Credit

Rural Credit Markets

Market Failure: 2 types of problems

- Involuntary Default: “inability to pay”- risky activity
- Voluntary/Strategic Default: borrower is in a position to repay the loan but refuses to do so- enforceability

Providers of Rural Credit

- Institutional/Formal Lenders: government banks, commercial banks etc.
- Problem: often do not have personal knowledge regarding the characteristics and activities of borrowers; cannot precisely monitor how the loans are used.
- Solution: collateral
- For poor borrowers however, this usually makes formal credit an infeasible option. It is not that
- Why? Collateral is of a specific kind (exotic)
- For e.g. a landless laborer can pledge his labor as collateral: he will work off the loan.
- However, no bank will accept labor as collateral.

Informal Lenders

- **Collateral** of forms that are unacceptable to formal lenders will be acceptable to the “right” sort of informal moneylender
- E.g. A large landowner who has land adjacent to that of a poor farmer may be interested in the tiny plot as collateral
- An employer of rural labor will accept labor as collateral, in case the laborer–borrower fails to repay.
- Hence, while formal banks cannot effectively reach out to poor borrowers, informal moneylenders perform better.
- Another reason for the dominance of informal moneylending: better **information** regarding the activities and characteristics of his clientele.

Characteristics of Rural Credit Markets

1. Informational Constraints

- Fundamental feature that creates imperfections in credit markets: informational constraints.
- Informational gaps occur at two basic levels:

1. There is lack of information regarding the use to which a loan will be put.
2. There is lack of information regarding the repayment decision.

- Limited knowledge of:
- Innate characteristics of the borrower that may be relevant in such a decision
- The defaulter's subsequent needs and activities, which place limits on his incentive to default.
- All the important features of credit markets can be understood as responses to one or the other of these informational problems.

2. Segmentation

- Many credit relationships are personalized and take time to build up.
- Usually, a rural moneylender serves a fixed clientele, to whom he lends to on a repeated basis
- He is extremely reluctant to lend outside this circle.
- Most often, a moneylender's clients are from within his village or from close by, so that the moneylender has close contact with them and is well informed about their activities and whereabouts.
- Repeat lending—a phenomenon in which a moneylender lends funds to individuals to whom he has lent before (or has otherwise close interactions with)—is very common.
- Hence rural credit markets exhibit a tendency towards segmentation

3. Interlinkage

- An extension of segmentation: interlinked credit transactions.
- A majority of village moneylenders do not pursue usury as their sole occupation.
- Most of them are also wealthy landlords, shopkeepers, or traders dealing in the marketing of crops.
- Given market segmentation, landlords tend to give credit mostly to their tenants or farm workers
- traders favor lending to clients from whom they also purchase grain
- Thus segmentation often takes place along occupational lines
- The complementarity of some production relationship facilitates the credit relationship.
- Interlocking of markets— people conduct their business in different markets (land, labor, credit, etc.) with the same trading partners, and make the terms of transaction in one market depend on the terms and conditions in the other.

4. Interest Rate Variations

- Segmentation has a natural corollary: informal interest rates on loans exhibit great variation, and the rates vary by geographical location, the source of funds, and the characteristics of the borrower.
- High interest rates are not necessarily the norm in informal credit transactions.
- Low or even zero-interest loans from traders are not uncommon.
- The absence of interest is deceptive: given the interlinked nature of many of these transactions, interest may be hidden in other features of the overall deal (such as the price at which a trader buys output from the farmer or the implicit wage at which a laborer is required to work off an ostensibly interest-free loan).
- The disparities in interest rates pose a puzzle: why don't clever and enterprising agents borrow from lenders who charge comparatively lower rates and lend that money to borrowers who are paying and are prepared to pay much more?
- Answer: segmentation and the informational variations that cause it.
- The personal characteristics of people matter and so does the nature or length of interaction between a borrower and a lender.
- The lender, before lending to a client, asks himself such questions as: Do I know him well? Is he from my village? Is he a good farmer? How much land does he possess? Does he have a pump set to irrigate his land if rainfall is scarce?
- The lender's decision whether or not to advance a loan and, if he does, what the terms and conditions will be, crucially depend on the answers to these questions.
- Thus, arbitrage opportunities may be only a mirage: the rate at which a landlord lends to client A from village X may not be the same at which he is willing to lend to client B from village Y.

5. Rationing

- Rationing: upper limits on how much a borrower receives from a lender.
- By rationing, we mean that at the going rate of interest, the borrower would like to borrow more but cannot.
- In this sense credit rationing is a puzzle: if the borrower would like to borrow strictly more than what he gets, there is some surplus here that the moneylender can grab by simply raising the rate of interest.
- This process should continue until the price (interest rate) is such that the borrower is borrowing just what he wants at that rate of interest.
- So why does rationing in this sense persist?
- Rationing includes the complete exclusion of some potential borrowers from credit transactions with some lenders.
- That is, at the going terms offered by the lenders, some borrowers would like to borrow, but the lender does not lend to them.
- In this sense rationing is intimately connected to the notion of segmentation.

6. Exclusivity

- Exclusive dealings.
- Moneylenders typically dislike situations in which their borrowers are borrowing from more than a single source.
- They insist that the borrower deal with them exclusively; that is, approach no other lender for supplementary loans.
- Particular dealings are often (though not always) bilateral, and
- Informational, locational, and historical advantages often tend to confer on lenders the blessings of a “local monopoly”, which they exploit.

Theories of Informal Credit Markets

1. Lender's Monopoly

- The lender has exclusive monopoly power over his clients and can therefore charge a much higher price for loans than his opportunity cost.
- There are two problems with this line of explanation.
- The first is empirical. It is certainly true that the credit market is segmented, but this is not necessarily a justification for an assumption of complete monopoly.
- Pure monopoly is not out of the question in some circumstances, but in today's rural societies, we can at best assume that lenders have "local monopoly" with limits.
- The second problem is theoretical.
- Monopoly power is not necessarily an explanation of high interest rates, at least of high explicit interest rates.
- From the point of view of efficient surplus generation, it is often better to pick up moneylending profits in forms other than interest (interlinkages)

2. Lender's Risk Hypothesis

- In its extreme form this hypothesis maintains that lenders earn no (ex ante) return on their money over and above their opportunity cost.
- However, there is substantial risk of default in rural credit markets: the borrower might default on interest payments and even part or all of the principal.
- This risk comes from many sources:
- First, there is the risk of involuntary default: owing to sheer misfortune (crop failure, unemployment, disease, death, etc.), the borrower simply may not have enough money when the loan matures.
- Second, there is the possibility of voluntary or strategic default: the borrower may simply take the money and run, or stubbornly refuse to pay up.
- In the simplest version of the theory, there is an exogenous probability of default on every dollar lent out. Competition between moneylenders drives the rural interest rate down to a point where each lender on the average earns zero expected profit (over and above the opportunity cost of funds to the lenders).

