Consumption, Saving, and Investment, Part 1

Agenda
- Consumption and Saving
- Determinants of National Saving
- Investment

Consumption and Saving
- Consumption and saving decisions:
  - Desired consumption is the consumption amount desired by households
  - Desired national saving is the level of national saving when consumption is at its desired level:
    \[ S^d = Y - C^d - G \]
Consumption and Saving

- Consumption and saving decisions:
  - There is a trade-off between current and future consumption:
    - The price of 1 unit of current consumption is $1 + r$ units of future consumption, where $r$ is the real interest rate.
    - **Consumption-smoothing motive**: the desire to have a relatively even pattern of consumption over time.

Consumption and Saving

- Effect of changes in **current income**:
  - Increases in current income increase both consumption and saving.
    - Because the **marginal propensity to consume**—the fraction of additional income consumed—is less than 1.
  - When current income ($Y$) rises, $C_d$ rises, but not by as much as $Y$, so $S_d$ also rises.

Consumption and Saving

- Effect of changes in **expected future income**:
  - Higher expected future income raises current consumption even at the same current income level, so current saving declines.

Consumption and Saving

- Effect of changes in **wealth**:
  - Increase in wealth raises current consumption even at the same current income level, so current saving declines.
Consumption and Saving

• Effect of changes in the real interest rate:

  ➢ A higher real interest rate has 2 effects.

  • The Substitution effect on saving is positive because a higher rate of return is a greater reward for saving.

  • The Income effect on saving is mixed:
    – It is negative for a net saver because it takes less saving to achieve a given amount in the future (target saving).
    – It is positive for a net borrower because a higher real interest rate represents a loss of wealth.

Consumption and Saving

• Effect of changes in the real interest rate:

  ➢ Taxes and the real return to saving.

  • The expected after-tax real interest rate is given by:

    \[ r_{a-t} = (1 - t)i - \pi \]

Consumption and Saving

• Effect of changes in fiscal policy:

  ➢ Changes in fiscal policy affects desired consumption through changes in both current and expected future income.

  ➢ They directly affect desired national saving:

    \[ S^d = Y - C^d - G \]
Consumption and Saving

- Effect of changes in fiscal policy:
  - **Government purchases:**
    - However, $C_d$ declines by less than $G$ rises because the marginal propensity to consume is less than 1.
    - Consequently, national saving ($S_d = Y - C_d - G$) declines.
    - An increase in government purchases reduce both desired consumption and desired national saving if it is financed by higher (current or expected future) taxes.

- Effect of changes in fiscal policy:
  - **Taxes—3 possible situations:**
    - If the decline in future expected income is less than the increase in current income, desired consumption will rise.
    - If the decline in future expected income is more than the increase in current income, desired consumption will fall.
Consumption and Saving

• Effect of changes in fiscal policy:

➢ Taxes—3 possible situations:

  • If the decline in future expected income exactly offsets the increase in current income, desired consumption will not change.
    – This is an example of Ricardian equivalence.
    – The tax change affects only the timing of taxes, not their ultimate (present value) amount.

Consumption and Saving

• Effect of changes in fiscal policy:

➢ Taxes:

  • In practice, people do not fully see that future taxes will rise if taxes are cut today.
  • Consequently, a tax cut today leads to increased desired consumption and reduced desired national saving.

Application: A Ricardian Tax Cut?

• The Economic Growth and Tax Relief Reconstruction Act (EGTRRA) of 2001 gave rebate checks to taxpayers and cut tax rates substantially.

➢ From 2001 Q1 to 2001 Q3:

  • Government saving fell $277 billion (at an annual rate).
  • Private saving increased $180 billion (at an annual rate).
  • National saving declined $97 billion (at an annual rate).
    – About 2/3 of the tax cut was saved.

Application: A Ricardian Tax Cut?

• Results of the tax rebates:

  ➢ Most consumers saved their tax rebates and did not spend them.
  ➢ As a result, the tax rebate and tax cut did not stimulate much additional spending by households.
Determinants of Desired National Saving

• Desired national saving will:
  ➢ Increase with a rise in current income because part of the extra income is saved.
  ➢ Decrease with an increase in expected future income because a higher expected future income raises current desired consumption and reduces current desired saving.

• Desired national saving will:
  ➢ Decrease with an increase in wealth because some of the extra wealth is consumed, which reduces saving for a given current income.
  ➢ Probably increase with an increase in expected (after-tax) real interest rates because the increased return to savings probably outweighs that less must be saved to reach a savings target.

Determinants of Desired National Saving

• Desired national saving will:
  ➢ Decrease with an increase in government purchases, G, because higher G directly lowers desired national saving.
  ➢ Probably rise with an increase in taxes, T, because consumers don’t take full account for future taxes and so reduce current consumption.
    • But saving won’t change if consumers fully account for a offsetting future tax cut.

