Banks, Money and the Credit Market

Economics

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Lecture 10

Context

Markets for goods and services allow parties to interact in mutually beneficial ways. *(Units 6-9)*

In most markets, money is the medium of exchange.

- How do banks *create money*?
- How do *banking systems* affect *individual consumption choices and economic outcomes*?
- What are the *limitations of the banking system*?

This lecture

Model how individuals *borrow, save* and *invest*

Understand the *role of commercial banks* and the *central bank* in the economy

Explain how *banks make money* and the *risks they face and pose*

Money

Money A medium of exchange used to purchase goods or services

bank notes, bank deposits, cheques, …

Money allows purchasing power to be transferred among people

For money to do its work, everyone else must trust that others will accept your money as payment.

Income and Wealth

Wealth Stock of things owned or value of that stock.

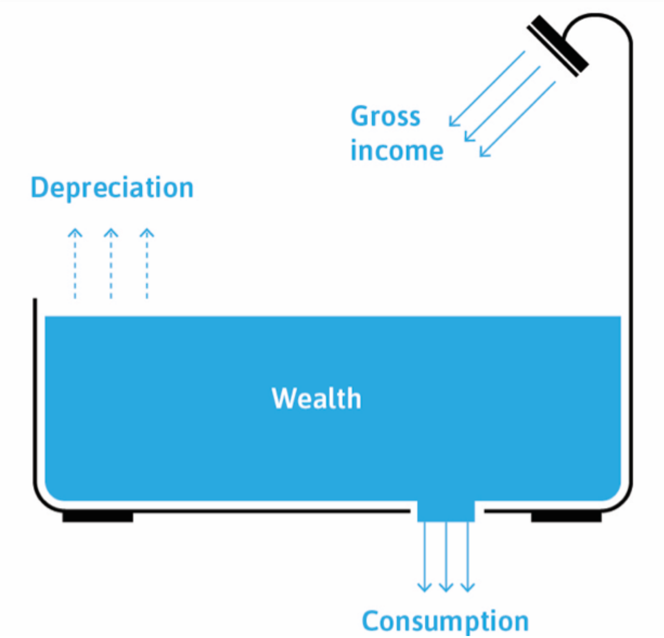
= *buildings, land, machinery, capital goods*

– *debts owed*

+ *debts owed to you*

Income The amount of money one receives over some period of time (flow)

from market earnings, investments, government.


Gross
income
Depreciation
Wealth
Consumption

Other Key Concepts

Depreciation
: *reduction* in the value of a stock of wealth over time.

Net income
: The *maximum* amount that one could *consume* without running down wealth.

  Net income = gross income - depreciation

Earnings
: Wages, salaries, and other income from labour.

Savings
: Income that is *not consumed*

Investment
: Expenditure on newly produced capital goods.

Consumption over time

Trade-off There is a trade-off between consuming goods *now* and *later*.

Opportunity cost The opportunity cost of having *more goods now* is *having fewer goods later*.

Borrowing allows us to *increase* our consumption today and *reduce* our consumption tomorrow

Lending allows us to *reduce* our consumption today and *increase* our consumption tomorrow

Borrowing

Borrowing allows us to consume more now at cost of consuming less tomorrow

r

Interest rate

the price we pay for moving consumption from tomorrow to today

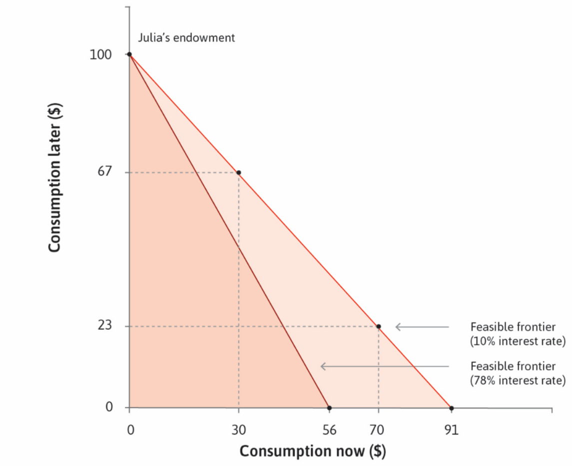
$1 + r$ tradeoff between current and future consumption

marginal rate of transformation (MRT)

