The Financial System

ECON201 - Winter, '24

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This Lecture

- First, we will talk about two determinants of interest rates: time and risk.
- Then, a closer look at how savings and investment are connected.
- In Lecture E, investment policy → more capital → economic growth.
- Financial markets funnel funds from those who have excess income (savers) to those with funding needs (borrowers).
- Financial intermediaries help diversify risk.
- We end with a model of a financial market, to study the effects of policy.

Outline

Outline

Discounting

- Previously, we compared prices across time. But, even when prices are the same, it matters when you receive a good or an amount of money.
- We compare cashflows received at different points in time by calculating their *present value*, V.
- The *present value* of a cash flow of $\$X$ in N years is the amount which, given an interest rate r, we would need save now to receive $\$X$ in N years:

$$(1+r)^N V = X.$$

- Therefore, $\$X$ in N years is worth

$$V = \frac{X}{(1+r)^N}$$

today.

- This process is called *discounting*.

Example I

What is worth more? \$100 today or \$110 in...

i. 1 year with $r = 5\%$?

$$V = \frac{\$110}{1 + 0.05} = \frac{\$110}{1.05} = \$104.76$$

ii. 2 years with $r = 5\%$?

$$V = \frac{\$110}{(1 + 0.05)^2} = \frac{\$110}{1.1025} = \$99.77$$

Example II

What is worth more? \$100 today or \$110 in...

i. 1 year with $r = 5\%$?

$$V = \frac{\$110}{1 + 0.05} = \frac{\$110}{1.05} = \$104.76$$

ii. 1 year with $r = 12\%$?

$$V = \frac{\$110}{1 + 0.12} = \frac{\$110}{1.12} = \$98.21$$

Outline

Risk Aversion

- Most people dislike risk, i.e. they are risk adverse.
- Risk aversion means that you will avoid the possibility of bad outcomes, even if that behaviour makes you worse off on average.
- A risk-averse person experienced more “pain” from the loss of $1,000 than “pleasure” from gaining $1,000.
- This is because of *diminishing marginal utility of wealth*. Having an additional $1,000 is worth more if you are poorer (lost $1,000) than if you are wealthier (won $1,000).
- Generally, trade-off between average return and risk.

Insurance

- Insurance is a way to reduce risk against payment of a *premium*/fee.
- **Examples:** Car insurance, fire insurance, health insurance, life insurance,....
- Insurance buys you a conditional cashflow. It only paid if a “bad” outcome realizes.
- Insurances cause the following two problems:
  i. adverse selection (only high-risk people buy it), and
  ii. moral hazard (less incentive to avoid risk).

Diversification

- Diversification is another way to reduce risk.
- Insurance companies reduce their risk by selling insurance to many people, each with (independent) risk.
- Individual stocks are very volatile, easily moving my several percentage point each day. Indices will move less.
- Diversification only reduces *idiosyncratic risk*. *Aggregate risk* or *market risk* remains (e.g. flood insurance).
- Risk is often measured by *standard deviation*. The higher the standard deviation of asset's return, the riskier the asset.

Outline

Fundamentals

- Price and value of an asset are *not* the same.

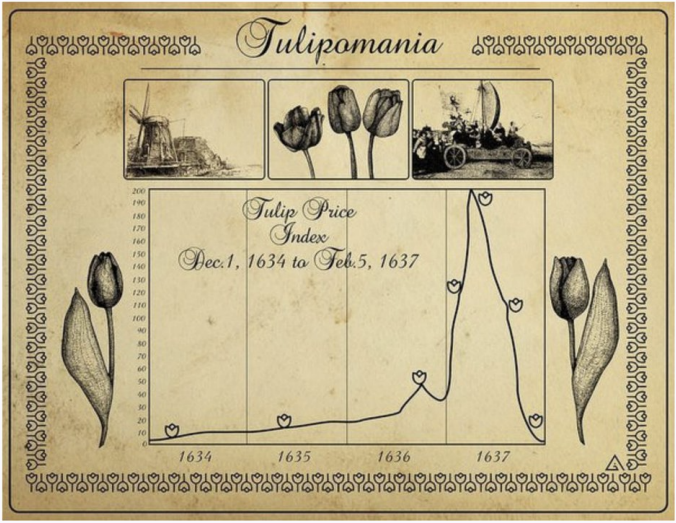
- The value of a stock depends on the expected profits/*dividends* of the company. Requires *fundamental analysis* (e.g. demand, competition, regulation, taxes, technology, ...).