Desired Saving & the Real Interest Rate
Desired Saving & the Real Interest Rate

- Shifts of the saving curve:
  - The saving curve will shift 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)

Effect of an increase in current output

Investment

- Why is investment important?
  - Investment fluctuates sharply over the business cycle.
    - Need to understand investment to understand the business cycle.
  - Investment plays a crucial role in long-term growth.

Investment

- Investment is determined by changes in the desired capital stock.
  - The desired capital stock is the amount of capital that allows firms to earn the largest expected profit.
    - Depends on benefits and costs of additional capital.
Investment

- The desired capital stock:
  - The **benefit** associated with additional capital depends on the **future** marginal product of capital, $MPK'$.  
  - Because the marginal productivity of capital falls a $K$ increase, the $MPK'$ also falls as $K$ increases.

Expect Future Marginal Product of Capital

User Cost of Capital

- The desired capital stock:
  - The **cost** associated with additional capital is the real cost of using a unit of capital per year.
    - This is called the **user cost of capital**, $uc$, which equals the sum of the real interest cost and depreciation.

$$uc = rp_K + dp_K = (r + d)p_K$$
Determining the Desired Capital Stock

If $MPK_f > uc$, profits rise if $K$ is added, i.e., the marginal benefits $>\,$ the marginal costs.

If $MPK_f < uc$, profits rise if $K$ is reduced, i.e., the marginal benefits $<\,$ the marginal costs.

Profits are maximized where $MPK_f = uc$.

Investment

• Changes in the desired capital stock:
  ➢ Any factor that changes the user cost of capital will also cause a change in the desired capital stock:
    • The real interest rate,
    • The depreciation rate, or
    • The price of capital.

An increase in the user cost of capital
Investment

• Changes in the desired capital stock:
  
- Any factor that shifts the $MPK^f$ curve will also cause a change in the desired capital stock:
  
  - Technology, or
  - The labor force.

An increase in $MPK^f$

Investment

• Changes in the desired capital stock:
  
- **Taxes** and the desired capital stock:
  
  - With taxes, the return to capital is $(1 - \tau)MPK^f$
  
  - The desired capital stock is where the after tax return equals the user cost:

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

  $$ MPK^f = \frac{uc}{(1 - \tau)} = (r + d)p_k(1 - \tau) $$

Investment

• Changes in the desired capital stock:
  
- **Taxes** and the desired capital stock:
  
  - Tax-adjusted user cost of capital is $uc/(1 - \tau)$.
  
  - An increase in $\tau$ raises the tax-adjusted user cost of capital and reduces the desired capital stock.
Investment

• Changes in the desired capital stock:

  ➢ Taxes and the desired capital stock:

    • There are complications to the tax-adjusted user cost.
      – In reality, profits, not revenues, are taxed.
      – Depreciation allowances reduce the tax paid by firms, because they reduce profits.
      – Investment tax credits also reduce taxes when firms make new investments

Effect of taxes on investment

• Do changes in the tax rate have a significant effect on investment?

  ➢ One study found that after major tax reforms, investment responded strongly with an elasticity of investment to changes in the user cost of capital about –0.66.

Investment and the Stock Market

• Tobin’s q theory of investment:

  ➢ $q$ is a firm’s market value divided by its replacement cost of capital.

  \[ q = \frac{V}{p_K K} \]

  • where $V$ is stock market value of firm,
  • $K$ is firm’s capital,
  • $p_K$ is price of new capital, and
  • $p_K K$ is the replacement cost of firm’s capital stock.
Investment and the Stock Market

• Tobin’s $q$ theory of investment:
  
  ➢ If $V > pK$, then if $q > 1$ and the firm increase investment.
    • If $q < 1$, don’t invest.

• Tobin’s $q$ theory of investment:
  
  ➢ Investment should move in the same direction as the stock market.
    • Stock market boom raises $V$, causing $q$ to rise, increasing investment.
    ➢ There is a general tendency for investment to rise when the stock market rises but relationship isn’t very strong.

Investment and the Stock Market

• Tobin’s $q$ theory of investment:
  
  ➢ Similar to the $MPK'$ and uc theory earlier.
    • A higher $MPK'$ increases the future earnings of the firm, so $V$ and $q$ should rise so investment should increase.
    • A lower real interest rate raises $V$—as people buy stocks instead of bonds—and $q$ but reduces uc so investment should increase.
    • A decrease in the cost of capital, $pK$, raises $q$ but reduces uc so investment should increase.

Next Time

• Investment
• Goods Market Equilibrium