Ch. 4: Consumption, Saving, and Investment

Munechika Katayama

Waseda University

2020 Spring

Chapter Outline

- Consumption and Saving

- Investment

- Goods Market Equilibrium

Consumption and Saving

- In a closed economy

$$S^d = Y - C^d - G$$

- Desired consumption (C^d) – consumption amount desired by households

- Desired national saving (S^d) – the level of national saving when consumption is at its desired level

Individual's Consumption and Saving Decision

- How do changes in
  - current income
  - expected future income
  - wealth
  - real interest rate

  affect current consumption and saving decisions?

Individual's Consumption and Saving Decision (Cont'd)

- A person can consume less than current income or more than current income

- Trade-off between current consumption and future consumption

- Real interest rate determines the relative price of current consumption

- Consumption-smoothing motive – the desire to have a relatively even pattern of consumption over time

Effect of Changes in Current Income

- Marginal Propensity to Consume (MPC) = fraction of additional income consumed in current period

$$0 < MPC < 1$$

- When current income (Y) rises, C^d rises, but not by as much as Y

- With higher current income, both C^d and S^d increase

Effect of Changes in Expected Future Income / Wealth

- Higher expected future income leads to more consumption today, so saving falls

- Increase in wealth raises current consumption, so lowers current saving
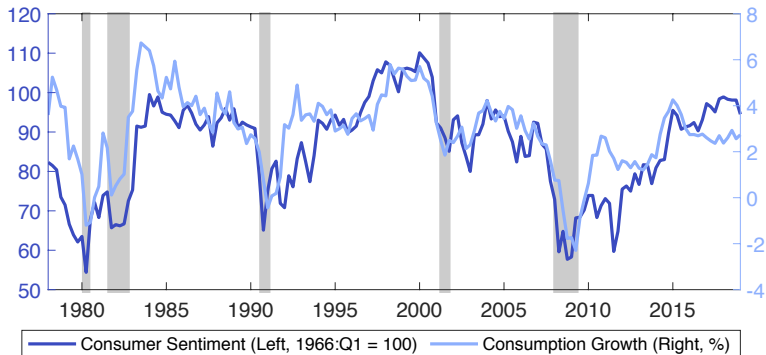
Consumer Sentiment and Consumption Spending

Figure: Consumer Sentiment and Consumption Spending Growth

Effect of Changes in Real Interest Rate

- Increased real interest rate has two opposing effects

- **Substitution effect:** Positive effect on saving, since rate of return is higher; greater reward for saving elicits more saving

- **Income effect:**
  - ▶ For a saver: Negative effect on saving, since it takes less saving to obtain a given amount in the future (target saving)
  - ▶ For a borrower: Positive effect on saving, since the higher real interest rate means a loss of wealth

- Net effect?

Effect of Changes in Real Interest Rate (Cont'd)

- Taxes and the real return to saving

- Expected real after-tax interest rate

$$r_{a-t} = (1-t)i - \pi^e$$

Different Interest Rates

- Different interest rates reflect differences in
  - default risk
  - term structure (maturity) $\rightarrow$ yield curve
  - tax status

- Since they often move together, we frequently refer to "the" interest rate

- Yield curve: relationship between life of a bond and the interest rate it pays
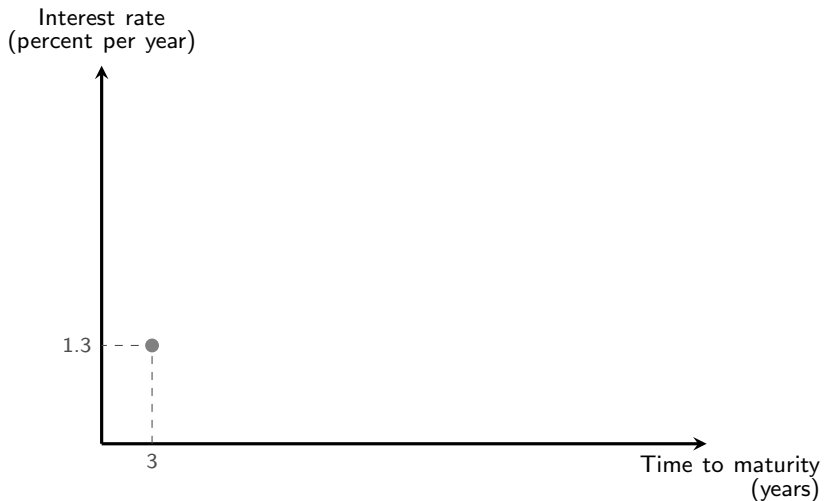
Yield Curve

