Lecture 7: The Credit Market

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EC566 | Macroeconomics for Business

This lecture

- Understand borrowing, saving and investment decisions of individuals
- 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

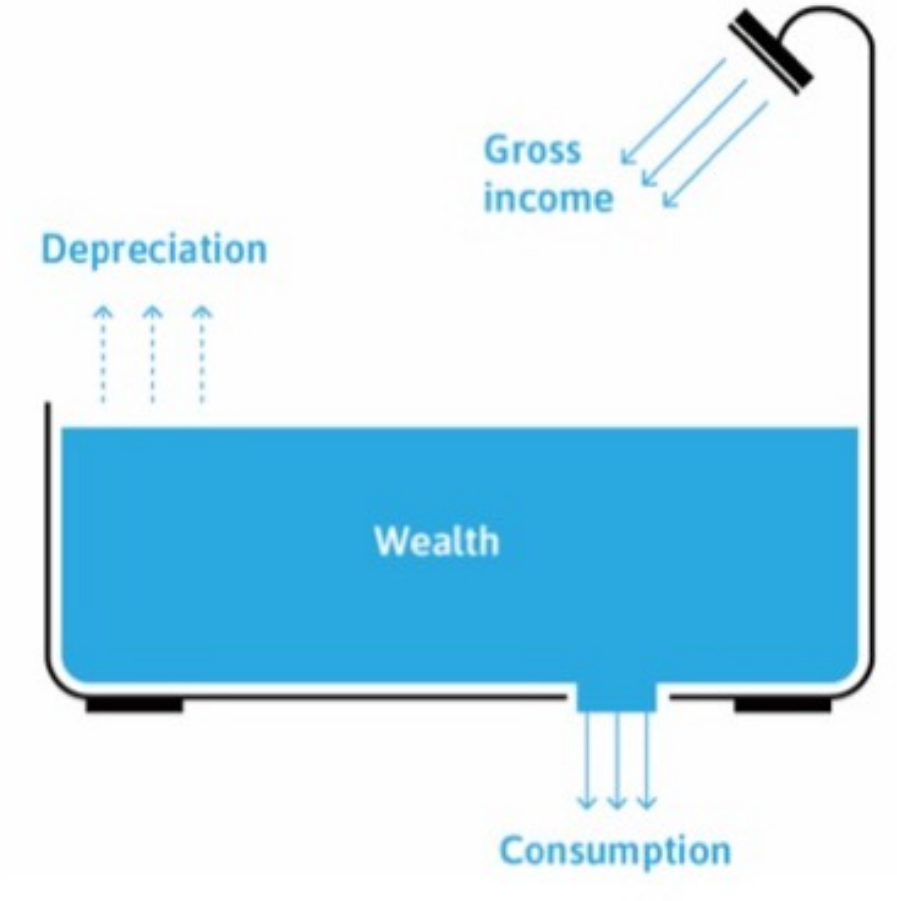
Income, borrowing and saving

Money

- **Money** = A medium of exchange used to purchase goods or services
  - consists of bank notes, bank deposits, cheques, ...
- Money allows purchasing power to be transferred among people.
- Trust is a crucial element of money
  - Everyone should trust that money will be accepted by others in transactions
  - One accepts money as payment believing that they can use money to purchase other goods/services

Income and wealth

- **Wealth =** Stock of things owned
  - or, value of that stock
  - includes buildings, land, machinery, capital goods, equities, diamonds, ...
  - debts a person owes substracted from their wealth
  - debts owed to a person added to their wealth
- **Income =** The amount of money one receives over some period of time (flow).
  - from market earnings, investments, government
- Change in weath = Gross income - consumption - depreciation



Other definitions

- **Gross income =** after tax income
- **Depreciation =** Reduction in the value of a stock of wealth over time.
  - For example, machines/buildings wear off by time/usage
- **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.
  - Investment in economics jargon $\neq$ investment in common language