Julia earns 100 tomorrow and 0 today

She can borrow against her future income

Her feasible consumption set decreases as interest rate increases from 10% to 78 %



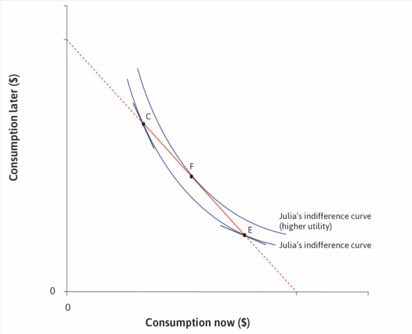
Preferences for consumption

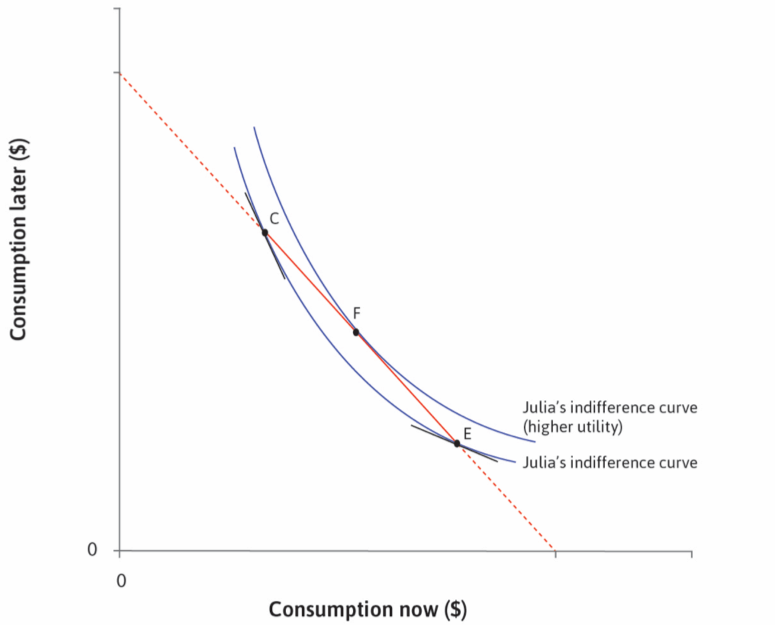
- Borrowing allows us to bring consumption forward
  - How much consumption an individual will bring forward depends on:
    - *consumption smoothing*
    - *impatience*

Consumption smoothing

Diminishing marginal returns to consumption: The value of an additional unit of consumption declines, the more consumption the individual has.

An individual *smoothes their consumption* to avoid consuming a lot in one period and little in the other.




Consumption later ($)
C
F
E
Julia's indifference curve
(higher utility)
Julia's indifference curve
0
0
Consumption now ($)

Pure impatience

Consumption smoothing may appear as being *impatient*.

However, we differentiate it from *pure impatience*

Pure impatience *being impatient as a person*

Myopia

short-sightedness

People experience the present satisfaction more strongly than the same satisfaction later

Prudence People know that they *may not be around in the future*, and so they want to *consume now*

How much more do you value a good now than later, if your endowments are the same in both periods?

