



# MICROCREDIT

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## CREDIT FOR THE POOR



# MICROCREDIT

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- What is microcredit?
- Microcredit and adverse selection
- Microcredit and moral hazard



# 1-WHAT IS MICROCREDIT?

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- The birth of microcredit
  - In 1976, in Bangladesh (Jobra)
  - Mohammed Yunus (Nobel laureate, 2006)
  - The Grameen Bank was created in 1976
- What is microcredit?
  - Microcredit is the extension of small loans to entrepreneurs too poor to qualify for traditional bank loans



# 1-WHAT IS MICROCREDIT?

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- Microfinance today
  - 10 millions borrowers in Bangladesh
  - 2500 microfinance institutions all over the world
  - Each IMF provides loans to 25000 borrowers (average)
  - Mostly present in Africa, South America, Asia, East Europe
  - But also in USA, UK, France, Norway, ...
  - Microcredit is particularly developed in Bangladesh, Bolivia and Indonesia



# 1-WHAT IS MICROCREDIT?

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- Classification of microcredit
  - Traditional informal microcredit (such as moneylender's credit, loans from friends and relatives, consumer credit in informal market, etc.)
  - Microcredit based on traditional informal groups (such as tontin)
  - Activity-based microcredit through conventional or specialised banks (such as agricultural credit, livestock credit, fisheries credit, etc.)



# 1-WHAT IS MICROCREDIT?

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- Classification of microcredit
  - Cooperative microcredit (cooperative credit, credit union, savings and loans associations, savings banks, etc.)
  - Consumer microcredit.
  - Bank-NGO partnership based microcredit.
  - Grameen type microcredit or Grameencredit.
  - Other types of NGO microcredit.
  - Other types of non-NGO non-collateralized microcredit.



# 1-WHAT IS MICROCREDIT?

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- Grameencredit
  - It promotes credit as a human right.
  - It is targeted to the poor, particularly poor women.
  - it is not based on any collateral, or legally enforceable contracts. It is based on trust
  - It is offered for creating self-employment for income-generating activities and housing for the poor, as opposed to consumption
  - it rejects the basic methodology of the conventional banking and creates its own methodology



# 1-WHAT IS MICROCREDIT?

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- Grameencredit
  - the people should not go to the bank, bank should go to the people
  - In order to obtain loans, a borrower must join a group of borrowers (peer group)
  - New loan becomes available to a borrower if her previous loan is repaid
  - All loans are to be paid back in instalments (weekly, or bi-weekly)
  - It comes with both obligatory and voluntary savings programmes for the borrowers



# 1-WHAT IS MICROCREDIT?

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- Grameencredit

- loans are given through non-profit organizations or through institutions owned primarily by the borrowers
- building social capital is promoted through formation of groups and centres, developing leadership quality through annual election of group and centre leaders, electing board members when the institution is owned by the borrowers



# 1-WHAT IS MICROCREDIT?

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- Grameen bank (from its web-site, 2006, august)
  - it has 6.61 million borrowers
  - 97 percent of whom are women
  - 2226 branches
  - GB provides services in 71371 villages
  - 86 percent of the total villages in Bangladesh are covered
  - Total staff is 18791
  - Current amount of outstanding loans stands at US\$ 457.52 million
  - Projected disbursement for 2006 is US \$ 821 million



# 1-WHAT IS MICROCREDIT?

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- Grameen bank
  - Loan recovery rate is 98.85 per cent.
  - Grameen Bank finances 100 per cent of its outstanding loan from its deposits
  - it has made profit every year except in 1983, 1991, and 1992
  - Four interest rates for loans from Grameen Bank
    - 20% for income generating loans,
    - 8% for housing loans,
    - 5% for student loans,
    - 0% for Struggling Members (beggars).



# 1-WHAT IS MICROCREDIT?

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- Grameen bank
  - Average loan
    - about 100 US\$
    - Average maturity=1 year
  - Deposit rates
    - Minimum interest rate offered is 8.5 per cent.
    - Maximum rate is 12 per cent.