Consumption over time

- There is a trade-off between consuming goods now and later.
  - The amount you consume today affects your savings
  - Your savings affect your consumption later
- The opportunity cost of having more goods now is having fewer goods later.
- One can borrow to consume more today, as well as lend today to consume later
  - Seems trivial, but borrowing/lending is a crucial aspect of modern economies

Borrowing

- Borrowing allows us to buy more now, at the cost of buying less later.
- Interest rate $(r) =$ The price of bringing some buying power forward in time.
- If one borrows $1 today, they will pay $(1+r) tomorrow.
    - Borrower gives up $(1+r) amount of consumption tomorrow to have $1 more consumption today
    - $(1 + r) =$ Tradeoff between current and future consumption (MRT)
    - MRT: marginal rate of transformation of goods from the future to the present

"By the way, this isn't a robbery. It's just coercive borrowing."

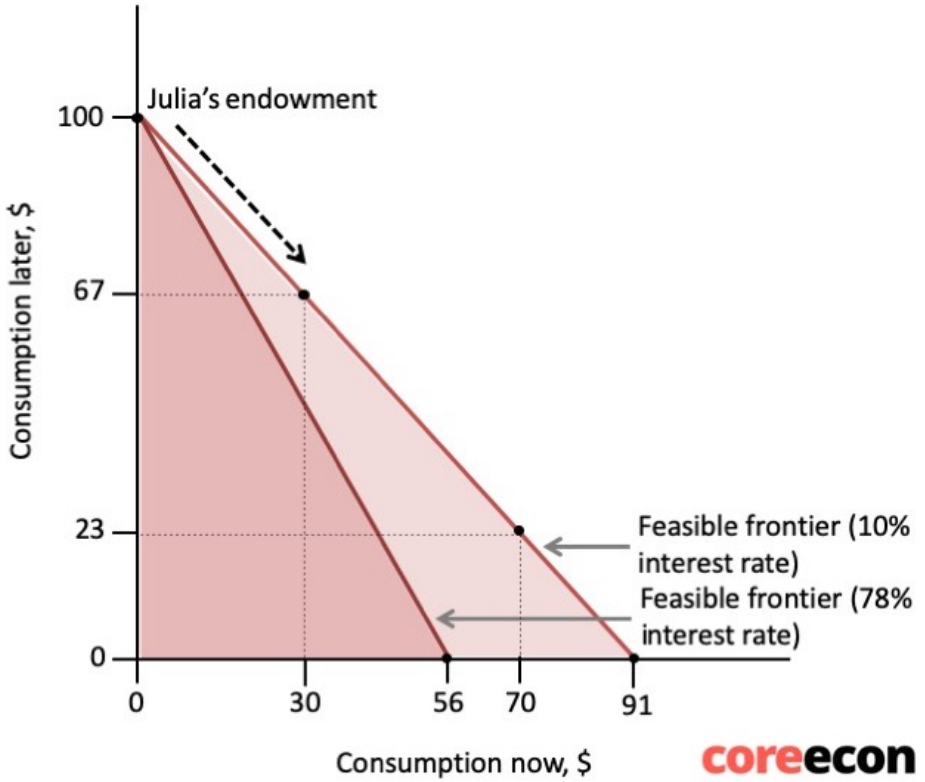
Source: New Yorker

Borrowing, cont'd

- In this example, Julia does not have any wealth today, but she will have $100 later.
- Suppose the interest rate is 10%, $r = .1$
- She can consume nothing today, and $100 later
- She can borrow in exchange of her future earnings
- She can consume as much as $91 (=100/(1.1)) today.
- She can consume at any point on the line connecting (0,100) and (91,0)

