Microcredit and Joint Liability Loans: Theory

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Ec 721 Lecture 3

The Microcredit Movement

- Since the 1980s, there has been significant spread world-wide of micro-credit institutions that lend to the poor (traditionally excluded from formal financial institutions, owing to lack of collateralizable assets)
- Pioneered in Bangladesh by two NGO/NPOs: Grameen Bank and BRAC
- Usually referred to as Micro Finance Institutions (MFIs), which have now branched out into offering a wide range of financial services (savings accounts, insurance etc) and development interventions
- MFIs have spread throughout developing countries (and recently even in the US): 150 million clients worldwide by 2010, of which 130 million in South Asia

The Microcredit Movement, contd.

- MFIs are typically *quasi-formal* non-profit, nongovernmental organizations that obtain their capital from formal credit/state/aid institutions, and lend to the poor
- Main achievements of MFIs: (a) majority of their clients are poor women (poverty defined by household assets); (b) repayment rates exceed 90%
- Earlier MFIs required subsidies or aid from international agencies, but since 2000 many MFIs are self-financing, some are for-profit institutions

Miracle?

To argue that banking cannot be done with the poor because they do not have collateral is the same as arguing that men cannot fly because they do not have wings. (Md Yunus, founder of Grameen Bank)

How Does Micro Credit Work?

- The key idea is to replace physical collateral by *social collateral*
- Formal institutions cannot lend to the poor in a self-sustaining manner owing to asymmetric information and weak capacity to punish defaulters (owing to lack of physical collateral or credit ratings)
- However, poor households in LDCs typically live in communities with high social capital (social interactions, mutual information and social sanctions)
- Micro-credit harnesses this social capital in a creative manner to create a collateral substitute

Unique Features of MC loans

- **Joint Liability:** Lend to self-forming groups (size 5-30), making members liable for each other's loans (though Grameen moving to IL loans to some extent since 2000)
- **Dynamic Repayment Incentives:**
  - Defaults punished by denial of future loan access
  - Start with small loans, raise future credit limits following successful repayment
  - High repayment frequency with small dues
- **Peer and MFI Monitoring:** Frequent group meetings with MFI loan official
- **Gender and Saving requirements** Lend mainly to women, regular saving targets

Theories of JL Loans (Ghatak and Guinnane 1999)

- Three leading theories:
  - Adverse Selection (Ghatak, Tassel)
  - Ex Ante Moral Hazard (Banerjee-Besley-Guinnane)
  - Ex post Moral Hazard (Besley-Coate)
- I shall focus mainly on the Adverse Selection theory, for two reasons:
  - empirical support from Ahlin and Townsend (EJ 2007)
  - relation to Maitra et al 2017 (next class)
- The theory aims to first explain the failure of formal credit institutions to lend to the poor with conventional (individual liability) loans, and then how this is overcome by using JL loans; adverse selection is plausible for (external) formal lenders

Ghatak-Tassel Adverse Selection Theory of JLL

- Two types of borrowers: $i = H, L$
- Every type i borrower has zero wealth, seeks to invest \$1 in an indivisible project that is successful with probability p_i and generates return Y_i, and fails otherwise (return is 0)
- Type H is the safe type: $1 > p_H > p_L > 0$, with $0 < Y_H < Y_L$
- Limited Liability: borrower can repay only in success state: $r_i \leq Y_i$
- Both types are risk-neutral and have common outside option payoff of u
- Lending cost $(1 + \rho)$, Bertrand competition among (risk-neutral) lenders
- Both projects are socially valuable: $p_i Y_i - (1 + \rho) > u$

Perfect Information Benchmark

- Suppose lenders can identify type of each borrower; two separate markets for the two types
- Bertrand competition in type i market, results in maximizing payoff of type i borrower $p_i(y_i - r_i)$ subject to lender breakeven constraint $p_i r_i = (1 + \rho)$
- Resulting (first-best) allocation: type i obtains loan at interest rate $r_i^* = \frac{1+\rho}{p_i}$ and invests in the project, maximizing social surplus

