

Lecture 4 Economic Growth, Financial System, and Business Cycles

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E3120 Intermediate Macroeconomics

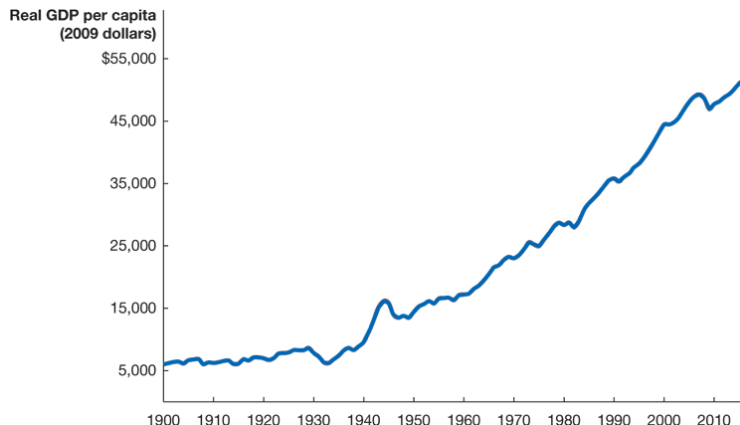
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What is Economic Growth?

- ▶ A process by which rising productivity increases average standard of living
- ▶ How to measure average standard of living
 - ▶ real GDP per capita (most common)
 - ▶ production per person, adjusted for inflation
- ▶ We measure long-run economic growth by percentage increase in real GDP per capita over long periods

$$\text{growth rate} = \frac{Y_t - Y_{t-n}}{Y_{t-n}} \times 100\%, \quad n \sim \text{decades}$$

U.S. Economic Growth, 1900-2016



- ▶ Growth in real GDP per capita (source: BEA)
- ▶ Average American can buy more than 8 times now

The Road Ahead...

- ▶ Calculating growth rates
- ▶ What determines growth rates
- ▶ What is financial system
- ▶ Saving equals investment
- ▶ Loanable funds market
- ▶ Business cycle

Calculating Growth Rates

- ▶ Growth rate over long periods

- ▶ annual growth rates: g_1, g_2, \dots, g_n

$$Y_{t-n} \times (1 + g_1) \times (1 + g_2) \times \dots \times (1 + g_n) = Y_t$$

- ▶ average annual growth rate: g

$$Y_{t-n} \times (1 + g)^n = Y_t$$

- ▶ A useful approximation: for small n

$$g \approx \frac{g_1 + g_2 + \dots + g_n}{n}$$

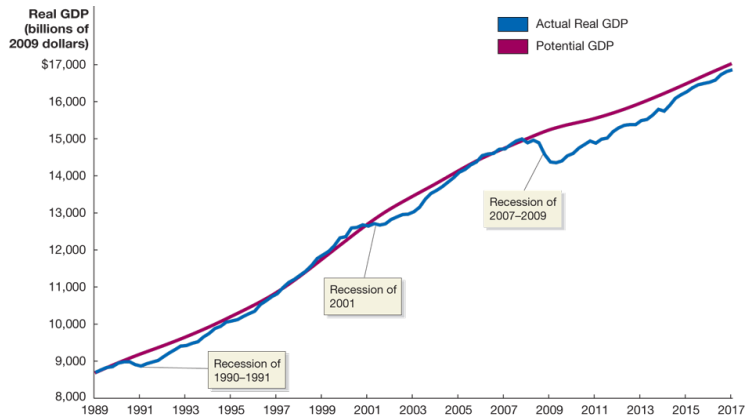
- ▶ Rule of 70: time for a variable to double

$$\text{number of years to double} = \frac{70}{g}$$

What Determines Growth Rates?

- ▶ Labor productivity: quantity of goods and services produced by one worker or one hour of work
- ▶ What determines labor productivity
 - ▶ increases in capital per hour worked
 - ▶ technological change
- ▶ Government must also provide secure rights to private property
- ▶ Potential GDP: level of real GDP attained when all firms are operating at capacity
 - ▶ “normal” hours & “normal” sized workforce
 - ▶ U.S. potential GDP: average annual rate of 3.2%

Actual versus Potential GDP



- ▶ U.S. actual and potential GDP (source: FRED)
- ▶ Actual GDP falls below potential during recessions

What is Financial System?