Optimal Consumption decision

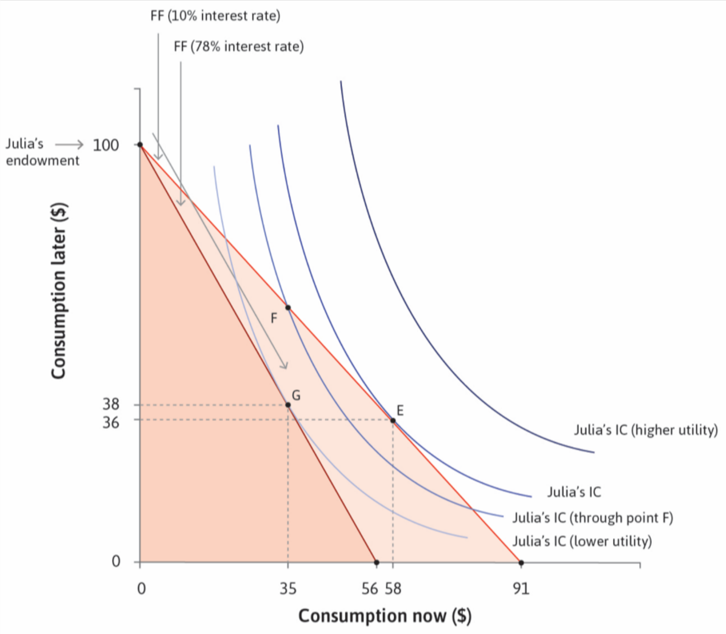
Discount rate (ρ): a measure of a person's impatience.

- Consumption smoothing
- Pure impatience

Individual borrows at the point where discount rate
equals
interest rate

Marginal rate of substitution = Marginal rate of transformation

$$1+\rho = 1+r$$

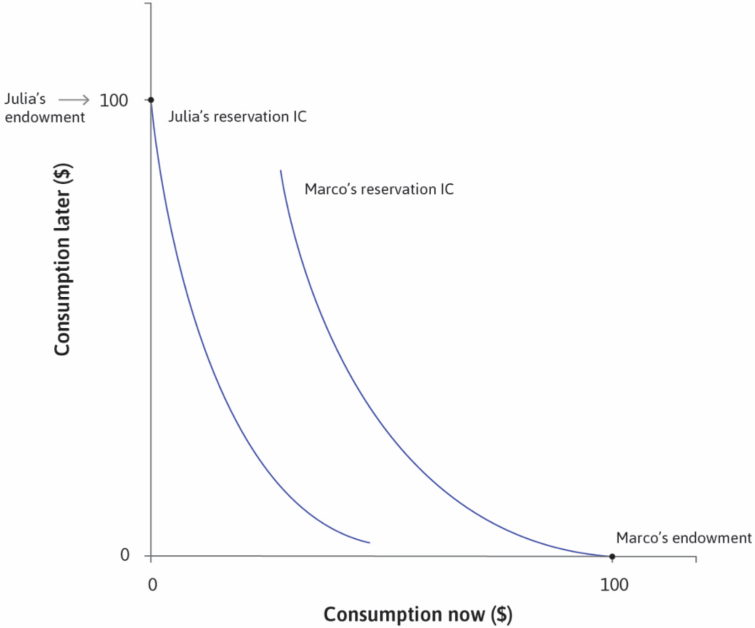

FF (10% interest rate)
FF (78% interest rate)
Julia's endowment
100
38
36
0
Consumption later ($)
F
G
E
Julia's IC (higher utility)
Julia's IC
Julia's IC (through point F)
Julia's IC (lower utility)
0
35
56
58
91
Consumption now ($)

Borrowers and savers

Reservation indifference curve all of the points at which the individual would be just as well off as at the reservation position (endowment point).

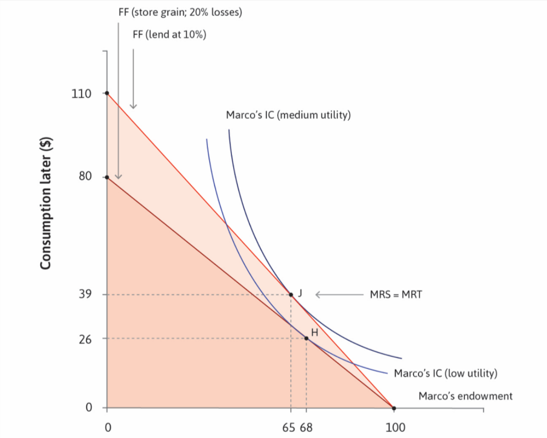
Different indifference curves The borrower and the saver have *different indifference curves* because they have *different endowments*.