- Consider a typical village moneylender in a competitive market.
- Let L be the total amount of funds he lends out
- Let r be the opportunity cost of funds for every moneylender
- Let i be the interest rate charged in competitive equilibrium in the informal sector.
- Because only a fraction p of loans will be repaid, the moneylender's expected profit is:

$$p(1 + i)L - (1 + r)L.$$

- The zero profit condition implies that this value must be zero in equilibrium, that is:

$$p(1 + i)L - (1 + r)L = 0,$$

$$i = \frac{1 + r}{p} - 1.$$

- Notice that when p = 1, that is, when there is no default risk, the entire loan is paid back, we have i = r: informal interest rates are the same as formal-sector rates.
- However, for p < 1, we have i > r: the informal rate is higher to cover the risk of default.
- For e.g. let the formal-sector rate to be 10% per annum and suppose that p = ½: i turns out to be a steep 120% per annum!
- Clearly, even under competition, informal-sector rates are very sensitive to the default risk.
- The preceding simple story lays a finger on a very important aspect of the reality of rural credit markets—the risk of default.
- However, if we look at the data, the fact remains that actual rates of default in rural credit markets are very low indeed.
- Suggests that although potential default may be important, lenders manage to devise contracts and create incentives to circumvent the problem.
- Understanding the various ways in which lenders manipulate and lower the default risk is the key to explaining some of the main features of informal credit markets.

3. Default and Fixed Capital Loans

- So far, we have assumed that the default probability is independent of the amount to be repaid.
- Larger amounts to be repaid may lead to a greater risk of default.
- Suggests that certain loans will not be given at all under any circumstances, irrespective of the interest rate premium, because the premium itself affects the chances of repayment.
- Large loans themselves raise the chances of default and will, therefore, not be made.
- We can extend this line of reasoning, not just to the size of the loan, but also to the kind of use to which the loan will be put.
- If the loan can be used by the borrower to permanently put himself in a situation in which he never has to borrow again, then such loans may not be forthcoming.
- In the presence of strategic default, the overwhelming provision of informal loans will be for working capital or consumption purposes, rather than for fixed investments that may permanently reduce the borrower's future need for credit.

4. Default and Collateral

- The fear of default also creates a tendency to ask for collateral, whenever this is possible.
- Collateral may take many forms.
- Fundamentally, collateral is of two types:
- both lender and borrower value the collateral highly
- the borrower values the collateral highly, but the lender does not
- From the point of view of strategic default, it is irrelevant whether the first or the second form of collateral is employed.
- Collateral that is valuable to both parties has the additional advantage that it covers a lender against involuntary default as well.
- For these types of collateral, credit may simply be a veil for acquiring collateral: alternative view of usurious interest rates.

- Suppose a loan of size L requires an interest rate i to be charged.
- Say, VS (S for “small”) be the (monetary) value that the borrower places on the collateral.
- Let VB (B for “big”) be the value that the moneylender attaches to the very same collateral.
- Thus the collateral is of value to both parties.
- Let the monetary value on the loss to the borrower from default, over and above the loss of his collateral be F.
- Such losses may include the fear of not receiving future loans etc.
- When the time comes to return the loan, we can conceive of two possibilities:
- (1) The borrower may be in a state of involuntary default: he simply does not possess the wherewithal to repay the money. In that case, he certainly loses the collateral, which passes into the hands of the moneylender.
- (2) The borrower may contemplate willful default and take his chances with the landless labor market or even with migration to the city. The total loss to the borrower in this case is VS + F, whereas the gain is that he gets to keep the principal plus interest that he owed.
- Thus the borrower will prefer to return the loan if

$$L(1+i) < V_S + F.$$

- The Lender will prefer his money back if: $L(1+i) > V_B.$
- loan repayment is in the interest of both parties only if $V_B < V_S + F,$
- the lender's valuation must not exceed the borrower's valuation by too much.
- In the special case where F = 0, so that collateral is the only way to force loan repayment, the lender's valuation of the collateral must be less than that of the borrower.
- Suppose that VB > VS + F. In this case, it follows that whenever the borrower prefers to repay the loan, the lender actually wants him not to do so!
- The lender would actually like the credit transaction to be an excuse to acquire the collateral (cheap).
- Thus collateral that is of high value to both lender and borrower may (paradoxically) result in credit transactions with excessive rates of default.
- This sort of analysis works much better for consumption loans than production loans.
- With consumption loans (taken, say, for an illness in the family), the amount is often fixed and cannot vary with the rate of interest.
- With production loans, a high interest rate may be self-defeating because the borrower can scale back the amount of the loan by reducing the extent of his productive activity.
- This hints at a possible explanation of why interest rates may be high for some types of credit transactions but not for others.

5. Default and Credit Rationing

Credit rationing refers to a situation in which at the going rate of interest in the credit transaction, the would like to borrow more money, but is not permitted to by the lender.

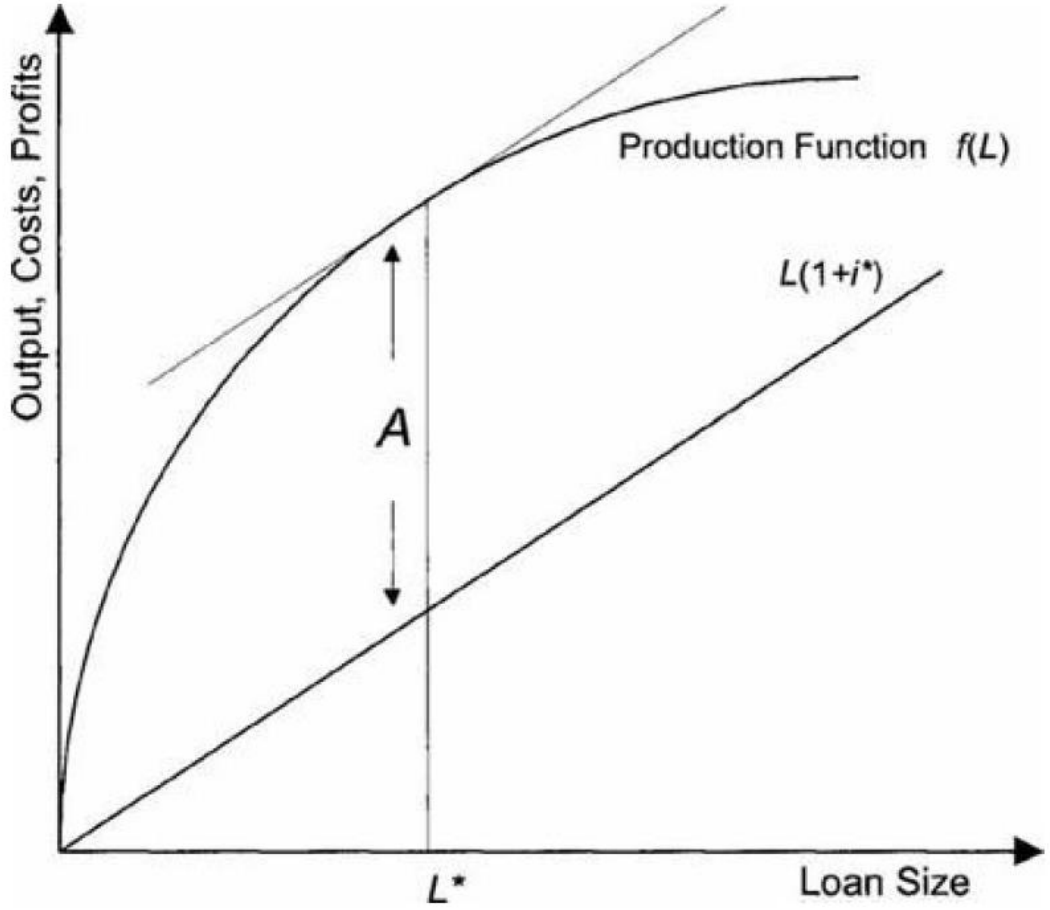

Figure 14.2. Maximizing the rate of interest i on a loan.