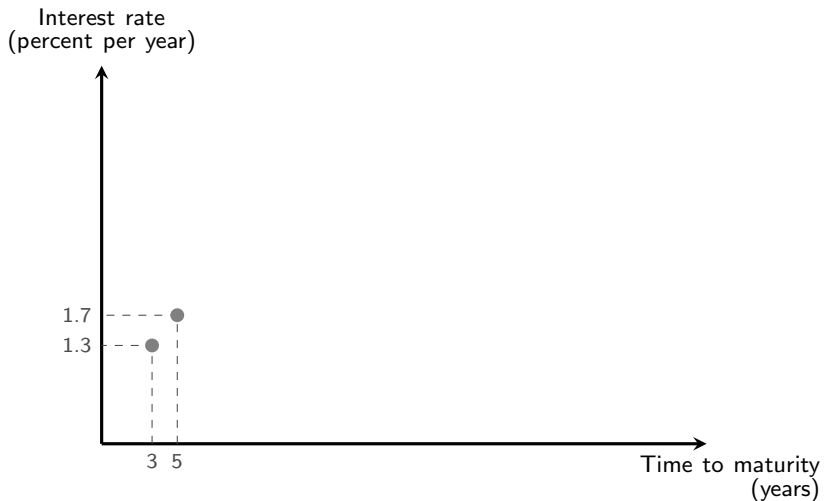**Figure:** Yield Curve

- Dynamic Yield Curve

Yield Curve

Figure: Yield Curve

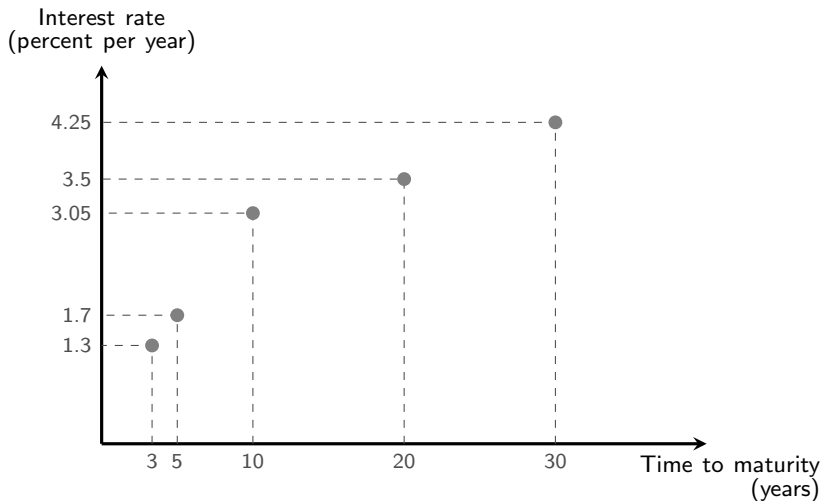- Dynamic Yield Curve

Yield Curve

Figure: Yield Curve
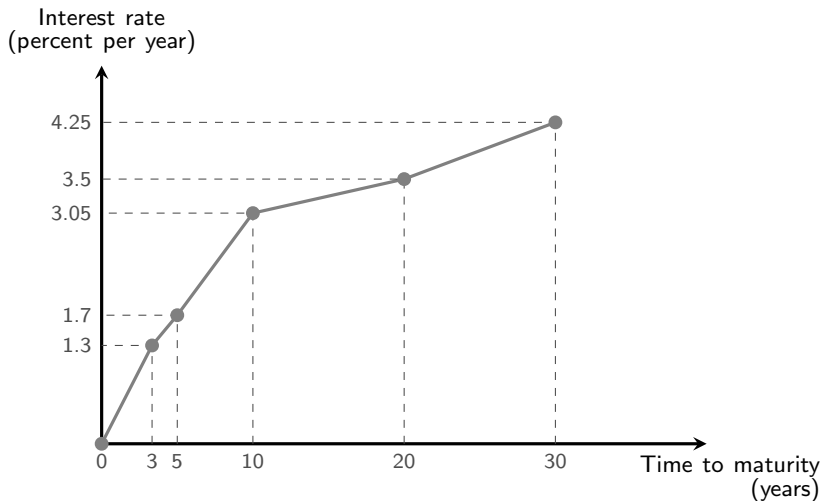
- Dynamic Yield Curve

Yield Curve

Figure: Yield Curve

- Dynamic Yield Curve

Effect of Fiscal Policy

- Fiscal policy affects desired consumption through changes in current and expected future income

- Fiscal policy directly affects desired national saving

$$S^d = Y - C^d - G$$

- The effect of government purchases (temporary increase) financed by higher current taxes?