# 1-WHAT IS MICROCREDIT

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- Grammencredit methodology
  - No collateral
  - Peer group loans
    - 5 borrowers
    - A potential borrower must join and form a peer group
      - The first two customers borrow
      - Then the next two customers
      - Finally the last one borrows



# 1-WHAT IS MICROCREDIT

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- Grammeencredit methodology
  - Every week, the credit officer meets 4 groups (20 borrowers) in a village
  - If one member of a group defaults, then all members of the group are excluded from the GB
    - There is a strong incitation for each member of the group to substitute for the 4 others if they come to default
    - Safe borrowers will group together forcing risky borrowers to do so
    - Peer groups are homogeneous



# 1-WHAT IS MICROCREDIT?

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- Grammeencredit methodology
  - Peer group formation means that screening and monitoring are delegated by GB to members of the group
  - Peer groups get the same loans and the same interest rates
    - But risky groups default more often
    - So cost of loans for risky groups will be higher
  - In case of default, the member of a peer group suffers from social penalties



# 2-MICROCREDIT AND ADVERSE SELECTION

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- Armendariz de Aghion and Gollier (2000)
- Intuition:
  - In peer group credit, social collateral is substituted to traditional collateral (asset backed loans)
  - Due to social collateral, interest rates are not so high
    - Adverse selection effect, which is traditionally associated with high interest rates, is limited



# 2-MICROCREDIT AND ADVERSE SELECTION

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- Hypothesis
  - Generalized information asymmetry
    - Between members within a group
    - Between the bank and each member of the group
  - Risk neutrality
  - Size project is normalized to 1
  - 2 types of individuals
    - Safe S (prob  $\mu$ ):  $1 \longrightarrow h$  with certainty
    - Risky R (prob  $1-\mu$ ):  $1 \longrightarrow H$  with prob  $p$ , 0 otherwise
    - $pH=h$  (mean preserving spread)



# 2-MICROCREDIT AND ADVERSE SELECTION

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- Hypothesis
  - Banks are competing
  - Refinance rate is  $r$
  - $H > h > r$ 
    - Investment projects are efficient
  - Bank can observe the output of a project if she pays  $c$  (in case of default, the bank monitors the debtor, which costs  $c$ )
  - Debt contract is the standard debt contract which specifies the payment  $r_b$  at date 1



# 2-MICROCREDIT AND ADVERSE SELECTION

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- The case of standard debt contract without peer group
- 3 cases are possible:
  - Only agents S ask for a loan
    - $r_b = r$
  - S and R agents both ask for a loan
    - $\mu r_b + (1-\mu)[p r_b - (1-p)c] = r$
    - So  $r_b = [r + (1-\mu)(1-p)c] / [\mu + (1-\mu)p]$  (1)
  - Only R agents ask for a loan
    - $r_b = [r + (1-p)c] / p$  (2)



# 2-MICROCREDIT AND ADVERSE SELECTION

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- 2 types of equilibrium are possible:
  - A pooling equilibrium in which both types ask for credit
    - If  $h > r_b$  (equation 1)
  - A separating equilibrium in which only R types ask for credit
    - If  $h \leq [r + (1-p)c] / p \leq H$



# 2-MICROCREDIT AND ADVERSE SELECTION

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- The case of peer group credit
- Consider the following sequence
  - In  $t=1$ , borrowers form pairs
  - In  $t=2$ , pairs ask for credit
  - In  $t=3$ , rates are fixed
  - In  $t=4$ , production, reimbursement or default



# 2-MICROCREDIT AND ADVERSE SELECTION

- In a pooling equilibrium, 3 types of pairs can be formed:  $\{(S,S);(S,R);(R,R)\}$ 
  - (S,S) can be formed with prob  $\mu^2$
  - (S,R) with prob  $2\mu(1-\mu)$
  - (R,R) with prob  $(1-\mu)^2$
- The equilibrium bank rate is  $r_b$ :

$$\mu^2 r_b + 2\mu(1-\mu) \{ p r_b + (1-p) [\min(r_b, h/2) - c] \} + (1-\mu)^2 \{ p^2 r_b + 2p(1-p) [\min(r_b, H/2) - c] - (1-p)^2 c \} = r \quad (3)$$



# 2-MICROCREDIT AND ADVERSE SELECTION

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- If the pair is (S,S), default risk is 0
- If the pair is (S,R):
  - Loan is reimbursed with prob  $p$
  - R type defaults with prob  $(1-p)$ 
    - Joined responsibility implies that S type is responsible for  $h/2$  (if  $h/2 < r_b$ )
    - Monitoring cost for the bank =  $c$



# 2-MICROCREDIT AND ADVERSE SELECTION

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- If the pair is  $(R,R)$ :
  - Reimbursement with prob  $p^2$
  - With prob  $2p(1-p)$ , only one project succeeds
    - Bank gets  $\text{Min}(r_b, H/2) - c$
  - With prob  $(1-p)^2$ , both projects fail
    - Bank suffers of monitoring costs  $c$
- In the following, let us suppose that  $H > 2r_b$

