

Notes for the lecture on Credit (Ray chapt 14 and Banerjee 2015)

- Credit is important to understand economic development (investments and growth) and welfare (credit enable households to smooth consumption if income fluctuates over time, and that makes life better).
- Credit is a complex transaction. The lender (who supply credit) hands over an amount L now and the borrower (who demand credit) is supposed to repay an amount $L(1 + i)$ at a later stage, where i is the interest rate.
- But will, or can the borrower repay? The possibility that a borrowers will renege and not repay their debt is always an issue, but it is a particularly acute worry in low income countries where law enforcement is weak and individuals are poor and have little collateral to to put up as security.
- The nature of the credit transaction (the repayment hazard that comes from the fact that the borrower has superior information about how he or she will use the credit, how risky the project is, and its actual return, and the lack of a third party (judicial system) to enforce repayment) has important implications for how credit market are organized.

Stylized facts about credit markets in low income countries

1. **Segmented, local, credit markets.** Banks and other formal credit institutions are often dominated by informal local money lenders. Often tight connections - strong ties - between lender and borrower.

2. **Interlinked markets.** Those providing credit to a person h is often dealing with person h in another market as well; selling seeds to h , employing h etc. And the terms of the credit deal is often intertwined with the terms of the other transactions.
3. **Credit constraints and rationing.** Given the terms of the credit trade (the interest charged) the borrower often request more credit, but is rationed.
4. **High interest rates**

Demand and supply for credit

- Those who need more liquid money than they have available will demand credit. Those who have more liquid money than they need will supply credit - either directly to borrowers or offer it to banks.

- Households demand credit for different purposes
 - consumption (seasonal work and need credit to consume out of work season)
 - working capital (seeds, fuel...)
 - fixed production capital (plow, sawing machine,..)

Some models to illustrate that “the nature of the credit transaction (asymmetric information, enforcement problems explains the stylized facts)

1. **Collateral and defaults:** Collateral can give lender an incentive to repay loans, but can also give lender an incentive to “provoke” a

default. Small farmer owns a small plot of land close to Big farmer. The plot is worth V_S to small farmer and V_B to big farmer. Small farmer puts down the plot of land as a collateral for a loan L with interest i from Big farmer. Suppose default has a cost F in addition to lost collateral for Small farmer. Small farmer will repay if $V_S + F < L(1 + i)$. If $V_B > L(1 + i)$ Big farmer prefers default for repayment. May provoke default by increasing interests. This may explain high interest rates.

2. High default probability can explain high interest rates.

- (a) If Small farmer repays with probability p and bank deposits pay safe rate r a money lender is willing to lend to the risky farmer if $pL(1 + i) - L(1 + r) = 0$. Hence if $r = 0.1$ and $p = 0.5$ the money lender must demand interest rate $i = 1.2$: a 120% interest rate. This assumes that the default rate is independent of the interest rate. Is that reasonable? And why not?
- (b) Money lenders can probably increase p by monitoring the lender. That costs. Transaction costs can explain high interest rates.

3. Default, repayment incentives and credit rationing: The logic: In agency relationships (for example between a lender and a borrower; but also between a landlord and a tenant; or insurer and insuree) there are two constraints that the Principal (who offers credit, work or insurance) must take into account. (i) *Participation constraint* (the contract must be palatable for the agent; he or she must be willing to accept the contract) and (ii) *Incentive constraint* (the agent must be willing to fulfill the conditions of the contract; repay the loan, work hard, not engage in risky activities). *To fulfill the incentive constraint the lender must offer the borrower*

relatively low interest rate and at the same time put a limit on how much credit the borrower can get.

Example: Suppose the borrower can buy fixed capital at unit price and produce $f(L)$ of output (sold at unit price) with a loan of size L . The borrower has an alternative credit source that gives her a surplus A . Participation requires that

$$f(L) - (1 + i)L \geq A$$

The borrower considers default and will default if the costs are lower than the gains (no morality here). The costs of default is that there will be no credit (from this source) in the future. Suppose the lender has a mental horizon of N periods. The incentive constraint is then given by

$$f(L) + (N - 1)A \leq N [f(L) - (1 + i)L]$$

\implies

$$f(L) - \frac{N}{N-1}(1+i)L \geq A$$

It is a tighter constraint than the Participation Constraint (must reduce i to fulfill it). For a given i the maximal distance between $f(L)$ and $\frac{N}{N-1}(1+i)L$ is an L such that $f'(L) = \frac{N}{N-1}(1+i)$. For very low i this surplus is bigger than A and the lender can do better and increase i . Suppose i^{**} is such that $f'(L^{**}) - \frac{N}{N-1}(1+i^{**}) = A$. That is the optimal contract for the lender. But at this rate $f'(L^{**}) > (1+i^{**})$ and the borrower would like to have more credit. Rationing.

4. **Asymmetric information, adverse selection and credit rationing:** The logic. Suppose the lender cannot observe the riskiness of the project that seeks funding (asymmetric information). A high interest rate may favor risky projects (just like a high level

of insurance may attract buyers with a high prop of a loss). Hence lenders may not raise the interest rate to clear the market even if there is a queue of borrowers at the present rate. Rationing.