- The effect of government purchases (temporary increase) financed by government borrowing?

Effect of Fiscal Policy (Cont'd)

- The effect of lump-sum tax cut today financed by higher future taxes?

- Ricardian equivalence proposition
  - ▶ If future income loss exactly offsets current income gain, no change in consumption

  - ▶ Tax change affects only the timing of taxes, not their ultimate amount (present value)

- In practice, people may not see that future taxes will rise if taxes are cut today

- Then a tax cut leads to increased desired consumption and reduced desired national saving

How consumers respond to tax rebates

- The government provided tax rebates in recessions of 2001 and 2007–2009, hoping to stimulated the economy

- A research suggests that consumers did not increase spending much in 2001, when the government provided a similar tax rebate

- A new research finds that even though consumers originally saved much of the tax rebate, later they increased spending and increased their credit-card debt

- New evidence on the tax rebates in 2008 and 2009
  - Consumers spent 50–90% of the tax rebates

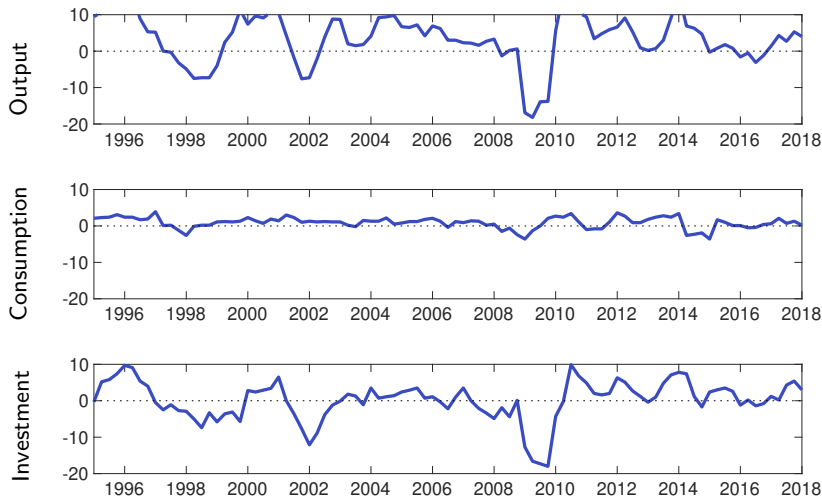 - Inconsistent with Ricardian equivalence

Importance of Investment

Figure: Growth Rates of Japan's Output, Consumption, and Investment (%)

Source: Cabinet Office, Economic and Social Research Institute, National Accounts for 2017.

Importance of Investment (Cont'd)

	GDP Share	Volatility
Private final consumption expenditure	55.4 %	1.5
Government final consumption expenditure	20.1 %	1.3
Gross fixed capital formation	24.5 %	5.4
Exports of goods and services	17.5 %	10.0
(less) Imports of goods and services	17.7 %	6.9
GDP		2.1

Source: Cabinet Office, Economic and Social Research Institute, National Accounts for 2017.

- Volatility is measured as standard deviation of growth rate of each variable from 1995:Q1 to 2018:Q1.

Investment

- The desired capital stock: The amount of capital that allows firms to earn the largest expected profit

- It depends on costs and benefits of additional capital

- The benefit of investment is the future marginal product of capital (MPK^f)

The User Cost of Capital

- Real costs of using a unit of capital for a specified period of time

- Equals to real interest cost $+$ depreciation

$$uc = rp_k + dp_k = (r + d)p_k,$$

where

$$r = \text{expected real interest rate}$$
$$d = \text{depreciation rate}$$
$$p_k = \text{the real price of capital goods}$$

