AREC 345: Global Poverty & Economic Development

Lecture 20:

Microfinance

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Lending to the Poor

Lending to the Poor: Basic Facts

Fact 1: the poor do not borrow from formal lenders (i.e. banks)

	— Rural Areas —		— Urban Areas —	
	Percent of HHs w/ any loan	Percent of loans from banks	Percent of HHs w/ any loan	Percent of loans from banks
Cote d'Ivoire	30.5	5.7	40.4	3.9
India (Udaipur)	66.3	6.0	.	.
India (Hyderabad)	.	.	70.5	6.9
Mexico	18.5	17.4	19.1	1.2
Pakistan	93.2	1.5	95.1	6.2
Peru	12.3	0	8.6	0

Data from Banerjee & Duflo (2007)

Lending to the Poor: Basic Facts

Fact 1: the poor do not borrow from formal lenders (i.e. banks)

- Perhaps the poor have no reason to take out loans?

Contradictory evidence: the poor take out loans from other sources

- Relatives and neighbors (Cote d'Ivoire, Mexico, Pakistan, Peru)
- Shopkeepers (Udaipur)
- Moneylenders (Hyderabad)

Why Do Poor Households Borrow Money?

Q: Why can't the poor cover these needs from their savings?

A: In most areas, the poor do not have savings accounts

	Percent of Poor Households with Bank Savings Accounts	
	Rural Areas	Urban Areas
Cote d'Ivoire	79.5	93.4
India (Udaipur)	66.4	.
India (Hyderabad)	24.7	6.9
Mexico	6.2	3.0
Pakistan	11.7	26.2
Peru	0.5	0

Data from Banerjee & Duflo (2007)

Why Do Poor Households Borrow Money?

Poor households have to finance their business activities

- Agriculture involves long delays between investment and return
- Many poor entrepreneurs take **daily** loans to cover working capital

Other reasons the poor often need to borrow money:

- Health shocks: very few poor households have insurance
- Long-run investments (children's education, weddings, etc.)

The poor need to (and do) take out loans,
but the formal lenders (i.e. banks) are unwilling to provide loans to them

Lending to the Poor: Basic Facts

Fact 2: the poor pay (moneylenders) very high interest rates

- Example: moneylenders in Pakistan
  - Charge 78.5 percent annual interest
  - Pay 32.5 percent interest on their capital
- Typical annual interest rates: 40–200 percent

Fact 3: the non-poor borrow more, pay lower interest rates

Do the poor default on their loans?

Lending to the Poor: A Simple Model

A borrower wants to take out a loan of size $L > 0$

- Borrowers default with probability $d < 1$
- For every unit of capital, bank must repay depositors $Z > 1$
- Bank charges borrowers interest rate R
- Expected repayments must equal amount bank owes depositors

$$(1 + R) \cdot (1 - d) \cdot L = ZL$$

$$\Leftrightarrow R = \frac{Z}{1 - d} - 1$$

where $1 - d$ is the probability that the loan gets repaid

Conclusion:

Does the Model Explain the Facts?

This is not what we see: default rates are low among the poor

Fact 1: the poor do not borrow from formal sources (banks)

Fact 2: the poor pay (moneylenders) very high interest rates

Fact 3: richer people borrow more, pay lower interest rates

Fact 4: among the poor, default rates are extremely low

Model does not explain any of these stylized facts!

Why Lending to the Poor is Difficult

Non-poor borrowers have some savings, valuable assets

- Can raise cost of default by offering lender **collateral**
- Will typically invest own savings + (costly) borrowed funds

Almost by definition, the poor lack collateral (assets, savings)

- **Limited liability**:
- Lender is forced to bear poor borrowers' downside risk
  - Changes a poor borrower's incentives, making default more likely
  - Makes high interest rates attractive to unattractive borrowers

Consequences:

Moral Hazard: Choosing What to Invest In

Entrepreneurs choose between two projects: low risk vs. high risk

- Each project succeed with some probability, $p \leq 1$
- Projects generate profits of Y if they succeed, 0 otherwise
- Average profits: $E(\text{profits}) = pY + (1-p)0 = pY$

	Low Risk	**High Risk**
Investment amount	X	X
Chance of success (percent)	100	50
Profits if project succeeds	$1.5X$	$2X$
Profits if project fails	–	0
Expected (average) profits	$1.5X$	X

$\Rightarrow$ **You'd invest your own money in the low risk project**

Moral Hazard: Choosing What to Invest In

Consider a poor borrower who takes a loan of 10 dollars

- Lender can see whether project succeeds or fails
- Borrower must repay 12 dollars if project is successful
  - Doesn't (can't) repay loan if project fails
- Lender can't see which project was chosen (high vs. low risk)
  - Only observes whether a project succeeds or fails

Moral Hazard: Choosing What to Invest In

Borrower must choose between two projects:

	Low Risk	High Risk
Investment amount	10	10
Chance of success (percent)	100	50
Profits if project succeeds	15	20
Repayment if project succeeds	12	12
Profits if project fails	–	0
Repayment if project fails	–	0
Expected gross profits	15	10
Expected net profits after repayment	?	?