Example: Suppose there are two types of projects that can be financed with a loan L . One safe that gives a return $R > L$ with certainty and one risky that gives 0 return with prob $1 - p$ and a return $R' > R$ with prob p . Suppose there is limited liability (no collateral) so in the bad state both the lender and the borrower gets 0. The maximal interest rate the safe project can pay is $i_s = \frac{R}{L} - 1$. The maximal interest the risky project can bear (before getting unprofitable) is $i_r = \frac{R'}{L} - 1$, which is higher than the safe project can pay, simply because it is only in the good state with high payout that interest rate is paid.

Suppose there are only two potential borrowers, one safe and one risky; the lender has only money to finance one project and cannot observe the riskiness of the project. The lender may choose the low interest rate i_s and have both borrowers knocking on the door and he will choose one. Or he may increase the rate to i_r and have only the risky project asking for credit. What is best?

$$\pi_s = 0.5L(1 + i_s) + 0.5pL(1 + i_s) - L$$

$$\pi_r = pL(1 + i_r) - L$$

$\implies \pi_s > \pi_r$ if $p < \frac{R}{2R' - R}$, so if the risky project is sufficiently risky (bad state is likely) and not too profitable in the good state (R' not too high), the lender will in fact prefer to have a low interest rate and credit rationing.

5. **Interlinked contracts** It is a fact that the lender often also is doing other transactions with the borrower. Why? Several possible explanations (i) convenient (ii) better information (iii) better enforcement (iv) efficient for the lender to interlink contracts

The efficiency argument comes from the fact that interlinkage enable the lender to use a non-linear contract, this will induce the borrower to choose an efficient amount of credit. Suppose the lender has a risk free return r . The lender is a monopolist that sets the rate i and the borrower choose how much to lend $L(i)$. If the monopoly lender must choose a linear price, i must be bigger than r for the lender to make money on the deal. But that is of course inefficient since the marginal costs of funds is r efficiency requires that the borrower should ask for credit until the marginal benefit of credit is equal to r not i . A interlinked lending contract enable the lender to make money even on the contract even if the interest rate charged is r . The point is that the lender charges only the low interest rate r to a worker that accepts a lower working wage. The figures in Ray are illustrative.

6. Other types of credit institutions

Roscas - rotating saving and credit institutions - are important in many low income settings. In the wake of the success (?) of the Grameen bank, there has also been a huge increase in formal and semiformal microcredit institutions, both profit and non-profit.

Banerjee et al (2015): The Miracle of Microfinance? Evidence from a Randomized Evaluation

- Estimates the effect of microcredit on different outcomes: A three-year study in Hyderabad. In 2005, 52 of 104 poor neighborhoods in Hyderabad were randomly selected for the opening of a Spandana branch, while the remainder were not. The team selected neighborhoods to observe based on two criteria, absence of financial institutions and residents who were desirable potential borrowers — "poor, but not the poorest of the poor,"

- Loans were offered through an organization called Spandana, which unlike other Microfinance providers, does not require borrowers to start a business to qualify for a loan. Spandana charges a 24-percent annual interest rate, which while high by American standards, is less than what local moneylenders charge.
- Fifteen to 18 months after the introduction of micro nance in each area, a comprehensive household survey was conducted with an average of 65 households in each neighborhood, for a total of about 6,850 households.
- Two years after this first end-line survey, the same households were surveyed once more.
- Estimate intention to treat (reduced form) results since the exclusion restriction is not likely to hold.
- Examine the effect on borrowing on different outcomes; consumption, new business creation, business income, etc., as well as on measures of other human development outcomes, such as education, health, and women's empowerment.
- To assess the effects they estimate this equation $y_{ia} = \alpha + \beta \times Treat_{ia} + X'_{ia}\gamma + \varepsilon_{ia}$, where y_{ia} is the outcome of interest and $Treat_{ia}$ is an indicator that is equal to 1 if the village (neighborhood) is treated (A Spandana branch opens).
- **Results:** Not a miracle: not a huge effect of microcredit (but can we generalize from one study??)
 - a small effect on take up of MFI loans (18% in Control and 26.4 in Treatment, mostly more Spandana loans). But take up is surprisingly low.
 - No significant difference in monthly per capita consumption or monthly nondurable consumption. We do see significant

positive impacts on the purchase of durables. There is evidence that this is financed partly by an increase in labor supply and partly by cutting unnecessary consumption: households have reduced expenditures on what they themselves describe as “temptation goods.”

- Fifteen to 18 months after gaining access, households are no more likely to be entrepreneurs (that is, have at least one business), but they invest more in the businesses they do have (or the ones they start). There is an increase in the average profits of the businesses that were already in existence before microcredit, which is entirely due to very large increases in the upper tail of profitability. At every quantile between the fifth and the ninety-fifth percentile, there is no difference in the profitability of the businesses. The median marginal new business is both less profitable and less likely to have even one employee in treatment than in control areas.
- We do not find any effect on any of the women’s empowerment or human development outcomes we examine, either after 18 or 36 months. Furthermore, almost 70 percent of eligible households do not have an MFI loan, preferring instead to borrow from other sources, if they borrow (and most do).