- ▶ A system through which firms acquire funds from households
 - ▶ financial markets, e.g. bond/stock markets
 - ▶ financial intermediaries, e.g. banks, mutual funds
- ▶ Three key services of financial system
 - ▶ risk-sharing: portfolio diversification
 - ▶ liquidity: ease with which financial security can be exchanged for money
 - ▶ information: facts about borrowers and expected returns on financial securities

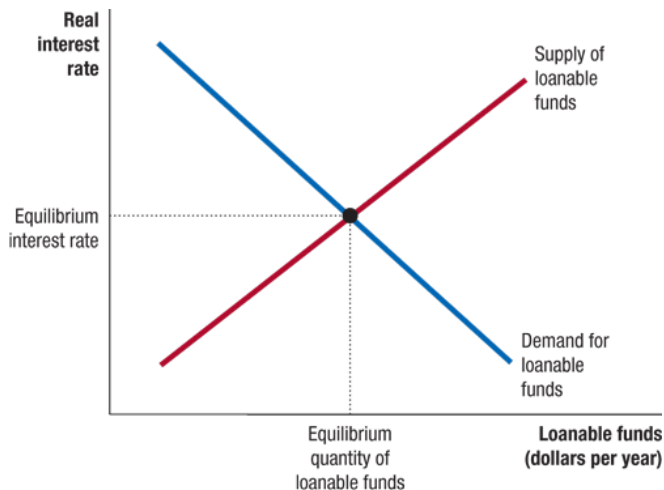
Saving Equals Investment

National income identity

$$\underbrace{S}_{\text{national saving}} = \underbrace{Y - T - C}_{\text{private saving}} + \underbrace{T - G}_{\text{gov't saving}} = I + NX$$

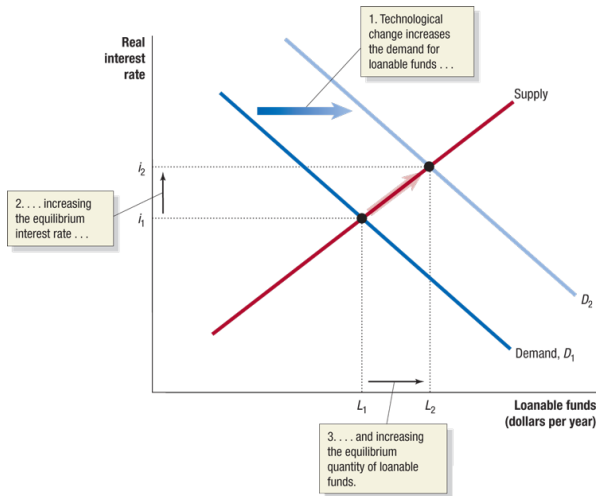
- ▶ Some notations
 - ▶ T = taxes net of transfers (net taxes)
 - ▶ $Y - T$ = disposable income
 - ▶ S^p = private saving, S^g = gov't (public) saving
 - ▶ $G - T$ = primary deficit/newly issued gov't debt
- ▶ Ways to raise national wealth
 - ▶ Closed economy: only accumulate capital ($S = I$)
 - ▶ Open economy: also net foreign investment (NX)

Loanable Funds Market



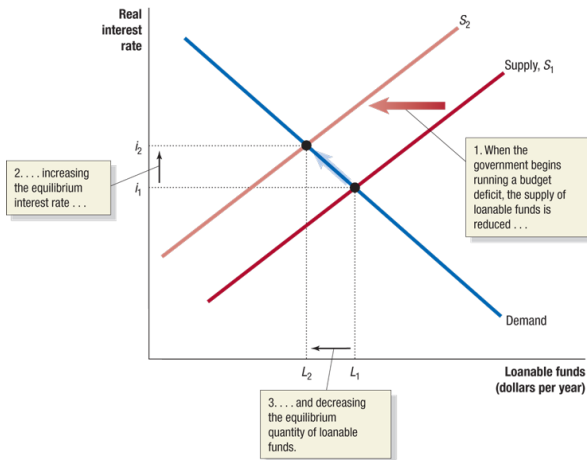
- ▶ Assume closed economy; single market for loanable funds
- ▶ Loanable funds market determines real interest rate

Shift in Demand Curve



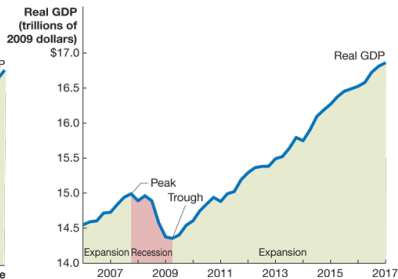
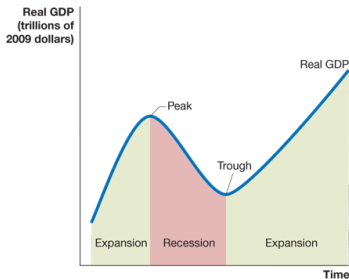
- ▶ Effect of technological change
- ▶ Equilibrium: real interest rate \uparrow , loanable funds \uparrow
- ▶ Effects of expected future profits, corporate taxes?

