

L20,21 Finance and Development: Formal and Informal Credit Markets

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Introduction

Topics (this and next lecture):

- Why finance is so important in the development process
- Characteristics of credit markets in LDCs
- Theoretical Explanations
- Empirical Evidence

References: Text (Ch. 14), Pakistan Case Study (Aleem (1990)), UPP (Ch 23)

Introduction, contd.

- Third lecture (Nov 20): critical policy issues in financial services for the poor
- Innovations and NGOs:
 - Microfinance
 - Savings Groups
- Micro-insurance

Importance of Credit in Agriculture

- Important attributes of agriculture:
 - long production duration
 - uncertainty (weather, soil, pests, prices)
- Cause credit to be an essential factor of production
 - bridge time gaps
 - insure against shocks

Purpose of Loans

- *Consumption loans*: bridge time gap between household expenditures and income realizations
- *Production (working capital) loans*: bridge gap between farm expenses and revenues
- *Investment (fixed capital) loans*: to finance purchase of farm equipment
- *Emergency loans*: borrow in bad times, repay in good times

Credit for Non-Agricultural Sector

- These apply also to small businesses and entrepreneurs in non-agricultural sector
- Formal sector firms in manufacturing and services: credit also important, but they have access to banks and capital markets, just as in DCs
- Will be focusing on farms and firms in the informal sector

Why Credit Markets Matter

- High cost and/or limited availability of credit hamper production and consumption
- Even more important over longer time horizons: affect investments, education, choice of occupations, migration, entrepreneurship
- Important in determining how *dynamic* the society is, how fast it grows
- Differences in credit access between poor and rich an important factor in persistence of inequality and poverty

Perfectly Competitive Credit Markets: Reality or Myth?

- What would a perfectly competitive credit market look like?
- *Law of One Price*: Given a loan of a specific duration, there is a prevailing interest rate at which everyone can borrow as much as they want
- *No Rationing*: Given a loan of a specific duration, there is a prevailing interest rate at which *everyone* can borrow *as much as they want*

Some Facts Concerning Credit Markets in LDCs

- Two kinds of lenders: *formal* and *informal*
- **Formal lenders:** banks, credit coops with regional/national branch structure; require collateral; fixed duration loans; access to credit rating; use courts to enforce
- **Informal lenders:** local moneylenders, traders, friends, relatives; no collateral; flexible repayment plan; no access to credit ratings or courts

Facts Concerning LDC Credit Markets, contd.

	Formal Sector Share	Formal Int Rate	Informal Int Rate
Zaria, Nigeria, 1987	8	-3.6	-7.5
NR Province, Thailand, 1985	44	12-14	90
India, 1951	7	4-13	7-35
India, 1981	61	10-12	22
Chambar, Pakistan 1980	25	12	79

Key Features of LDC Credit Markets: Segmentation/Price Variations

- Price (interest rate) gaps between formal/informal sector; between borrowers within any sector
- Growth in formal sector credit, e.g., India 1951-81
- In Thailand, agri loans made by BAAC grew from 4 billion baht in 1975, to 23 billion in 1985
- But informal sector is not disappearing quickly
- Formal sector far smaller in SS-Africa

Key Features, contd: Credit Rationing

- Nobody can borrow as much as they like at prevailing interest rate for any kind of loan: Credit Limits
- Limits vary widely across borrowers
- Zero access for many poor, rural borrowers to formal sector (**Financial Exclusion**)

Key Features, contd: Collateral

- In the formal sector, require collateral to get a loan
- Downpayment restrictions in house loans; pledge assets
- Also with anonymous informal lenders: pawnbrokers
- Value of collateral sometimes exceeds the loan (Thailand: 9 times for business owners, 17 times for households)

Key Features, contd: Interlinked Transactions

- Informal credit often bundled with other transactions:
 - Landlord-tenant credit
 - Employer-employee credit
 - trade credit
- 'Hidden' credit costs, in pricing of bundled transactions
- Also see sometimes in formal credit: e.g., auto-loans, durable appliance purchase loans

Key Features, contd: Long-term Exclusive Relationships

- Often borrowers borrow from a single lender repeatedly over time
- Long-term relationships matter for credit access and cost
- First-time borrowers have lower credit limits, and higher credit costs

Key Features, contd: Role of Kinship, Social Ties, Proximity

- Social ties between borrower and lender matter
- Lenders who are friends, relatives, neighbors, tribe, caste networks provide better credit access (i.e., cheaper, more)
- Problem of discrimination/unfairness in access for minorities

