
Consumption, Saving, and Investment, Part 2

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Agenda

- Investment
 - Goods Market Equilibrium
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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.
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Investment

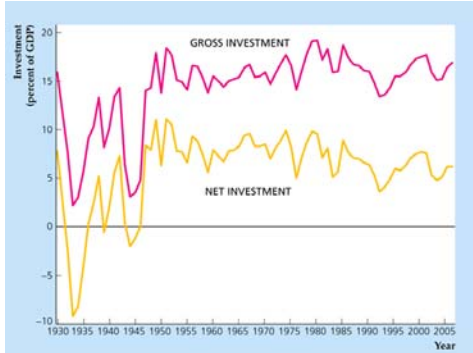
- From the desired capital stock to investment:
 - Net investment = gross investment – depreciation:

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

- where net investment = the change in the capital stock.
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Gross and net investment, 1929-2005



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Investment

- From the desired capital stock to investment:

➤ Rewrite

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

➤ as

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

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Investment

- From the desired capital stock to investment:

➤ If firms can change their capital stocks in one period, then:

$$K^* = K_{t+1}$$

- where K^* is the desired capital stock.

➤ Then

$$I_t = K^* - K_t + dK_t$$

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Investment

- From the desired capital stock to investment:

➤ Now investment has two parts:

$$I_t = K^* - K_t + dK_t$$

- $K^* - K_t$, the desired net increase in the capital stock over the year, and
- dK_t , the investment needed to replace depreciated capital.

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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.

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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.

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Determinants of Desired Investment

- Desired investment will:
 - Increase with an increase in the **expected future marginal product of capital, MPK^e** , 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.

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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.

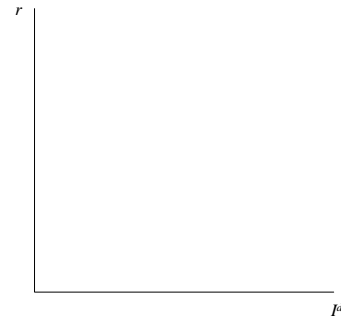
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Determinants of Desired Investment

- 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.

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Desired Investment & the Real Interest Rate



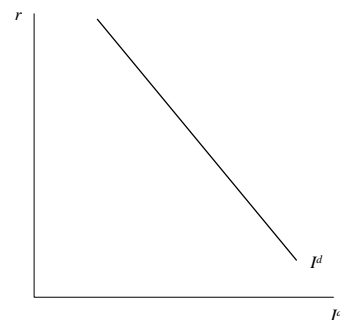
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Desired Investment & the Real Interest Rate

- 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.

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Effect of an increase in MPK^f



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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.

$$Y = C + I + G$$

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Goods Market Equilibrium

- The goods market need not be in equilibrium.
 - If undesired goods are produced, the goods market will NOT be in equilibrium.

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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

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

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Goods Market Equilibrium

- Now

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

- and (by definition):

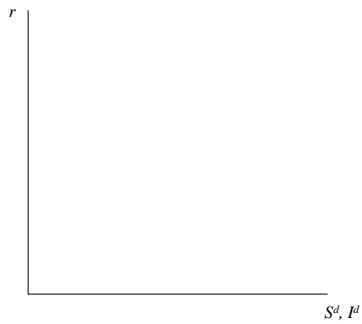
$$S^d = Y - C^d - G$$

- So the goods market equilibrium is also:

$$S^d = I^d$$

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Goods Market Equilibrium



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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 $S^d = I^d$.

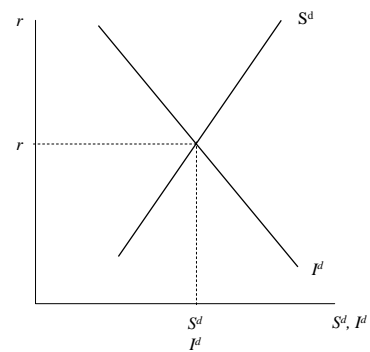
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Goods Market Equilibrium

- 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)

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A decrease in desired savings



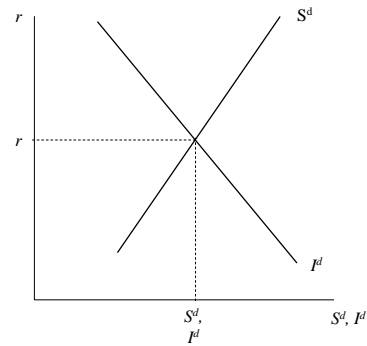
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Goods Market Equilibrium

- 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.

