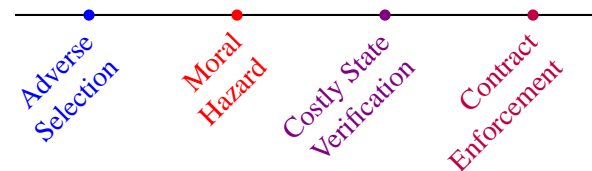


Credit and Microfinance: Enforcement & Savings

Dr. Kumar Aniket

Lecture 4

Lender's Contract Prism



Adverse Selection: Ascertaining the borrower's risk type.
~> *Borrower invests and thus initiates the project*

Moral Hazard: Ensuring that the borrower exerts high effort.
⦿ *Project concludes and its outcome is realised*

Costly State Verification: Verifying the project's actual outcome

Enforcement: Forcing the borrower to repay

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Loan Contract & Strategic Default

Lender offers borrower the following contract:

1. Loan amount 1
2. Interest rate r
3. Duration $\dots 1$ time period

After output realisation, borrower chooses:

Involuntary Default: Insufficient output for repayment.

\dots *borrower has no option but to default*

Strategic Default: Sufficient output for Repayment obligations

\dots *borrower chooses to default*

Assume away **Involuntary Default** to focus on **Strategic Default**.

Output realisation is always greater than r

Contract Enforcement

Interaction between the *lender(s)* and *wealth-less borrower(s)* in the context of credit markets.

Explore the interaction between borrower's limited ability to enforce contracts and borrower's incentive to default strategically.

Ideal world: Lender has *unlimited ability to enforce contracts*, i.e., punish strategic defaulters \rightarrow Obtains repayment with certainty.

Limited enforcement capability \rightarrow lender obtains repayment in the cases where the punishment exceeds the borrower's benefit from defaulting.

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Enforcement Set Up & Penalty Function

Project: 1 unit of capital investment yields x . x is distributed on $[\underline{x}, \bar{x}]$ according to the distribution function $F[x]$.

Intuition: There is some external factor beyond the control of the borrower affecting the value of the project output.

If the borrower could affect the value, it would be a moral hazard environment.

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Project Examples

A buyer in the UK borrows and buys a flat in London

The value of the flat in the future depends on the housing market and is beyond the control of the buyer.

A farmer in Kenya borrows and buys a buffalo The output of the buffalo depends on the price of the milk in the local market which is beyond the farmer's control.

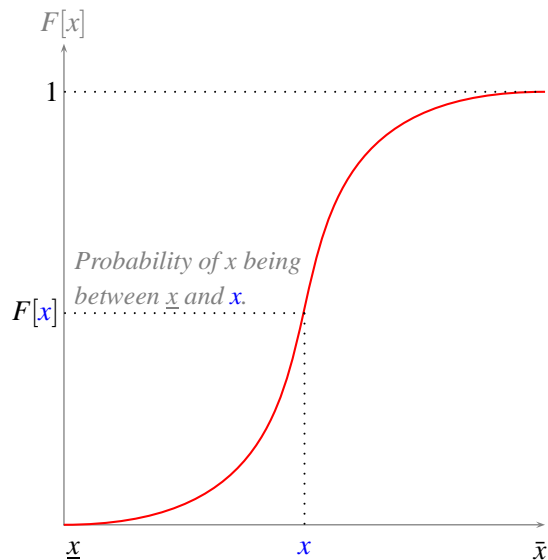
↪ **Lender's Penalty**: In case of a threat of default on the borrowing, the lender can **penalise** the borrower by confiscating the project output, i.e., the flat or the buffalo.

↪ The higher the value of the flat or milk, the more reluctant the borrower is to

... part with the project
... default on the loan

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Distribution of x



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Set Up & Penalty Function

Project: 1 unit of capital investment yields x . x is distributed on $[\underline{x}, \bar{x}]$ according to the distribution function $F[x]$.

Penalty Function $p(x)$: the output contingent penalty that the lender can impose on the borrower(s) once the project has been completed and the output x has been realised.