Consequences

- Uneven credit access: across wealth categories, social groups, regions
- Backward, poorer categories face higher costs, possibly reinforcing inequality over time
- Lack of access to credit restricts production, insurance
- One or two adverse health or weather shocks can wipe out a poor family, force it into long-term debt
- **Overall:** restricts GDP, growth; reinforces inequality, poverty; limits mobility

Explanations: Theories of Credit Market Imperfections

- **Lender's Monopoly Power:** popular explanation (*'loan sharks'*), favored by left-wing economists (e.g., Bhaduri) and popular press
- Lenders monopoly in the informal market explains high interest rates, and exclusivity, interlinkage, collateral as instruments of exploitation of poor borrowers
- Bhaduri 'semi-feudalism' hypothesis: landlord-lender prevents tenant from adopting farm innovation as it reduces his demand for credit

Lenders Monopoly Hypothesis: Problems

- Cannot explain credit rationing: inconsistent with profit maximization by lender
- Semi-feudalism hypothesis runs into similar problems
- More fundamentally, why is the market monopolized? Are there economies of scale, large fixed costs, or entry barriers?
- In fact, informal credit markets in LDCs characterized by many competing lenders within any village or market town (examples: Pakistan, India)

Default Risk Hypothesis

- Bottomley's *default risk* hypothesis:
- Poor borrowers with little assets, low and uncertain earning capacity are more likely to default on loans
- Loan defaults create costs for lenders (loan write-offs, collection costs)
- In a competitive market, lenders have to break-even

Default Risk Hypothesis, contd.

- Formal financial institutions are not prepared to make risky loans, so will not lend to those with high default risk
- Informal lenders are able and willing to bear risks, so will lend to risky borrowers
- Have to charge interest rates high enough that they will break-even on average

Default Risk Hypothesis, contd.

- Let loan size be L , cost of capital for lender be r .
formal sector interest rate
- Lender must recover at least $L(1 + r)$ to break-even on average
- If the borrower's default risk is q , what is the lowest interest rate that will enable the lender to break even?
- Solve for i in

$$(1 - q)L(1 + i) = L(1 + r)$$

Default Risk Hypothesis, contd.

- Competitive interest rate:

$$i = \frac{r + q}{1 - q}$$

- Example: if $r = .08$, $q = 0.20$ $\longrightarrow i = .35$
- If $r = .08$, $q = 0.50$, informal interest rate exceeds 100% !
- Consistent with observed formal-informal interest rate gaps

How High are Default Risks?

- How high are default risks?
- In Aleem study of Chambar (Pakistan), actual default rate was 5%, so this cannot explain the observed gap of 12-80% between formal and informal sector

Explaining Collateral

- One means of limiting default risk: require collateral, which limits lenders loss in the event of default
- Let A be amount of collateral
- Break-even condition:
$$L(1 + r) = (1 - q)L(1 + i) + qA$$
- Competitive Interest rate formula:

$$i = \frac{r + q - q\frac{A}{L}}{1 - q}$$

Collateral and Interest Rates

$$i = \frac{r + q - q\frac{A}{L}}{1 - q}$$

- If $\frac{A}{L} = 0.2$, while $q = 0.2$, $r = .08$, then $i = .30$ instead of .35
- If $\frac{A}{L} = 1.0$, $i = r = .08$
- Interest rate therefore varies a lot with the collateral the borrower can post — wealthier borrowers pay lower interest rates

Problem with Collateral Based Theories

- Collateral can explain why informal interest rates are low despite high default risk
- Whereas the empirical phenomenon is high interest rates (.80) and low default rates ($q = .05$)
- And these considerations cannot help explain credit-rationing: why there should be any credit limits

Why is Credit Rationed?

- In practice, see quantitative limits to how much anyone can borrow
- Some people (esp. among the poor): cannot borrow at all
- This is difficult to explain by either lender monopoly power, or **exogenous** default risk

Endogenous Default Risk

- Now consider the following variation: default risk itself depends on the amount borrowed
- Consider the decision of a borrower who has borrowed L at interest rate i : *repay or not to repay?*
- Outcome depends on the costs and benefits of defaulting on the loan

Costs of Default

- Could be
 - psychic: guilt
 - punishments imposed by lender
 - punishments imposed by others (village chief, neighbors etc)
 - costs of running away
 - future inability to borrow
- These costs are likely to vary from person to person

