Lecture 4  Saving and Investment

Principles of Macroeconomics
KOF, ETH Zurich, Prof. Dr. Jan-Egbert Sturm
Fall Term 2008
Population Growth

• Economists and other social scientists have long debated how population growth affects a society.

• Population growth interacts with other factors of production:
  • Stretching natural resources
  • Diluting the capital stock
  • Promoting technological progress
International Evidence on Population Growth and Income per Person

Income per person in 1992 (logarithmic scale)

Population growth (percent per year) (average 1960 –1992)
### General Information

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Saving, Investment, and the Financial System

• The *financial system* consists of the group of institutions in the economy that help to match one person’s saving with another person’s investment.

• It moves the economy’s scarce resources from savers to borrowers.
FINANCIAL INSTITUTIONS

• The financial system is made up of financial institutions that coordinate the actions of savers and borrowers.

• Financial institutions can be grouped into two different categories:
  • Financial markets
  • Financial intermediaries
FINANCIAL INSTITUTIONS

• Financial Markets
  • Stock Market
  • Bond Market
• Financial Intermediaries
  • Banks
  • Mutual Funds
FINANCIAL INSTITUTIONS

• *Financial markets* are the institutions through which savers can directly provide funds to borrowers.

• *Financial intermediaries* are financial institutions through which savers can indirectly provide funds to borrowers.
Financial Markets

• The Bond Market
  • A *bond* is a certificate of indebtedness that specifies obligations of the borrower to the holder of the bond.

• Characteristics of a Bond
  • Term: The length of time until the bond matures.
  • Credit Risk: The probability that the borrower will fail to pay some of the interest or principal.
  • Tax Treatment: The way in which the tax laws treat the interest on the bond.
Financial Markets

• The Stock Market
  • *Stock* represents a claim to partial ownership in a firm and is therefore, a claim to the profits that the firm makes.
  • The sale of stock to raise money is called equity financing.
    • Compared to bonds, stocks offer both higher risk and potentially higher returns.
  • The most important stock exchanges in the United States are the New York Stock Exchange, the American Stock Exchange, and NASDAQ.
Financial Markets

• The Stock Market
  • Most newspaper stock tables provide the following information:
    • Price (of a share)
    • Volume (number of shares sold)
    • Dividend (profits paid to stockholders)
    • Price-earnings ratio
Financial Intermediaries

- Financial intermediaries are financial institutions through which savers can indirectly provide funds to borrowers.
Financial Intermediaries

- Banks...
  - take deposits from people who want to save and use the deposits to make loans to people who want to borrow.
  - pay depositors interest on their deposits and charge borrowers slightly higher interest on their loans.
Financial Intermediaries

• Banks...
  • help create a *medium of exchange* by providing non-cash payment methods
    • A medium of exchange is an item that people can easily use to engage in transactions.
  • facilitate the purchases of goods and services.
Financial Intermediaries

• Mutual Funds
  • A *mutual fund* is an institution that sells shares to the public and uses the proceeds to buy a portfolio, of various types of stocks, bonds, or both.
  • Mutual funds allow people with small amounts of money to easily diversify.
Financial Intermediaries

- Other Financial Institutions
  - Credit unions
  - Pension funds
  - Insurance companies
  - Loan sharks
SAVING AND INVESTMENT IN THE NATIONAL INCOME ACCOUNTS

• Recall that GDP is both total income in an economy and total expenditure on the economy’s output of goods and services:

\[ Y = C + I + G + NX \]
Some Important Identities

- Assume a closed economy – one that does not engage in international trade:

\[ Y = C + I + G \]
Some Important Identities

• Now, subtract $C$ and $G$ from both sides of the equation:
  \[ Y - C - G = I \]

• The left side of the equation is the total income in the economy after paying for consumption and government purchases and is called national saving, or just saving ($S$).
Some Important Identities

• Substituting $S$ for $Y - C - G$, the equation can be written as:

$$S = I$$
Some Important Identities

- **National saving**, or *saving*, is equal to:

  \[ S = I \]

  \[ S = Y - C - G \]

  \[ S = (Y - T - C) + (T - G) \]
The Meaning of Saving and Investment

• National Saving
  • National saving is the total income in the economy that remains after paying for consumption and government purchases.