- *Price-earnings ratio:* Price of one share divided by corporation's earnings per share from previous reporting year. High $\longrightarrow$ potentially overvalued.

Efficent Markt Hypothesis

- *Efficient markets hypothesis:* The price of an asset reflects all available information about the value of an asset.
- Conditions:
  i. Many sellers and buyers are analyzing the asset closely.
  ii. The price of the asset is the market equilibrium, that is, the number/size of buyers equals the number/size of sellers.
- Intuition behind *informational efficiency*: Each seller and each buyer may be wrong but, on average, their errors cancel out.
- **Implication:** Stock prices cannot be predicted with publicly available data.

Tulip Mania


Tulipomania
Tulip Price
Index
Dec.1, 1634 to Feb.5, 1637
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1634
1635
1636
1637

Bubbles

- Financial markets occasionally experience *speculative bubbles*.
- In bubbles, the price of an asset rises well above its fundamental value.
- Speculation about future high resale prices, independent of future profits, drive bubbles (e.g. tulips).
- The existence and origin of bubbles is still debated.

Outline

Financial Markets

- Financial markets are markets which trade in money, i.e. (contingent) cash flows.

- Some of these markets directly provide money to those firms which need funds for capital investment.

- The two biggest markets are
  i. the bond market, and
  ii. the stock market.

Outline

The Bond Market I

- Bonds are IOUs.
- The buyer gives the borrower an amount (*principal*) at issuance.
- The borrower promises to repay an amount (*face value*) at *date of maturity*.
- Price/interest rate is determined by *default risk*. High interest rate = high default risk = “junk bond”.

The Bond Market II

- Another factor which affects interest rates on bonds is taxation.
- Interest income is normally taxed.
- **Exception:** Local and state government bonds.
- Some bonds offer inflation protection but most are nominal.

Example

- In Year 1, bondholder pays issuer a principal of $100. The one-year bond has a face value of $110.
- Thus, the interest rate is 10%.
- In Year 2, when the term of the bond ends, either:
  i. The issuer pays the bondholder $110, or
  ii. The issuer defaults on the bond and does not pay $110.

Outline

The Stock Market

- In stock markets, shares (ownership stakes) in companies are traded.
- *Equity finance:* Return is a share of future profits, rather than a fixed amount. Firms raise money by selling their shares.
- Stock exchanges (e.g. NYSE, LSE).
- Stock indices: Averages which track a large number of stock prices (e.g. Dow Jones Industrial Average, S&P 500).
- Stock prices are determined by supply and demand, reflecting expectations of future profits.

Outline

Financial Intermediaries

- Financial intermediaries allow savers' funds to be given to borrowers without the two parties ever meeting directly.
- Financial intermediaries add cost but can overcome certain frictions. This is especially important for small savers and small borrowers.
- There are many types of intermediaries: banks, mutual funds, pension funds, credit unions, insurance companies, "loan sharks," ...
- We will focus on banks and mutual funds.

Outline

Banks

- Banks are the most important source of funding for small businesses and households.
- Banks take deposits (from households) and pays an interest rate on them.
- These deposits are then lend (to firms) at a higher interest rate.
- Banks' profit margin: The difference between interest paid on deposits and the interest received from loans.
- Banks also help create money (more on this in Lecture H).

