MONEY AND INFLATION

1. What is Money?

- Definition: the stock of assets that can be readily used to make transaction

- The functions of money
  • Store of value: a way to transfer purchasing power from the present to the future
  • Unit of account: the terms in which prices are quoted and debts are recorded
  • Medium of exchange: what we use to buy goods and services (liquidity)

- The types of money
  • Fiat money: money that has no intrinsic value e.g., dollar bills
  • Commodity money: money that has intrinsic value e.g., gold
    → Using raw gold as money is costly

- How the quantity of money (Money Supply) is controlled → monetary policy
  • Delegated to a partially independent institution
  • US: Federal Reserve (Fed), Federal Open Market Committee
- Open market operation: the purchase and sale of government bonds  
  e.g., buy bonds from the public \( \rightarrow M^S \uparrow \)

- How the quantity of money is measured (table 4-1, p.81)

2. The Quantity Theory of Money

  \( \rightarrow \) How the quantity of money affects the economy

- Transactions and the quantity equation
  
  • Quantity equation: the link b/t transactions and money
  
  \( \rightarrow M \times V = P \times T \)

  1) \( M \): the quantity of money

  2) \( V \): the transaction velocity of money  
  (measures the rate at which money circulates in the economy)

  3) \( P \): the price of a typical transaction  
  (the number of dollars exchanged)

  4) \( T \): total number of transactions during some period of time \( \rightarrow \) difficult to measure
\[ M \times V = P \times Y, \]

- **Money demand function**

  \[ M / P = kY \]

  \[ M(1/k) = PY \]

  \[ \text{If } V = 1/k, \quad M \times V = P \times Y \]

  • The link b/t the demand for money and the velocity
    e.g., When people want to hold a lot of money for each dollar of income, money changes hands infrequently

- **The quantity theory of Money**

  Assuming constant velocity, \( M \times V = P \times Y. \)

  \[ \text{A change in the quantity of money must cause a proportionate change in nominal GDP} \]

  \[ \text{i.e., If velocity is fixed, the quantity of money determines the dollar value of the economy's output} \]

- **Total output of the economy (real GDP)**

- **GDP deflator**

- **Income velocity of money**
- Money, Price, and Inflation (fig. 4-1 – 4-2)

1) The factor of production & the production function
   \[ Y \]

2) Money supply \( \rightarrow \) the (nominal) value of output \( (PY) \)

3) \( P \) is determined
   \[ \rightarrow \text{The price level is proportional to the money supply} \]
   \[ \text{\% change in } M + \text{\% change in } V = \text{\% change in } P + \text{\% change in } Y \]

\( cf) \) “Inflation is always and everywhere a monetary phenomenon” (Milton Friedman)

3. Inflation and Interest Rates

- Nominal interest rate vs. Real interest rate
  - Nominal interest rate \( (i) \): the rate of interest that investors pay to borrow money
  - Real interest rate \( (r) \): the nominal interest rate corrected for the effects of inflation
    \[ r = i - \pi \]
- The Fisher Effect

  • Fisher equation: \( i = r + \pi \)

  \( \Rightarrow \) Nominal interest rate can change b/c
  
  1) real interest rate changes
  2) inflation rate changes

  • The Fisher effect: one-for-one relationship b/t the inflation rate and nominal interest rate
  (fig. 4-3 & 4-4, pp. 90-91)

    i.e., an increase in the rate of money growth of 1%
    \( \Rightarrow \) 1% increase in the rate of inflation
    \( \Rightarrow \) 1% increase in the nominal interest rate

4. Nominal Interest Rate and the Demand for Money

- The nominal interest rate is the opportunity cost of holding money

- The quantity of money demanded depends both on the level of income and on the nominal interest rate.

  \( \Rightarrow \) \( (M / P)^D = L(i, Y) = L(r + \pi, Y) \)

- The linkage among money, price, and interest rates (fig. 4-5, p.94)
5. The Social Costs of Inflation

(1) *The costs of “expected” inflation*

- The distortion of the inflation tax on the amount of money people hold
- Menu costs: firms change their posted price very often
- Variability in relative prices → microeconomic inefficiency
- The distortion of individuals’ tax liability
- Inconvenience of living in a world with a changing price level

(2) *The costs of “unexpected” inflation*

- Arbitrarily redistributes wealth among individuals
- Hurt individuals on fixed pensions
- Uncertainty
6. Hyperinflation

- Inflation that exceeds 50 percent per month.
  → more than 100-fold increase in price level over a year
- The costs of hyperinflation
- The causes of hyperinflation
  • Excessive growth in the supply of money
- Hyperinflation in interwar Germany (fig.4-6, p.106)