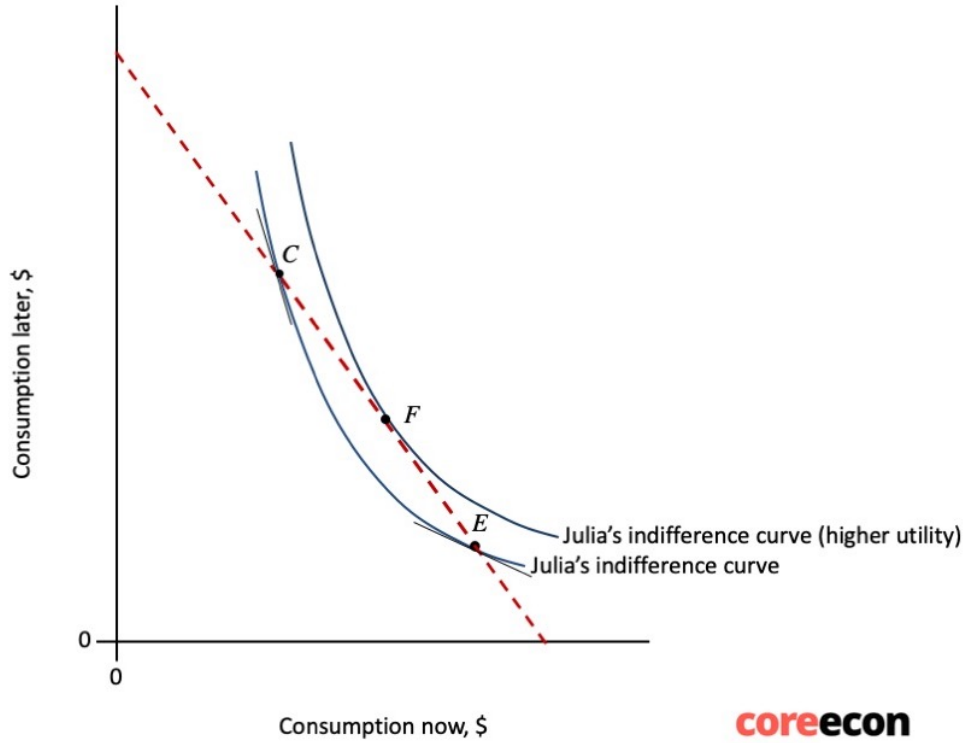
$$(1 + r)c_n + c_l = 100$$

- If interest rate goes up to 78%, she can consume as much as $56 (=100/(1.78)) today.



Preferences for consumption

- Borrowing allows us to bring consumption forward
- How much consumption an individual will bring forward depends on the individual's preferences.
- Preferences are affected by
  - consumption smoothing motive
  - pure 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.

Source: New Yorker

Pure impatience

- Pure impatience = being impatient as a person.
- An individual is impatient if they value
  - a good more highly now than later
  - when her initial endowment is having the same in both periods
- Reasons for impatiences:
  - 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