Moral Hazard: Choosing What to Invest In

What is borrower's expected net profit?

$$\text{probability project succeeds} \cdot (\text{profits} - \text{repayment})$$

Which project would the borrower invest in?

- **Low risk project**: $1 \cdot [15 - 12] = 3$
- **High risk project**: $\frac{1}{2} \cdot [20 - 12] = 4$

Moral Hazard: Choosing What to Invest In

Borrower must choose between two projects:

	Low Risk	High Risk
Investment amount	10	10
Chance of success (percent)	100	50
Profits if project succeeds	15	20
Repayment if project succeeds	12	12
Profits if project fails	–	0
Repayment if project fails	–	0
Expected gross profits	15	10
Expected net profits after repayment	3	4

Limited liability makes risky projects more attractive

- With the high risk project, borrowers cut their expected repayments

Moral Hazard: Choosing What to Invest In

Now consider a non-poor borrower with some of her own money to invest

- Invests 5 dollars of her own money, borrows (and invests) 5 dollars; must repay 6 dollars if project is successful, repays nothing if failure

	Low Risk	High Risk
Investment amount	10	10
Chance of success (percent)	100	50
Profits if project succeeds	15	20
Repayment if project succeeds	6	6
Profits if project fails	–	0
Repayment if project fails	–	0
Expected gross profits	15	10
Expected net profits after repayment		

Which project will the wealthier borrower choose?

Limited liability induces moral hazard: banks are forced to take on the downside risk, can't (costlessly) ensure borrowers choose safe projects

Adverse Selection

Now consider a world with two types of poor borrowers

- **High risk borrowers** fail 50 percent of the time
- **Low risk borrowers** fail 20 percent of the time
- High and low risk borrowers are equally prevalent
- Banks can't tell the difference between the two (in advance)
- Limited liability: borrowers only repay their loans when they succeed

What interest rate should a bank charge?

$$R = \frac{Z}{1-d} - 1$$

For simplicity, let $Z = 1$

Adverse Selection

Lender would like to charge:

- High risk borrowers: $R_{high} = \frac{1}{1-0.5} - 1 = 2 - 1 = 1$
- Low risk borrowers: $R_{low} = \frac{1}{1-0.2} - 1 = 1.25 - 1 = 0.25$

Must choose a single interest rate — doesn't know borrowers' types

$$d = 0.5 \cdot 0.5 + 0.5 \cdot 0.2 = 0.25 + 0.1 = 0.35$$

Implied interest rate: $R = \frac{1}{1-0.35} - 1 \approx 1.54 - 1 = 0.54$

But this interest rate is only attractive to low risk borrowers with extremely profitable projects; high risk borrowers care less about the interest rate because they repay less of the time.

- Adverse selection explains why demand exceeds supply

Consequences of Limited Liability

Moral hazard

- Borrowers may take on too much risk, exert too little effort
  - Under limited liability, lender and borrower face different incentives
- When project fail, bank cannot recover anything

Adverse selection

- Banks cannot easily screen out those borrowers likely to fail
- Raising the interest rate leads to a riskier pool of borrowers

Twin problems of lending to poor borrowers

- They do not have collateral
- Screening, monitoring loan applicants extremely costly

Careful Monitoring Replaces Collateral

A borrower wants to take out a loan of size $L > 0$

- Moneylender pays fixed cost $C > 0$ to screen, monitor borrowers
- With monitoring, borrowers do not default ($d = 0$)
- For every unit of capital, lender must repay depositors $Z \geq 1$
- Lender charges borrowers interest rate R
- Expected repayments must equal amount lender owes depositors

$$(1 + R) \cdot (1 - d) \cdot L = ZL + C$$

$$\Leftrightarrow R = L + \frac{C}{L} - 1$$

$\Rightarrow$ Lenders will charge lower interest rates on larger loans

Does the Model Explain the Facts?

Fact 1: the poor do not borrow from formal sources (banks)

- Moneylender has better information about borrowers than banks

Fact 2: the poor pay (moneylenders) very high interest rates

- Market interest rate + costs of screening, monitoring
- Moneylenders may also have market power

Fact 3: richer people borrow more, pay lower interest rates

- Screening, monitoring involve fixed costs

Fact 4: among the poor, default rates are extremely low

- Moneylenders exert considerable effort monitoring behavior

Study Guide: Key Terms

- credit market
- moneylenders
- default
- moral hazard
- limited liability