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Penalty Function

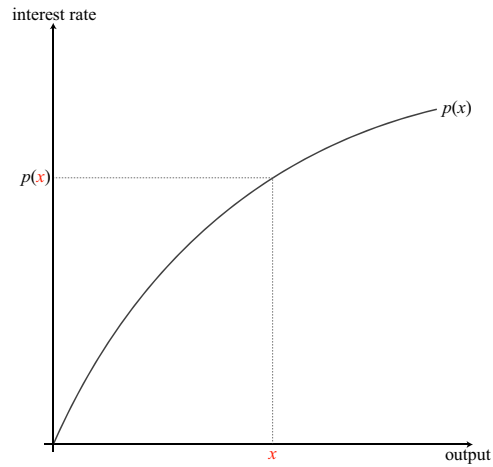


Figure: Penalty Function

Threshold Function

Threshold Function $\phi(r)$: Given r , it gives the threshold output beyond which the borrower would choose to repay. Conversely, if the project output is below this threshold output, the borrower would choose to default strategically.

Inverse of the penalty function.

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Threshold Function

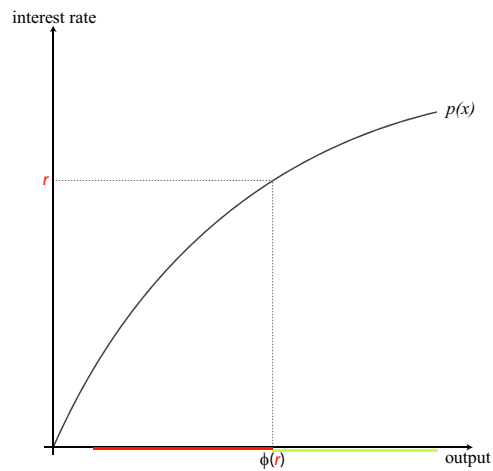


Figure: Penalty and Threshold Function

Threshold Output

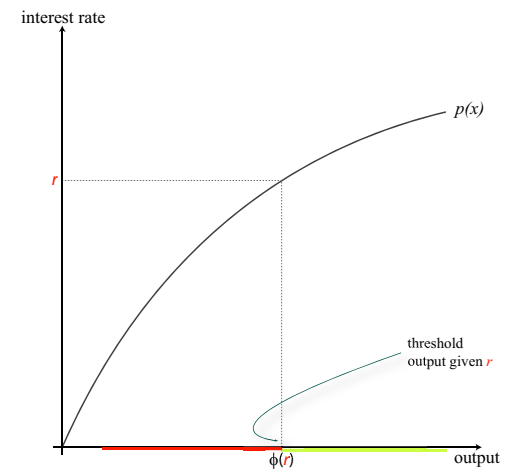


Figure: Threshold Output

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– Under individual lending, the loan repayment has the following pattern

Case	Project output range	Loan status
A	Greater than $\phi(r)$	Repay
B	Otherwise	Default

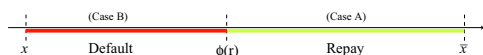


Figure: Default and Repayment Regions

Individual Lending Repayment Rate:

$$\Pi_I(r) = 1 - \underbrace{F[\phi(r)]}_{\text{Default Rate}} \quad \Pi'_I(r) < 0$$

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Group Lending without Sanction

Groups are composed of two ex ante identical, B1 and B2.

Group Contract:

The group gets 2 unit of investment capital for the project

The group has a collective repayment obligation of $2r$ once the projects are completed.

Joint-Liability: Both borrowers are penalised if this repayment obligation is not met by even one borrower.

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Loan repayment pattern under group lending:

Case	Project output range	Group Loan status
C	At least one greater than $\phi(2r)$	Repaid
D	Both between $\phi(r)$ and $\phi(2r)$	Repaid
E	Otherwise	Not Repaid

Group Lending Repayment Rate:

$$\Pi_G(r) = 1 - \underbrace{\left\{F[\phi(2r)]\right\}^2}_{\text{Case C}} + \underbrace{\left\{F[\phi(2r)] - F[\phi(r)]\right\}^2}_{\text{Case D}}$$

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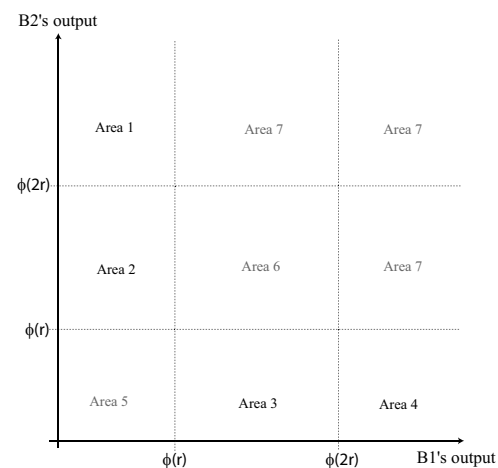