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An increase in desired investment



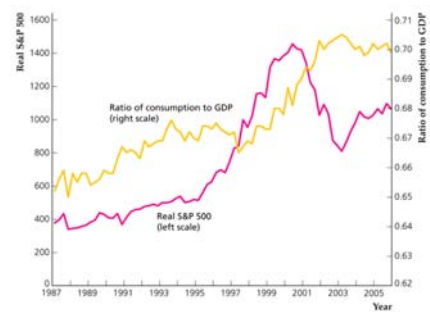
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Goods Market Equilibrium: Application

- 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 .

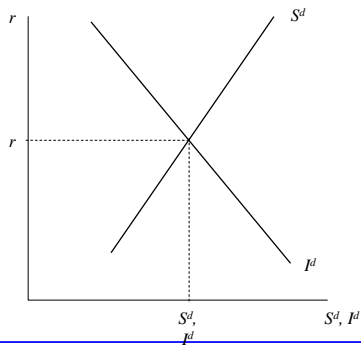
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Real stock prices and the C/GDP ratio



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Effect on consumption of 1987 stock crash



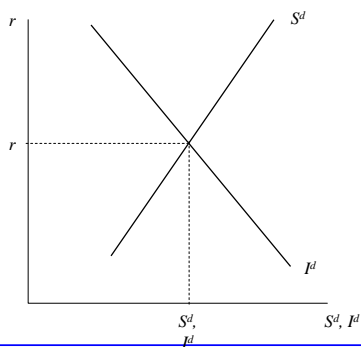
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Goods Market Equilibrium

- 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.

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Effect on consumption of 1990s stock boom



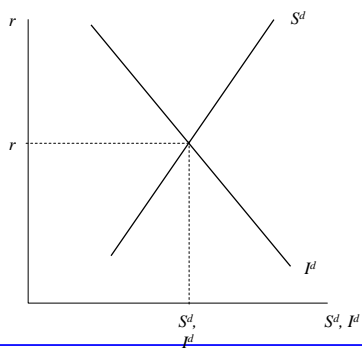
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Goods Market Equilibrium

- 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

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Effect on consumption of 2000s stock crash



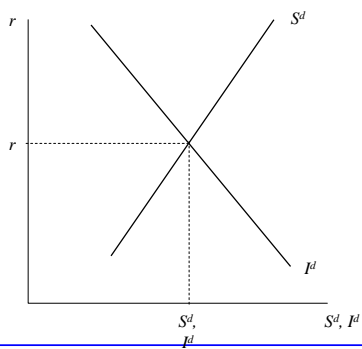
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Goods Market Equilibrium

- 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.

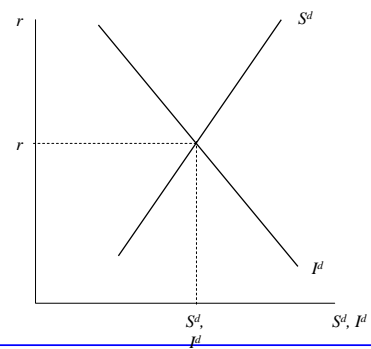
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Effect on investment of 1990s stock boom



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Effect on investment of 2000s stock crash



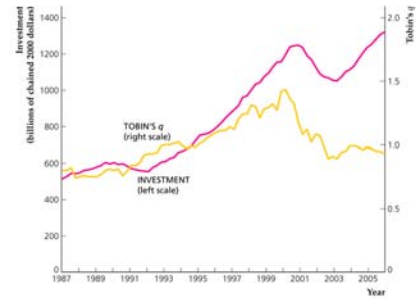
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Goods Market Equilibrium

- 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.

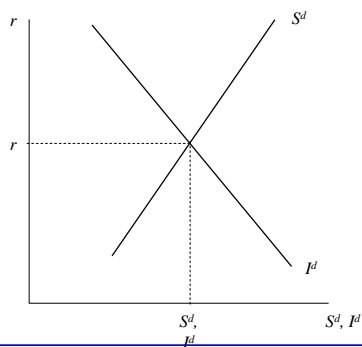
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Investment and Tobin's q , 1987-2005



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Key Diagram #3: Goods Market Equilibrium



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Key Diagram #3: Goods Market Equilibrium

- Goods market equilibrium is given by:

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

- OR

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

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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**.

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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.

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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.

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