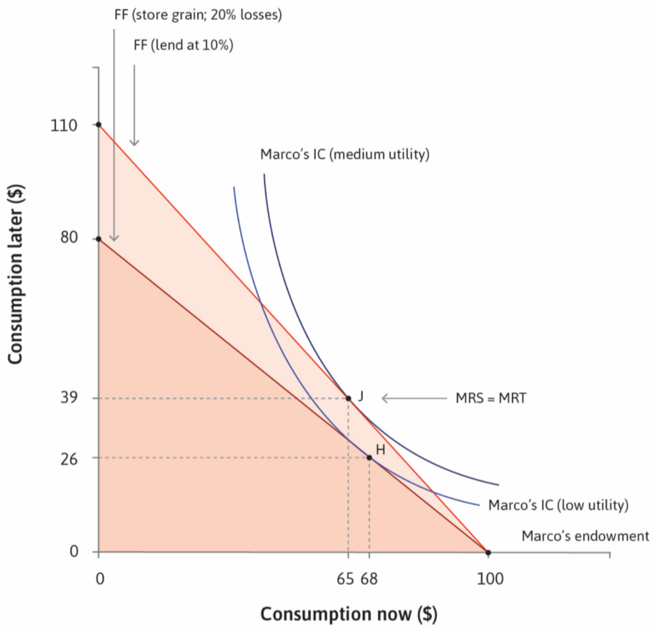
Julia's endowment	0 today, 100 tomorrow
Macro's endowment	100 today, 0 tomorrow


Julia's endowment
100
Julia's reservation IC
Marco's reservation IC
Marco's endowment
0
0
100
Consumption later ($)
Consumption now ($)

Saving and lending

A *saver* smoothes his consumption by postponing it into the future. *Lending money* at interest *expands the saver's feasible set*, compared to simply storing it.



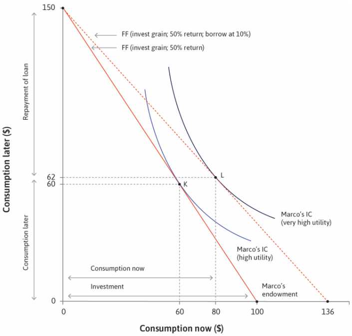

FF (store grain; 20% losses)
FF (lend at 10%)
Marco's IC (medium utility)
MRS = MRT
J
H
Marco's IC (low utility)
Marco's endowment
110
80
39
26
0
0
65
68
100
Consumption later ($)
Consumption now ($)

Investment

Investment is another way to move consumption to the future

Combination of *investing* and *borrowing* at the same time can *increase consumption in both periods*

An individual's situation e.g. *wealth* and *income affects* their opportunities to engage in these activities



Marco's investment and borrowing

Marco's *endowment* is 100 today, 0 tomorrow

Marco gets 50% *returns on his investment*

Macro can *borrow* at 10%

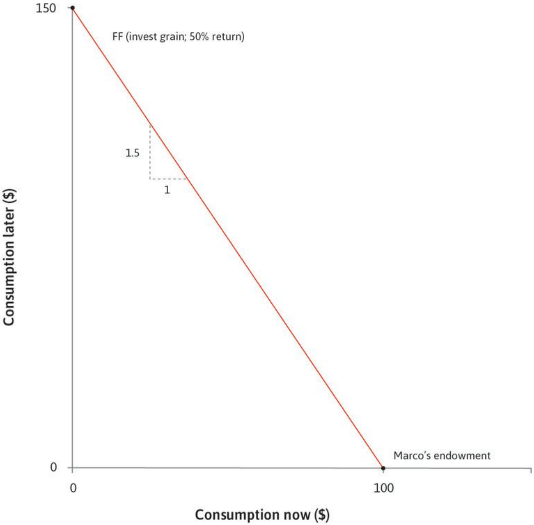
Macro *invests* 100 and get 150 tomorrow from his investment project