Default Cost Distribution

- Let d denote the default cost of any specific borrower
- While a borrower knows his own default cost, lenders do not (*Asymmetric Information*)
- Lenders beliefs about default cost of any given borrower is a described by probability distribution $F(d)$ over d
- For any given d^* , $F(d^*)$ denotes the probability that a borrower's default cost is less than d^*

Default Decision

- Benefit of default: $L(1 + i) - A$
- A borrower with default cost d will default if $L(1 + i) - A > d$
- Given a loan repayment obligation of $L(1 + i) - A$, the lender's assessed probability of default is $F(L(1 + i) - A)$
- Hence default risk is *endogenous*: rising in loan size, decreasing in collateral:

$$q = F(L(1 + i) - A)$$

Non-Linear Interest Rates: that Depend on the Loan Size

- Break-even condition for lenders:

$$i = \frac{r + q[1 - \frac{A}{L}]}{1 - q}$$

- Assuming collateral A is no larger than loan L (more generally, $A < L(1 + r)$), the interest rate i is higher, the higher default risk q is
- So *interest rate i is higher, the larger the loan size L*

Credit Rationing

- What happens to default risk q as L grows without limit?
- q approaches one — default is almost certain to happen
- For example, suppose there is a maximum D with $F(D) = 1$
- Then $L > D + A$ implies $q = 1$, no matter what i is: borrower will not break even at any loan bigger than $D = A$
- Hence lender must impose credit limit of $\bar{L} < D + A$

Transaction (Screening and Collection) Costs

- Lenders can undertake steps to reduce the risk of default:
- *Screening*: Gather information about any given borrowers past behavior with respect to other lenders
- *Collection*: Impose costs on borrower for defaulting (reminding/wailing/abusing/seizing property/hiring thugs...)
- These are costly to the lender: T , say (independent of loan size), which lower default risk to \underline{q}

Breakeven Interest Rate, given Transaction Cost T

$$i = \frac{r + \underline{q}(1 - \frac{A}{L}) + \frac{T}{L}}{1 - \underline{q}}$$

- Breakdown of lender costs = Capital Cost + Bad Loan Write-Offs + Transaction Costs

Rationale for Transaction Costs

- Screening and Collection Costs enable reduction in default risk
- Essence of Lending Business: control default risk by (a) background checks (b) imposing credit limits (c) interest rate based on loan size and collateral (d) collection efforts on overdue loans

Explaining Observed Features of Credit Markets

- *Long-Term Relationships*: relax credit limits and lower interest rates for previous borrowers who repaid on time
- *Social Networks*: easier to obtain information about past credit history, to impose sanctions on defaulters
- *Interlinked Transactions*: withhold employment, land rentals, crop purchases to workers, tenants, suppliers if they default on loans
- More generally, why **trust** is so important in lending business

Evidence: Chambar (Pakistan) Case Study, Aleem (1990)

- Market town of Chambar, 180 miles north of Karachi, cotton growing area
- 15 lenders in town, another 15 in neighboring villages, 20-30 in surrounding urban centers
- Aleem studied 14 market lenders, and random sample of 60 (farmer) borrowers
- Segmented market: formal rate 12-14%, informal rate 79% (s.d. 38%) accounting for 3/4 of farmer loans
- Interlinked transactions (trade credit repaid on sale of cotton crop)

Table 2. Costs of Obtaining Information about Loan Applicants and Some Screening Statistics

Lender	Resources allocated to obtaining information on average loan applicant		Lenders experiencing a decrease in the cost of screening over time?	Average rate of rejection of loan applicants (percent)	Lenders prepared to give loans to farmers borrowing from other lenders as well?	Percentage of repeat borrowers in 1980 summer season
	Time (days)	Expense (rupees)				
1	3.0	20	Yes	75	No	82
2	0.5	0	Yes	50	No	78
3	2.0	50	Yes	80	No	83
4	1.0	30	Yes	50	No	67
5	0.5	0	Yes	75	No	60
6	1.0	50	Yes	20	No	91
7	0.0	0	Yes	10	Yes	80
8	0.0	0	Yes	20	No	67
9	0.5	0	Yes	90	No	83
10	2.0	100	Yes	70	No	100
11	2.0	30	Yes	25	Yes	85
12	0.0	0	Yes	20	Yes	52
13	0.5	20	No	60	Yes	85
14	1.0	20	Yes	70	No	75

Note: The rupees-to-dollar exchange rate was 9.9 (1981).