- So far there is no credit rationing.
- Now we show that the possibility of default is closely associated with credit rationing
- To do so we introduce the possibility of strategic default.
- Suppose that the farmer can willingly default on the loan.
- In the event of a strategic default, the moneylender will never lend to him again.
- However, the farmer can always go for his next best alternative and guarantee himself a profit of A from the next date onward.
- To study the default problem, then, we have to account for the importance that the borrower attaches to future gains and losses.
- We consider the borrower's mental time horizon: the extent to which the future concerns him when he makes current decisions.
- Suppose that at each date, the farmer thinks N dates into the future and factors in the consequences of his current decisions on gains and losses in the coming N periods.
- Let f(L) be the value of the output for every loan size L. Thus f(L) is simply an expression that describes the
- production function: as L increases, so does the value f(L).

- The Participation Constraint: the requirement that the farmer should want to participate at some interest rate i and some loan size L is just the statement that: $$f(L) - L(1+i) \geq A.$$
- In the presence of potential default, a fresh constraint appears called the No Default Constraint.
- We look at what the farmer gets over his entire mental horizon of N dates. It is the amount per date, multiplied by N: N[f(L) − L(1 + i)]
- What does he get if he decides to default? Well, today he will get all of f(L).
- From tomorrow onward, he is excluded by our moneylender and so can get only A per period.
- Thus the total profit over the N period mental horizon is f(L) + (N − 1)A.
- For default not to occur: $$N[f(L) - L(1+i) \geq f(L) + (N-1)A.$$
- Or,

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

- This condition looks a bit like the participation constraint except for the term N/(N − 1) that multiplies the cost line.
- Because this term always exceeds 1, the new restriction is tighter than, and therefore effectively subsumes, the participation constraint.

- The shorter the mental horizon, the more difficult it is to meet the no-default constraint. For instance, if N = 1, so that the farmer never contemplates the future consequences of his current actions, NDC can never be satisfied. The farmer will always default on the loan, so no loans will be advanced.
- On the other hand, if the farmer is very farsighted, then N is very large and the fraction N/(N − 1) has a value close to 1: we are then effectively back to the old problem in which only the PC matters.
- Thus we are interested in situations in which N is neither too large nor too small.
- When NDC holds, the original cost line gets multiplied by the factor N/(N-1).
- The rest of the analysis remains the same.
- We maximize vertical difference between the production function and the modified cost line such that it is no less than A.
- To find this maximum, we set the marginal product of the production function equal to the slope of the modified cost line, which is N/(N − 1)(1 + i).
- At interest rate i**, the maximized difference just equals A. If it is chosen any higher, then the NDC will fail.
- Thus the interest rate i** and the associated loan size L** represent the moneylender’s optimal solution when default is possible.

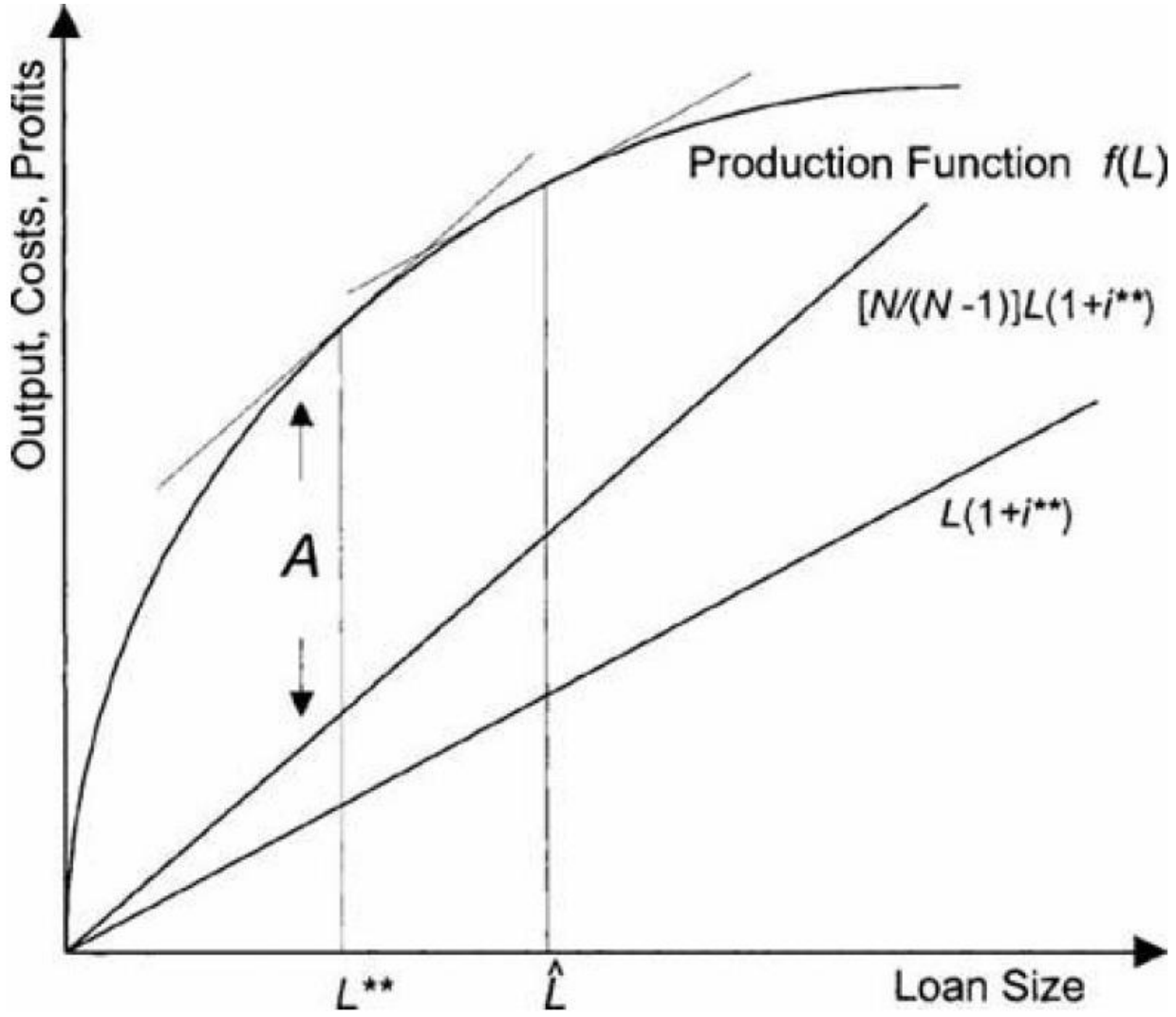

Figure 14.3. Loan contracts when default is possible.

- At the optimum credit transaction, the moneylender will advance a loan of L**
- The marginal product of the loan equals N/(N − 1)(1 + i**) and not the true marginal cost of the loan as faced by the borrower, which is 1 + i**.
- It follows that we have credit rationing: if the borrower were asked in an interview if he would like to borrow more at the going interest rate i**, he would answer in the affirmative.
- The moneylender would not react to such a situation by simply raising the interest rate or advancing a larger loan at the going interest rate (or some combination of the two)
- The fear of sparking off a default prevents such actions by the moneylender.
- A higher loan increases the return to a defaulter by allowing him to pocket more money.
- A higher interest rate increases the return as well, by allowing the defaulter to save on the repayment of more interest.
- The moneylender's preferred contract therefore involves credit rationing.
- Credit rationing may stem from considerations other than default. In the next section, we take up this theme.