Outline

Mutual Funds

- Mutual funds buy a *portfolio* of bonds and stocks with savers' money.
- Allows small savers to *diversify*, reducing risk.
- Mutual funds charge operating fees (0.1 to 1.5 p.p.a.)
- Fund managers are unlikely to "beat the market," due to fierce competition.
- **Alternative:** Index funds track an (stock) index, smaller fees.

Outline

Accounting Identities

For simplicity, assume we are in a *closed economy*. This means no exports or imports, $NX = 0$.
This implies

$$Y = C + I + G + NX = C + I + G$$

and

$$I = Y - C - G.$$

Note: $(Y - C - G) = S$.
$\rightarrow$ Thus, investment equal national saving, $I = S$.

Public Saving

- If we add and subtract taxes, T, we can decompose national saving into *private saving* and *public saving*:

$$S = \underbrace{(Y - C - T)}_{\text{private saving}} + \underbrace{(T - G)}_{\text{public saving}} .$$

- If $(T - G) > 0$, there is a *budget surplus*.
- If $(T - G) < 0$, there is a *budget deficit*.
- If $(T - G) = 0$, we have a *balanced budget*.

A Word of Caution

- Be careful! Saving here is any income that is not spend.
- Putting money in the bank or a mutual fund is **not** investment.
- In macroeconomics, investment = purchase of new capital.

Outline

Outline

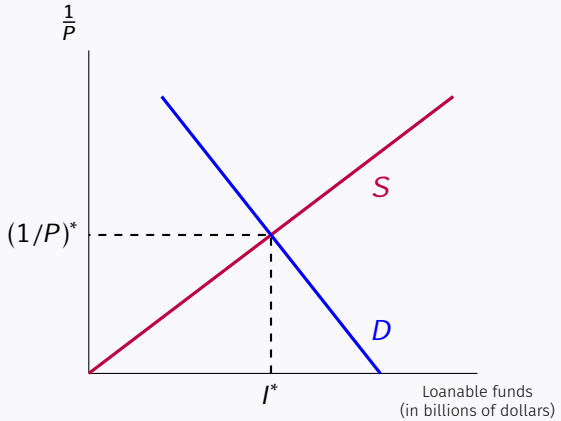
Assumptions

- Closed economy, $NX = 0$.
- Only one financial market.
- Only one interest rate for both savers and borrowers.

Outline

Supply and Demand

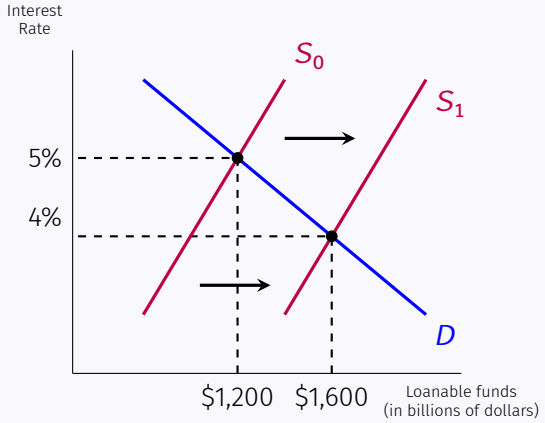
- National saving = Supply of loanable funds.
- Investment = Demand for loanable funds.
- Interest rate = Price of loanable funds.
- **Note:** Real interest rate.



Outline

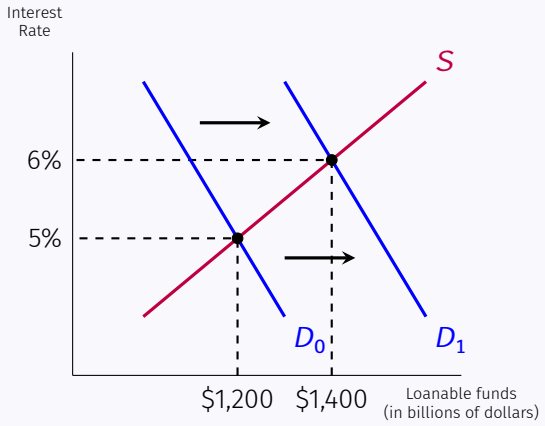
Saving Incentives

- Saving incentives (e.g. Individual Retirement Accounts) encourage more saving.
- Supply curve shifts right.
- Real interest rate ↓; investment ↑.
- Thus, saving incentive create growth.



