Origins and Issues of Macroeconomics


Macroeconomic Problems
1) Economic Growth
2) Unemployment
3) Inflation
4) Deficits

Short-Term Versus Long-Term Goals

Keynes focused on the short-term primarily. He felt the depression was caused by insufficient private spending. Government should increase its spending. Long-term consequences were virtually disregarded. In the long run, we’re all dead.

Today, macroeconomics is concerned with:
1. Long-term economic growth and inflation.
2. Short-term business fluctuations and unemployment.

The Road Ahead

The focus of macroeconomics has shifted:
- Depression
- Inflation of the 1970s
- International economics of today

Economic Growth

Economic growth is the expansion of the economy’s production possibilities. Measured by real gross domestic product (Real GDP). The value of the total production of all the nation’s farms, factories, shops, and offices linked back to the prices of a single year (1992)

The Growth of Potential GDP

When an economy’s labor, capital, land, and entrepreneurial ability are fully employed. Real GDP fluctuates around potential GDP. Growth slowed during the 1970s.

Economic Growth in the United States

Fluctuations Around Potential GDP

The business cycle is the periodic, but irregular up-and-down movement in production.

Phases of the Business Cycle

1. Recession: Period during which real GDP decreases for two successive quarters.
2. Expansion: Period during which real GDP increases.

Turning Points

Peak: Expansion ends, recession begins.
Trough: Recession ends, expansion begins.
Growth Rates Around the World

**Industrial economies**
- Japan
- United States
- Other industrial
- European Union

**Developing economies**
- Asia
- Middle East and Europe
- Western Hemisphere
- Africa

**Transition economies**
- Central Europe
- Russia
- World

![Graph showing growth rates around the world](image)

Benefits and Costs of Economic Growth

**Benefits**
- Expanded production possibilities:
  - health care
  - medical research
  - space exploration
  - roads
  - environmental improvements

**Costs**
1) Foregone consumption
2) Depletion of natural resources
3) Increased pollution
4) More frequent job and location changes

Jobs and Unemployment

**Jobs**
In 1996, 127 million people had jobs. An increase of 20 million over 1985 and 23 million over 1975. On average, 1.8 million new jobs are created every year.

**Unemployment**
On average, 7 million people are unemployed in the U.S. Unemployed workers who do not have a job but is available for work, is willing to work, and has made some effort to find work within the previous four weeks.

**Labor Force**
Sum of the people who are unemployed and the people who are employed.

**Unemployment Rate**
The percentage of the labor force who are unemployed.

**Discouraged Worker**
A person who does not have a job, is available for work, and is willing to work but who has given up the effort to find work.

The unemployment rate may be misleading because:
1. Discouraged workers are excluded.
2. Part-time workers who want full-time jobs are considered employed.

**Important Features**
1) The unemployment rate during the Depression peaked in 1933 at 25 percent.
2) After 1934, the unemployment rate overstated the true rate because it counts the people who had make-work jobs.
3) Unemployment rates have reached high levels in recent years during recessions.
4) The unemployment rate never falls to zero.

Unemployment in the United States

![Graph showing unemployment rates](image)

**Why Unemployment is a Problem**
- Lost Production and Incomes
- Lost Human Capital, Prolonged unemployment can hurt a person’s job prospects.

**Inflation and Deflation**
Inflation is a process of rising prices. The inflation rate is measured as a percentage change in the average level of prices or the price level. Consumer Price Index (CPI). Deflation is negative inflation, the price level is falling.

In December 1995, the CPI was 153.5.
In December 1996, it was 158.6.
How would the inflation rate for 1996 be calculated?

**Inflation**
The inflation rate for 1996 was:

\[
\text{Inflation} = \frac{158.6 - 153.5}{153.5} 
\]

\[
= 3.3\%
\]
Is Inflation a Problem?
Predictability of inflation rates creates problems: High, unpredictable inflation causes resources to be diverted to predicting inflation rates. This is a wasteful use of resources.

**Hyperinflation**
- Inflation in excess of 50% per month
- Workers are paid daily
- Money loses value rapidly
- Workers spend their incomes quickly

1994
- Zaire — 76% per month
- Brazil — 40% per month

Policies that reduce the inflation rate increase the unemployment rate.