6. Informational Asymmetries and Credit Rationing

- Not all borrowers bear the same amount of risk.
- There are high-risk borrowers and there are low risk borrowers.
- Risk may be correlated with characteristics of the borrower that are observable to the lender (such as landholdings or access to irrigation)
- It may substantially depend on other qualities that are not observable (farming skills or mental acumen in the face of a crisis, thriftiness, the quality of his land etc)
- When the factors that make for risk are observable, the lender can select his clients or charge appropriately higher rates for the high-risk clients.
- However, to the extent that clients bear different risks that cannot be discerned by the lender, an additional dimension is added to credit market transactions—the interest rate now affects the mix of clients that are attracted (and hence, the average probability of default)
- This new dimension might give rise to a situation in which at prevailing rates, some people who want to obtain loans are unable to do so
- Lenders are unwilling to capitalize on the excess demand and raise interest rates for fear that they will end up attracting too many high-risk customers.

- Consider a moneylender who faces two types of potential customers: call them the safe type and the risky type.
- Each type of borrower needs a loan of (the same) size L to invest in some project or activity.
- The borrower can repay only if the investment produces sufficient returns to cover the repayment.
- Suppose that the safe type is always able to obtain a secure return of R (R > L) from his investment.
- On the other hand, the risky type is an uncertain prospect; he can obtain a higher return R' (where R' > R), but only with probability p.
- With probability 1 − p, his investment backfires and he gets a return of 0
- The lender can freely set the interest rate without fear of losing his clients to competing lenders.
- Let us suppose that the lender has enough funds to lend to just one applicant, and that there are two of them (one risky, one safe).
- Should he raise his interest rate until one borrower drops out?
- What is the highest interest rate i for which the safe borrower wants the loan? Because his net return is given by R − (1 + i)L, the highest acceptable rate for him is $i1 = R/L - 1$
- For the second borrower, the expected return is p[R' − (1 + i)L]; hence, the maximum rate he is willing to pay is $i2 = R'/L - 1$.
- Clearly, because R' > R, we have i2 > i1.
- The risky borrower is willing to pay a higher rate of interest than the safe borrower, and this interest rate is independent of his probability of success, p.
- The reason is that bankruptcy yields zero, and in such a situation he defaults on the loan anyway, so his expected profits depends only on the success state. In this sense the risky borrower acts as if he does not care about failure.

- Of course, the lender cares.
- If the lender charges i1 or below, both borrowers will apply for the loan.
- If the lender cannot tell them apart, he has to give the loan randomly to one of them.
- On the other hand, if a rate slightly higher than i1 is charged, the first borrower drops out and excess demand for the loan disappears.
- The lender may then go all the way up to i2 without fear of losing the second customer.
- The lender's choice is then really between the two interest rates ii and i2. Which should he charge?
- Suppose the lender charges i2. His expected profits are then given by:

$$\Pi_2 = p(1 + i_2)L - L.$$

- If the lender charges i1, he attracts each type of customer with probability 1/2. His expected profits are then given by

$$\Pi_1 = \tfrac{1}{2} i_1 L + \tfrac{1}{2}[p(1 + i_1)L - L].$$

- Under what condition will the lender be reluctant to charge the higher interest rate? This will happen when Π1 > Π2.

$$p < \frac{R}{2R' - R}.$$

- *if the high-risk type is “sufficiently” risky (remember, a lower p means a higher chance of default), then the lender will not raise his interest rate to i2, thereby attracting the risky type.*
- *Instead, he will stick to the lower level i1 and take the 50–50 chance of getting a safe customer.*
- *This will lead to credit rationing in equilibrium: out of two customers demanding a single available loan, only one will get it; the other will be disappointed.*
- *The price is not raised even in the face of excess demand, but the reason is different.*
- *Raising the price would drive away the good borrower instead of the bad one, and the higher possible return cannot compensate for the lowered chance of repayment.*

7. Default and Enforcement

- The NDC is fundamentally dependent on the mental horizon of the borrower: the number of future time periods N he worries about when making current decisions.
- Thus a default today, followed by N − 1 periods of profits A, should not be more valuable than N periods of nondefault dealings with the moneylender.
- The borrower's dealings with the moneylender must yield him a greater profit than he could get elsewhere by defaulting i.e.

$$f(L^{**}) - (1 + i^{**})L^{**} > f(L^{**}) - \frac{N}{N-1}(1 + i^{**})L^{**} = A.$$

- Borrowers who are "patient" or have large mental horizons N can actually be given a relatively worse deal without fear of default.
- A smaller gap between the profitability of the current credit deal and that of the alternative A will be enough to make him conform: because the borrower is very patient, the threat of termination of future credit carries great bite, and hence the lender can charge stiffer rates without fear of default.

- So far we have been looking at default decisions ex- ante, ex-post default,
- A defaulter must fall back on his alternative opportunities, because the current lender will no longer lend to him.
- Typically, the borrower will have access to more than one moneylender.
- He may therefore be tempted to default on the loan from the current lender and switch to another source when the current lender refuses to deal with him any further.
- ***How do lenders tackle this problem, apart from building repayment incentives into their credit transactions?***
- **System of reputations used to discipline borrowers:** If a borrower defaults in his transactions with one lender, this may destroy his reputation in the market and mark him as a bad risk.
- As a result, other lenders may be reluctant to lend to him in the future.
- This requires that information about the borrower's default action be spread throughout the lending community.
- ***Is the rapid spread of default information a reasonable postulate for informal credit markets?***
- It depends.
- In the informationally sophisticated credit markets that prevail in industrialized countries, credit histories are tracked on computer networks: a person's past offenses can be found at the touch of a button, and the ability to learn this information quickly acts as a device to discipline the borrower.

- In traditional village societies with limited mobility, community networks are very strong: everyone knows about everyone else.
- These networks have social value: they act as credible sanctioning devices in situations where a computerized credit agency is missing.
- A violation of contractual promise against one party will not go unnoticed by others, who will limit their dealings with the offender as a result.
- These threats of social sanctions and censure permit acts of reciprocity and cooperation (including the granting and repayment of loans) that would not be possible otherwise.
- As societies develop, mobility increases and traditional ties fall apart and he flow of information slows to a trickle.
- This is the transitional stage in which many developing countries find themselves.
- Information flow follows a U pattern: both traditional and economically advanced societies have a lot of it, whereas societies in transition do not.

- The screening efforts of a lender have enormous (positive) externalities: they prevent default on the loans of other lenders.
- However, a lender will only do so if it benefits him.
- This means that intrinsic uncertainty about the types of borrowers, namely, the possibility that some borrowers are more default-prone than others, enables the credit market to function where otherwise it would collapse!
- The presence of bad types creates careful lenders, who regard past defaults as signals of intrinsically bad risks.
- To avoid being branded, good risks (who may be opportunists, nevertheless) do repay their loans.
- *Hence, the incentive to check out a new borrower actually enables a credit market to function by creating the fear that a default may block of access to future credit; the incentive to screen a fresh borrower depends on the belief that some borrowers are intrinsically bad risks.*
- *Combining these two points, we see, paradoxically enough, that the presence of some bad types is essential for the functioning of a credit market under limited information, albeit at some reduced level.*

- The same idea can be applied in the case of **testing loans:**
- Lenders may wish to start small and increase the loan size if borrowers return the smaller loans.
- These small loans serve as indirect tests of the borrower's intrinsic honesty.
- The presence of testing loans serves as an incentive for (honest but opportunistic) borrowers to repay, because they know that if they default, they will be subject to the slow build-up of cooperation that characterizes any new relationship, and this is costly to them.
- Observe that in a sense, the market solves one kind of information failure (the lack of information on past defaults) by relying on an additional failure of information (lack of knowledge about intrinsic types)
- Because of the second failure, lenders have some incentive to screen borrowers or provide small test loans at the beginning of a relationship, and the existence of this phase acts as a deterrent to the destruction of an established relationship.

