Banks, Money and the Credit Market

ECONOMICS

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UCL

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

allows transfer of purchasing power

. . . bank notes, bank deposits, cheques etc.

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

Why do we trust sterling?

Income and Wealth

Wealth **Stock** of things owned or value of that stock.

= *buildings, land, machinery, capital goods*

– *debts you owe*

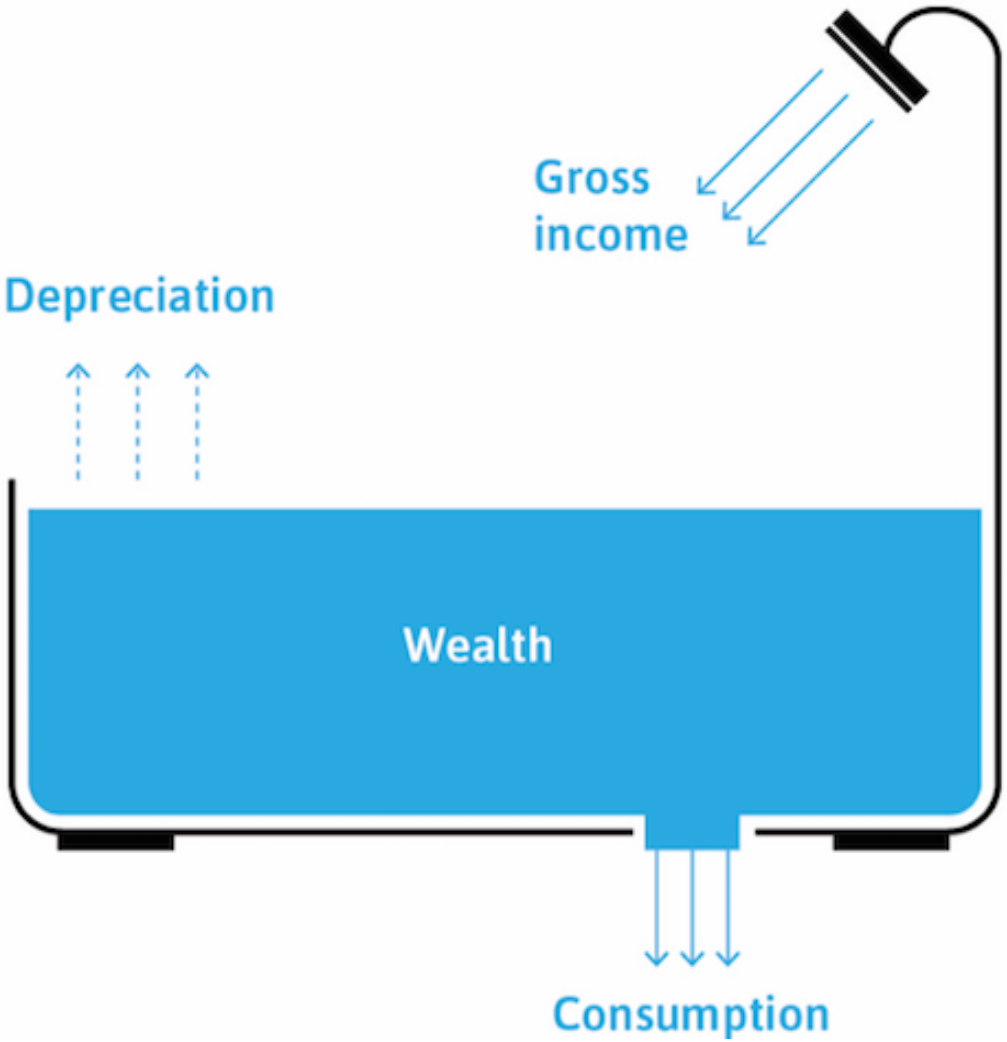
+ *debts owed to you*

Income . . . **flow**

The amount of money a person receives over some period of time

. . . from labour market (earnings), investments (returns), government (transfers)

Wealth as Stock



Stock

Wealth

Flow

Gross income

Consumption

Depreciation

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

Consumption 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 later

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

Borrowing

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

r *Interest rate*

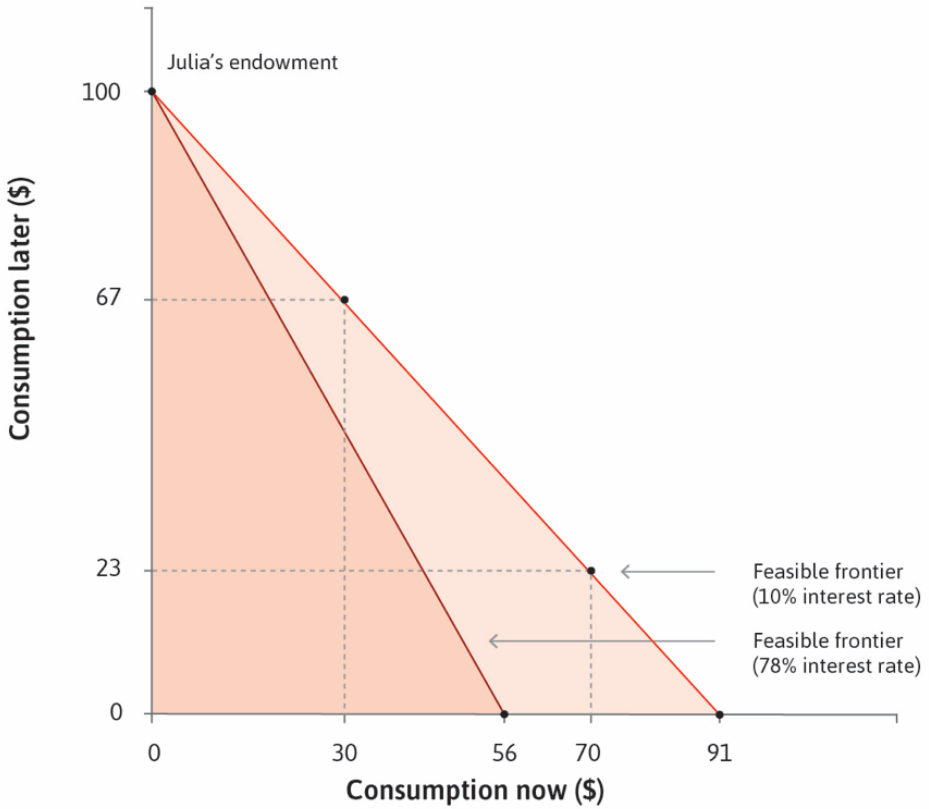
the price we pay for moving consumption from later to today