• Private Saving
  • Private saving is the amount of income that households have left after paying their taxes and paying for their consumption.
  • Private saving = ($Y$ – $T$ – $C$)
The Meaning of Saving and Investment

- **Public Saving**
  - *Public saving* is the amount of tax revenue that the government has left after paying for its spending.
  - Public saving $= (T - G)$
The Meaning of Saving and Investment

- **Surplus and Deficit**
  - If $T > G$, the government runs a *budget surplus* because it receives more money than it spends.
    - The surplus of $T - G$ represents public saving.
  - If $G > T$, the government runs a *budget deficit* because it spends more money than it receives in tax revenue.
Government Budget Balances in Switzerland

Government excl. social insurances

Government incl. social insurances

Forecast

% of GDP

2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

KOF Forecast September 2008
Gross government debt (% GDP)
The Meaning of Saving and Investment

• For the economy as a whole, saving must be equal to investment.

\[ S = I \]
The Meaning of Saving and Investment

• Note: “Investment” means the creation of new productive assets by firms and households, e.g. building a new factory or a new house.

• Buying an old house or a share in an existing company is only a financial transaction, although this is also oftentimes called “investment”.
The Meaning of Saving and Investment

• Firms invest in order to raise future productivity, or to replace depreciated capital.
• The difference between total investment and depreciation is called net investment.
Investment, Growth, and Output

Output ($Y$), Investment ($I$), Depreciation ($D$)

Output ($Y$)

Depreciation ($D$)

Investment ($I$)

Capital stock ($K$)

$Y_0$, $Y_1$

$I_0$

$D_0$

$K_0$, $K_1$

Graph shows the relationship between output, investment, and depreciation as a function of capital stock.
Investment, Growth and Output

- At a given saving rate, with positive net investment, the capital stock (and hence output) will grow until D=I
- If the saving rate is increased, the capital stock, GDP grows further, again until D=I
- Once D=I the growth rate will be zero.
Effect of an increase in the rate of saving and investment

Output ($Y$), Investment ($I$), Depreciation ($D$)

Capital stock ($K$)

$Y_2$, $Y_1$, $I_2$, $I_1$, $D$, $K_1$, $K_2$
International Evidence on Investment Rates and Income per Person

Income per person in 1992 (logarithmic scale)

Investment as percentage of output (average 1960–1992)
The economy’s output is used for saving (investment) or consumption.

Long-run (steady state) consumption is the difference between steady state depreciation (investment) and steady state output.

There’s a unique saving rate that maximizes the difference between output and investment.
Steady state consumption

Output (Y), Investment (I), Depreciation (D)

Capital stock (K)

Steady state consumption

\[ c^* \]

\[ Y \]

\[ S^* \]

\[ K \]
An optimum saving rate

Consumption

Saving rate (%)
An optimum saving rate

Consumption

Saving rate (%)
Technological Progress

• So far, the growth rate in the steady state is zero
• This is no longer the case if we allow for technological progress
Saving, Investment and Growth

- The saving and investment rate determines the growth rate and long-run level of GDP and consumption.
- Saving and investment are coordinated on the financial market.
THE MARKET FOR LOANABLE FUNDS

• Financial markets coordinate the economy’s saving and investment in the market for loanable funds.

• The market for loanable funds is the market in which those who want to save supply funds and those who want to borrow to invest demand funds.
Supply and Demand for Loanable Funds

• Loanable funds refers to all income that people have chosen to save and lend out, rather than use for their own consumption.

• The supply of loanable funds comes from people who have extra income they want to save and lend out.

• The demand for loanable funds comes from households and firms that wish to borrow to make investments.
Supply and Demand for Loanable Funds

• Interest rate
  • the price of the loan
  • the amount that borrowers pay for loans and the amount that lenders receive on their saving
  • in the market for loanable funds, the real interest rate.
Supply and Demand for Loanable Funds

• Financial markets work much like other markets in the economy.
• The equilibrium of the supply and demand for loanable funds determines the real interest rate.
Figure 1 The Market for Loanable Funds

Interest Rate

5%

Supply

Demand

Loanable Funds (in billions of dollars)