Interlinked Transactions

1. Hidden Interest 2. Information 3. Enforcement 4. Creation of Efficient Surplus

1. Hidden Interest

- In some societies, the explicit charging of interest is forbidden or shunned.
- For e.g. in Islamic societies usury is regarded as immoral and so is banned under the Shaariat law.
- In such situations, it is prudent to ask for interest in secondary forms and advance the loan interest-free.
- With the need for hidden interest, interlinked contracts provide a way out.

2. Information

- Interlinked contracts may enable the lender to dispense with some of the costs of keeping track of the activities of the borrower.
- For e.g. A rice trader who makes funds available to a farmer may demand repayment in terms of the output because such repayment is easier to enforce under the normal routines of the trader-lender.
- At harvest time, the trader might arrive at the fields of his suppliers to pick up the crop for transportation.
- If this is something the trader has to do anyway, a useful by-product is that he gets to place first claim on the crop.
- Such claims are extremely powerful, because other debts are effectively pushed to a secondary position.
- These are all ways to reduce the chances of involuntary default without having to incur the extra costs of monitoring or tracking.

3. Enforcement

- Interlinked relationships prevent strategic default as well.
- To prevent default, the moneylender cannot drive down the borrower to his PC; a certain surplus over the next best option had to be provided.
- The borrower trades off the loss in this surplus at future dates with the one time gain to be had from default.
- With an interlinked relationship, a single carrot can be used as two sticks, as long as deviations cannot be carried out simultaneously on both fronts.
- For instance, suppose that a landlord has a tenant to whom he offers a rental contract with threat of eviction in case the output is lower than some predefined minimum.
- A loan to the tenant can be supported by an “interlinked threat”: if the loan is not repaid, then the tenancy will be removed.
- The surplus in the tenancy thus serves a twin role.
- It assures the provision of appropriate effort in the tenancy contract, while at the same time it doubles as an incentive to repay loans.
- In this sense, the landlord is at a distinct advantage in advancing credit to his tenant, because he has at his disposal a preexisting instrument of repayment.
- In contrast, a pure moneylender who lends to the same tenant must offer additional incentives for repayment through the credit contract itself.

4. Creation of Efficient Surplus

- Interlinkages prevent “distortions” that lower the total surplus available to be divided between lender and borrower.
- The granting of a loan at some pre-announced rate generally affects the quantity of the loan taken by the borrower.
- The lender may not want this, because a larger surplus is available from other loan sizes.
- Interlinkage is a way to counteract the distortion in loan amounts that might arise.

(a) Loan repayment in Labour

(b) Loan repayment in Output

(a) Loan repayment in Labour

- Suppose that a rural laborer, Anka, must feed her family through both the slack and the peak seasons of an agricultural year.
- Imagine that there is no employment available in the slack season.
- In the peak season, harvesting jobs are available that pay a wage of w.
- To finance her consumption in the slack season, Anka must borrow.
- Suppose that there is a large farmer, Birju, who hires harvesting labor during the peak season and also has access to funds at an opportunity cost of i per unit.
- i is the equivalent of the risk-free rate of return that Birju would obtain by putting these funds into the best alternative opportunity.
- Birju is in a position to lend money to Anka.
- Because Anka is a laborer and Birju is an employer, Birju has the option to interlink the credit contract with a labor contract.
- The interlinked deal has two components: (i) the offer of a loan (to be chosen by Anka) at interest rate i* (chosen by Birju) and (ii) the offer of a wage w* at which Anka will pledge to supply her labor to Birju in return for the loan.

- Figure 14.4 describes the total return to Birju from a contract of the form (w*, i*) for a loan of size L is taken by Anka.
- It displays various combinations of slack and peak consumption available to Anka under the contract (w*, i*).
- The left-hand panel of the figure considers the case where w* < w and i* > i. i.e. the loan is repaid with interest in both cash and labor.
- The right-hand panel looks at the case where w* < w and i* < i i.e. the loan is “subsidized” in cash terms, but repayment is extracted in labor.
- In both cases, the total return to Birju is given by the algebraic sum of the segments AB (interpretable as the interest return) and BC (interpretable as the employment return).
- In the left-hand panel, both terms are positive. In the right-hand panel, the first term is negative whereas the second term is positive.
- In both cases the net return to Birju is given by the segment AC.