**Deficits**
A government budget deficit exists if the federal government spends more than it collects in taxes.

**Government Budget and International Deficits**

**Do Deficits Matter?**
Governments must borrow if it spends more than it earns in tax revenue. If the borrowed funds are used to purchase assets that earn a profit, the investment may be sound.

**Macroeconomic Policy Challenges and Tools**

**Policy Challenges**
1) Boost economic growth
2) Stabilize the business cycle
3) Reduce unemployment
4) Keep inflation low
5) Reduce the government and

**Policy Tools**
1) Fiscal policy
   - Making changes in taxes and government spending.
      - Long-term growth
      - Smooth the business cycle
2) Monetary policy
   - Changing interest rates and the amount of money in the economy
      - Control inflation
      - Smooth business cycle

**CHAPTER 22**
**Measuring GDP, Economic Growth, and Inflation**

**Gross Domestic Product (GDP)**
The value of the aggregate production of goods and services in a country during a given time period.

**Flows and Stocks**
1) A flow is the quantities per unit of time.
2) A stock is a quantity that exists at a point in time.

**Capital**
The plant, equipment, buildings, and inventories of raw materials and semifinished goods that are used to produce other goods and services.

**Depreciation**
The decrease in the stock of capital that results from wear and tear and obsolescence. Otherwise known as capital consumption.

**Gross Investment**
The total amount spent on adding to the stock of capital and on replacing depreciated capital.

**Net Investment**
The amount spent on adding to the stock of capital. Gross Investment minus depreciation.

**Wealth**
Another macroeconomic stock. The value of all the things that people own. Related to their earnings (a flow).
Consumption Expenditure
The amount spent on consumption goods and services.

Saving
The amount of an income after meeting consumption expenditures.

Income, Expenditure, and the Value of Production
1) Households sell their labor, capital, land, and entrepreneurship to firms.
2) Firms sell consumer goods and services.
3) Firms buy and sell capital goods.

Government
Government purchases are purchases of goods and services by governments. Paid for with tax revenue. Net taxes are taxes paid to governments minus transfer payments received from governments and minus interest payments from the government on its debt.

Rest of World Sector
Net exports is the value of exports minus the value of imports.

Production can be valued by what:
- Buyers pay for it.
- It costs producers to make it.

The Circular Flow of Income and Expenditure

Expenditure Equals Income:
\[ Y = C + I + G + NX \]

How Investment is Financed
1) National saving is the amount of saving by households and businesses plus government saving

National saving = S + (T - G)
2) Borrowing from the rest of the world

Measuring U.S. GDP
1) Expenditure Approach
2) Income Approach

Expenditure Approach
Uses data on consumption expenditure, investment, government purchases, and net exports.

1. Personal consumption expenditures are the expenditures by households on goods and services produced in the United States and the rest of the world.
2. Gross domestic investment is expenditure on capital equipment and buildings by firms and expenditure on new homes by households. Also, it includes the change in inventories. Government purchases of goods and services are the purchases of goods and services by all levels of government. Does not include transfer payments.
3. Net exports of goods and services are the value of exports minus the value of imports.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount in 1996</th>
<th>Percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal consumption</td>
<td>C, 5,152</td>
<td>63.0</td>
</tr>
<tr>
<td>Gross private domestic</td>
<td>I, 1,116</td>
<td>14.7</td>
</tr>
<tr>
<td>Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government purchase of goods</td>
<td>G, 1,407</td>
<td>18.6</td>
</tr>
<tr>
<td>and services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net exports of good and</td>
<td>NX, -99</td>
<td>-1.3</td>
</tr>
<tr>
<td>services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross domestic</td>
<td>Y, 7,575</td>
<td>100.0</td>
</tr>
<tr>
<td>Product</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expenditures Not in GDP
1) Intermediate goods and services
2) Used goods
3) Financial assets

Income Approach
Measures GDP by summing the incomes that firms pay households for the resources they hire.

1. Compensation of employees is the payment for labor services. Includes net wages and salaries plus taxes withheld on earnings plus fringe benefits such as social security and pension fund contributions.
2. Net interest is the interest households receive on loans they make minus the interest households pay on their own borrowing.
3. Rental income is the payment for the use of land and other rented inputs.
4. Corporate profits are the profits of corporations.
5. Proprietors’ income is a combination of all of these.

Net Domestic Income at Factor Cost
The sum of the five categories of income. We must convert factor cost to market prices.

