

# Unit 10

## Banks, Money and the Credit Market

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# Introduction

# Introduction Textbook

*Economics is a choice between alternatives all the time. Those are the trade-offs.*

- Paul Samuelson

- Food spoils, barrels leak, yet all trades take **time**.
- Time is both the friend and the foe: depreciation & appreciation
- **Inter-temporal assets** allow agents to **carry value over time**.
- What are inter-temporal assets?

Examples	Money	Capital	Bond / Debt	Social Security	Housing
Value ↑ / ↓	↓	↓	↓	↑	↑ (?)
Cause (?)	inflates	tech	default	age	develop

**Table:** Examples of Intertemporal Assets

# Income, Borrowing and Saving

# Money, Income and Wealth

- **Money**: medium of exchange, allow **transfer** of purchasing power
  - Whether a currency is **trust-worthy** is important
- (Flow) **Income**: amount of money receive for a period of time
  - wage bill, market earning, investment, gov transfer
- (Stock) **Wealth**: inter-temporal assets carry values
  - buildings, land, machinery, capital goods – debts + credit

# Other Key Concepts

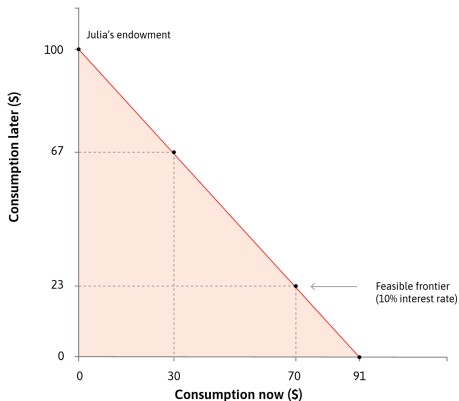
- Depreciation / Appreciation: value of stock ↓ / ↑ over time
- Net income = gross income – depreciation
- Savings: income not consumed
- Investment: Expenditure on newly produced capital goods

# Inter-temporal Substitution

- As time is here, **current you** and **future you** are sharing for resources
- The opportunity cost of **more current goods** is **less future goods**
- **Borrowing** and **lending** allows resource-sharing across time
- The “price” for inter-temporal substitution depends on the assets;
- In the case of borrowing / lending, we call the “price” as **interest rate**
- The position matters: the impact of change in interest rate depends on whether you are **borrower** or **lender**

# Borrowing

- Julia has 100 endowment in the **future**: Nothing for today. 😞
- Julia wants to **borrow** some consumption **today** and promise to repay **tomorrow** with her endowment
- How **much** goods could Julia get for today if she commit all her endowment tomorrow?



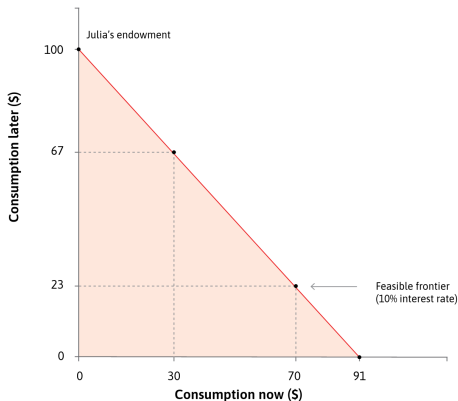


# Borrowing

- **Interest rate ( $r$ ):** price to bring purchasing power forward in time

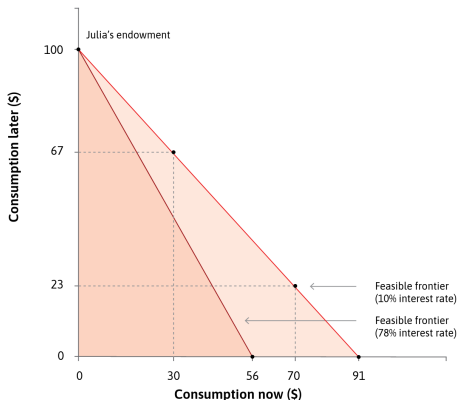
- current  $\xRightarrow[1+r]{}$  future

- | today           | tomorrow |
|-----------------|----------|
| $1$             | $1 + r$  |
| $\frac{1}{1+r}$ | $1$      |