Asymmetric Information

- Can the first-best outcome be implemented if type information is private?
- Not if IL loans without collateral are used, since $r_H^* < r_L^*$, so L will pretend to be an H type, and lenders will fail to break even

Proposition (Market for Lemons) *Let λ_H denote the fraction of H types in the population, and $\bar{p}$ denote $\lambda_H p_H + (1-\lambda_H)p_L$. If Min $\{Y_L - \frac{u}{p_L}, \frac{1+\rho}{\bar{p}}\} > Y_H - \frac{u}{p_H}$, Bertrand competition will result in exclusion of H type from the market, while L types get a loan at first-best interest rate r_L^*.*

The Role of (Physical) Collateral

- Suppose all borrowers have wealth w which they can post as collateral $c \leq w$
- A loan contract for tyoe i can now be a pair (r_i, c_i), with $r_i \leq Y_i$ and $c_i \leq w$
- Generates type i borrower payoff $p_i Y_i - p_i r_i - (1 - p_i)c_i$ and lender payoff $p_i r_i + (1 - p_i)c_i - (1 + \rho)$

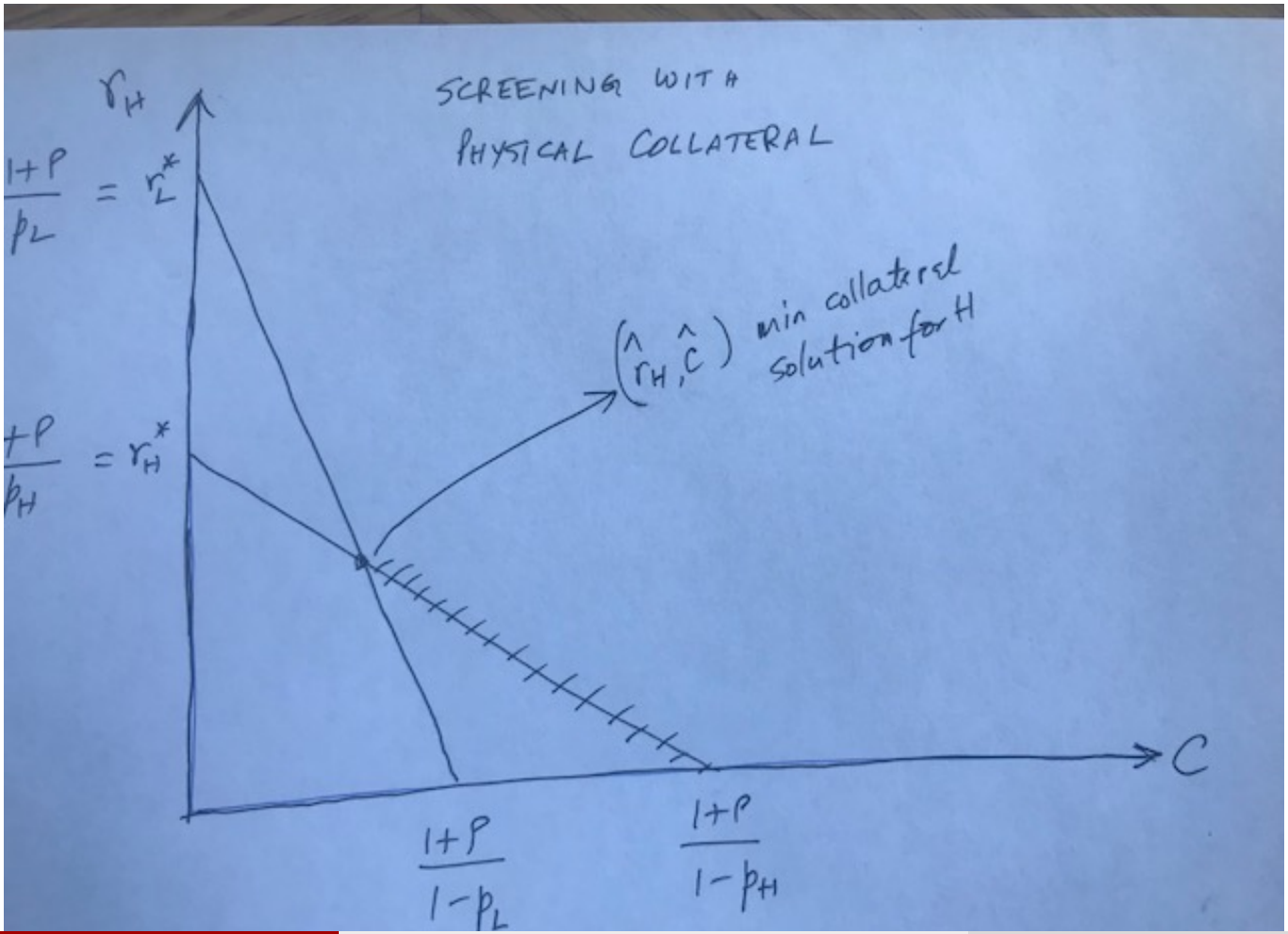
The Role of (Physical) Collateral, contd.