Indirect taxes are taxes paid by consumers when they buy goods and services. Due to this additional cost, the market price is greater than the factor cost value for measuring GDP.

Subsidies are payments by the government to a producer. Due to this payment, the factor cost is greater than the market price for measuring GDP. We must convert from Net Domestic Product to Gross Domestic Product.

Net profit of businesses—profit after subtracting depreciation—is a component of aggregate incomes. To get gross domestic product, we must add depreciation to aggregate income.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount in 1996</th>
<th>Percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation of employees</td>
<td>4,449</td>
<td>68.7</td>
</tr>
<tr>
<td>Net Interest</td>
<td>405</td>
<td>5.4</td>
</tr>
<tr>
<td>Rental Income</td>
<td>127</td>
<td>1.7</td>
</tr>
<tr>
<td>Corporate Profits</td>
<td>650</td>
<td>8.6</td>
</tr>
<tr>
<td>Proprietors’ Income</td>
<td>619</td>
<td>8.8</td>
</tr>
<tr>
<td>Indirect taxes, less subsidies</td>
<td>669</td>
<td>7.6</td>
</tr>
<tr>
<td>Capital consumption (depreciation)</td>
<td>958</td>
<td>11.2</td>
</tr>
</tbody>
</table>
Valuing the Output of Industries

Value added is the value of a firm’s production minus the value of the intermediate goods that the firm buys from other firms.

Value Added and Final Expenditure

Aggregate Expenditure, Output, and Income

The Price Level and Inflation

The inflation rate is the percentage change in the price level from one year to the next.

Two Main Price Indexes
1. Consumer Price Index
2. GDP Deflator

Consumer Price Index

Measures the average level of prices of the goods and services that a typical urban family buys. Published monthly by the Bureau of Labor Statistics. Must use a base period (ex: 1982-1984)

A Simplified Calculation

The GDP Deflator

Measures the average level of prices of all the goods and services that are included in GDP

The GDP Deflator

\[ \text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100 \]

Nominal GDP is GDP valued in the current year’s prices.

Real GDP is GDP in a base year (ex: 1992) scaled up by the growth rate of real GDP since the base year.

Real GDP Growth: A Chain-Weighted Measure

The chain-weighted output index is an index number that measures the growth rate of real GDP.

Calculating a Chain-Weighted Output Index

Output Index

\[ C = \frac{B}{A} = 1.150 \]

\[ \frac{1.043}{1.000} = 1.043 \]

The GDP Deflator can now be calculated.

\[ \text{GDP deflator} = \frac{146}{109.5} \times 100 = 133.33 \]

The U.S. GDP Balloon

The Biased CPI

The sources of bias are:
1) New goods bias.
2) Quality change bias.
3) Commodity substitution bias.
4) Outlet substitution bias.

In 1996, a Congressional Advisory Commission on the CPI said the CPI overstates inflation by 1.1 percentage points. The GDP deflator uses price indexes to estimate quantities, so it too is somewhat biased.

The three primary consequences of the bias are:
1) It distorts private contracts
2) It increases government outlays
3) It biases estimates or real earnings

Two Measures of Inflation

The Limitations of Real GDP

Real GDP and growth rates of real GDP are used for:
1) Economic welfare comparisons.
2) International comparisons of GDP.
3) Business cycle assessment and forecasting.

Economic Welfare
A comprehensive measure of the general state of economic well-being. Economic welfare depends upon a variety of other factors.

Factors Not Accounted for by Real GDP
1) Overadjustment for inflation.
2) Household production.
3) Underground economic activity.
4) Health and life expectancy.
5) Leisure time.
6) Environmental quality.
7) Political freedom.

International Comparisons of GDP
The real GDP of one country must be converted into the same currency units as the real GDP of the other. The same prices must be used to value the goods and services in the countries being compared.

Two Views of Real GDP in China

CHAPTER 23
Measuring Employment and Unemployment

Employment and Wages

Population Survey
Every month, the U.S. Census Bureau surveys 60,000 households and asks a series of questions about the age and job market status of its members. It called as the Current Population Survey. The working age population is the total number of people aged 16 years and over who are not in jail, hospital, or some other form of institutional care. he working age population is divided into those in the labor force and those not in the labor force. The labor force is divided into the employed and the unemployed.