$1+r$ tradeoff between current and future consumption

Marginal rate of transformation (MRT)

slope of the *feasible consumption set* or the *budget constraint*

Borrowing

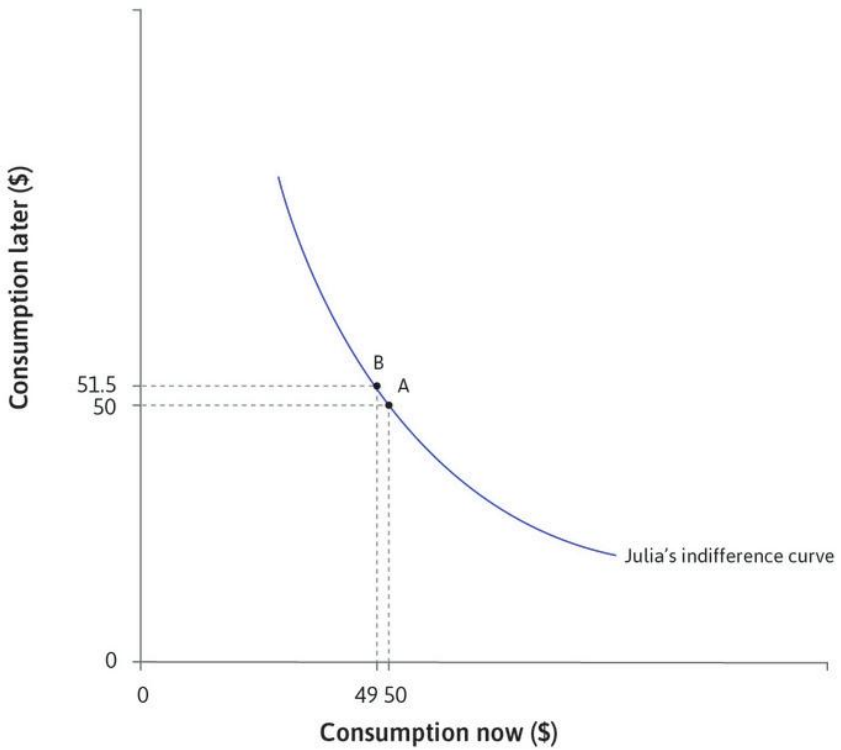


Julia earns 100 later and 0 now

She can borrow against her future income

Her *feasible consumption set* decreases as interest rate increases from 10% to 78%. The maximum she can consume now has decreased to 56.

Julia's Indifference Curve



Moving her indifference curve from $A \longrightarrow B$, Julia is ready to trade-off

$1 of *consumption now* for $1.5 of *consumption later*

Marginal Rate of Substitution: slope of indifference curve at A is 1.5 *(absolute value)*

Discount Rate

Discount Rate: ρ

A measure of person's impatience

how much the person values an additional unit of *consumption now* relative to an additional unit of *consumption later*

It is the slope of the person's indifference curve minus one.

Marginal Rate of Substitution

$$1+\rho$$

Preferences for consumption

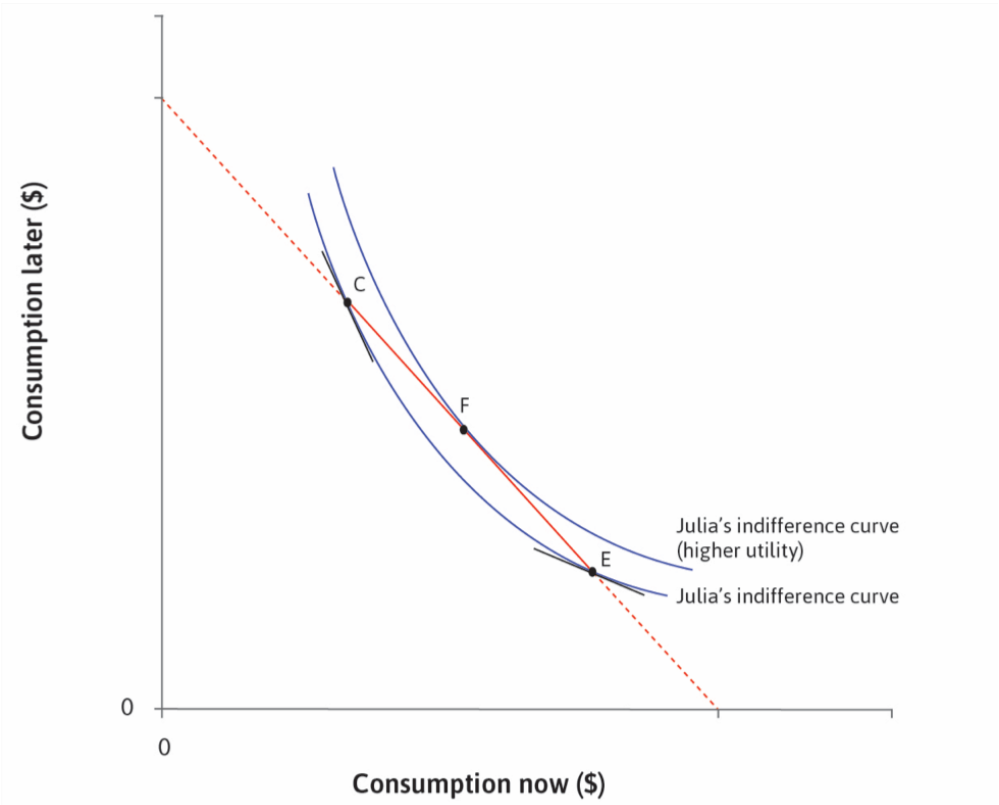
Borrowing allows us to bring consumption forward