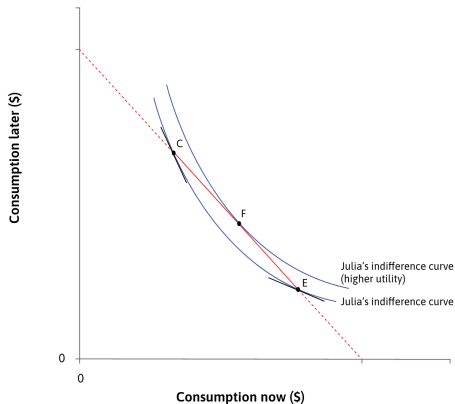
# Borrowing

- $(1 + r)$ : **supply-side** tradeoff  $\Rightarrow$  MRT
- Motivation for borrowing & lending:
  - ① consumption smoothing (Julia's case)
  - ② Impatience



# Consumption Smoothing

- The indifference curve exhibits **diminishing marginal returns to consumption** in one period.
- Avoid consuming a lot in one period and little in the other.
- **Discount rate ( $\rho$ )**: measure of one's impatience/precautions



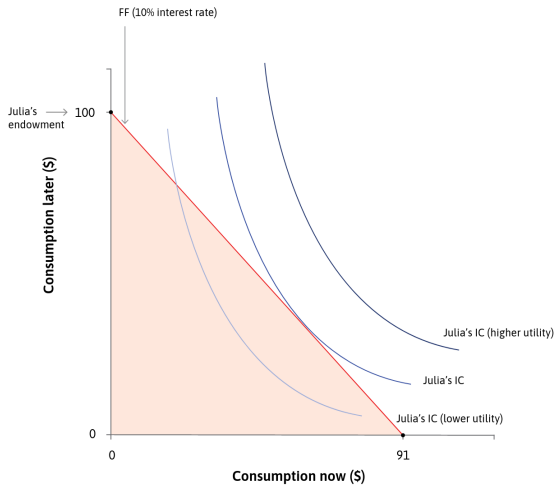
# Pure Impatience

*How much more do you value a good now than later?*

- Consumption smoothing may appear as being impatient.
- However, we differentiate it from 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

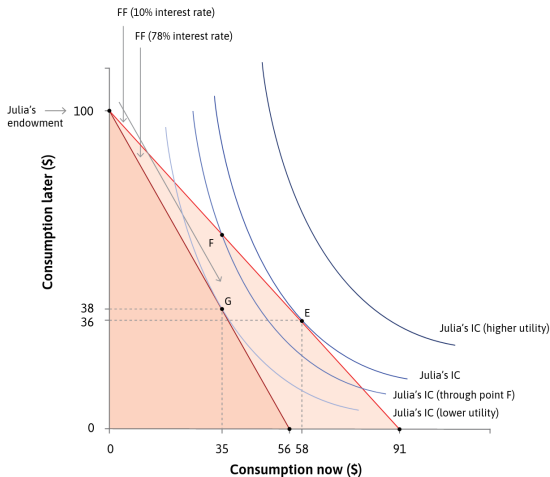
# Optimal Decision-Making for Borrowers

- In equilibrium  
 $MRS = MRT$ , i.e.,  
 $1 + \rho = 1 + r$
- At 10% interest rate,  
 Julia is happy at point  $E$   
 (intersection of IC and FF)

