

Notes on Credit Markets in Developing Countries

Introduction

- **credit markets** – intermediation between savers and borrowers:
 - many economic activities (production) are spread over time – invest today, reap results tomorrow (notably agriculture)
 - people’s income can fluctuate (uncertain output in agriculture, probability of losing your job, etc.) – credit markets can serve to smooth consumption
- **credit markets – often imperfect** (more so in developing countries)
 - inability (limited ability) to **monitor** what is done with a loan (e.g. put into too risky projects, eat the money)
 - possibility of (strategic) **default** – if the borrower is better off not returning the loan he will not (e.g. if enforcement of contracts is weak (international debt – hard to commit credibly that no future loans will be extended)
 - because of the above problems – large share of informal financial institutions in developing countries (better information, better enforcement)

Sources of Demand for Credit

- **1. fixed capital** – required for new startups or expansion of production (machines, buildings)
- **2. working capital** – needed for ongoing production because of time lag between putting in inputs and getting/selling output (materials)
- **3. consumption credit** – mainly insurance purpose – consumption smoothing
- #1 – greatest importance for overall growth, #2-3 – very important for agricultural population

Rural Credit Markets

- most of the people in developing countries live in rural areas, so focus on rural credit markets; can also get good insights for informal credit markets in cities or even developed countries

Providers of Rural Credit

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(1) **institutional lenders** – commercial banks, credit bureaus, government (incl. international) institutions

- their share of total credit has grown over time in most developing countries but still not predominant

- **problems:**

* often don’t have personal knowledge of clients – **hard to monitor**

* if borrower is poor and can't repay if output is low – incentive to take on more risky projects even if they have lower expected rate of return than another safe project (since he bears no downside risk – **limited liability**). Since richer people will be less likely to have this problem – provides reason for banks to discriminate against poor borrowers.

* because of above – institutional lenders typically **require collateral**. A small farmer may want to mortgage his land but the bank may not want it – hard to sell; a landless person – would like to put his labor as collateral – not allowed –

* all these cause **inefficiencies** in the allocation of credit.

* example – Thailand – government created specialized agricultural lending bank (BAAC) and forced commercial banks to have 5% of their loans extended to farmers. Still, even now more than 40% of loans are informal. Poorest farmers – typically no access at all to formal credit. Paulson-Townsend (2004) study – 39% of businesses started from savings, 24% by selling land/assets; 9% commercial bank loan; 21% informal credit (moneylenders, cooperatives, relatives)

(2) informal lenders

- historically the only sources of credit in rural areas

- typically live in the village – personal knowledge of clients (better information) ; may be willing to accept land, labor as collateral (have better enforcement technologies)

- example: India – in 1951, 92.8% of loans – by informal sources; 1981 – 39% (still very high) – moneylenders don't vanish with development

- other sources of informal credit

* relatives and families (typically no interest, expected to return the favor in the future)

* cooperatives (ROSCAs – rotating credit and savings associations) – pool funds

* trade and production credit (by storeowner, landlord, pub)

- informal lenders – often borrow from formal sources – act as intermediaries with better information.

Characteristics of the Rural Credit Market

- **main issues:** imperfect competition; many informational/enforcement imperfections; transaction costs
- **1. information constraints** – lack of information about
 - **loan use**
 - **repayment decision/probability**
- **2. segmentation** – many credit relationships are personalized and take long to build (repeated interaction) – informational/enforcement advantage
- **3. interlinkages** – despite common misperceptions most village moneylenders do not do usury – lending is not their sole occupation (landlords, store owners, pub owners, traders). They give credit to clients they have **some other**

relationship with (gain more leverage, enforcement power, better information)

- **4. interest rate variation**
 - – informal credit interest rates vary a lot (by location, source of funds, characteristics of borrower) – highest to lowest – 10-20 times difference. Why not arbitrage away these differences? The rates are personalized – won't necessarily apply to anyone walking up to the lender.
 - the rates are usually high (e.g. Pakistan – average 78% yearly, Thailand – 7-12% monthly)
 - sometimes we may observe low interest rates (e.g. 0) but due to interlinkages this may be compensated for elsewhere (e.g. prices, wages, etc.)
- **5. rationing**
 - widespread – upper limits of how much you can borrow; why not raise interest rate and lend more? (may attract “bad” borrowers); often credit is refused to some people at any interest rate they wish to pay.
- **6. exclusivity** - typically moneylenders don't allow borrowers to borrow from other sources.

Theories of informal credit market – must explain the above characteristics.

Theories of Informal Credit Markets

1. Lender's monopoly

* remember: high interest rate observed – one possible explanation is that lenders are monopolists

* problems:

- empirical: it is true that the credit market is segmented but usually not monopoly – variety of lenders are available
- theoretical: even if a lender had monopoly power it is not necessarily optimal to extract profits with high interest rates (e.g. more profits can be extracted by interlinking and lower interest rates)

2. Lender's risk

* states: high interest rates (IR) observed because there is substantial **risk of default**, lenders need high IR to break even

* **sources of risk**: involuntary default (e.g. crop failure) or strategic default (if limited enforcement)

* example: suppose default happens with prob. p , L – loan, r – opportunity cost of funds to lender, i – interest rate charged

* to break even need: $p(1+i)L = (1+r)L$ so $1+i = (1+r)/p$ – can be high.
E.g. if $p=0.5$, $r=10\%$, get $i=120\%$.

