Inflation: Definition

- Inflation is a sustained, continuous increase in the price level. It does not refer to a “once-and-for-all” increase in prices.
- The opposite is termed deflation.
- Inflation deals with the increase in the average of prices and not just significant increases in the price of a few goods.
- It is measured using the CPI.
Inflation: Historical Aspects

- Over the past sixty years, prices have risen on average about 5% per year.
- *Deflation* occurred in the 19th century and briefly in the 20th century.
- In the 1970’s prices rose by 7% per year.
- From 1990 to 1998 prices rose about 2% per year.
The Causes of Inflation

- Inflation is an economy-wide *monetary phenomenon*.
- Since it concerns, first and foremost, the value of the economy’s medium of exchange, it is the prime concern of the Fed.
- To understand the cause of inflation we must understand the concepts of *Money Supply, Money Demand, and Monetary Equilibrium*. 
Money Supply and Money Demand

- **Money Supply** is controlled by the Federal Reserve Banks. Through instruments such as open market operations, the Fed directly controls the quantity of money supplied.

- **Money Demand** has several determinants including:
  - interest rates
  - price level in the economy
  - income levels
Money Supply and Money Demand

- The amount of money people choose to hold depends on the prices of the goods and services.
- The “value” of dollar is inversely related to the price level
  - the higher are prices the less a single dollar buys.
- In the long run, the overall level of prices adjusts to the level at which the demand for money equals the supply.
Money Supply, Money Demand and Equilibrium Price Level

- Value of Money
  - High
  - Low
- Equilibrium Value of Money
  - Low
- Money Supply
- Money Demand
- Price Level
  - Low
  - High

Equilibrium Price Level

Q_{Fixed}
Monetary Equilibrium

- The Fed could inject money (monetary injection) into the economy by buying government bonds. Results would be:
  - The supply curve shifting to the right
  - The equilibrium value of money decreasing
  - The equilibrium price level increasing
- This process is referred to as the quantity theory of money.
The Effects of Monetary Injection

Value of Money

Price Level

MS¹

Money Demand

Q_{Fixed}
The Effects of Monetary Injection

Value of Money

Price Level

$V_M^E$

Money Demand

$Q_{Fixed}$

$M_S^1$

$P^E$
The Effects of Monetary Injection

Value of Money (High)  MS\(^1\)  Price Level (Low)

Low  VM\(^E\)  High

Low  Money Demand  P\(^E\)

Q\(^{Fixed}\)
The Effects of Monetary Injection

Value of Money (High) vs. Price Level (Low)

Money Demand

Q^{Fixed}

MS^1 MS^2

VM^E PE^E

Low High
Cause of Inflation: The Quantity of Money Theory

- The quantity of money available in the economy determines the value of money. Growth in the quantity of money is the primary cause of inflation in the long run.

- In the long run, the quantity of money affects only nominal variables in the economy.
Monetary Neutrality

- An increase in the rate of money growth raises the inflation rate but does not affect any “real” variables (e.g. real GDP, employment, real wages, and real interest rates.) Such irrelevance of monetary changes for “real” variables is called *monetary neutrality*.

- Nominal variables are affected (prices, nominal interest rates, nominal GDP).
Velocity and The Quantity Equation

- “How many times per year is the typical dollar bill used to pay for a newly produced good or service?”
- The *velocity of money* refers to the speed at which the typical dollar bill travels around the economy from wallet to wallet.
Velocity and The Quantity Equation

\[ V = \frac{(P \times Y)}{M} \]

Where:  
- \( V \) = Velocity  
- \( P \) = the average price level  
- \( Y \) = the quantity of output  
- \( M \) = the quantity of money

- Rewriting the equation gives the quantity equation.

\[ MV = PY \]
Five Step Foundation to The Quantity Theory of Money

① The velocity of money (V) is relatively stable over time.

② A proportionate change in the nominal value of output (PY) is related to changes in the quantity of money (M) by the Fed.

③ Because money is neutral, money does not affect output (Y).
Therefore, changes in the money supply (M) that induce parallel changes in the nominal value of output (PY) are also reflected in changes in the price level, since they do not affect real output (Y).

When the Fed increases the money supply rapidly, the result is a higher rate of inflation.
Hyperinflation & Inflation Tax

- **Hyperinflation** is inflation that exceeds 50 percent per month.
- Hyperinflation in some countries is caused because the government prints too much money to pay for their spending.
  - Financing government expenditure by printing money is called *seigniorage*. 
Hyperinflation & Inflation Tax

- Financing government expenditure by printing money increases prices for everyone, reducing their spending power just as a tax to finance the spending would.
- This is called an inflation tax.
- The inflation ends when the government institutes fiscal reforms such as cuts in government spending.
Nominal Interest Rate \( (i) = \) Real Interest Rate \( (r) + \) Inflation Rate \( (\pi). \)

Over the long run, a change in the money growth should not affect the Real Interest Rate \( (r) \) due to money neutrality thus, the Nominal Interest Rate must adjust one-for-one to changes in the Inflation Rate.

When the Fed increases the rate of money growth, the result is both a high inflation rate and a higher nominal interest rate. This is called the Fisher Effect.
The Inflation Fallacy

- Fallacy: “Inflation reduces individuals’ incomes and causes living standards to decline.”
- Fact: “One person’s inflated price is another’s inflated income.” Unless incomes are fixed in nominal terms, the higher prices paid by consumers are exactly offset by the higher incomes received by sellers.
The True Costs of Inflation

The four major costs of inflation are:

- Unproductive activities provoked by inflation
- Increased variability of relative prices
- Unintended changes in tax liabilities
- Arbitrary redistribution of wealth
Unproductive activities provoked by inflation

- These include:
  - shoeleather costs
  - menu costs
  - confusion and inconvenience

- All of these reasons lead to people pursuing unproductive activities in order to avoid the effects of inflation.
Increased Variability of Relative Prices

- During times of rising prices, not all prices are increased at the same time. It then becomes difficult to know exact relative prices as prices change irregularly.
- This makes it difficult to make spending decisions that maximize the people’s standards of living.
Unintended Changes in Tax Liability

- With inflation, nominal incomes rise yet real incomes do not.
- Taxes do not differentiate between nominal and real income, so income increases are treated as real gains.
- With progressive taxation, rising nominal incomes are taxed more heavily even though people are no better off.
Arbitrary Redistribution of Wealth

- With unexpected inflation, wealth is redistributed between net monetary debtors and creditors. This may result in wealth transfers that would not otherwise be acceptable.
  - Recall the Fisher Effect.
- People on fixed incomes (seniors on pension for example) are also made worse off.
Summary

- Inflation refers to continuously increasing price levels.
- Price levels are determined in the long run by money supply and money demand. The more scarce money is the higher it’s value and the less money will be needed to buy things (prices are lower).
- Higher rates of money growth cause higher inflation rates.
- Money does not affect real variables (neutrality).
- Higher inflation rates cause higher nominal interest rates (the Fisher Effect).
- The true costs of inflation include redistribution of income, tax distortions, changes in relative prices, and unproductive reactions to inflation.