Shift in Supply Curve



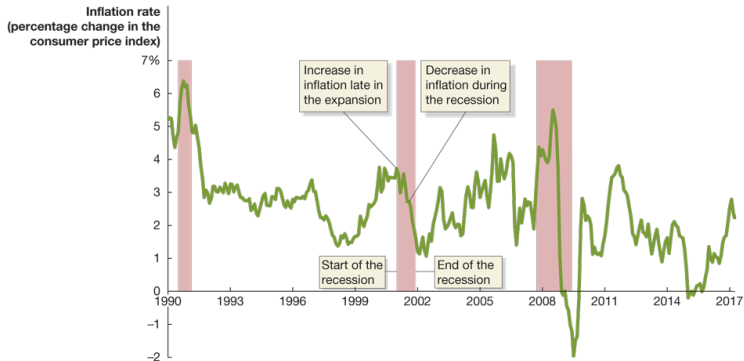
- ▶ Effect of budget deficit
- ▶ Equilibrium: real interest rate \uparrow , loanable funds \downarrow
- ▶ Higher G crowds out private expenditures (I)
- ▶ Effects of 401(k) retirement plan?

Idealized vs. Actual Business Cycle



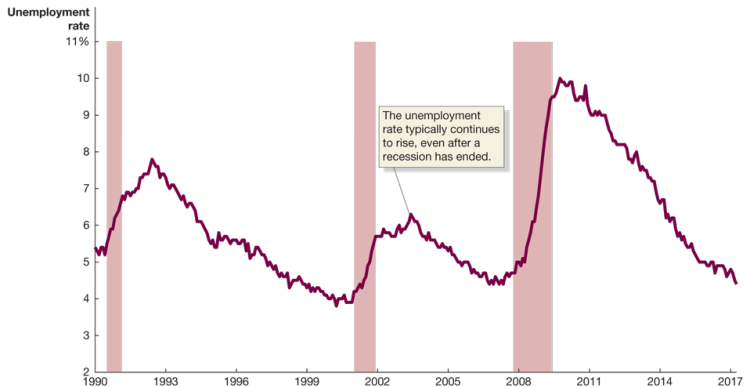
- ▶ Alternating periods of expansions and recessions
- ▶ $(Y, N) \uparrow (\downarrow)$ during expansions (recessions)
- ▶ Recession: two consecutive quarters of declining real GDP
- ▶ National Bureau of Economic Research (NBER) Business Cycle Dating Committee

Effect of Business Cycle



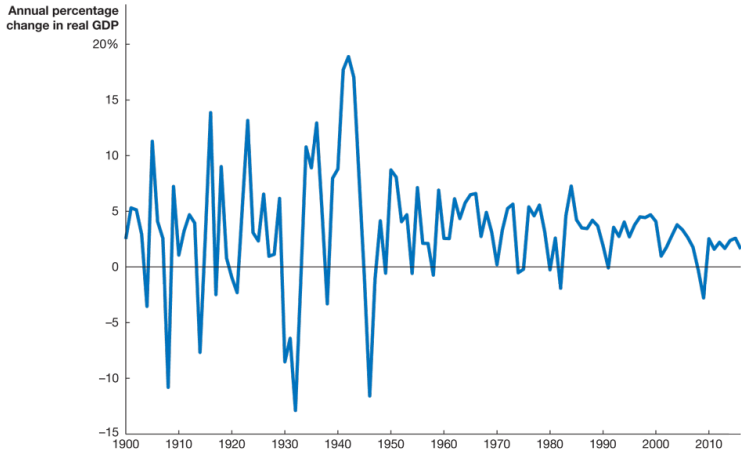
- Effect of business cycles on inflation (source: BLS)

Effect of Business Cycle (Cont'd)



- Effect of business cycles on unemployment (source: BLS)

Great Moderation



- ▶ Annual fluctuations in real GDP (source: BEA)
- ▶ Reduction in volatility of business cycles since mid-1980s

Readings & Exercises

- ▶ Readings

- ▶ HO: chapter 10

- ▶ BJ: lecture 2 (sec. 4) (supplementary)

- ▶ Exercises

- ▶ HO: problem 1.8, 2.7, 2.8, 2.10, D10.1, D10.2