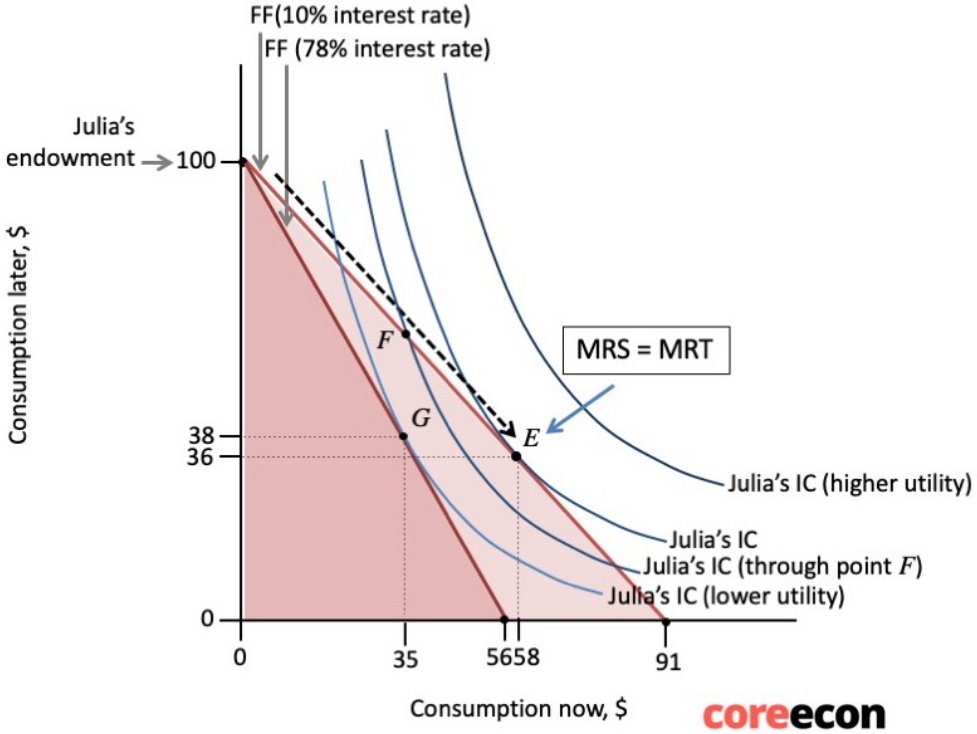
Optimal decision-making

- Discount rate (ρ) = a measure of a person's impatience.
- Discount rate (ρ) is determined by
  - Consumption smoothing motive
  - Pure impatience
- Individuals borrow at the point where discount rate = interest rate

$$MRS = MRT$$

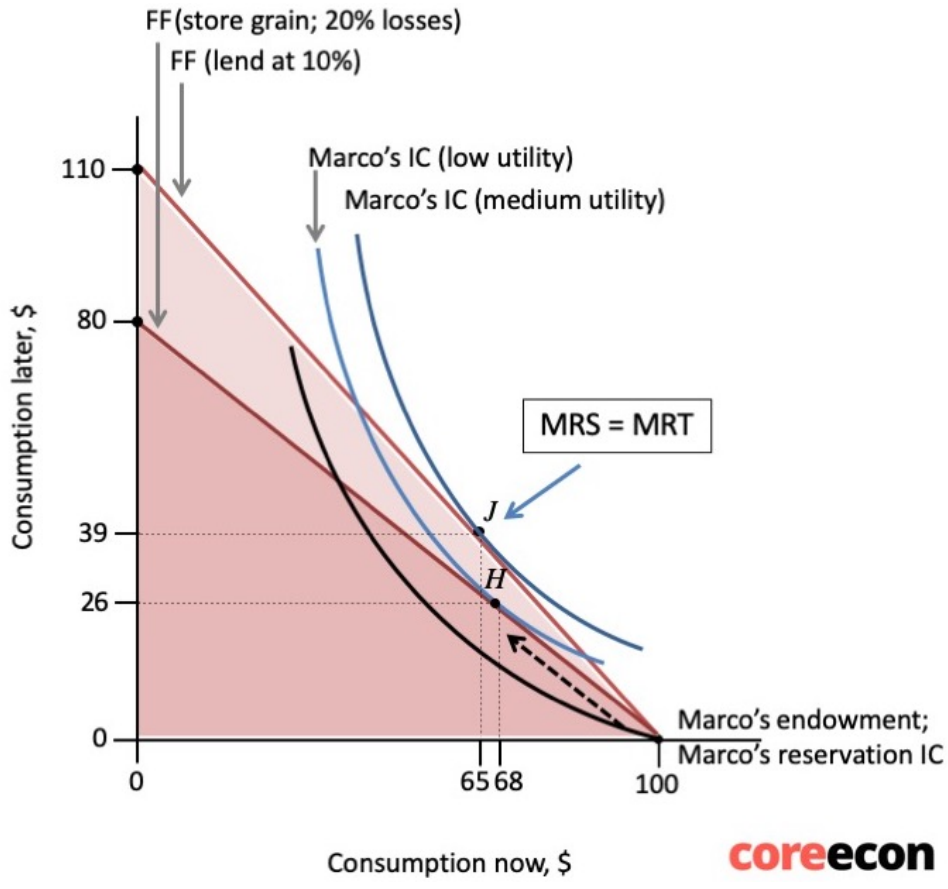
$$1 + \rho = 1 + r$$

- In this example, Julia is a borrower.
  - She consumes more than what she has right now by borrowing



Saving and lending

- In this example, Marco is a saver
  - He consumes less than what he has today
- 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.