Source: Author's survey data, available for a nominal reproduction charge upon written request to

Table 5. *The Average Annual Costs of Administering Loans, Estimated per Rs100 lent to Farmers*

Lender	Average amount outstanding over the year (thousands of rupees) (1)	Assuming lending is the primary activity			Assuming lending is a joint activity, administration costs ^d (5)
		Variable costs ^a (2)	Overhead ^b (3)	Administration costs ^c (4)	
1	89.5	7.92	23.15	31.07	15.54
2	42.0	13.33	74.29	87.62	61.33
3	132.0	7.65	23.64	31.29	25.03
4	226.4	12.19	14.31	26.50	23.85
5	14.5	46.90	157.24	204.14	163.31
6	293.5	8.18	8.79	16.97	11.03
7	197.5	8.51	8.51	17.02	9.36
8	72.5	21.52	16.55	38.07	28.55
9	180.0	10.67	20.00	30.67	26.07
10	6,000.0	6.40	6.60	13.00	7.80
11	19.0	11.58	56.84	68.42	61.58
12	22.0	27.27	48.18	75.45	71.65
13	172.5	18.09	18.09	36.18	21.70
14	195.0	5.64	11.28	16.92	15.23
Mean				49.52	38.72
Standard deviation				50.20	41.40

Table 6. *Other Costs of the Lending Operation: The Capital Charge per Rs100 Lent to Farmers*
(rupees)

Lender	Marginal cost of capital				Average cost of capital ^a
	Marginal cost of funds (1)	Bad debt (2)	Interest lost on delinquent loans (3)	Marginal capital charge (1)+(2)+(3)	
1	36	3.0	1.13	40.13	30.08
2	20	10.0	1.00	31.00	20.92
3	40	3.0	2.01	45.01	23.16
4	36	0.0	2.70	38.70	34.83
5	24	9.0	1.81	34.81	20.85
6	40	3.0	0.60	43.60	39.57
7	20	2.0	2.00	24.00	19.60
8	50	15.0	5.00	70.00	51.75
9	30	4.5	0.60	35.10	25.98
10	30	3.0	0.60	33.60	24.05
11	40	0.0	0.50	40.50	16.20
12	25	7.0	1.25	33.25	22.75
13	30	9.0	3.0	42.00	26.87
14	25	6.0	0.48	31.48	20.75
Mean				38.80	26.95
Standard deviation				10.64	9.48

Table 7. *Structure of Total Costs for the Lending Operation per Rs100 Recovered from Farmers*
(rupees)

Lender	Total marginal cost	Total average costs	
		Lending the primary activity	Lending a joint activity
1	60.97	61.77	46.08
2	39.46	120.60	91.36
3	67.34	55.00	48.68
4	44.71	61.33	58.68
5	46.88	231.95	189.86
6	47.47	57.11	51.11
7	25.00	37.37	29.55
8	82.35	94.35	84.53
9	41.15	57.51	52.84
10	36.36	37.42	32.17
11	56.32	84.42	78.05
12	37.98	105.59	101.51
13	47.95	65.00	50.07
14	39.33	38.44	36.71
Mean	48.09	79.20	67.94
Standard deviation	14.58	40.78	40.52

Note: Because the costs are allocated per Rs100 recovered rather than lent, they will exceed the sum of administration and capital costs shown in tables 5 and 6. The rupees-to-dollar exchange rate was 9.9 (1981).

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

Table 8. Comparing Costs and Observed Interest Rates per Rs100 Recovered

<i>Item</i>	<i>Average costs</i>			<i>Interest rate</i>
	<i>Marginal costs</i>	<i>Lending the primary activity</i>	<i>Lending a joint activity</i>	
Mean	48.09	79.20	67.94	78.65
Standard deviation	14.58	40.75	40.52	38.14

Implications

- Evidence of wide variations in credit access and cost across borrowers
- Poor are excluded from opportunity to borrow from formal credit institutions, unlike wealthy borrowers
- Forced to rely on informal lenders
- Comparative advantage of informal lenders: able to screen borrowers, collect loans via various means that formal bankers cannot
- These however entail large transaction costs, which have to be passed on to borrowers

The Policy Challenge

- *Financial Exclusion* of the poor from formal credit: a major factor preventing growth and perpetuating poverty
- How can the poor be granted access to formal credit?
- Subsidized lending to the poor by government banks, regulations mandating 'priority sector' lending by private banks in many LDCs
- The credit did not reach the poor, and the banks incurred substantial losses (threatening financial stability of the government via debt crises in 1980s, 1990s)