To be counted as unemployed, a person must be available for work and must be in one of three categories:
1) Without work but has made specific efforts to find a job within the previous four weeks.
2) Waiting to be called back to a job from which he or she has been laid off.
3) Waiting to start a new job within 30 days.

Population Labor Force Categories

Employment and Wages

Aggregate Hours
The indicators previously studied are useful signs of the health of the economy. However, they do not measure the productivity of labor. Aggregate hours are the total number of hours worked by all the people employed, both full time and part time, during a year.
Wage Rates
The real wage rate is the quantity of goods and services that an hour's work can buy. Equals the money wage rate divided by the price level.


Unemployment and Full Employment
People become unemployed if they:
1) Lose their jobs and search for another job.
2) Leave their jobs and search for another job.
3) Enter or reenter the labor force to search for a job.

Job losers are people who are laid off, either permanently or temporarily.
- Biggest source of unemployment.
- Numbers fluctuate considerably.

Job leavers are people who voluntarily quit their jobs. Smallest and most stable source of unemployment. Entrants are people who are entering the labor force. Reentrants are people who have previously withdrawn from the labor force. Entrants/reentrants are a large component of the unemployed. Numbers fluctuate mildly.

Labor Market Flows

There are three types of unemployment:
1) Frictional
Frictional Unemployment
A rise from normal labor turnover — people entering and leaving the labor force and the creation and destruction of jobs. Influenced by unemployment benefits.

Structural Unemployment
Arises when changes in technology or international competition change the skills needed to perform jobs or change the locations of jobs. Typically lasts longer than frictional.

Cyclical Unemployment
Arises from the fluctuations of the business cycle. Increases during a recession and decreases during expansion. The natural rate of unemployment excludes cyclical unemployment.

Full Employment
Full employment exists when the unemployment rate equals the natural rate of unemployment. It fluctuates periodically. Economists disagree about the size of the natural rate and the extent to which it fluctuates.

Aggregate Supply and Aggregate Demand

The aggregate production function describes how the factors influence the quantity of GDP supplied. The aggregate production function is:

\[ Y = F(N, K, T) \]

Aggregate Supply
The aggregate production function shows that the quantity of real GDP supplied is determined by the quantities of labor and capital and the state of technology. Capital and technology are fixed at any point in time. However, labor is not fixed.

- Lower wages result in a greater quantity of labor demanded.
- Higher wages result in a greater quantity of labor supplied.

Full Employment
Occurs at the wage rate that makes the quantity of labor demanded equal to the quantity of labor supplied.

Natural Rate of Unemployment
The unemployment rate that exists at full employment. In 1997 it was about 5.5%.

Potential GDP is the quantity of real GDP supplied when unemployment is at its natural rate and there is full employment.

Long-Run Aggregate Supply
The macroeconomic long run is a time frame that is sufficiently long for forces that move real GDP toward potential GDP to have done their work so that full employment prevails. The long-run aggregate supply curve is the relationship between the quantity of real GDP supplied and the price level in the long run when real GDP equals potential GDP.

Potential GDP is independent of the price level because the price level, wage rate, and other resource prices all change by the same percentage.

Short-Run Aggregate Supply
The macroeconomic short run is a period during which real GDP has fallen below or risen above potential GDP. The unemployment rate has risen above or fallen below the natural rate.

The short-run aggregate supply curve is the relationship between the quantity of real GDP supplied and the price level in the short run when the money wage rate, other resource prices, and potential GDP remain constant.

 Movements Along the LAS and SAS Curves
When the price level rises, holding the money wage rate and other resource prices constant, the quantity of real GDP supplied increases and there is a movement along the SAS curve.

As real GDP fluctuates around potential GDP, the unemployment rate fluctuates around the natural rate of unemployment. In the deep recession of 1982, unemployment reached almost 10 percent. In the milder recession of 1990-1991, the unemployment rate peaked at less.
Changes in Aggregate Supply

Occurs when influences on production other than the price level change

Potential GDP changes as a result of:
1) Changes in the full-employment quantity of labor
2) Changes in the quantity of capital
3) Advances in technology

Changes in the money wage rate changes short-run aggregate supply but does not change long-run aggregate supply.

A Change in the Money Wage Rate

Aggregate Demand

The quantity of real GDP demanded is the sum of the real consumption expenditure (C), investment (I), government purchases (G), and exports (X) minus imports (M).

\[ Y = C + I + G + X - M \]

Aggregate demand is the relationship between the quantity of real GDP demanded and the price level.