Proposition (Role of Collateral) *If w is large enough, there exist H type contracts (r_H, c_H) satisfying*

$$p_H r_H + (1 - p_H)c_H = (1 + \rho) \leq p_L r_H + (1 - p_L)c_H$$

which can implement the first-best allocation (combined with the first best contract $(r_L^*, 0)$ for L types).

Intuition: H types signal their type by selecting the contract with collateral in order to avail of interest rate $r_H < r_H^*$ which compensates them exactly for the loss of collateral in the failure state, and would result in a larger loss for the L type


SCREENING WITH
PHYSICAL COLLATERAL
r_H
$\frac{1+p}{p_L} = r_L^*$
$\frac{1+p}{p_H} = r_H^*$
$(\hat{r}_H, \hat{C})$ min collateral solution for H
C
$\frac{1+p}{1-p_L}$
$\frac{1+p}{1-p_H}$

JL Loans as a Substitute for Physical Collateral

- Key assumption: borrowers know each other's types
- Suppose an MFI lends to a group of two borrowers, and offers each of them a JL loan (r, c) where each borrowers own liability is r and liability for the other's default is c
- If a type i borrower forms a group with a type j, it would receive payoff $U_{ij}(r, c) \equiv p_i Y_i - p_i[r + (1 - p_j)c]$
- Who will team up with whom?

Positive Assortative Matching (PAM)