How much consumption an individual will bring forward depends on:

consumption smoothing or *impatience*

budget constraint or the *feasible consumption set*

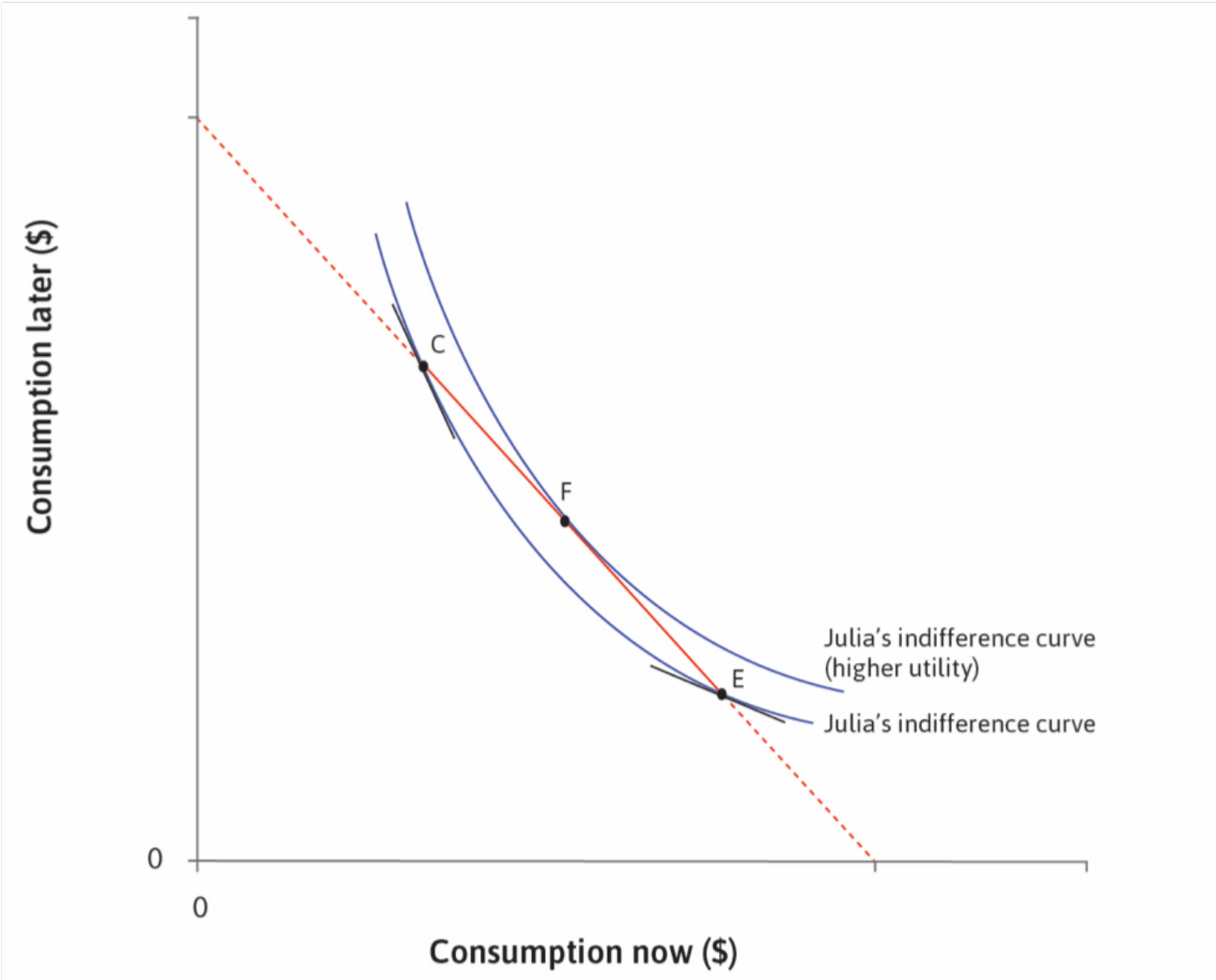
Consumption smoothing



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 Smoothing

Consumption Smoothing

A strong to prefer to smooth out consumption as opposed to consuming everything now or everything later.

Pure Impatience

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*

Pure impatience

Consumption smoothing follows from *diminishing marginal returns to consumption*

may appear as *pure impatience* but there is a difference between the two

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

Individual borrows at the point where

$$\textit{Marginal rate of transformation} = \textit{Marginal rate of substitution}$$