Principal-agent problem

Principal-agent problem

- Principal-agent problem
  - a conflict of interest between a principal and an agent,
  - about some hidden action or attribute of the agent (asymmetric information)
  - that cannot be enforced or guaranteed in a binding contract.
- Lenders and borrowers have different information about the project's success
  - asymmetric information about the riskiness of a project
- Lenders cannot perfectly observe borrower’s effort so cannot ensure that the project succeeds.
- 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

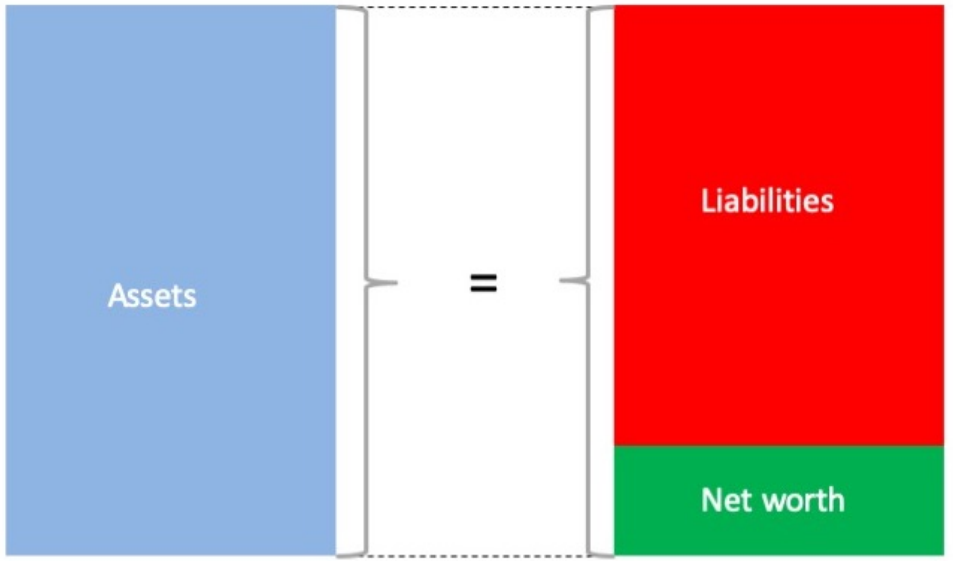
Credit rationing

- 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)

Balance Sheet

Balance sheet

- Summarizes what
  - the household or firm owns
  - what it owes to others.
- Assets = Anything of value that is owned.
- Liabilities = Anything of value that is owed.
- Net worth = assets - liabilities



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Balance sheet and wealth

- Wealth or net worth does not change when you lend or borrow.
- A loan adds both assets and liabilities to the balance sheet:
  - the borrowed money (cash) is an asset
  - the debt is an equal liability
- Wealth goes down after you consume the borrowed amount

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 and money

Banks

- A bank is a firm that makes profits by lending and borrowing.
- Banks borrow from households (deposits), other banks, and the central bank.
- The interest they pay on deposits is lower than the interest they charge on loans, which is how banks make profits.

Types of money

- Base money:
  - cash held by households, firms, and banks
  - reserves: commerial banks' deposits on the central bank
  - liability of the central bank
- Bank money:
  - bank deposits created by commercial banks when they extend credit to firms and households
  - liability to commercial banks
- Broad money
  - sum of base money and bank money

Central bank

- Creates base money/high-powered money
  - notes and coins.
- Creates money as legal tender.
  - Legal tender has to be accepted as payment by law.
- The central bank is the only bank that can create legal tender.
- The central bank is usually owned by the government and other commerical banks.
- The central bank acts as the banker for the commercial banks
- Commercial banks have accounts at the central bank that hold legal tender.
- By crediting commercial banks' accounts (central), the central bank can create money.