Determination of the Desired Capital Stock
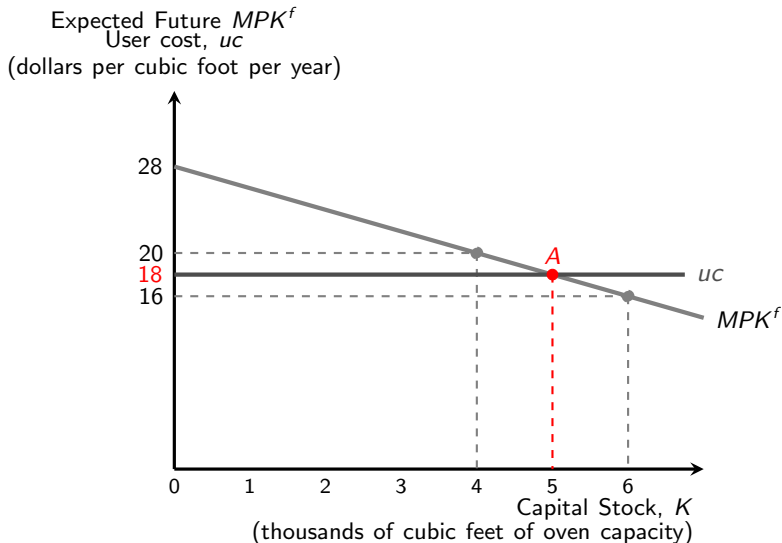
Figure: The Determination of the Desired Capital Stock

Taxes and the Desired Capital Stock

- With taxes, the return to capital is only $(1-\tau)MPK^f$, where τ is the tax rate on firm revenue

- A firm chooses its desired capital stock so that the return equals the user cost

$$(1-\tau)MPK^f = uc$$

- How does an increase in τ affect the desired capital stock?

- What is the tax-adjusted user cost of capital?

Taxes and the Desired Capital Stock (Cont'd)

- In reality, there are complications to the tax-adjusted user cost

- We assumed that firm revenues were taxed
  - In reality, profits, not revenues are taxed
  - Depreciation allowances reduce the tax paid by firms, because they reduce profits

- Investment tax credits reduce taxes when firms make new investments

- The effective tax rate: Economists summarize the many provisions of the tax code affecting investment by a single measure of the tax burden on capital
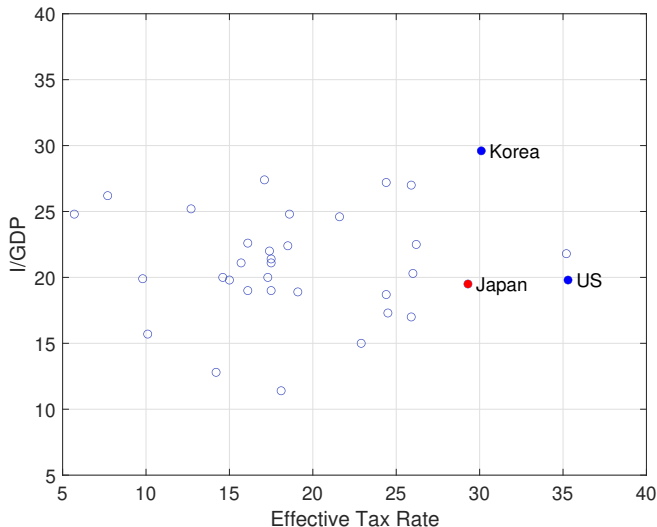
Effective Tax Rate on Capital

Figure: Effective Tax Rate and Investment Rate

From the Desired Capital Stock to Investment

- Net investment = gross investment (I) minus depreciation

$$\underbrace{K_{t+1} - K_t}_{\text{net investment}} = I_t - dK_t$$

- Alternatively

$$I_t = K_{t+1} - K_t + dK_t$$

- If firms can change their capital stocks in one period, then the desired capital stock $K^* = K_{t+1}$

$$I_t = \underbrace{K^* - K_t}_{\substack{\text{desired net} \\ \text{increase in } K}} + \underbrace{dK_t}_{\substack{\text{replacing} \\ \text{depreciated } K}}$$

- Lags and investment

Gross and Net Investment
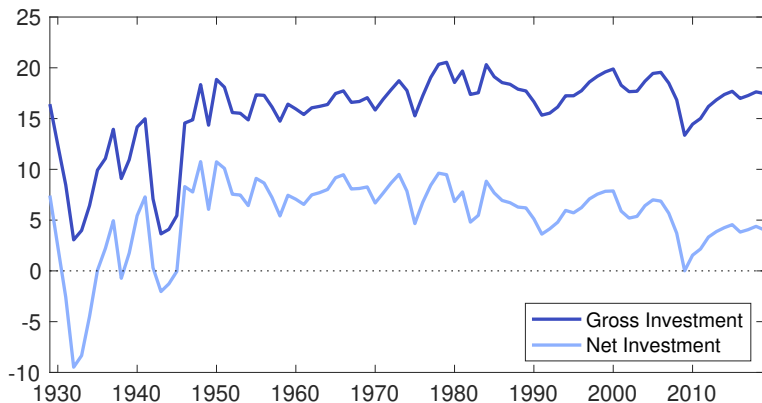
Figure 4.6 Gross and Net Investment, (% of GDP)