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

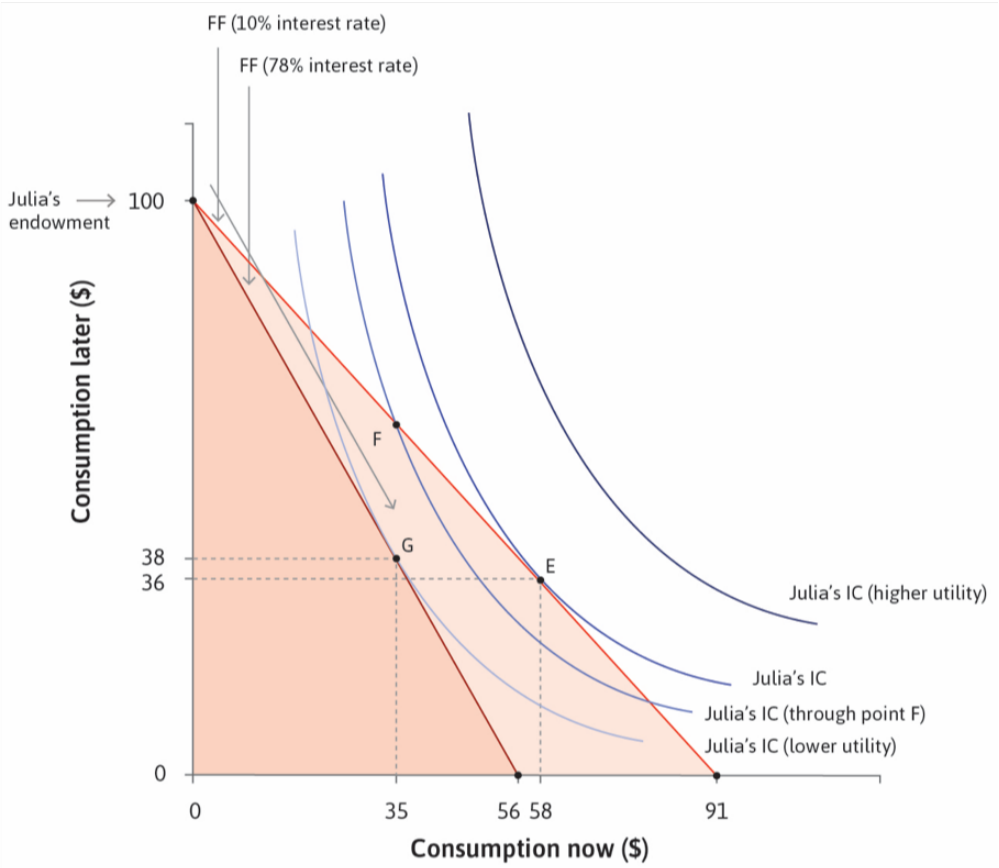
Marginal rate of transformation: captures the rate at which goods now can be *transformed* into goods later.

slope of the *budget constraint*

Marginal rate of substitution: captures both a person's desire for *consumption measure* and their *pure impatience*

slope of the *indifference curve*

What happens to *optimal consumption* when *interest rates increase*?



E: *interest rate 10%*
Julia's $MRS = MRT = 10\%$
Borrows 58, Repays 64
Consumes 58 now
Consumes 36 later

F: $MRS > 10\%$

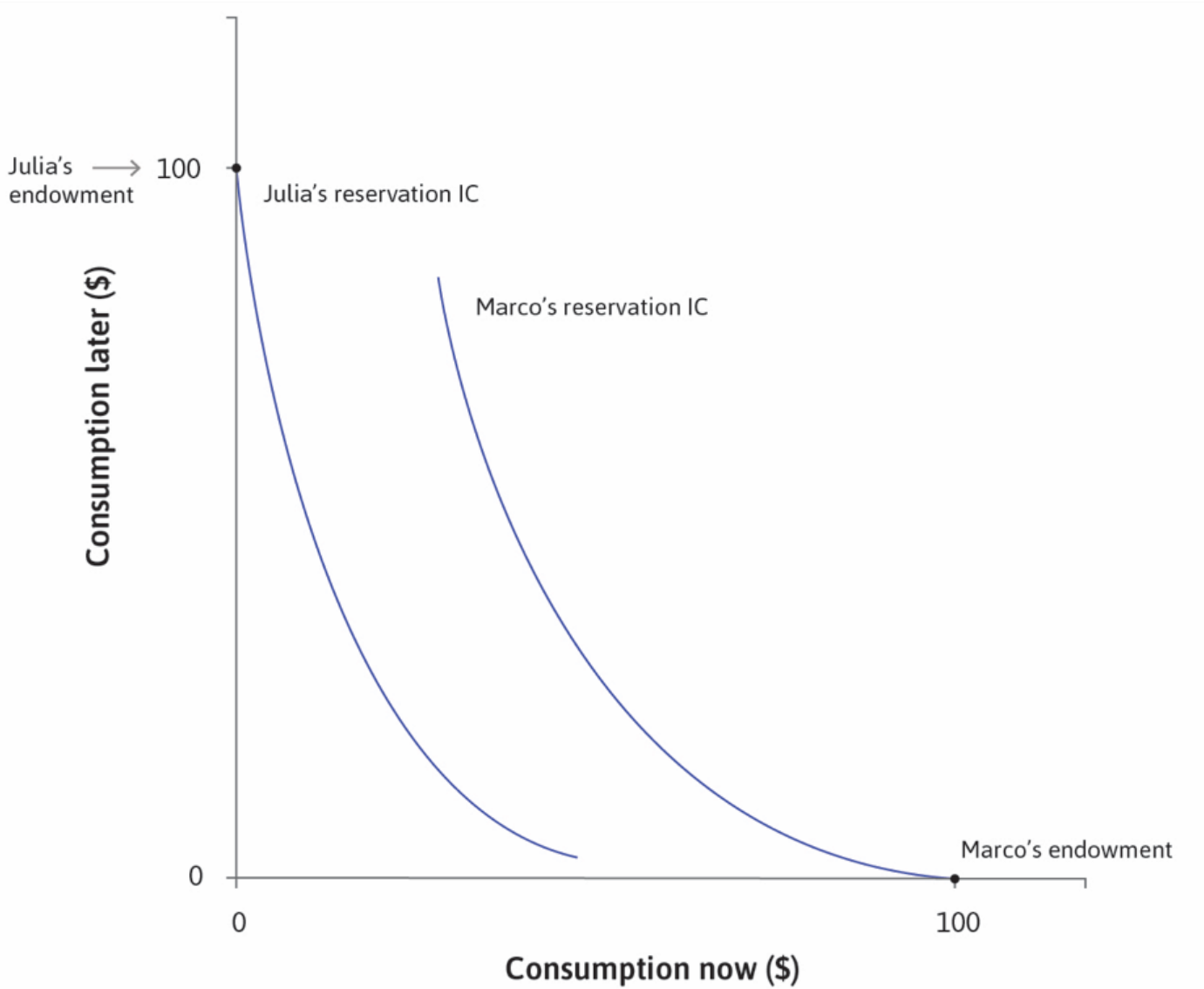
G: *interest rate 78%*
Julia's $MRS = MRT = 78\%$
Borrows 35, Repays 62
Consumes 35 now
Consumes 38 later

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).