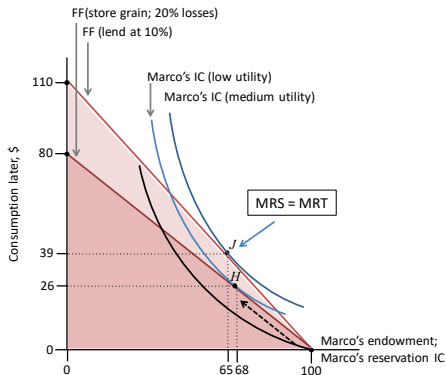


# Optimal Decision-Making for Borrowers

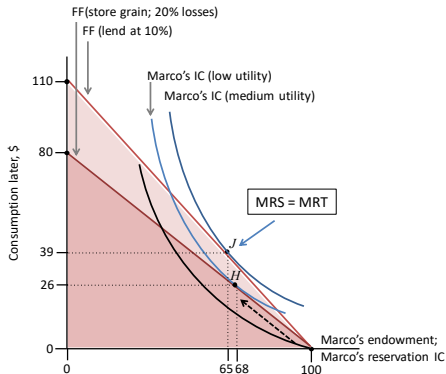
- $r : 10\% \rightarrow 78\%$ , optimal decision:  $E \rightarrow G$  😞.
- Julia hurts since she is **borrowers**:
  - Point  $F$  is when Julia only wants 35 consumption now under 10% of interest rate.
- **Income and substitution** effects also applies.  
How?



- Marco is a **saver** with 100 endowment **today**
- Macro store his grain: 20% of loss
- Macro lend to Julia: achieve **medium** utility w/o grain loss



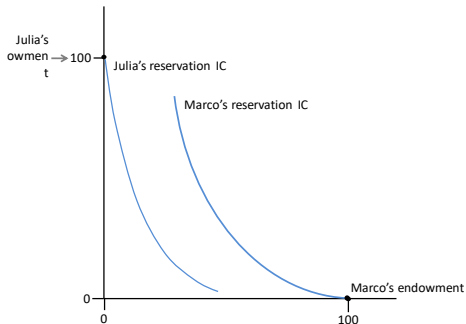
- **Reservation indifference curve:** outside option for Marco
- What is reservation IC for Julia?





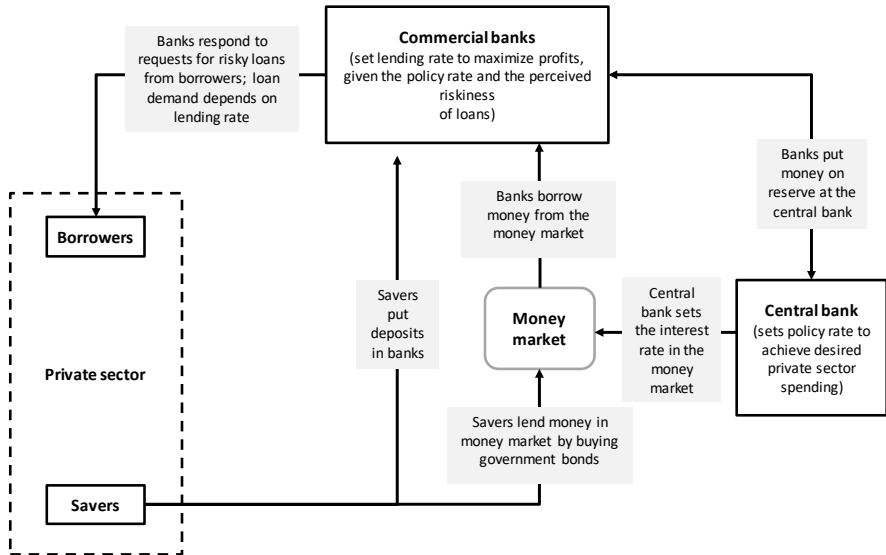
# Reservation Indifference Curve

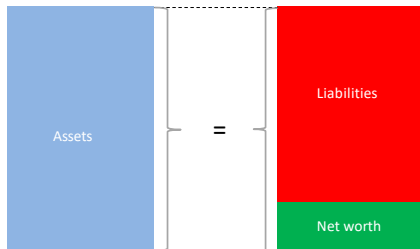
- Reservation indifference curve: all of the points at which the individual would be just as well off as at the reservation position (endowment).
- **Room for trade** is to ensure Marco is happier than reservation IC; o/w Marco is not lending!



# Banks and Money

# The Financial System





- **Assets:** Anything of value that is owned.
- **Liabilities:** Anything of value that is owed.
- **Net worth:** assets – liabilities

# Balance Sheet and Wealth

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 =  $\$100 - \$64 = \$36$

Later – after consuming

Julia's assets		Julia's liabilities	
Cash	\$64	Loan	\$64

Net worth = 0

# Banks

- Banks: firm that makes profits by lending and borrowing
- **Borrow** from households (**deposits**), other banks, and the central bank at a **lower** interest rate
- **Lend** out loans at a **higher** interest rate
- **Cost:**
  - operational: the salaries of bank officers, branch rents
  - interest costs: paying interest on their deposits and other borrowing
- **Revenue:** interest and repayment of loans
- **Expected return:** The return on the loans, taking into account **the default risk**.

