Agenda

- Investment
- Goods Market Equilibrium

Investment

- From the desired capital stock to investment:
  - The capital stock changes from 2 sources.
    - Gross investment, which adds to the capital stock.
    - Depreciation, which reduces the capital stock.
  - Gross investment = net investment + depreciation.
Investment

• From the desired capital stock to investment:
  ➢ Rewrite
  \[ K_{t+1} - K_t = I_t - dK_t \]
  ➢ as
  \[ I_t = K_{t+1} - K_t + dK_t \]
Investment

• From the desired capital stock to investment:
  ➢ Lags and investment.
    • Some capital can be constructed easily, but other capital may take years to put in place.
    • So investment needed to reach the desired capital stock may be spread out over several years.

Investment

• Investment in inventories and housing:
  ➢ The marginal product of capital and user cost of capital also apply to housing and inventories as well as to equipment and structures.

Determinants of Desired Investment

• Desired investment will:
  ➢ Increase with an increase in the expected future marginal product of capital, $MPK^f$, because the desired capital stock increases.
  ➢ Decline with an increase in the price of capital which also increases the user cost of capital and reduces the desired capital stock.

Determinants of Desired Investment

• Desired investment will:
  ➢ Decline with an increase in the real interest rate which also increases the user cost of capital and reduces the desired capital stock.
  ➢ Decline with an increase in the effective tax rate which also increases the tax-adjusted user cost of capital and reduces the desired capital stock.
  ➢ Decline with an increase in depreciation rates.
Determinants of Desired Investment

- Desired investment will:
  - Decline with an increase in depreciation rates, which also increases the tax-adjusted user cost of capital and reduces the desired capital stock.
  - Decline with an increase in the price of capital, which also increases the user cost of capital and reduces the desired capital stock.

Desired Investment & the Real Interest Rate

- Shifts of the investment curve:
  - The investment curve shifts right because of:
    - a rise in expected future marginal product of capital,
    - a fall in the effective tax rate,
    - a decline in depreciation rates, or
    - a decline in the price of capital.
Goods Market Equilibrium

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

\[ Y = C^d + I^d + G \]

- This is goods market equilibrium condition.

  This differs from the income-expenditure identity.

\[ Y = C + I + G \]

Goods Market Equilibrium

- The goods market need not be in equilibrium.

  ➢ If undesired goods are produced, the goods market will NOT be in equilibrium.

Goods Market Equilibrium

- The income-expenditure identity is:

\[ Y = C + I + G \]

- The goods market equilibrium condition is:

\[ Y = C^d + I^d + G \]

- or

\[ I^d = Y - C^d - G \]

Goods Market Equilibrium

- Now

\[ I^d = Y - C^d - G \]

- and (by definition):

\[ S^d = Y - C^d - G \]

- So the goods market equilibrium is also:

\[ S^d = I^d \]
Goods Market Equilibrium

• Establishing goods market equilibrium:
  - Equilibrium where $S^d = I^d$.
  - If $S^d > I^d$, then $r$ will decrease until $S^d = I^d$.
  - If $S^d < I^d$, then $r$ will increase until $S^d = I^d$.

Goods Market Equilibrium

• Shifts of the saving curve, $S^d$:
  - The saving curve shifts right because of:
    - A rise in current output,
    - A fall in expected future output,
    - A fall in wealth,
    - A fall in government purchases, or
    - A rise in taxes (unless Ricardian equivalence holds, in which case tax changes have no effect)

A decrease in desired savings
Goods Market Equilibrium

• Shifts of the investment curve, \( I^d \):

  ➢ The investment curve shifts right because of:

    • A rise in expected future marginal product of capital,
    • A decrease in the price of capital, or
    • A decrease in the effective tax rate.

An increase in desired investment

Goods Market Equilibrium: Application

• Macroeconomic consequences of a boom and bust in stock prices.

  ➢ Sharp changes in stock prices affect:

    • Consumption via a wealth effect, and
    • Business investment via the price of capital or Tobin’s \( q \).

Real stock prices and the C/GDP ratio
Effect on consumption of 1987 stock crash

Goods Market Equilibrium

- The boom and bust in stock prices:
  - Consumption and the 1987 stock crash.
    - The stock market crash of 1987 reduced wealth by about $1 trillion.
    - Consumption fell somewhat less than expected and not enough to cause a recession.
      - Probably because there had been a large run-up in stock prices between December 1986 and August 1987, so the crash mostly erased this run-up.

Effect on consumption of 1990s stock boom

Goods Market Equilibrium

- The boom and bust in stock prices:
  - Consumption and the 1990s stock boom.
    - Stock prices more than tripled in real terms.
    - Consumption was not strongly affected by the run-up in stock prices
Goods Market Equilibrium

- The boom and bust in stock prices:

  - Consumption and the early 2000s stock crash.
    - In the early 2000s, the decline in the stock market reduced wealth by about $5 trillion.
    - But consumption actually increased as a share of GDP.
Goods Market Equilibrium

• The boom and bust in stock prices:
  ➢ Investment and Tobin’s $q$.
    • Investment and Tobin’s $q$ were not closely correlated following the 1987 crash in stock prices.
    • But the relationship has been tighter in the 1990s and early 2000s, as the theory suggests.

Investment and Tobin’s $q$, 1987-2005

Key Diagram #3: Goods Market Equilibrium

• Goods market equilibrium is given by:
  \[ Y = C^d + I^d + G \]
  • or
  \[ I^d = Y - C^d - G \]
Key Diagram #3: Goods Market Equilibrium

• If
  \[ I^d = Y - C^d - G \]
  • and
  \[ S^d = Y - C^d - G \]
  • then:
  \[ S^d = I^d \]
  • which is also goods market equilibrium.

Key Diagram #3: Goods Market Equilibrium

• Factors that Shift the Curves:
  ➢ Changes in these factors will shift the \( S^d \) curve:
    • Current income,
    • Expected future income,
    • Wealth,
    • Expected real interest rate,
    • Government purchases, and/or
    • Taxes.

Key Diagram #3: Goods Market Equilibrium

• Factors that Shift the Curves:
  ➢ Changes in these factors will shift the \( I^d \) curve:
    • Expected future marginal product of capital,
    • The effective tax rate,
    • The depreciation rate, and/or
    • The price of capital.