... borrowers and the savers have different *reservation indifference curves* because they have different *endowments*.

Julia's endowment	0 now,	100 later
Marco's endowment	100 now,	0 later



Saving and lending

Saving saver *smoothes* his *consumption* by postponing it into the future.

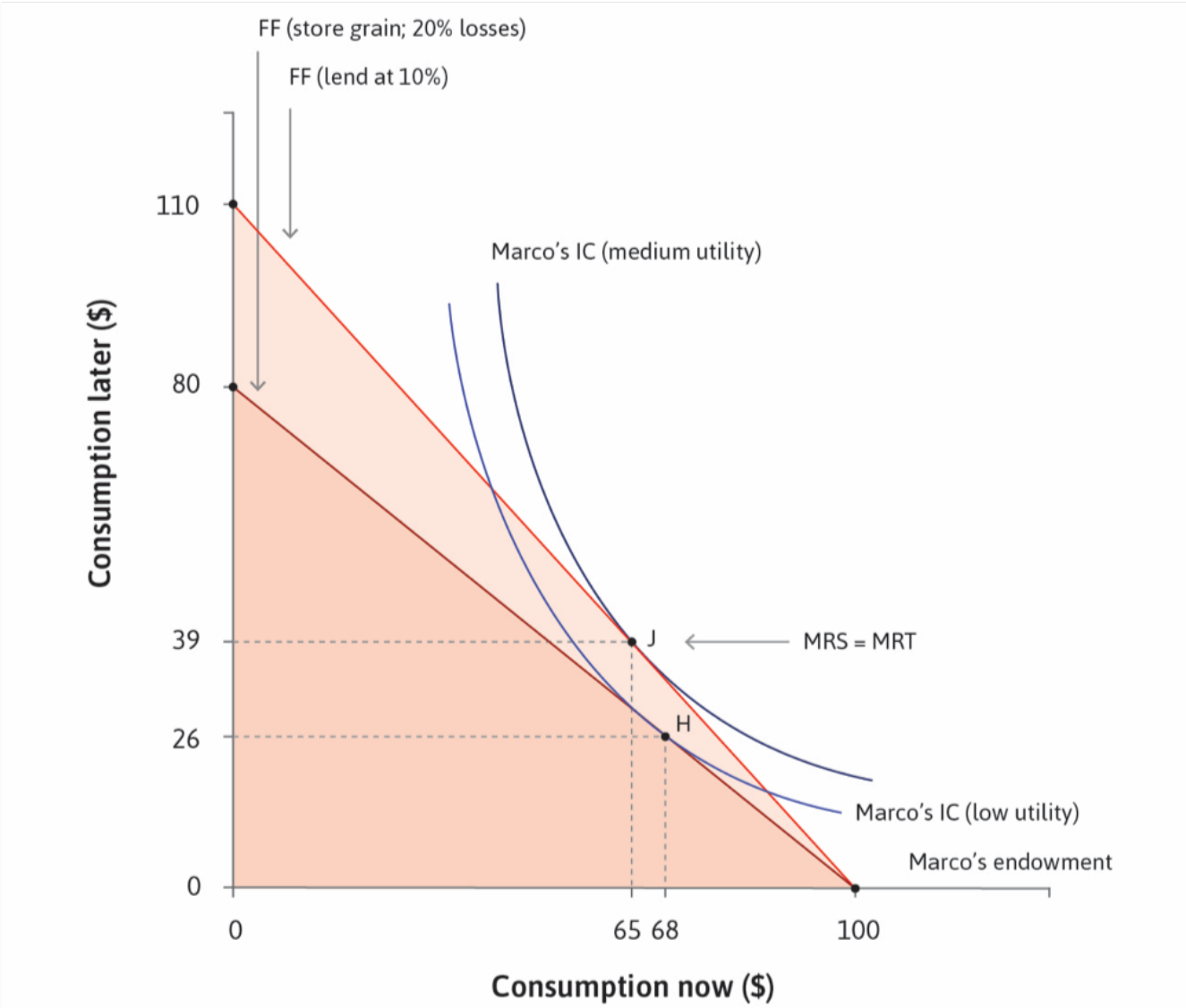
Lending *lending money* at the given interest rate *expands* the saver's *feasible set*