Marco *borrows* 80 to consume today and repays back $80 \times (1 + 0.1) = 88$

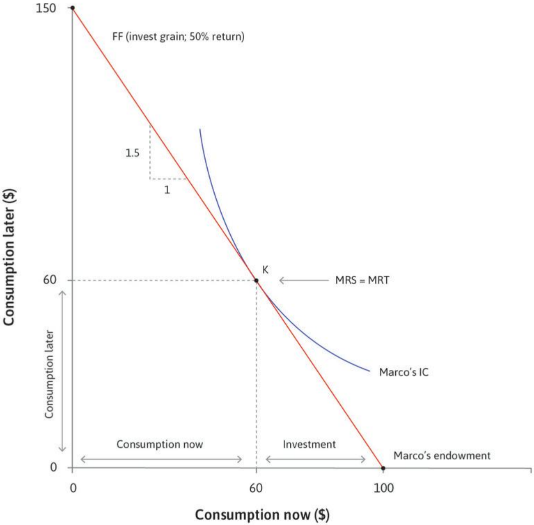
Marco *consumes* 62 tomorrow.

> Marco earns 150 and is left with 62 to consume after he makes the loans repayment of 88.

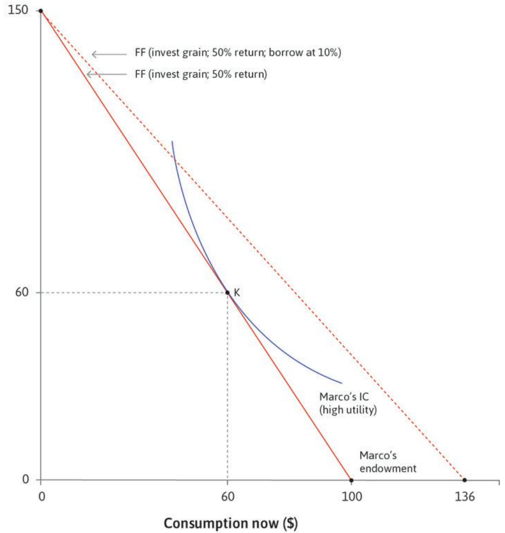
Macro has *an investment opportunity* that gives him *a return of 50%*. This implies that $r = 0.5$.



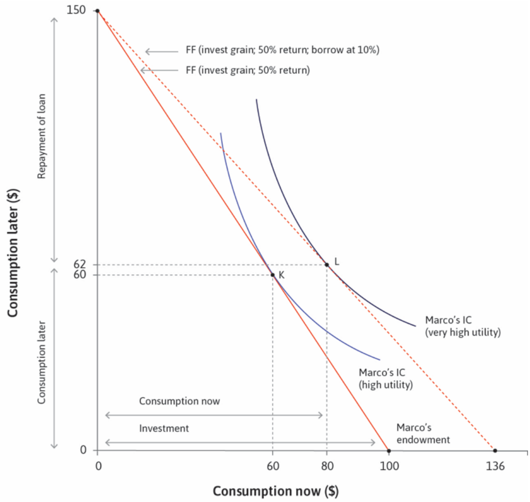
Macro's *optimal decision* would be to invest 40 and consume 60 now. The 60 invested today allows him to consume 90 tomorrow



Macro is *wealthy* and *banks are ready to lend to him at 10%* interest rate. At 10% interest rate, he can thus borrow 136 today in against 150 tomorrow.



Macro *invests all he has today*, i.e., 100 and *borrows at 10% to consume today*. What he borrows today, He *pays back his loan* tomorrow with his *earnings tomorrow*.



