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:
  ➢ A person can consume less than current income, i.e., saving is positive.
  ➢ A person can consume more than current income, i.e., saving is negative.
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.

• 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.

• 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.

• 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.

- 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:
      $$ r_{ad} = (1 - t)i - \pi $$

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:
    $$ Sd = Y - C_d - G $$

- Effect of changes in fiscal policy:
  - Government purchases:
    - Higher $G$ financed by higher current taxes reduces after-tax income, lowering desired consumption.
    - Higher $G$ financed by higher future taxes also lowers desired consumption if people realize that future after-tax income will be lower.
### 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.

- **Taxes:**
  - A reduction in current taxes will increase current (disposable) income and desired consumption.
  - However, consumers may realize that a tax cut today will result in higher taxes in the future, which will reduce future expected income.

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### Consumption and Saving

*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 Saving & the Real Interest Rate

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Determinants of Desired National 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 offsets future tax cut.
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.

Expected Future Marginal Product of Capital

\[
MPK'
\]

\[
K
\]

User Cost of Capital

\[
u_c = r p_K + d p_K = (r + d) p_K
\]

Investment

• 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**, \( u_c \), which equals the sum of the real interest cost and depreciation.

\[
u_c = r p_K + d p_K = (r + d) p_K
\]
Determining the Desired Capital Stock

Investment

- Determining the desired capital stock:
  - If $MPK' > uc$, profits rise if $K$ is added, i.e., the marginal benefits > the marginal costs.
  - If $MPK' < uc$, profits rise if $K$ is reduced, i.e., the marginal benefits < the marginal costs.
  - Profits are maximized where $MPK' = uc$

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 $MPK^f$**

$$\begin{align*}
\text{Taxes and the desired capital stock:} \\
\text{With taxes, the return to capital is } (1 - \tau) MPK^f \\
\text{The desired capital stock is where the after tax return equals the user cost:} \\
(1 - \tau) MPK^f = uc \\
MPK^f = uc/(1 - \tau) = (r + d)pK/(1 - \tau)
\end{align*}$$

**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.