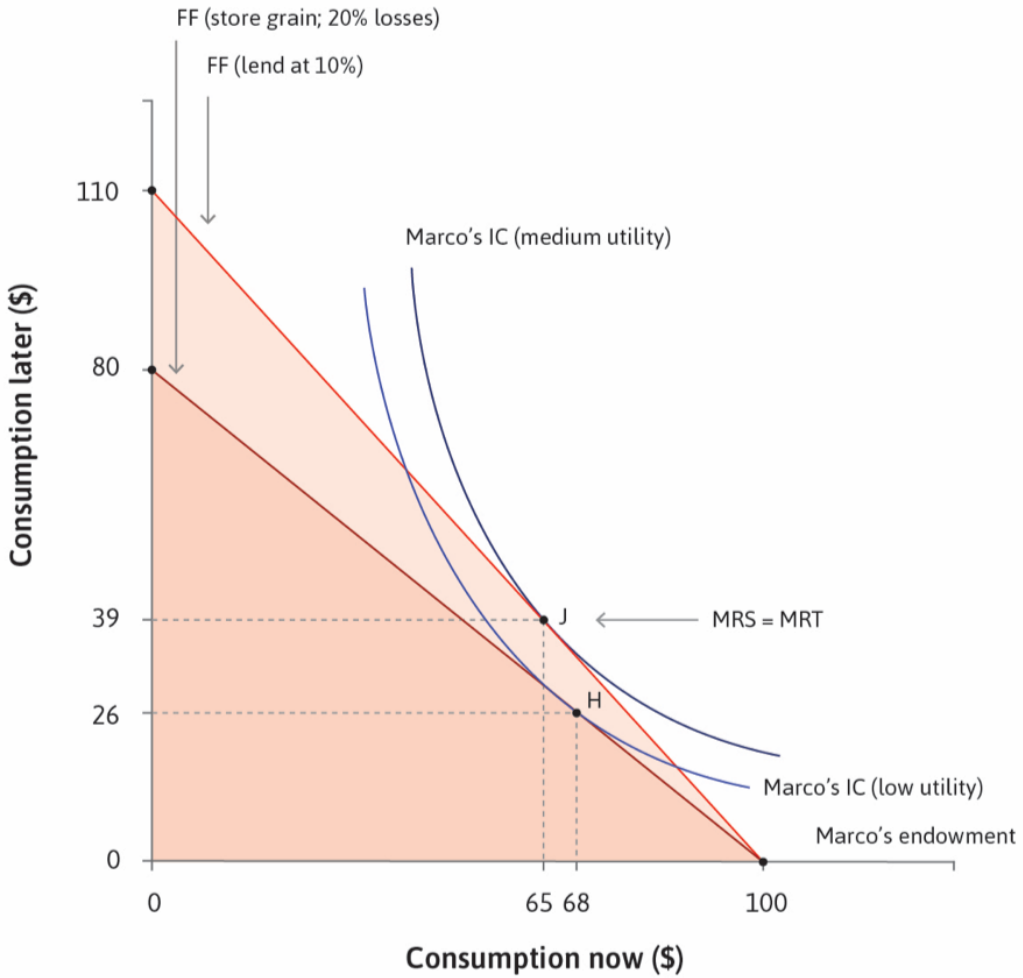
. . . compared to simply storing it.

Marco has $100 of grains. Marco's options are:

Storage: lose 20% of the grains

Lending: earn an interest rate of 10%





H: highest indifference curve Marco can get to if he choses to *store* his grains and *lose 20%* of his grains

J: highest indifference curve Marco can get to if he choses to *lend* at *10% interest rate* his grains

Investment

- Another way to move consumption to the future is through *investment*

  Lump-sum investment now gets you a return later

  What do you consume now if you invest everything?

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

- An individual's *wealth* and *income* affects their opportunities to *invest* and *borrow*

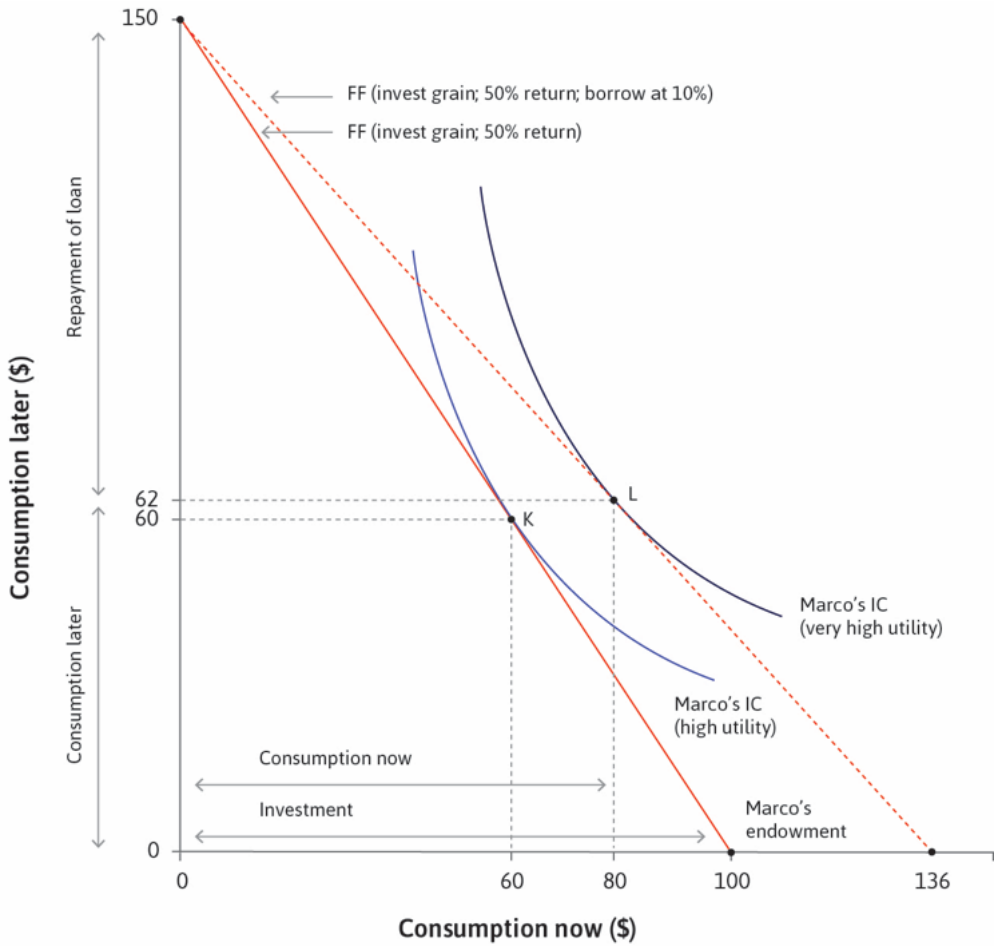
  Rich may have more investment opportunities

  Poor borrow at higher interest rates, if at all

Marco's investment and borrowing

Marco's endowment	100 now, 0 later
Investment project	invest 100 now
	50% return on investment later
Borrow	Marco can borrow at 10% interest rate

Investment	invest 100 now
...	get 150 later
Borrowing	borrows 80 now and
	repays back $80 \times (1 + 0.1) = 88$ later
Consumption	80 now
...	62 (150-88) later