# Bank's Balance Sheet

Assets (owned by the bank or owed to it)		% of balance sheet	Liabilities (what the bank owes households, firms and other banks)		% of balance sheet
1. Cash and reserve balances at the central bank	Owned by the bank: immediately accessible funds	2	1. Deposits	Owned by households and firms	50
2. Financial assets, some of which (government bonds) may be used as collateral for borrowing	Owned by the bank	30	2. Secured borrowing (collateral provided)	Includes borrowing from other banks via the money market	30
3. Loans to other banks	Via the money market	11	3. Unsecured borrowing (no collateral provided)		16
4. Loans to households and firms (e.g. mortgages)		55			
5. Fixed assets such as buildings and equipment	Owned by the bank	2			
Total assets		100	Total liabilities		96
			4. Net worth = Total assets – total liabilities = equity		4

# Bank's Net Worth

Net worth = assets – liabilities

- means what is owed to the shareholders/ owners
- also called **equity**
- net worth  $< 0$  means bank is **insolvent**
  - i.e., unable to repay debt
- Leverage describes the reliance of a company on debt:

$$\text{leverage} = \frac{\text{total assets}}{\text{net worth}}$$



# Central Banks

- **Legal tender** has to be accepted as payment by law
- **Base money/high-powered money**: notes and coins. Money as legal tender
- The central bank is the only bank that can **create** legal tender.
  - the central bank is usually owned by the government.
    - Or not! e.g. **Federal Reserve**
  - 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.

# Bank Money

*Commercial banks create money by making loans*

- this is called bank money  $\neq$  legal tender
- it is a liability to the bank, not an asset
- banks earn profits by charging interest on bank money

Bonus Bank's assets	Bonus Bank's liabilities
\$20 base money	\$120 payable on
\$100 bank loan	demand to Gino
Total: \$120	

**Table:** Bonus Bank gives Gino a loan of \$100

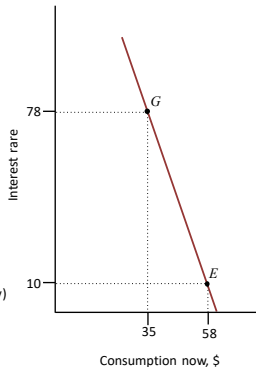
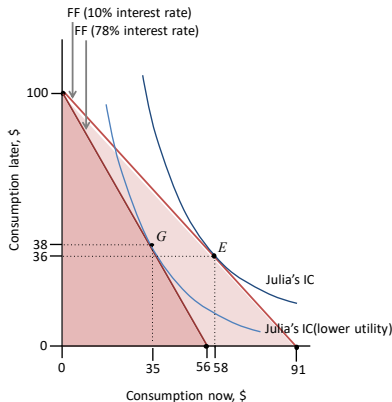
Broad money = base money + bank money

# The Money Market

- Banks need enough base money to cover their net transactions.
- They borrow base money on the money market at the short-term interest rate.
  - The demand for base money depends on how many transactions commercial banks have to make.
  - The supply of base money is a decision by the central bank.

# Application: central bank's policy rate impact

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



Right: Credit market, Left: Loan Demand for Julia

# Credit Rationing

# Recall: Principal-agent Problem

- Def: conflict of interest between principal (**lender**) and agent (**borrower**)
  - Lender has no info on borrower's effort in financial project  $\Rightarrow$  loan may not repay
- Resolution: **equity constraint** and/or **collateral constraint**
  - Equity: require the borrower to put some of her wealth into the project
  - Collateral: set aside property that will be transferred loan not repaid
- Lender's risk  $\downarrow\downarrow$ , but at what cost?

# Credit Rationing

- Those with less wealth find it more difficult to provide equity or collateral
- **Credit-constrained**: borrow on unfavourable terms compared with those with more wealth
- **Credit-excluded**: refused loan entirely

# Credit Rationing & Inequality

- 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.