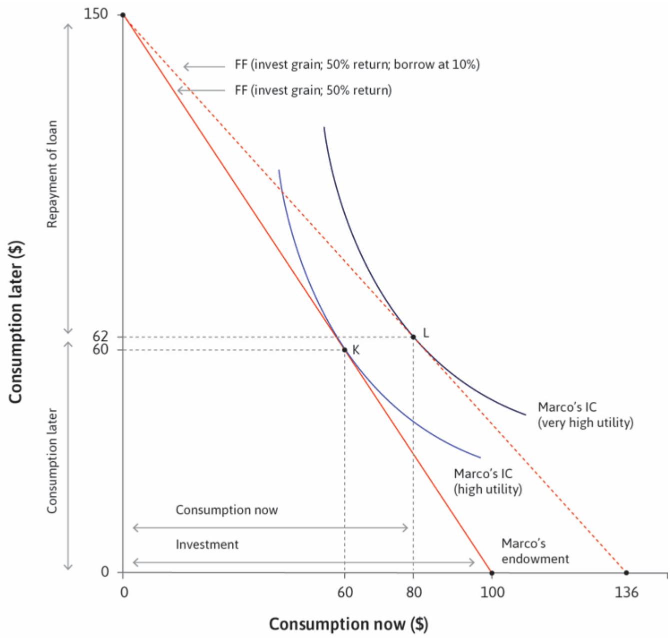
Rich versus Poor

Wealthy

- Wealthy have *investment projects with high returns*
- Wealth can *borrow at low interest rates*
    - *Collateral*

Poor

- Poor have *investment projects with low returns*
- Poor *borrow at high interest rate or refused loans*
    - *No collateral*



150
FF (invest grain; 50% return; borrow at 10%)
FF (invest grain; 50% return)
Repayment of loan
Consumption later ($)
62
60
L
K
Marco's IC
(very high utility)
Consumption later
Marco's IC
(high utility)
Consumption now
Investment
Marco's
endowment
0
0
60
80
100
136
Consumption now ($)

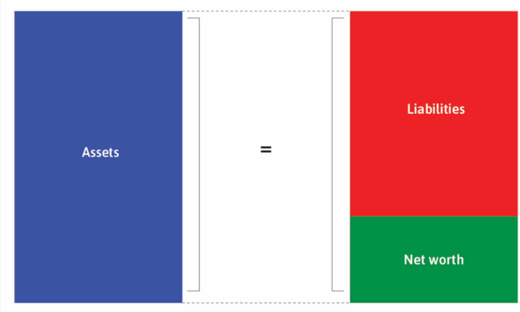
Balance sheet

Balance sheet summarises what the household or firm owns, and what it owes to others.

Assets Anything of value that is owned

Liabilities Anything of value that is owed

Net worth = assets - liabilities



Balance sheet and wealth

Wealth or net worth does not change when you lend or borrow

- Loan adds both *assets* and *liabilities* to the balance sheet
- the *borrowed money* (cash) is an asset, the *debt* is an equal liability

	JULIA'S ASSETS		JULIA'S LIABILITIES	
Now (before consuming)	Cash	\$58	Loan	\$58
			Net worth = \$58 - \$58	0

	JULIA'S ASSETS		JULIA'S LIABILITIES	
Now (after consuming)	Cash	0	Loan	\$58
			Net worth	-\$58

	JULIA'S ASSETS		JULIA'S LIABILITIES	
Later (before consuming)	Cash	\$100	Loan	\$64
			Net worth = \$100 - \$36	\$36

	JULIA'S ASSETS		JULIA'S LIABILITIES	
Later (after consuming)	Cash	\$64	Loan	\$64
			Net worth	0

Banks

Bank — a *firm that makes profits by lending and borrowing*

Banks borrows from households (deposits), other banks, and the central bank.

Bank's profits — The *interest they pay on deposits is lower than the interest they charge on loans*, which is how banks make profits.

Central bank

Base money or legal tender: = notes and coins. money as legal tender.

Legal tender has to be accepted as payment by law

Central bank is the only bank that can create legal tender.

Central bank is usually owned by the government

acts as the banker for the commercial banks, who have accounts at the central bank that hold legal tender

by crediting these accounts, the central bank can create money.

What is money?

Money is the purchasing power you have at your disposable

The actual notes and coins in the country is much less than what is people have in the bank.

Bank money is the money you can use whenever you want, i.e., your purchasing power

Base money is the actual money which is much less the total bank money

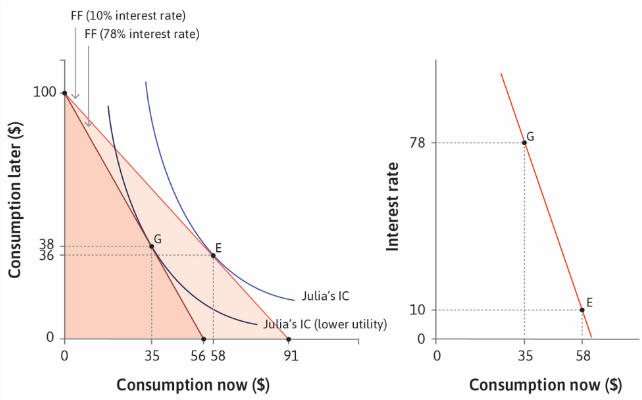
Broad Money $= \textit{base money} + \textit{bank money}$