Figure: Advantages and Disadvantage of Group Lending

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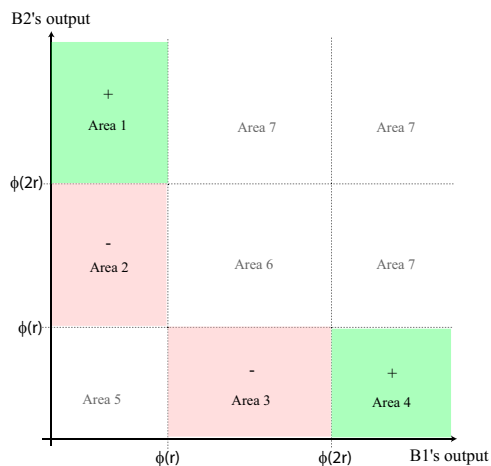


Figure: Advantages and Disadvantage of Group Lending

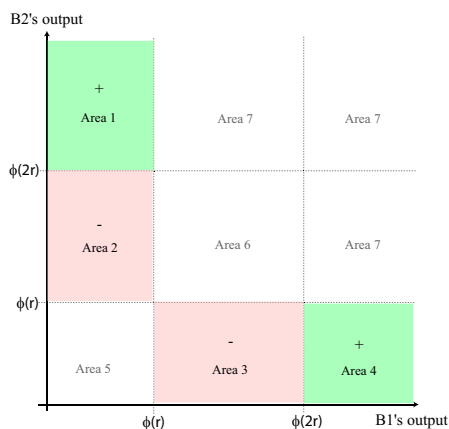
Figure 6 allows us to compare group lending with individual lending.

- + Under Area 1, B1 would have defaulted under individual lending. The loans are repaid under group lending. Similarly for Area 4 for B2.
- Under Area 2, B2 would have repaid under individual lending but does not pay under group lending due to joint liability. Similarly for Area 3 for B1.

Area 5: Official penalty is not strong enough to give either borrower incentive to repay.

Area 6: Both borrowers prefer repaying r to incurring official penalties.

Area 7: The group always repays back since repaying $2r$ is better than incurring official penalties.



- Under Area 1, B1 (B2) would have defaulted under individual lending. The loans are repaid under group lending.
- Under Area 2, B2 would have repaid under individual lending but does not pay under group lending due to joint liability.

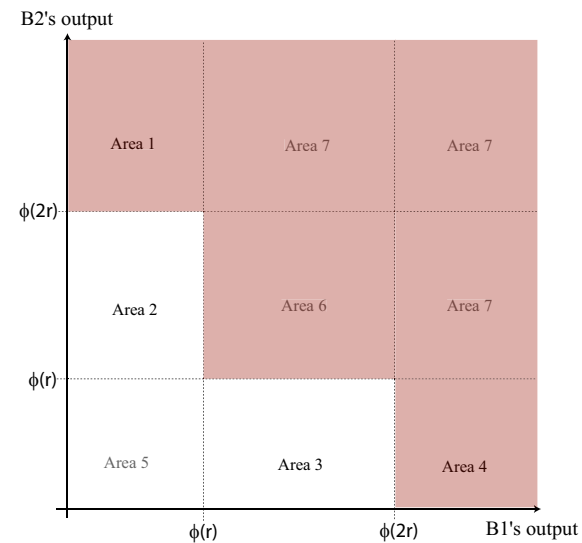


Figure: Repayment Area in Group Lending without Social Sanction

Group Lending with Social Sanction

Analyse the group member's ability to social sanction each other, which can be used to amplify the effect of lender's penalty.

Group members impose a negative externality on each other when one group member would like to pay off her own loan but defaults because her peer is going to default.

Social Sanction s : If a group member imposes a negative externality on her peer, she faces a social sanction s in response.

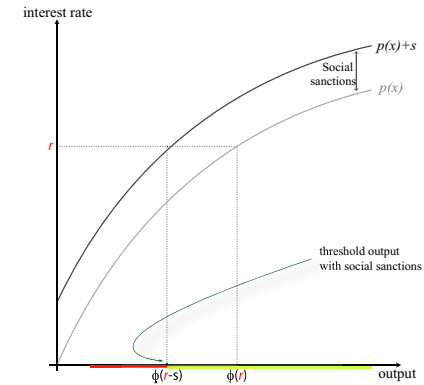
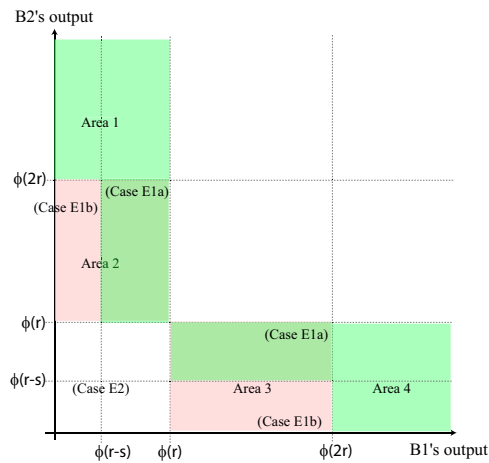


