The IS-LM Model

Chapter 8.1 – 8.5

Outline

- Investment and the Interest Rate
- Net Exports and the Interest Rate
- The IS Curve
- The Demand for and Supply of Money
- The LM Curve
- Policy Analysis with IS-LM

8.1. Investment and the Interest Rate

- **Investment depends negatively on interest rates.** Why?
  - Most investments are financed through borrowing or with funds from selling financial securities. If interest rates are high, then there are high borrowing costs or high losses in income

Investment function:

$$\mathbf{I = e - dR}$$

e, d = constants

d = how much investment falls when the interest rate increases by 1%

Investment and the Interest Rate

By making investment endogenous, we have introduced a new endogenous variable: the interest rate, **R**

We focus here on the **average interest rate** (which represents the behavior of all the different types of rates: long-term, short-term securities, etc.)

Note: distinguish between real and nominal interest rates:

Real interest rate (R) = Nominal interest rate (i) – Inflation real interest rate: R

Here we use the real interest rate: R

8.2. Net Exports and the Interest Rate

- Net exports depend negatively on the interest rate. Why?

If U.S. interest rates are higher than rates in other countries, dollars become more attractive, which drive up the price of dollars; U.S. goods become more expensive and foreign goods cheaper, thus net exports fall

$$\mathbf{X = g - mY -- nR}$$

n – measures the decrease in net exports when the interest rate rises by 1%

8.4. The IS Curve

$$Y = C + I + G + X$$

$$C = a + b(1-t)Y$$

$$I = e - dR$$

$$X = g - mY - nR$$

The IS Curve

- The IS curve shows all combinations of R and Y that satisfy the income identity, the consumption function, the investment function, and the net-export function.
- It is the set of points for which spending balance occurs.
- **When the curve slopes downward --** higher interest rate reduces investment and net exports and thereby reduces GDP through the multiplier process
- **Shifts:** an increase in government spending increases GDP through the multiplier and shifts the IS curve to the right

8.3. The Demand for and Supply of Money

- Money is:
- Currency issued by the Federal Reserve (coins, dollar bills) together with checking account balances held by public in banks
- It does not include larger amount of wealth, such as mutual funds, bonds, corporate stock, etc.

The Demand for Money

1. People want to hold less money when the **interest rate** is high and more money when the interest rate is low.
2. People want to hold more money when **income** is higher and less money when income is lower.
3. People want to hold more money when **price level** is higher and less money when price level is lower.

The Demand for Money

Money demand function

$$M = (kY - hR)P$$

M – demand for money

R – interest rate

P – price level

k, h – coefficients

k – how much money demand increases when income increases

h – how much money demand declines when interest rate raises

The Supply of Money

- Money Supply level – determined by the Federal Reserve System
- For now, we assume that the Fed picks a certain level, M
- In the short-run model, when prices are predetermined, income and interest rates adjust to keep the demand for money equal to its fixed supply

8.4 The LM Curve

- The LM curve shows all combinations of R and Y that satisfy the money demand relationship for a fixed level of the money supply and a predetermined value of the price level.
- **When the curve slopes upward:** if the interest rate increases, money demand decreases; therefore, to have equilibrium in the money market there should be an increase in income. So, an interest-rate increase is associated with a rise in income.

The LM Curve

- Note: Real money = money supply M divided by price level P

$$M/P = kY - hR$$

  - The demand for real money depends positively on real GDP and negatively on the interest rate

- **Shifts**: an increases in money supply shifts the LM curve to the right

8.5.Policy Analysis with IS-LM

Monetary Policy: changes in the money supply

What happens in the economy when the Fed increases the money supply?

- Immediately after the increase, more money is in the economy than people demand. This makes the interest rate fall, so the demand for money increases.
- The lower interest rate stimulates investment and net exports.
- This raises GDP through the multiplier process; GDP rises and the interest rate falls
- LM curve shifts to the right (increase in real money)

Policy Analysis with IS-LM

Fiscal Policy: the use of tax rates and government spending to influence the economy

- Ex. Congress passes a bill that increases government spending or decrease in taxes
- An increase in government spending increases the interest rate (through the increase in the demand for money) and increases income (through the multiplier)
- Increasing the interest rate reduces investment and net exports, thereby offsetting some of the increase in income – **crowding out**

Policy Analysis with IS-LM

These are short-run results with the price level predetermined. When the time frame is lengthened so that the price level can adjust, these results will be modified.