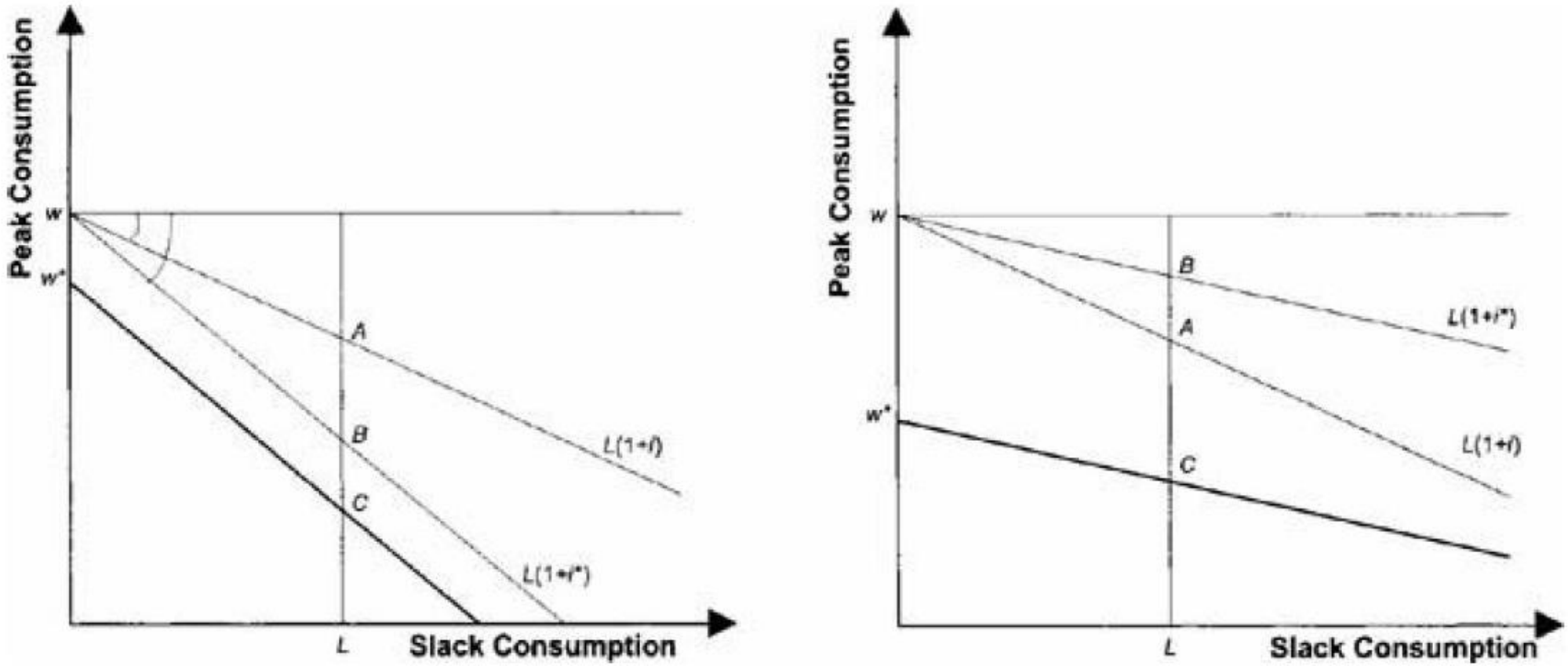

Figure 14.4. Birju's return from a contract (w, i*).*

- Figure 14.5 shows Anka's method of making loan choices.
- Anka has preferences over slack and peak consumption which are represented by indifference curves.
- What is Anka's budget line under the contract (w*, i*)?
- To find this, determine the vertical intercept w* and then draw a line sloping downward from it that represents her trade-off between slack and peak consumption. This is precisely the line w*C in Figure 14.4.
- Anka maximizes her utility at point C, which places her on the indifference curve marked U.
- Birju receives a profit of AC from this contract.
- We have drawn this diagram assuming that the left-hand panel of Figure 14.4 is in force.
- ***Now the question is, can Birju devise an alternative contract that places Anka on exactly the same indifference curve as before, but gives Birju a higher payoff?***
- If he can, then we conclude that the contract depicted in Figure 14.4 cannot be optimal from the point of view of Birju, the lender.
- The point at which the vertical difference between the indifference curve U and the line marked L(1 + i) is maximized is given by the point Ĉ, at which the tangent to the indifference curve is parallel to the L(1 + i) line.
- Birju could get Anka to choose this point as her consumption bundle provided he lowered the wage rate further (to ŵ), but charged exactly the same rate of interest on loans as his own opportunity cost, which is i.
- Birju's return will be ÂĈ, which is higher than AC.

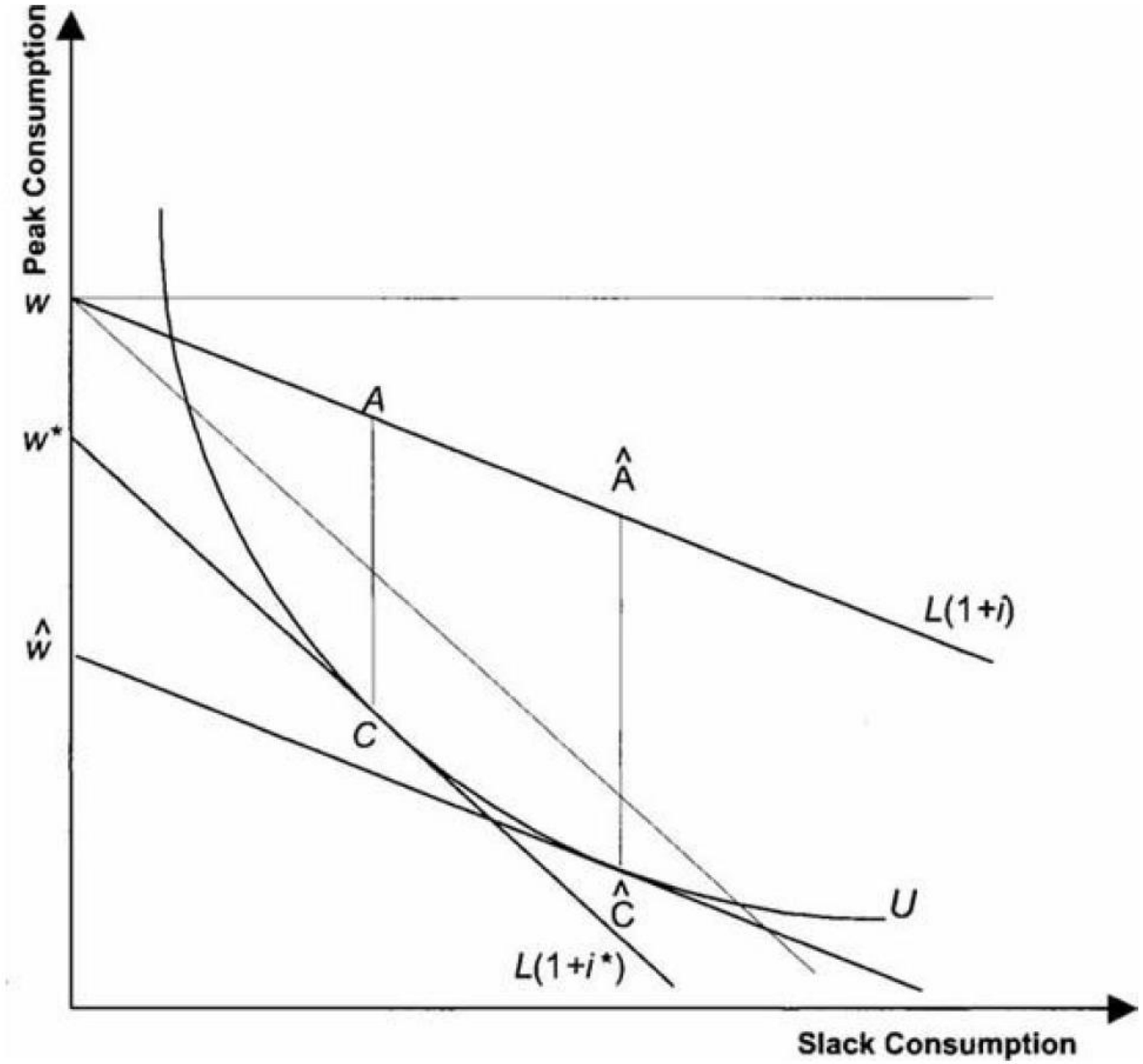

Figure 14.5. Anka's return from a contract (w, i*).*

- We may therefore conclude that the contract (w*, i*) depicted in Figure 14.5 can be dominated by another in which Birju asks for subsidized labor services (at the wage $\hat{w}$), but provides Anka with loans at exactly the rate of interest i.
- We may conclude, then, that the dominant contract to offer is indeed an interlinked contract!
- No extra interest is charged on the loan; all payments are made in “labor units.”
- The “maximal degree of surplus” that can be generated from the credit contract is given by the gap between the next best alternative for Anka (as captured by the indifference curve U) and the terms at which Birju can bring loans to her (as summarized by the interest rate i).
- The monetary value of this surplus can be captured by the vertical difference between the indifference curve U and the L(1 + i) line.
- However, to get Anka to take a loan that will generate the full surplus, the interest rate must not be distorted away from i (otherwise she will choose a different consumption package such as the one represented by the point C, as distinct from $\hat{C}$)
- Consequently, a best contract is one that taxes her labor, which Anka treats effectively as a lump-sum tax that does not distort her loan incentives (she has to “pay the tax” anyway regardless of loan size)

(b) Loan repayment in Output

- Let us consider a production loan
- Rahul, a small rice farmer, and Ayesha, a rice trader.
- Rahul sells his crop to Ayesha, who markets it.
- Rahul needs to borrow money for working capital to buy the seed, fertilizer, and other inputs to grow his rice.
- In this sense we can think of a working capital loan as an input in production; we can think of production as depending on the amount of money that is available to buy these inputs.
- We will depict output as physical units of rice multiplied by the market price of rice (net of costs of transportation), so now both inputs and outputs are in monetary units.
- The horizontal axis depicts various quantities of working capital and the vertical axis shows the resulting quantities of produced output, evaluated at the market price of rice, which we'll denote by p per unit.
- The production function that links input and output has the usual diminishing returns shape (because of fixed inputs such as land).

