# Consumption Smoothing, Saving, Credit and Insurance

## Lecture 9/3 Problems in rural credit markets

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- Simple model of credit assumed that the default probability is independent of the amount to be repaid.
- Here, there are theories of informal credit markets explaining problems we often see in rural credit markets. We will focus on credit rationing.
    - Informational asymmetries and credit rationing
    - Default and credit rationing

# Informational asymetries and credit rationing

- Credit ration: why the moneylend won't increase the interest rate when there is excess demand for loan.
- Two types of borrowers: high-risk borrowers (risky type) and low-risk borrowers (safe type)
- Risk may be correlated with characteristics of the borrower that are observable or unobservable to the lender.
- When it is unobserved, the interest rate affects the mix of clients that are attracted, and hence the average probability of default.
- Suppose each type needs a loan of size $L$ to invest in some project.
- Safe type: always obtain a secure return of $R$
- Risy type: Obtain a higher return of $R'$ with probability $p$ and possbily get zero return with probability 1-$p$

# Informational asymetries and credit rationing

- The lender can freely set the interest rate; which rate he should choose?
- What is the highest interest rate that the safe borrower wants the loan?
  - From net return, $i_1 = R/L - 1$
- What is the highest interest rate that the risky borrower wants the loan?
  - From expected return, $i_2 = R'/L - 1$
- Since we have $R' > R$, we then have $i_2 > i_1$
- Note that this interest rate is independent of the risky type's probability of success.

# Informational asymetries and credit rationing

- Suppose the lender charges $i_2$, his expected profits are $\Pi_2 = p(1+i_2)L - L$
  - Only the risky type is willing to borrow at $i_2$
- If the lender charges $i_1$, both types are in; hence, his expected profits are $\Pi_1 = \frac{1}{2}i_1 L + \frac{1}{2}[p(1+i_1)L - L]$
- When $\Pi_1 > \Pi_2$, the lender will be reluctant to charge the higher interest rate.
- By substituting $i_1$ and $i_2$, we obtain the condition $p < \frac{R}{2R' - R}$
  - If the high-risk type is sufficiently risky (a lower p means a higher chance of default), the lender will not raise his interest rate to $i_2$ that attract on the risky type.
- The price is not raised even in the face of excess demand.

# Default and credit rationing

- Another explanation of credit rationing: at the going rate of interest in the credit transaction, the borrower would like to borrow more money, but is not permitted by the lender
- The possibility of default is tied to the existence of credit rationing.
- Moneylender wants to maximizes his rate of return on the funds
  - Choosing i to be large, but not too large since farmer can borrow from other sources, and earn a net profit of A, after some level of $i$

# Default and credit rationing

- Farmer's profit: the vertical difference between the production function (output) and the cost line (loan costs). This must be as large as $A$.
- Farmer's maximized profit: choosing a loan that generate marginal product = marginal cost $(1+i)$
  - The tangent at the vertical difference between the production function and the cost line represents the maximal surplus to farmer at interest rate $i$
- Solution: choose $i*$ such that the surplus is $A$
- There is no credit rationing here since at any given interest rate, the farmer is getting the desired loan size.

# Default and credit rationing

- Suppose the farmer can willingly default on the loan (strategic default)
- This means that moneylender will never lend to him again.
- To understand this, we need to know that borrower attaches to future gains and losses: N dates that consequences of his current decisions will arrive.
- Let *f(L)* be the value of the output for every loan size *L*. $f'(L) > 0$
- Participation constraint (a requirement that farmer should want to participate at some interest rate i and some loan size L): $f(L) - L(1+i) \geq A$

# Default and credit rationing

- What farmer gets over the entire horizon of N date: $N[f(L) - L(1+i)]$
- What he gets if he decides to default: $f(L) + (N-1)A$
  - Get today $= f(L)$
  - From tomorrow, moneylender won't allow him to borrow. So, he only earns A (from other best source) period
- For the default not to occur (No-default constraint), we need $N[f(L) - L(1+i)] \geq f(L) + (N-1)A$
  $f(L) - \frac{N}{N-1}L(1+i)] \geq A$

# Default and credit rationing

- $f(L) - \frac{N}{N-1}L(1+i)] \geq A$
- If N = 1 (short mental horizon), farmer will never contemplates the future consequences of his current actions, and the above inequality can never be satisfied. Farmer will always default on the loan
- If N is very large and N/(N-1) is close to 1, only participation constraint matters
- We are interested in situations in which N is neither too large nor too small.
- Now, maximize the vertical difference between the production function and the modified cost line (optimal credit transaction): marginal product of loan = $\frac{N}{N-1}(1+i)$

# Default and credit rationing

- Moneylender will advance a loan of L** with interest rate i**
- We have credit rationing: if the borrower were asked in an interview if he would like to borrow more at the rate i**, he would answer yes.
- He would like to borrow the amount $\hat{L}$ (see Figure 14.3) for which marginal product of loan = (1+i**), the true marginal cost faced by the borrower.
- However, moneylender won't give the amount $\hat{L}$ because a higher loan increases the return to a borrower by allowing him to pocket more money, and this prompts a default.