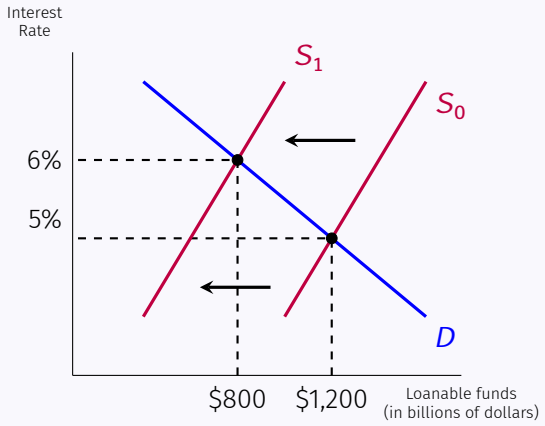
Investment Incentives

- Investment tax credit reduces cost of investment for firms.
- Demand shifts right.
- Real interest rate ↑; investment ↑.
- Thus, investment incentives create growth

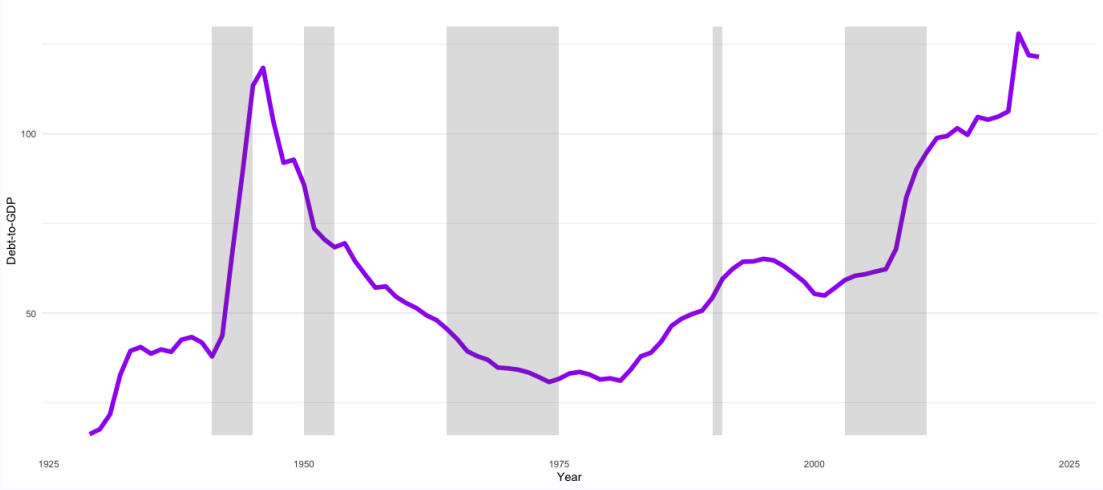


Crowding Out

- An increase in the budget deficit, $G - T$, reduces national saving.
- Supply shifts left.
- Real interest rate ↑; investment ↓.
- Fall in investment here is called *crowding out*.
- **Reverse:** Budget surplus can create growth by supplying loanable funds.