<table>
<thead>
<tr>
<th>Price Level (GDP deflator, 1992 = 100)</th>
<th>Real GDP (trillions of 1992 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a'</td>
<td>90</td>
</tr>
<tr>
<td>b'</td>
<td>100</td>
</tr>
<tr>
<td>c'</td>
<td>110</td>
</tr>
<tr>
<td>d'</td>
<td>120</td>
</tr>
<tr>
<td>e'</td>
<td>130</td>
</tr>
</tbody>
</table>

The two reasons the demand curve sloped downward are:

1) Wealth effect
Changes in the price level, with other things remaining the same, change real wealth. People try to restore wealth by increasing saving and decreasing consumption.

2) Substitution effects
People substitute future consumption for present consumption as a result of higher interest rates. A change in prices cause consumers to spend less on domestic items and more on imported items.

Changes in the Quantity of Real GDP Demanded

When the price level changes, other things remaining the same, the quantity of real GDP demanded changes and there is movement along the aggregate demand curve.

Changes in Aggregate Demand

A change in any factor than influences buying plans other than the price level.

The factors that influence buying plans other than the price level and bring a change in aggregate demand are:

1) Expectations
2) Fiscal policy and monetary policy
3) The world economy

Expectations

Expectations about future incomes, inflation, and profits influence buying plans today.

Fiscal Policy and Monetary Policy

- Fiscal policy is the government’s attempt to influence the economy by setting and changing taxes, transfer payments, and government purchases. These influence a household’s disposable income. Disposable income equals aggregate income minus taxes plus transfer payments.
- Monetary policy consists of changes in interest rates and in the quantity of money in the economy.

The World Economy

The exchange rate and foreign income affect aggregate demand.

Changes in Aggregate Demand

Real GDP (trillions of 1992 dollars)
Price level (GDP deflator, 1992 = 100)
90
120
140
100
110
130
6.0, 6.5, 7.0, 7.5, 8.0
AD0
Aggregate demand decreases if:
1. Expected future incomes, inflation, or profits decrease.
2. Fiscal policy decreases government purchases, increases taxes, or decreases transfer payments.
3. Monetary policy decreases the quantity of money and increases interest rates.
4. The exchange rate increases or foreign income decreases.

Aggregate demand increases if:
1. Expected future incomes, inflation, or profits increase.
2. Fiscal policy increases government purchases, decreases taxes, or increases transfer payments.
3. Monetary policy increases the quantity of money and decreases interest rates.
4. The exchange rate decreases or foreign income increases.

Macroeconomic Equilibrium

Short-Run Macroeconomic Equilibrium
Occurs when the quantity of real GDP demanded equals the quantity of real GDP supplied.

Long-Run Macroeconomic Equilibrium
Occurs when real GDP equals potential GDP, i.e., the economy is on its long-run aggregate supply curve.

Economic Growth and Inflation
Economic growth occurs because the quantity of labor grows, capital is accumulated, and technology advances. Inflation occurs when aggregate demand increases by more than long-run aggregate supply.

In the long-run, the main influence on aggregate demand is the growth rate of the quantity of money. Real GDP fluctuates around potential GDP in a business cycle. Inflation fluctuates at the same time.
Fluctuations in Aggregate Demand
Real GDP sometimes fluctuates as a result of changes in aggregate demand.

An Increase in Aggregate Demand
An economy cannot produce in excess of potential forever. Workers begin to demand higher wages. Eventually, wage rates rise by the same percentage as the price level.

Fluctuations in Aggregate Supply
Fluctuations in short-run aggregate supply can bring fluctuations in real GDP around potential GDP. A decrease in aggregate supply can lead to a recession and inflation — stagflation.

A Decrease in Aggregate Supply

Real GDP and Employment
When we talk about productivity, we usually mean labor productivity.

CHAPTER 24
The Economy at full employment

Economic Growth
The forces that bring economic growth were stronger during the 1960s and mid-1980s that at other times. During the 1970s, growth was slow.

Inflation
The main force generating the persistent increase in the price level is a tendency for aggregate demand to increase at a faster pace than the increase in long-run aggregate supply.

Cycles
Cycles arise because both the expansion of short-run aggregate supply and the growth of aggregate demand do not proceed at a fixed, steady pace.