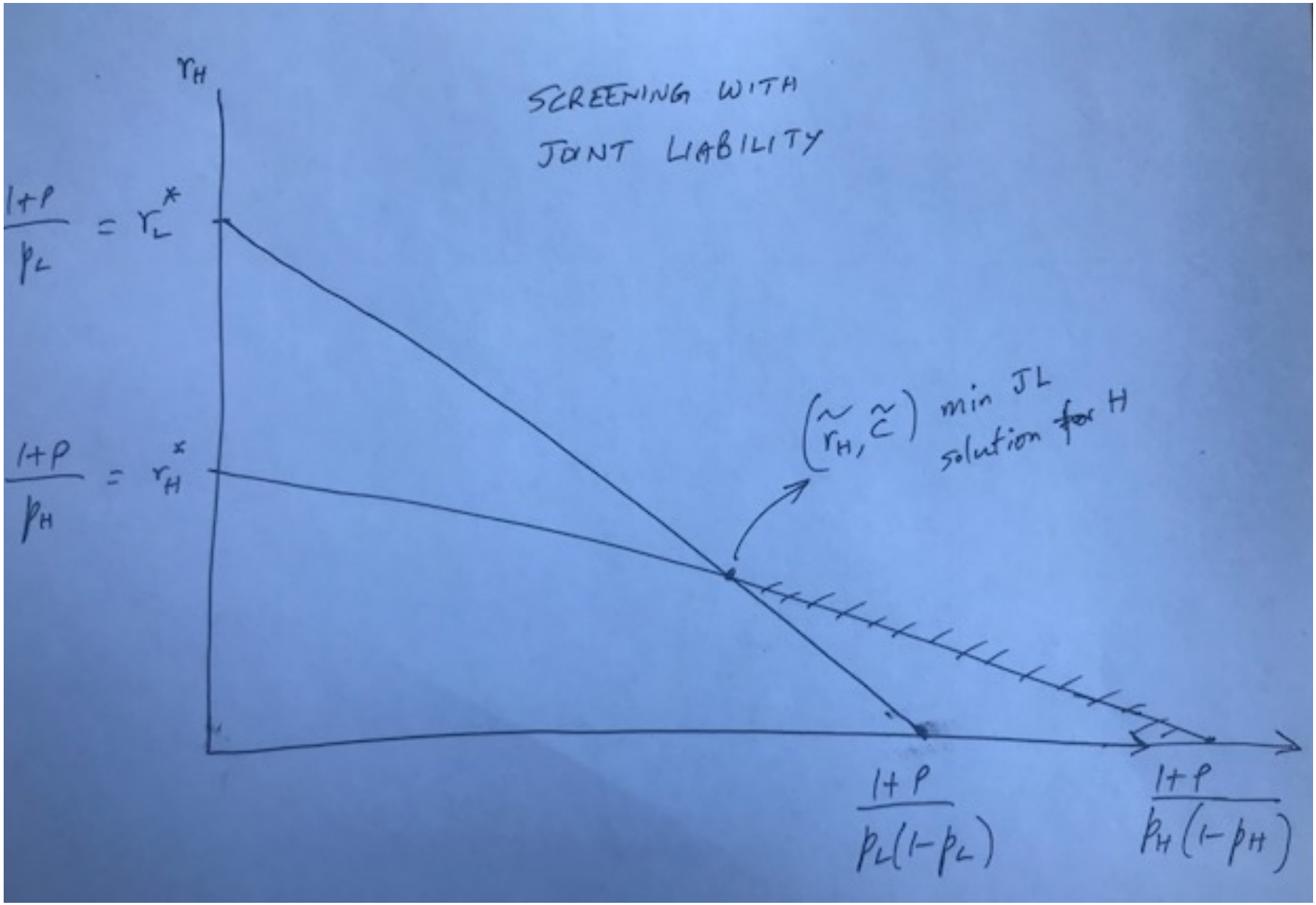
- **Claim:** if $c > 0$, H types will form groups (only) with other H types.
- Equivalently, there cannot be two mixed groups (H,L), (H,L) — because the two H's would be better off forming a group by themselves
- So borrowers will sort into (H,H) and (L,L) groups
- But how can lenders distinguish the two kinds of groups?

Efficient Screening with JLL's

- An (H,H) group member with a contract (r, c) receives payoff $p_i Y_i - p_i[r + (1 - p_i)c]$
- JL burden $p_i(1 - p_i)c$ plays a similar role as physical collateral: relieves lenders participation constraint both directly, and indirectly by inducing screening

Proposition (JLL as Collateral Substitute): *If* $p_L(1 - p_L) > p_H(1 - p_H)$ *and* Y_H *is large enough, the first best allocation can be implemented by offering H types a JLL with* (r_H, c) *satisfying* $p_L r_H + p_L(1 - p_L)c \geq (1 + \rho) = p_H r_H + p_H(1 - p_H)c$*, while L types receive the first best IL loan without collateral* $(r_L^*, 0)$*.*

(The first condition is needed to induce self-selection. The second condition to ensure the LL constraint $r_H + c \leq Y_H$.)


SCREENING WITH
JOINT LIABILITY
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$(\tilde{r}_H, \tilde{c})$ min JL
solution for H
$\frac{1+\rho}{p_L(1-p_L)}$
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