Investment and the Stock Market

- Tobin's q theory of investment

- Firms change investment in the same direction as the stock market

$$q = \frac{V}{p_k K},$$

where

$$q = \text{Tobin's } q$$
$$V = \text{firm's market value}$$
$$p_k K = \text{firm's replacement cost}$$

- If $q < 1$, don't invest. If $q > 1$, invest more.
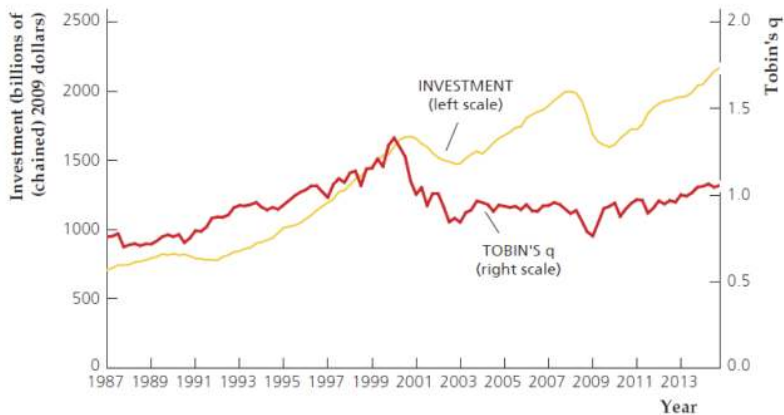
Investment and Tobin's q

Figure 4.6 Investment and Tobin's q, 1987Q1 – 2014Q4

Other Types of Investment

- Inventory investment and residential investment

- Marginal product of capital and user cost also apply, as with equipment and structures

Goods Market Equilibrium

- $Y = C^d + I^d + G$

- For simplicity, assume no foreign sector

- The real interest rate adjusts to bring the goods market into equilibrium

- Alternative representation: $S^d = I^d$
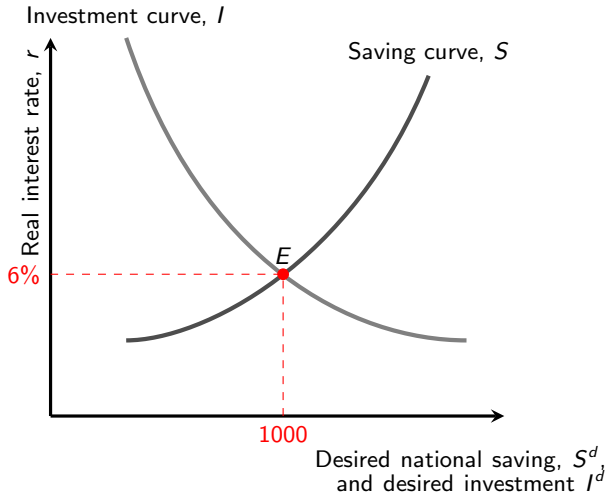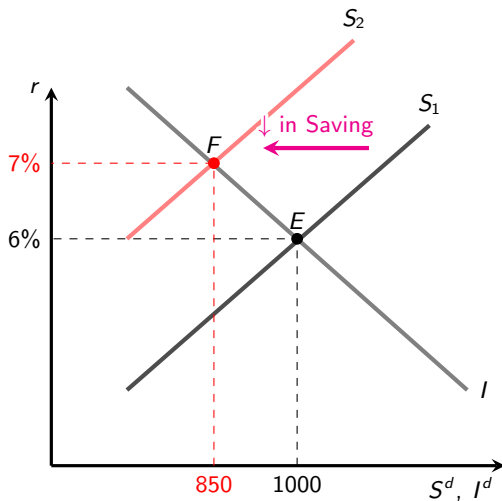
Saving-Investment Diagram

Figure: Goods Market Equilibrium

Shifts of the Saving Curve

Factors:

- Current output
- Expected future output
- Wealth
- Government purchases
- Taxes
  (w/o Ricardian Equivalence)

Shifts of the Investment Curve

Factors:

- Effective tax rate

- Expected future marginal productivity of capital