$1,200

0
Supply and Demand for Loanable Funds

• Government Policies That Affect Saving and Investment
  • Taxes and saving
  • Taxes and investment
  • Government budget deficits and surpluses
Policy 1: Saving Incentives

- Taxes on interest income substantially reduce the future payoff from current saving and, as a result, reduce the incentive to save.
- A tax decrease increases the incentive for households to save at any given interest rate.
  - The supply of loanable funds curve shifts right.
  - The equilibrium interest rate decreases.
  - The quantity demanded for loanable funds increases.
Figure 2 An Increase in the Supply of Loanable Funds

1. Tax incentives for saving increase the supply of loanable funds . . .

2. . . . which reduces the equilibrium interest rate . . .

3. . . . and raises the equilibrium quantity of loanable funds.

Loanable Funds (in billions of dollars)

Interest Rate

Supply, $S_1$

Demand

$S_2$

5%

4%

0 $1,200 $1,600
Policy 1: Saving Incentives

- If a change in tax law encourages greater saving, the result will be lower interest rates and greater investment.
Policy 2: Investment Incentives

- An investment tax credit increases the incentive to borrow.
- Increases the demand for loanable funds.
- Shifts the demand curve to the right.
- Results in a higher interest rate and a greater quantity saved.
Policy 2: Investment Incentives

• If a change in tax laws encourages greater investment, the result will be higher interest rates and greater saving.
Figure 3 Investment Incentives Increase the Demand for Loanable Funds

1. An investment tax credit increases the demand for loanable funds.

2. . . . which raises the equilibrium interest rate.

3. . . . and raises the equilibrium quantity of loanable funds.

Graph:
- **Supply**
- **Demand (D1)**
- **Demand (D2)**

- Interest Rate
  - 5%
  - 6%

- Loanable Funds (in billions of dollars)
  - $1,200
  - $1,400

The graph illustrates the shift in demand due to an investment tax credit, leading to an increase in both the equilibrium interest rate and the quantity of loanable funds.
Policy 3: Government Budget Deficits and Surpluses

• When the government spends more than it receives in tax revenues, the short fall is called the budget deficit.

• The accumulation of past budget deficits is called the government debt.
Policy 3: Government Budget Deficits and Surpluses

- Government borrowing to finance its budget deficit reduces the supply of loanable funds available to finance investment by households and firms.
- This fall in investment is referred to as *crowding out*.
  - The deficit borrowing crowds out private borrowers who are trying to finance investments.
Policy 3: Government Budget Deficits and Surpluses

- A budget deficit decreases the supply of loanable funds.
- Shifts the supply curve to the left.
- Increases the equilibrium interest rate.
- Reduces the equilibrium quantity of loanable funds.
Figure 4: The Effect of a Government Budget Deficit

1. A budget deficit decreases the supply of loanable funds . . .

2. . . . which raises the equilibrium interest rate . . .

3. . . . and reduces the equilibrium quantity of loanable funds.

Interest Rate

Loanable Funds (in billions of dollars)

$1,200

$1,200

$800

5%

6%
Policy 3: Government Budget Deficits and Surpluses

• When government reduces national saving by running a deficit, the interest rate rises and investment falls.

• A budget surplus increases the supply of loanable funds, reduces the interest rate, and stimulates investment.
Figure 5: The U.S. Government Debt

- Revolution War
- Civil War
- World War I
- World War II
Summary

• The financial system is made up of financial institutions such as the bond market, the stock market, banks, and mutual funds.
• All these institutions act to direct the resources of households who want to save some of their income into the hands of households and firms who want to borrow.
Summary

- National income accounting identities reveal some important relationships among macroeconomic variables.
- In particular, in a closed economy, national saving must equal investment.
- The saving and investment rate determines the growth rate and long-run level of GDP and consumption.
Summary

- Financial institutions attempt to match one person’s saving with another person’s investment.
- The interest rate is determined by the supply and demand for loanable funds.
- The supply of loanable funds comes from households who want to save some of their income.
- The demand for loanable funds comes from households and firms who want to borrow for investment.
Summary

• National saving equals private saving plus public saving.
• A government budget deficit represents negative public saving and, therefore, reduces national saving and the supply of loanable funds.
• When a government budget deficit crowds out investment, it reduces the growth of productivity and GDP.