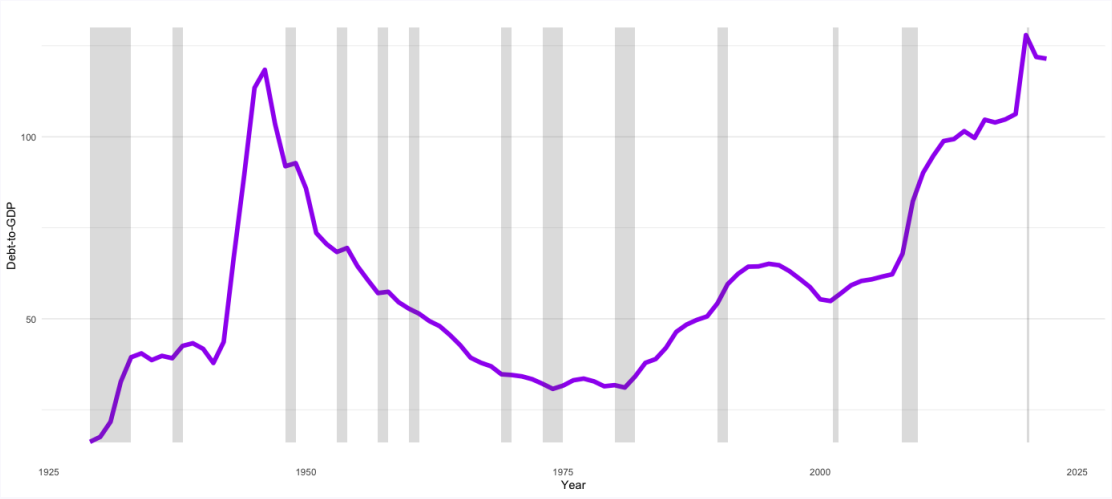


Government Debt in the USA: Wars



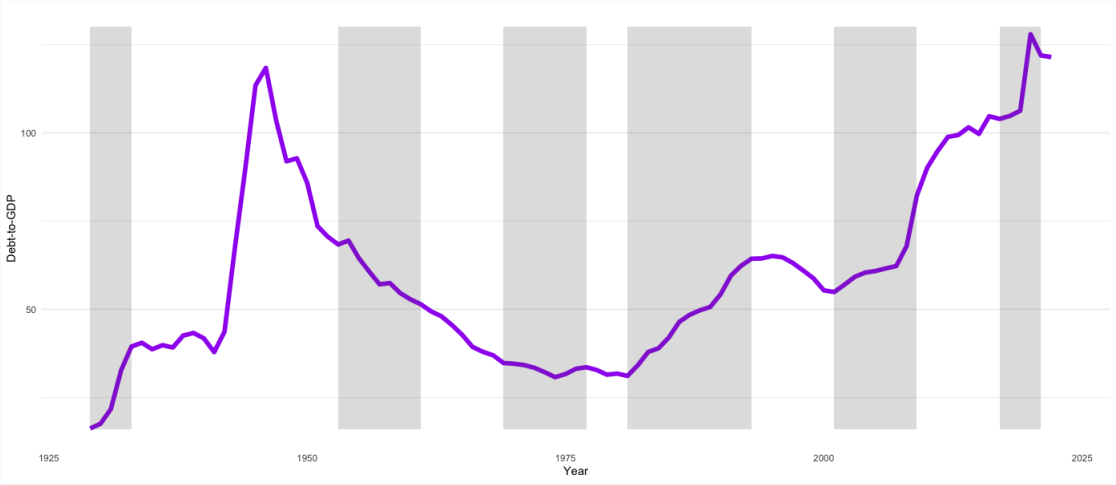
Debt data from the U.S. Treasury. Annual GDP data from FRED. Major wars underlayed in grey.

Government Debt in the USA: Recessions



Debt data from the U.S. Treasury. Annual GDP data from FRED. NBER recessions underlayed in grey.

Government Debt in the USA: Politics



Debt data from the U.S. Treasury. Annual GDP data from FRED. Republican administrations underlayed in grey.

Conclusion

- **Discounting** is another tool to compare cash flows over time. **Risk aversion** gives rise to insurance.
- In efficient financial markets, asset prices are unpredictable and reflect **expected cash flows**.
- Stocks are ownership stakes and bonds are IOUs.
- Banks and mutual funds are **financial intermediaries**.
- Tax policy may encourage saving and investment, supporting growth.
- Public deficits **crowd out** private investment.
- **Next:** The nature of money as well as the cost and benefits of inflation.