Central bank controls broad money by controlling the base money

Policy rate and the economy

The central bank's *policy interest rate* affects the *level of spending* in the economy, because *households and firms borrow to spend*.

higher interest rate → low spending today



Principal-agent problem

Agent takes an action that is hidden

Principal requires the action taken but can't observe it

Principal-agent problem a *conflict of interest between principal and agent*, about some *hidden action* or attribute of the agent that *cannot be enforced* or *guaranteed in a binding contract*.

e.g. Lending Borrower takes a *loan* from lender for a project

If borrower *does use loan properly*, then she defaults and lender lose his money.

Borrower's loans usage is the hidden action in this case.

Equity and collateral

To resolve the conflict of interest between the principal (lender) and the agent (borrower):

Equity the lender may require the borrower to put some of her wealth into the project

Collateral the borrower has to set aside property that will be transferred to the lender if the loan is not repaid

Both *equity* and *collateral* give the borrower the incentive to take actions to ensure that the project succeeds, thus creating conditions for the loans to be repaid back.

They *resolve the conflict of interest* between the borrower and lender.

Credit rationing and Inequality

Those with less wealth find it more difficult to provide *equity* or *collateral*.

Credit rationing when those with less wealth

- borrow on unfavourable terms compared with those with more wealth (credit-constrained)
- or are refused loans entirely (credit-excluded)

Inequality may increase when some people are in a position to profit by lending money to others.

Credit-rationing increases inequality: people with limited wealth are not able to profit from the investment opportunities that are open to those with more assets.

Example: Credit-rationing

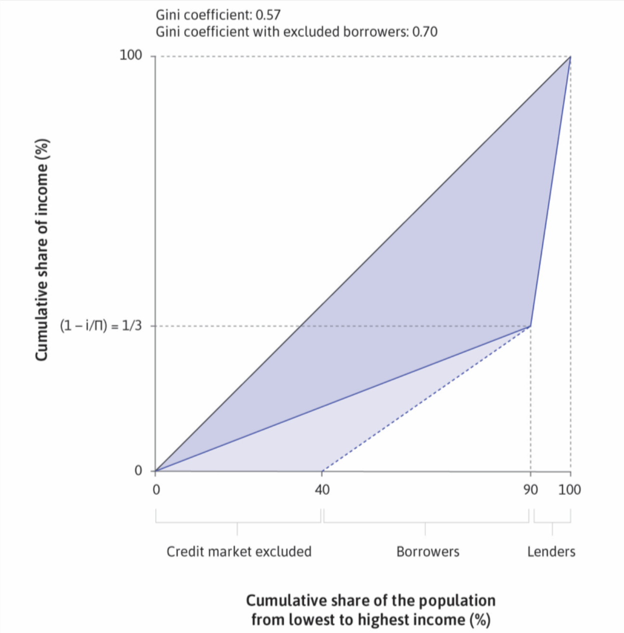
Economy: 90 farmers who borrow from 10 lenders at 10% interest rate.

Project: farmer's projects give a 15% return on investment.

Gini coefficient

when 0 farmers are excluded: *0.57*

when 40 farmers are excluded: *0.70*


Gini coefficient: 0.57
Gini coefficient with excluded borrowers: 0.70
100
(1 – i/Π) = 1/3
0
Cumulative share of income (%)
0
40
90
100
Credit market excluded
Borrowers
Lenders
Cumulative share of the population from lowest to highest income (%)

Summary

Ways to move consumption into the future

- Borrowing, saving, investing
- Options available depend on individual's endowment
- Optimal choice depends on individual's discount rate

Outline of the banking system

- Banks create money (lend) to make profits
- Central bank sets the policy rate, which influences spending
- Credit constraints create additional problems