Bank money creation

An example:

- Suppose Marco deposits his $100 cash to Abacus Bank

Abacus Bank's assets	Abacus Bank's liabilities
Base money $100	Payable on demand to Marco $100

- Marco pays $20 to his local grocer, Gino (Gino uses Bonus Bank)

Abacus Bank's assets	Abacus Bank's liabilities
Base money $80	Payable on demand to Marco $80

Bonus Bank's assets	Bonus Bank's liabilities
Base money $20	Payable on demand to Gino $20

- These are all transactions using base money

Bank money creation, cont'd

An example:

- Suppose Gino borrows $100 from Bonus bank
  - Bonus bank credits Gino's account by $100

Bonus Bank's assets	Bonus Bank's liabilities
Base money $20	Payable on demand to Gino $120
Bank loan $100	
Total $120	

- Bonus bank has expanded the money supply
  - by creating $100 of bank money
  - Gino can make payments upto $120

Base money is still essential

- Customers withdraw cash, and banks have to pay them
- Banks often transfers base money to other banks
  - Suppose Gino hires Marco to his grocery for $10

Abacus Bank's assets	Abacus Bank's liabilities
Base money $90	Payable on demand to Marco $90

Bonus Bank's assets	Bonus Bank's liabilities
Base money $10	Payable on demand to Gino $110
Bank loan $100	
Total $110	

Money supply has grown

- Because of the loan, money supply has grown

Abacus Bank and Bonus Bank's assets	Abacus Bank and Bonus Bank's liabilities
Base money $100	Payable on demand to Gino $200
Bank loan $100	
Total $200	

- Notice that by creating money, Banks are increasing their liabilities

Policy rate, short-term interest rate, lending rate

- 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.
- Central banks intervene in the market by lending money to banks at interest rate i
  - i is the **policy rate**
- The technicalities in implementing the policy interest rate varies across central banks
- The policy rate than affects short-term interest rates
- Short-term interest rates than affects the **bank lending rate**
  - the interest rate banks charge to firms/households

The business of banking

- Bank's costs:
  - operational: the salaries of bank officers, branch rents
  - interest costs: paying interest on their liabilities (deposits and other borrowing)
- Bank's revenue:
  - interest and repayment of loans
- Expected return = The return on the loans, taking into account the default risk.

Default risk and liquidity risk

- Banks provide the service of **maturity transformation:**
  - deposits can be withdrawn at any time
  - but loans only need to be repaid after a specified time
- This is also **liquidity transformation:**
  - deposits are liquid
  - loans to borrowers are frozen (illiquid)
- This exposes the bank to risks:
  - **Default risk:** the risk the credits will not be repaid
  - **Liquidity risk:** the risk that an asset will not be exchanged with cash rapidly without major financial loss

Banking crisis

- Banks make money by lending much more than they hold in legal tender.
  - They lend deposits as well
  - They can lend deposits because depositors are not expected to withdraw their money at the same time
- **Bank run** = situation when all depositors demand their money at once; may result in bank failure.
  - Many countries have deposit insurance to prevent bank runs
- Banks can also fail by making bad investments, such as by giving loans that do not get paid back.
- The government may intervene, because unlike the failure of a firm, a banking crisis can bring down the financial system.

Bank's balance sheet

- Assets: bank lending
- Liabilities: bank borrowing (deposits and other)
- Net worth = assets – liabilities
- The net worth of a bank is what is owed to the shareholders/ owners. It is also called equity.
- Negative net worth means the bank is insolvent.
- Insolvency $\neq$ illiquidity
  - The former means value of assets is lower than value of liabilities
  - The latter means assets cannot be converted into cash quickly without losing financial value
- Leverage describes the reliance of a company on debt.

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

Summary

1. Ways to move consumption forward/into the future
    - Borrowing, saving, investing
    - Options available depend on individual's endowment
    - Optimal choice depends on individual's discount rate
2. Outline of the banking system
    - Banks create money (lend) to make profits
    - Central bank sets the policy rate, which influences spending
    - Issues: principal-agent problem, credit constraints

To revise this lecture read Unit 10 : Banks, Money, and the Credit Market

Next lecture

- Economic Fluctuations and Unemployment