* problem: looking at the data – actual default rates are very low (e.g. 5%) – still maybe potential default risk is high and just lenders have devised smart ways to minimize it.

3. Limited enforcement - strategic default and credit rationing

* Example: suppose to operate the technology need I capital. Suppose the probability of getting caught if don't repay loan is π , penalty is F , output is q , wealth is a

* the borrower will not default if: $q - r(I-a) > q - \pi F$, i.e., if $a > I - \pi F/r$

* rationing: all people with wealth less than $I - \pi F/r$ (call it a^*) want credit but the ones with $a < a^*$ don't get it.

* in other words – the maximum loan a person with wealth a can get is $\pi F/r$ (think about why). These people may want a higher loan but will not get it – rationing occurs in the credit market

* why not raise the interest rate and give larger loan? Doesn't help – raising the interest rate will increase the return to the borrower if he defaults.

4. Discussion on default and enforcement

* if a borrower defaults – why not go to another lender and ask for new loans afterwards? How is this prevented?

* system of reputations – usually in place – 1 default destroys one's reputation – no one else wants to lend to such person (need to spread information however – lenders do that in public – also notify the borrower in advance that they will do this to discourage default)

* in developed countries – the reputation system is highly developed – computer database (credit ratings).

* In closely-knit village societies – also – small mobility, everyone knows everything about all others (social networks – huge value as sanctioning device)

* transition: as countries develop – mobility increases, traditional networks fall apart. Before they are replaced by anonymous institutions (credit ratings) the efficiency in credit markets can worsen due to larger enforcement problems.

* What is observed in such countries? Lenders check potential borrowers very carefully (spend money, effort), start with small loans until the borrower builds reputation (same situation with your first credit card)

5. Credit rationing and adverse selection

* suppose there exist two types of borrowers – “safe” and “risky” and suppose their characteristics that make them such are unobservable to the lender (e.g. lack of information, no reputation, etc)

* if the above is true – a given announced interest rate affects the mix of clients a lender will have (this is called an **adverse selection** problem) – the average probability of default will increase if raise the interest rate since only few safe borrowers would have projects with high enough return to pay the high rate while the risky people don't care how high interest rate if there is limited liability

Simple model (based on Stiglitz and Weiss, 1981)

- 1 risky and 1 safe client – difference is unobservable to the lender
- each needs a loan of size L
- suppose the safe type always obtains return $R > L$ from his project
- the risky type gets return $R' > R$ with probability p or 0 with probability $1-p$
- suppose the lender has enough money to lend to just one of them

- the safe agent would take the loan as long as the gross interest $(1+i)$ is lower than $1+i_1 = R/L$
- assume limited liability: the risky agent has expected return $p(R' - (1+i)L) + (1-p)(0)$. Thus he wants the loan up to a gross interest of $1+i_2 = R'/L$, which is higher than $1+i_1$ above.
- If the lender charges i_1 (doesn't make sense to charge below that if wants to max profits) – both agents would apply for the loan – since he can't distinguish assume he flips a coin (probability $1/2$) who to give it to – gets expected return $R_1 = 0.5(1+i_1)L + 0.5p(1+i_1)L$
- If the lender instead charges i_2 he gets only the risky clients and expected return of $R_2 = p(1+i_2)L$
- Turns out that if $p < R/(2R' - R)$ (i.e. when the probability of default is not too high) we have $R_1 > R_2$ i.e. the lender will charge i_1 (even if there is excess demand for credit at that price) and not raise the rate to i_2 – credit rationing occurs - inefficiency

Discussion:

- Use of collateral to alleviate adverse selection problem (offer two contracts – one with high collateral, low interest rate and one with low collateral and high interest rate.
- If no private information – optimal to charge each type a different interest rate. (Why doesn't this work if type is unknown?)

6. Moral hazard (see notes at the end of this document)

Notes on Moral Hazard in Credit Markets (adapted from Ghosh, Mookherjee and Ray, 2000)

Model

- indivisible project - requires L to be viable
- output is stochastic - either Q (good harvest) or 0 (failure)
- probability of good harvest (success) is $p(e)$ where e is effort. Assume $p' > 0$, $p'' < 0$ (e.g. $p(e) = \ln e$)
- effort cost of putting effort level e is simply e ($c(e) = e$). Effort is not observed by outsiders (lenders)
- agents are risk neutral
- there is limited liability - the farmer doesn't pay back if output is 0
- the farmer has wealth w which he can put up as collateral for loan. If the farmer cannot repay - collateral is confiscated.

Self-financed farmer

- solves:

$$\max_e p(e)Q - e - L$$

- the FOC is $p'(e) = \frac{1}{Q}$ which determines the first best effort, e^* . (e.g if $p(e) = \ln e$ we'll have $e^* = Q$)

Debt financed farmer ($w < L$)

- let $R = (1 + i)L$ (notice $R > w$ for the bank to break even) be the total repayment required
- given R the farmer solves:

$$\max_e p(e)(Q - R) + (1 - p(e))(-w) - e$$

- the FOC is:

$$p'(e) = \frac{1}{Q - R + w} \tag{ICC}$$

- the above equation determines $\hat{e}(R)$ – the incentive compatible effort level for the farmer given R . The above is then the incentive compatibility constraint for the lender to take into account when determining R .
- notice that for any $R > w$, $\hat{e}(R) < e^*$, i.e. **for borrowers effort choice will be lower than the first best level** - "debt overhang" problem - indebted farmers will always work less hard than self-financed (because of limited liability).