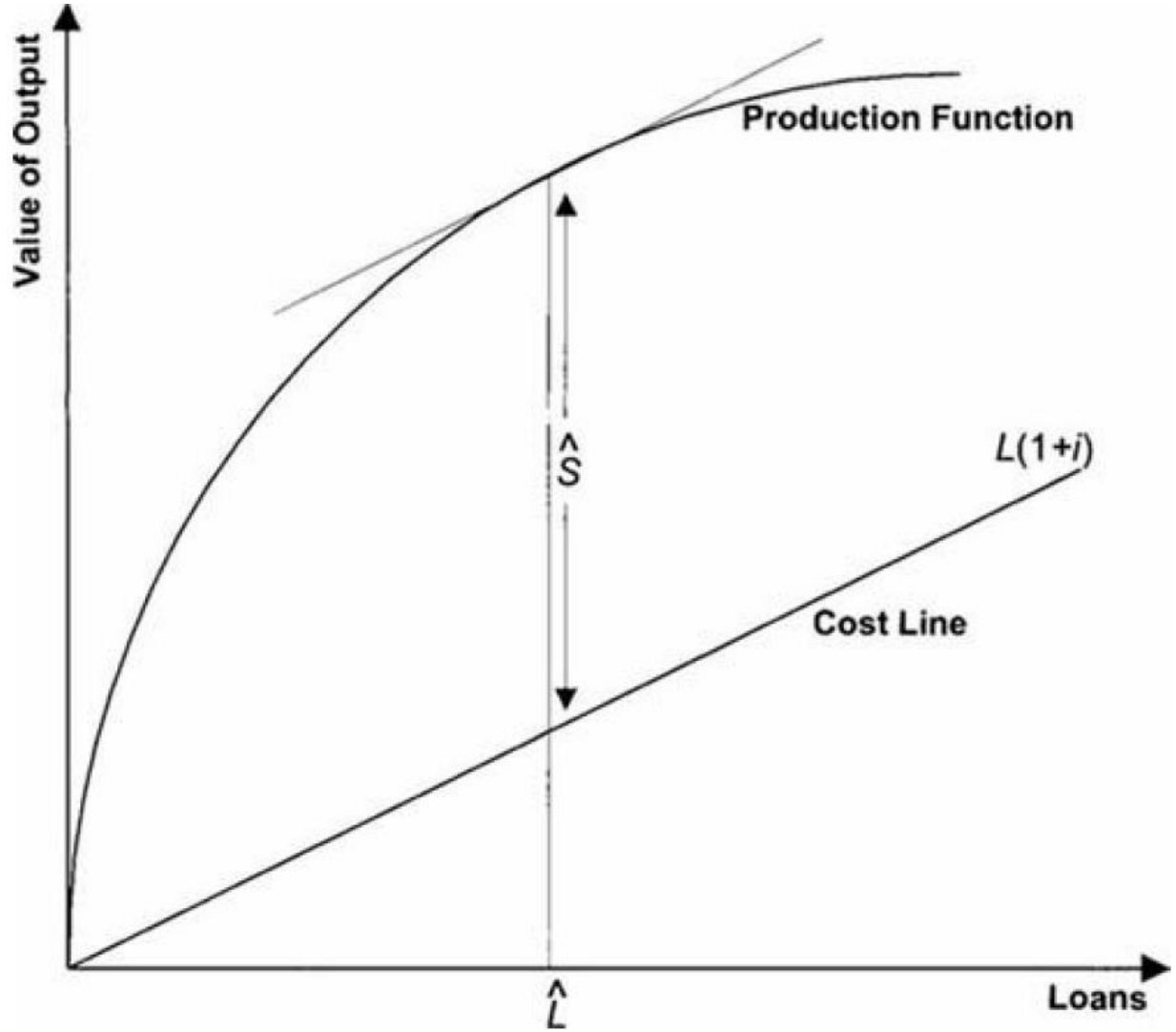

Figure 14.6. Working capital, output, and interest.

- Ayesha has access to loanable funds at an opportunity cost of i per unit
- For a loan size L the total cost of providing the loan is simply L(1 + i)
- Imagine for a moment that Rahul can get these loans at the very same rate of interest, or equivalently, that Ayesha owns Rahul's farm.
- In this imaginary combined operation, what would be the best choice of loan?
- The amount of working capital should be chosen to maximize the value of output net of the loan cost.
- This amounts to finding the loan size at which the vertical distance between the production function and the cost line is maximum in Figure 14.6
- Let the maximum profit or surplus generated in the combined business be $\hat{S}$
- However, in reality, Rahul cannot get loans at this rate of interest.
- Unlike Ayesha, he is a small farmer and the usual informational and collateral-based constraints that we have already discussed come into play.
- Nevertheless, this imaginary benchmark is useful, because it tells us something about the maximum possible surplus that is available in the system.
- **No loan contract can create a surplus greater than this**

- Imagine that in the absence of loans from Ayesha, Rahul can obtain some working capital loans from an informal lender and market his output through a trader.
- The profit that Rahul can realize from it: A.
- A is less than $\hat{S}$ because Rahul's loan sources aren't as good as Ayesha's.
- Thus A is a measure of Rahul's best alternative; Ayesha cannot push Rahul below this level of profit.
- Thus the maximum that Ayesha can hope to get from her dealings with Rahul is $\hat{S}$ — A.
- **Can Ayesha construct a contract that gets her this amount?**
- It is possible for Ayesha to offer a contract that prescribes both an interest rate as well as a price at which she will buy rice from Rahul for marketing.
- We may therefore think of a contract as a pair of numbers (p*, i*), where p* is a buying price and i* is the rate of interest.
- The contract is a pure credit contract if the price offered is no different from the market price p
- Otherwise, the contract is interlinked, in the sense that credit and output transactions cannot be disentangled.

- Now consider any pure credit contract.
- For Ayesha to make money out of such a contract, the interest rate charged must exceed the opportunity rate i, while at the same time Rahul can earn no less than A (which is his outside option)
- The interest rate is i*, so that Rahul faces a cost L(1 + i*) if he takes a loan of size L.
- This gives rise to a cost line that is steeper than the one in Figure 14.6
- Rahul will maximize his profits using the new cost line, and maximum profits are achieved at the.point L*, where the marginal product is equal to 1 + i*.
- Because marginal cost is higher than in the imaginary combined operation, the loan size chosen by Rahul must be smaller than L^
- Rahul's profits are given by the vertical segment BC, whereas Ayesha's returns (over and above normal trading profit) are given by the vertical segment CD
- BC + CD is the combined surplus generated by this pure credit contract, which is simply the total vertical distance between the production function and the opportunity cost line L(1 + i).