Investment: Marco invests 100 now and gets 150 later

Borrow to consume now: Marco borrows 80 at 10% interest rate to consume now and repays back 88 later

Consume after repaying: Consumes 62 later

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

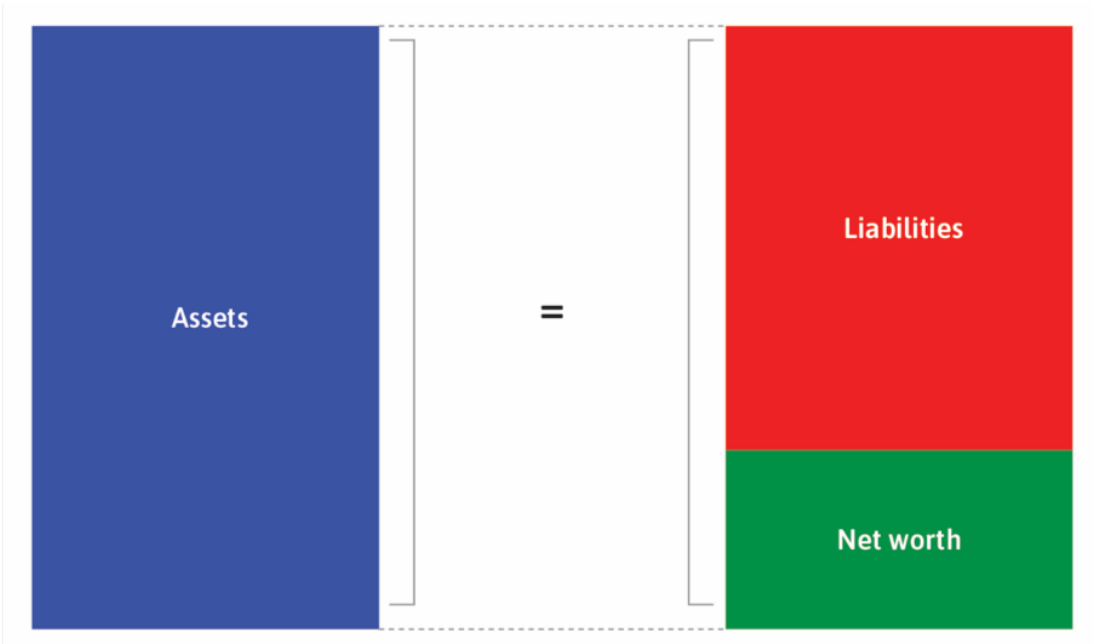
BALANCE SHEET

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

Now (before consuming)

JULIA'S ASSETS		JULIA'S LIABILITIES	
Cash	$58	Loan	$58
		Net worth = $58 - $58	0

Now (after consuming)

JULIA'S ASSETS		JULIA'S LIABILITIES	
Cash	0	Loan	$58
		Net worth	-$58

Later (before consuming)

JULIA'S ASSETS		JULIA'S LIABILITIES	
Cash	$100	Loan	$64
		Net worth = $100 - $36	$36

Later (after consuming)

JULIA'S ASSETS		JULIA'S LIABILITIES	
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.

What is money?

Base money — *actual money* circulating in the economy

Money — *purchasing power* people in the economy have at your disposable

. . . — actual notes and coins is much less than what people have in their bank accounts

Bank money — money in the bank that people can use whenever they want, i.e., their *purchasing power*

Broad Money — = *base money* + *bank money*

Central bank controls broad money by controlling the base money

Central bank

Base Money has to be *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 run by the government

acts as the banker for the commercial banks, who have accounts at the central bank