Figure: Threshold Output with Social Sanctions

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$$\Pi_{G_s}(r) = 1 - \{F[\phi(r)]\}^2 - 2F[\phi(r-s)]\{F[\phi(2r)] - F[\phi(r)]\}$$

(Repayment Rate with Social Sanctions)

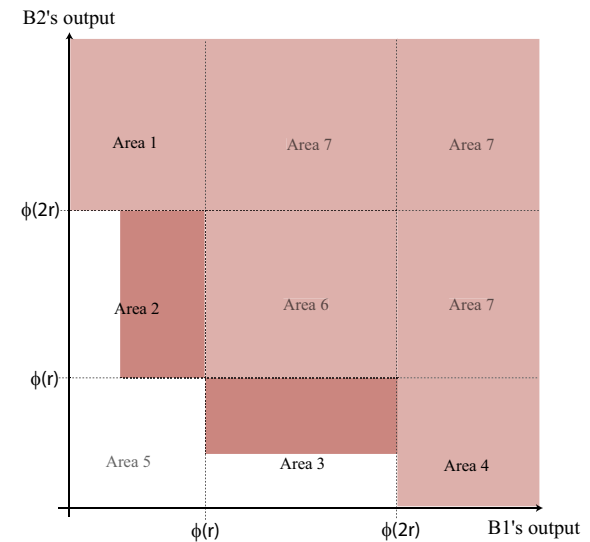


Figure: Repayment Area in Group Lending *with* Social Sanction

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Under harsh social sanctions, i.e., the repayment rate reduces to

$$\lim_{s \rightarrow r} \Pi_{G_s} = 1 - \{F[\phi(r)]\}^2$$

It should be easy to check that Π_{G_s} is greater than Π_G and Π_I .

With sufficiently strong social sanction, a borrowing group enforces repayment rate which is better than individual lending and group lending without social sanctions.

Group Lending without social sanction:

Advantage: Borrower with high output pay for borrowers with low output

Disadvantage: Borrowers with moderate output may default even though they would have repaid in individual lending

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Wealth

Microfinance lenders across the world require that borrower repay much before the completion of the project

Periodicity: Frequency of loan repayment

Periodicity used by microfinance institutions to compensate for lack of collateral

Force borrower to acquire **stake** in their own projects

Borrower need to have some **wealth** to be able to borrow.

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Related Ideas

Rai, A. S. & Sjöström T. (2004): Reducing the deadweight punishment when the lender cannot distinguish between involuntary and strategic default.

Jain, S. & Mansuri, G. (2003): The lender uses the local money lender's capabilities by setting very tight repayment schedules.

Exercise based on *Ghatak and Guinnane (1999)*: Analyses the enforcement problem in a much simpler setup using risk averse borrowers.

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Savings

Poor have extremely volatile income streams

Require savings instruments to be able to

Smooth consumption Self-insure Save towards lumpy investments

Poor are offered no saving instruments in the rural credit market

Moneylender lends but does not take any saving deposits. Why?

Covariate Risks Transaction Costs

How can Microfinance institutions help?

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⊙ *Case-study of a Microfinance Institution in Haryana*

Documents the innovative design features of India's new national microfinance programme.

○ Lender offers saving opportunities

... by *restricting* loans to the group
... creates *intra-group* competition for loans

○ Individuals can join a *group* as either a *borrower* or a *saver*

- *Borrower* partly self-finance's the buffalo
- *Saver* co-finance's the borrower's project

... and gets a premium interest rate on her savings

⊙ We observed

- *Intra-group income heterogeneity*
- *savers were poorer than borrowers*

Offering saving opportunities in group lending would lead to *negative assortative matching* along *wealth* lines:

Rich and poor match in the same group.

Could potentially initiate a chain where the poor who get wealthier match with the other poor people and uplift them out of poverty