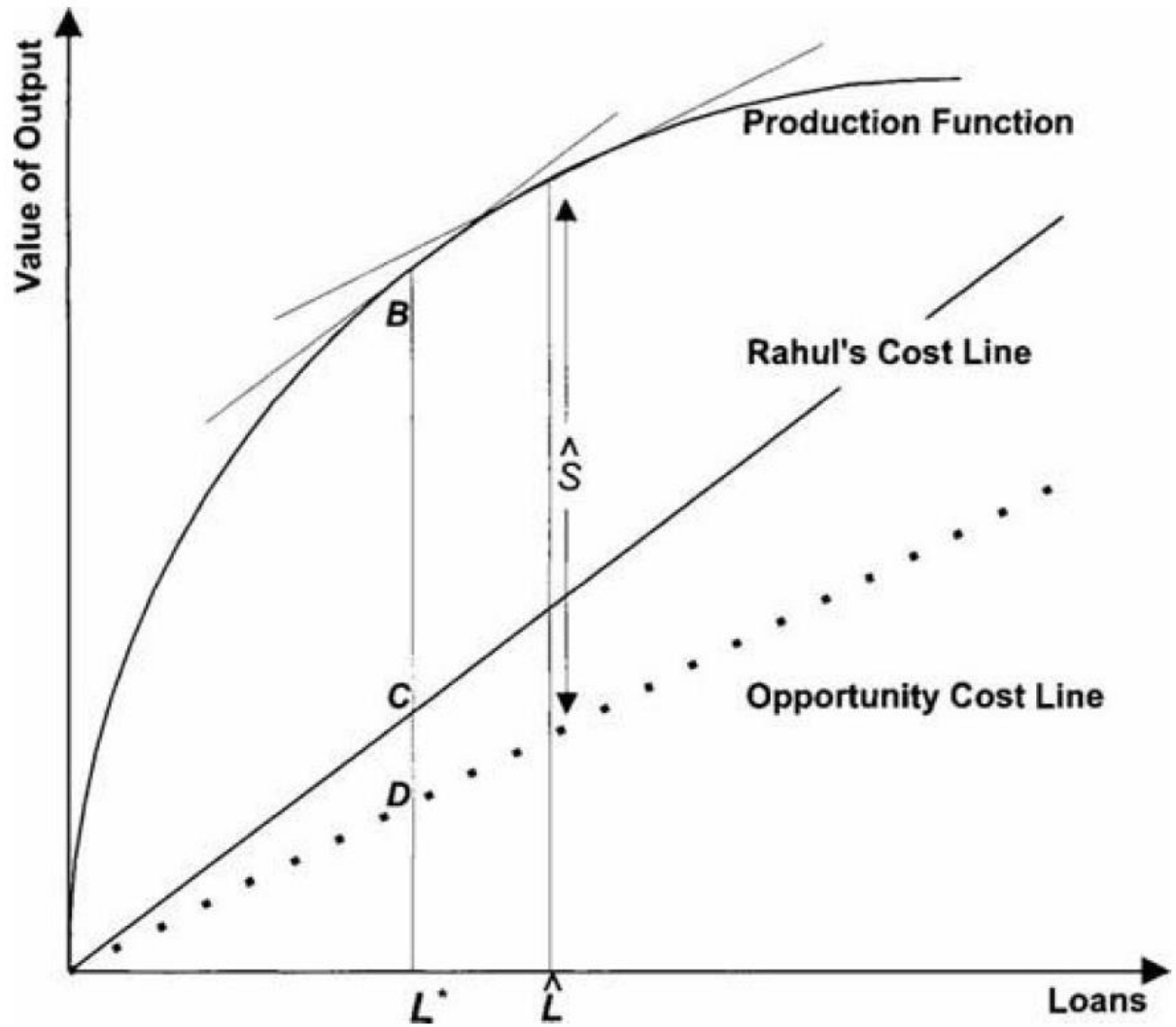

Figure 14.7. A pure credit contract.

- This surplus must be less than $\hat{S}$, which by definition is the maximum vertical distance between the production function and the opportunity cost line.
- Thus we have shown that a pure credit contract is inefficient: it distorts Rahul's loan choice away from the surplus maximizing point.
- Can Ayesha do better than a pure credit contract?
- The contract that actually attains the maximum possible return ($\hat{S}$ — A) for Ayesha turns out to be an interlinked contract.
- The idea of such a contract is to depress both Rahul's marginal cost of production and the price he receives for his output in equal proportion so that the ratio of price to marginal cost is left unchanged relative to p/(l + i)
- This kind of move is akin to a profit tax on Rahul, which is non-distortionary in this case.
- Rahul will continue to choose the same loan size as in the combined operation.
- Let Q^ be the value of output in the combined operation. Then, $\hat{S} = p\hat{Q} - (1 + i)\hat{L}.$
- Now impose a profits tax of t per dollar on the combined operation and choose its value so that $t\hat{S}$ = A. Multiplying through in the preceding equation yields: $t\hat{S} = pt\hat{Q} - (1 + i)t\hat{L}.$

- Now define a price p^ ≡ pt, and an interest rate such that 1 + i^ = (1 + i)t. Note that p^< p and i^< i.
- Offer this pair (p^ ,i^) as an interlinked contract to Rahul.
- Then, by construction, it is as if Rahul has been handed the combined operation (at Ayesha's opportunity cost of loans) and then been taxed on his profits at rate t.
- The tax on his profits cannot deflect his choice of loan from the efficient level.
- Maximizing profits must lead to the same action as maximizing t times profits.
- So under this contract, Rahul makes A. He generates a total surplus of Ŝ.
- Thus Ayesha picks up the difference: Ŝ – A. She can do no better.
- We have shown that an interlinked contract is optimal under these particular circumstances.
- The interlinked contract involves both a low buying price as well as a low rate of interest on loans.

Alternative Credit Policies

Vertical Formal-Informal Links: Expansion of Formal Credit to Informal Lenders

The policy of forging “vertical” links between the informal and the formal credit systems, rather than the more traditional policy of “horizontally” displacing one system by another

- The lending of formal funds to informal markets: Large landowners or traders are in a much better position to put up collateral
- From the point of view of the banks, they are good credit risks
- They then use the funds to cash in on their informational advantage in informal markets.
- The expansion of formal sector credit to these agents generates competition among them, and this hopefully improves the borrowing terms faced by individuals who fall outside the ambit of the formal credit system.
- Similarly, loans might be made to cooperative groups who are better placed to lend the funds because of social or religious ties among the members.

Mixed Results

- **Cost of Monitoring**

- " If formal credit is expanded, it is likely to increase the number of active moneylenders, which increases the alternatives available to borrowers. All other things being equal, this raises the probability of a default on an existing loan (because alternative sources are more abundant). To avoid this, a lender will have to expend more resources on tracking a loan and will also have to spend more time and money to clear a borrower's credit history. The increased administrative costs will raise the equilibrium rate of interest on a loan. Thus intensified competition can be counterproductive from the point of view of the borrowers"

- **Collusion**

" Lenders might engage in collusive transactions; they implicitly or explicitly agree to not invade each other's territory, thereby giving them local monopolies in their spheres of influence"

- **Differential Information**

- **"**Lenders may have differential information regarding borrowers. For instance, lender A may be able to easily distinguish between good and bad credit risks, whereas lender B cannot. Then lender A essentially contaminates the pool for lender B, because he siphons off the good borrowers. Of course, if A faces a credit ceiling, he cannot siphon off all the good borrowers. Thus B faces a mix of borrowers. The mix might still be profitable enough for lender B to operate. An expansion of formal-sector credit will allow A to siphon off even more good borrowers. This might contaminate the available pool to B to the extent that he no longer finds it profitable to operate. The increase in A's activities may be more than offset by the shutdown in B's lending"