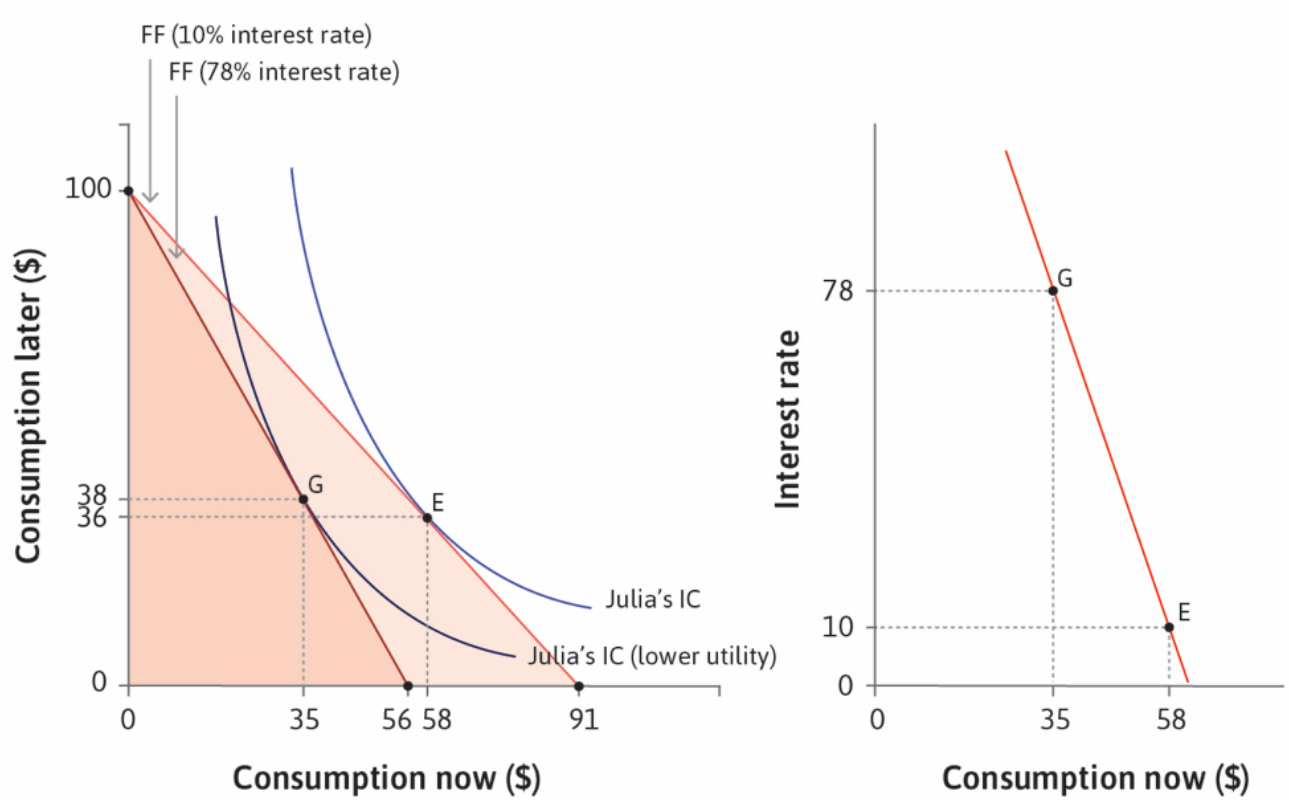
these accounts hold legal tender

. . . by crediting these accounts, the central bank can create 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 now*



Principal-agent problem

Agent takes an *action* that is *hidden*

Principal requires the action taken by the agent but cannot observe the action

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 the lender loses his money.

. . . Borrower's *loans usage* is the *hidden action*.

Equity and collateral

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

Equity lender requires the borrower to invest some of her wealth into the project

Collateral 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 (i.e., the poor) 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 rich profit by lending to others

Credit-rationing increases inequality: people with limited wealth (i.e., poor) are credit rationed and cannot purse their profitable investment opportunities

. . . while rich continue to do so

Example: Credit-rationing

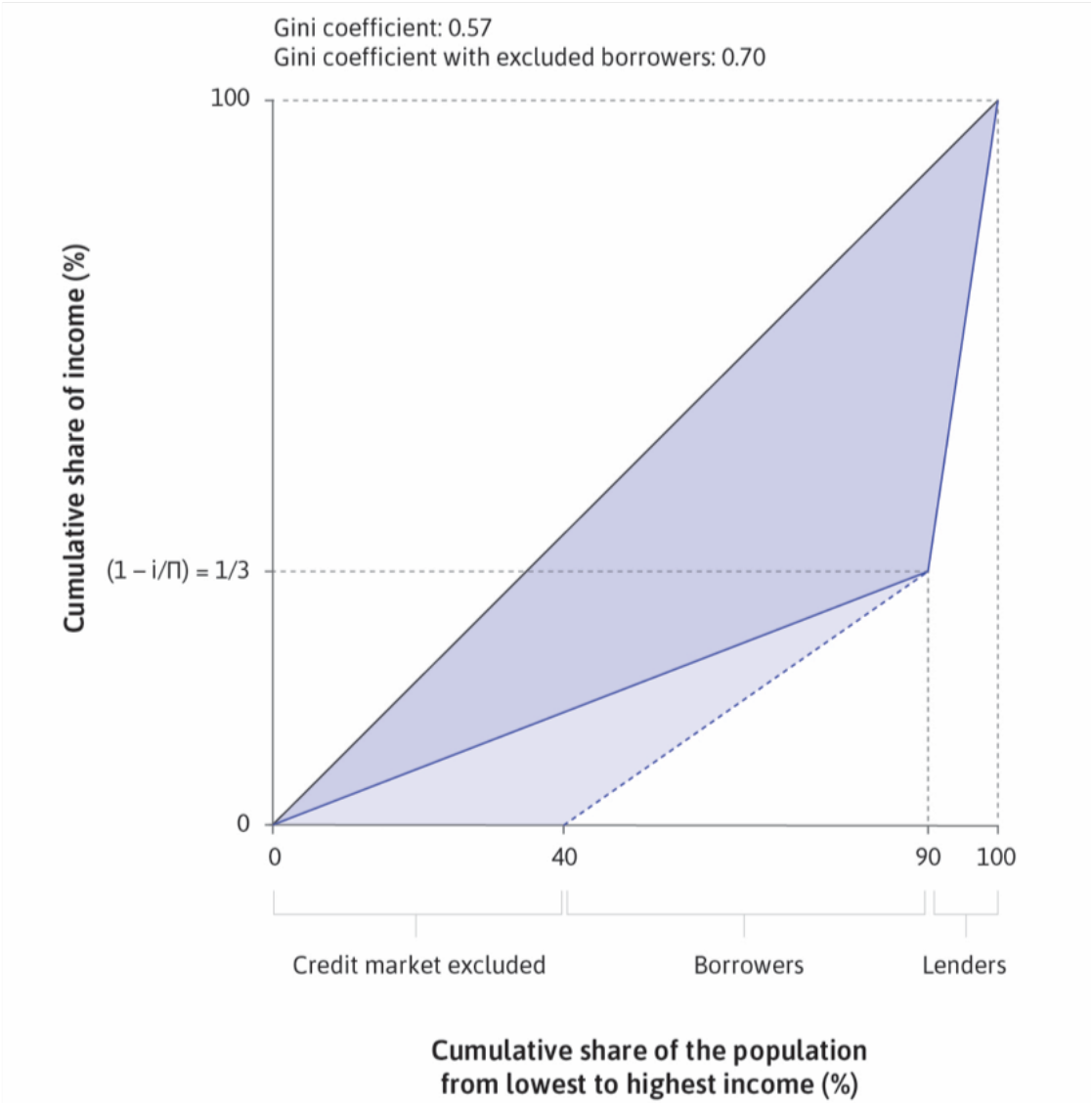
Economy: 90 farmers who borrow from 10 lenders at 10% interest rate.

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*



Summary

Ways to move consumption across time

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

Banking system

- *Banks* create money and lend it to make profits
- *Central bank* sets the policy rate, which influences spending
- *Credit constraints* create additional problems and impact *inequality*