:

Firstly, it would be interesting to allow for a group of NGO clients who, having succeeded in the training programme, are satisfied with the wealth they have and do not wish to take out a bank loan. This implies that we would have (at least) two groups of NGO clients with different preferences, which we feel is a realistic extension of the model.

Secondly, we could allow for the realistic possibility that the NGO may wish keep lending to clients who, although they successfully passes the training programme, for some reason do not manage to get a bank loan, perhaps because banks are imperfect at assessing clients' capabilities, or perhaps because banks require that clients make higher profits than the NGO requires.

Thirdly, we wish to study policy, in particular the provision of cheap credit by the central bank to commercial banks with a view to helping poor people *via NGO's*. Such a policy has been tried both in the Philippines and in Thailand (see the chapter on credit in Ray (1997)), with a variant: it was aimed primarily at making credit more accessible to informal moneylenders, who do much more lending than NGO's. Nevertheless, NGO's would be affected by such a policy, and it would be interesting to study the consequences of such a policy for the provision of training by the NGO, in particular for the trade-off between the number of poor people who receive assistance and the level of empowerment.

Fourthly, it would be useful to explore to what the extent our results are robust to the use of other kinds of social welfare functions, and concave utility. If the NGO (and the policy maker) wish to maximize the expected utility of the poor, rather than the number of poor who get across the poverty line, the assumption that unsuccessful NGO clients obtain a return of zero in the first period will become significant.

Fifthly, the solution for the level of empowerment, (see (12)) suggest that the size of the loan is important. It therefore makes sense to consider the consequences of endogenizing the loan size. With a continuum of returns at the end of the first period, a higher first period return could be associated with a higher probability of project success, so that rich bank clients would get cheaper bank loans than poor clients, as observed in practise.

Finally, it would be interesting to see if an internally optimal number of banks from society's point of view is ever possible. This would be due to notion that, as the number of banks rises, there is a the trade-off between a lower bank interest rate and collateral, with increase the welfare of the poor, and lower banks profits, which reduce welfare of the poor where bank profits are taxed and used by the policy maker to finance training and loan provision for the poor.

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