# 2-MICROCREDIT AND ADVERSE SELECTION

- 1st case:  $h > 2r_b$

- Equation (3) becomes 
$$r_b = \frac{r + (1-\mu)^2(1-p)^2 c}{1 - (1-\mu)^2(1-p)^2} \quad (4)$$

- A pooling equilibrium exists if S-type apply for a loan, which leads to:

$$\mu(h - r_b) + (1 - \mu)[p(h - r_b) + (1 - p)(h - 2r_b)] \geq 0 \quad (5)$$

- For a given type S, w.p.  $\mu$ , the pair is homogeneous; w.p.  $(1-\mu)$ , he is with a type R:
  - R succeeds w.p.  $p$ ; S gets  $(h-r_b)$
  - R fails w.p.  $(1-p)$ ; S gets  $(h-2r_b)$

# 2-MICROCREDIT AND ADVERSE SELECTION

- Using (4), condition (5) can be rewritten:

$$h \geq \frac{r + (1 - \mu)^2 (1 - p)^2 c}{\mu + (1 - \mu)p} \quad (6)$$

- Comparing (6) and (1):
  - It appears that the threshold  $h$  above which S type apply for a loan is lower
- Conclusion:
  - Peer group credit creates a joined responsibility which lowers interest rates
  - In turn, lower interest rates reduce adverse selection effect



# 2-MICROCREDIT AND ADVERSE SELECTION

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- 2nd case:  $h < 2r_b$

- Equation (3) becomes:

$$r_b = \frac{r - \mu(1 - \mu)(1 - p)h + 2\mu(1 - \mu)(1 - p)c + (1 - \mu)^2(1 - p)^2 c}{[\mu + (1 - \mu)p]^2 + 2(1 - \mu)^2 p(1 - p)} \quad (7)$$

- Both types apply for a loan if:

$$\mu(h - r_b) + (1 - \mu)p(h - r_b) \geq 0 \quad (8)$$



# 2-MICROCREDIT AND ADVERSE SELECTION

- Using equation (7), condition (8) can be rewritten in:

$$h \geq E_1 = \frac{r + 2\mu(1-\mu)(1-p)c + (1-\mu)^2(1-p)^2c}{[\mu + (1-\mu)p] + (1-\mu)^2 p(1-p)}$$

- There exists  $h$  greater or equal to  $E_1$  and smaller than  $r_b$  defined in equation (1)
- Conclusion
  - Safe types will be less credit rationed in a market with peer group credit



# 3-MICROCREDIT AND MORAL HAZARD

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- Peer group formation
  - In village type microcredit, borrowers know each other
  - So, the peer group formation is an important question
    - Will the groups be homogeneous?
    - Or heterogeneous?

# 3-MICROCREDIT AND MORAL HAZARD

- Peer group formation
  - Same notations and hypothesis than before
  - In case of default within a pair, the lucky agent must pay  $c$  for his partner
  - Note  $t$  the transfer from a type  $R$  to a type  $S$  in order to convince him to form a pair with  $R$
  - $F_{sr}$ =cash-flow for a type  $S$  forming a pair with  $R$
  - $F_{ss}$ = cash-flow if the pair is  $(S,S)$

# 3-MICROCREDIT AND MORAL HAZARD

- $F_{sr} = h - [r + (1-p)c] + t$
- $F_{ss} = h - r$
- S will group with R if  $t > (1-p)c$
- But the gain for a type R who forms a pair with S is at max  $p(1-p)c$
- So the transfer  $t$  will be smaller than  $p(1-p)c$  and insufficient to convince a type S to join a type R
- Conclusion
  - Pairs will be homogeneous

# 3-MICROCREDIT AND MORAL HAZARD

- Group credit and asset substitution moral hazard
  - Suppose now that agents are risk adverse
  - Each agent can choose between previous type R ou type S project
  - Bank can't observe if the project is R or S
  - When a project fails, induced utility is 0
  - Pairs are homogeneous

# 3-MICROCREDIT AND MORAL HAZARD

- If both agents choose type S project

$$U_s = u(h - r)$$

- If both agents choose type R project

$$U_r = p^2 u(H - r) + p(1 - p) u(H - r - c)$$

- Comparing these 2 equations leads to the following conclusion (Morduch, 99)
  - If  $c$  is high enough, then borrowers have incentives to choose the safe project
  - Joined responsibility within peer groups reduces the asset substitution moral hazard



# CONCLUSION

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- Microcredit is targeted to the poor and is not based on any collateral
- Grameencredit is based on group credit
- Group credit creates a social responsibility which substitutes to traditional collateral
- Peer groups are homogeneous
- Peer group credit reduces interest rates, adverse selection and moral hazard



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