The Evolving Economy: 1960-1996
During the 1960s, real GDP growth was rapid and inflation was low. Rapid increases in aggregate supply and moderate increases in aggregate demand. During the mid-1970s there was rapid inflation and recession — stagflation. Oil price increases shifted short-run aggregate supply leftward. A rapid increase in the quantity of money shifted the aggregate demand curve rightward. Recession occurred because the short-run aggregate supply curve shifted leftward at a faster pace than the aggregate demand curve shifted rightward. The rest of the 1970s saw high inflation and moderate growth in real GDP. By 1980, inflation was a major problem. The Fed took strong action to reduce it. Interest rates increased to levels not seen before. Aggregate demand decreased as a result. The economy went into a deep recession.

During the years 1982 to 1990, capital accumulation and steady technological advance resulted in a sustained rightward shift of the long-run aggregate supply curve. Aggregate demand growth kept pace with the growth of aggregate supply. A decrease in aggregate demand led to the 1991 recession. The economy has continually expanded through 1996.

Real GDP and Employment
To produce more output, we must use more inputs. The quantity of capital and the state of technology are fixed. The relationship between leisure time and real GDP is a production possibility frontier.

The Production Function
The production function shows how real GDP varies as the quantity of labor employed varies, other things remaining the same. Because one more hour of labor employed means one less hour of leisure, the production function is like a mirror image of the leisure time-real GDP PPF.

Production Possibilities and the Production Function

U.S. Economic Growth, Inflation, and Cycles
Labor productivity: real GDP per hour of labor

Three factors influence labor productivity:
1. Physical capital
2. Human capital
3. Technology

Labor productivity:

Physical capital
The more physical capital we use, the greater is our labor productivity, other things remaining the same.

Human capital
The knowledge and skill that people have obtained from education and on-the-job training. Learning by doing can bring incredible increases in labor productivity.

Technology
Enormous impact of technology on productivity.

Any influence on production that increases labor productivity shifts the production function upward. Real GDP increases at each level of labor hours.

The Labor Market
The labor market determines the quantity of labor hours employed. To see how the labor market works, we must study:
1. The demand for labor
2. The supply of labor
3. Labor market equilibrium

The quantity of labor demanded is the number of labor hours hired by all firms in the economy. The demand for labor is the relationship between the quantity of labor demanded and the real wage rate. The real wage rate is the quantity of goods and services that an hour of labor earns. The money wage rate is the number of dollars that an hour of labor earns. The real wage rate is equal to the money wage rate divided by the price level multiplied by 100.

<table>
<thead>
<tr>
<th>Real wage rate (1992 dollars per hour)</th>
<th>Quantity of labor demanded (billions of hours per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>30</td>
</tr>
<tr>
<td>b</td>
<td>25</td>
</tr>
<tr>
<td>c</td>
<td>20</td>
</tr>
</tbody>
</table>

The Demand for Labor

The Marginal Product of Labor
The marginal product of labor is the additional real GDP produced by an additional hour of labor when all other influences on production remain the same. Calculate the marginal product of labor as the change in real GDP divided by the change in the quantity of labor employed.

Diminishing Marginal Product
The marginal product of labor diminishes as the quantity of labor employed increases because all the labor, both old and new, work with the same fixed amount of physical capital and given technology. As more labor hours are hired, the physical capital is worked more intensely and more breakdowns and bottlenecks arise. Eventually, as more labor hours are hired, workers get in each other’s way and output increases barely at all.

Diminishing Marginal Product and the Demand for Labor
Because marginal product diminishes as the quantity of labor employed increases, the lower the real wage rate, the greater is the quantity of labor that a firm can probably hire. The marginal product curve is the same as the demand for labor curve. When the firm pays a real wage rate equal to the marginal product of labor, it is maximizing profit.
The Supply of Labor
The real wage influences the quantity of labor supplied because what matters to people is not the number of dollars they earn (the money wage rate) but what those dollars will buy. The quantity of labor supplied increases as the real wage rate increases for two reasons:

1. Hours per person increase
2. Labor force participation increases

Hours Per Person
In choosing how many hours to work, a household considers the opportunity cost of not working - the real wage rate. The higher the real wage rate, the greater is the household’s income. The higher the household’s income, the more leisure it wants to consume. The rise in the real wage rate has two opposing effects

1. It makes the household want to consume less leisure and to work more.
2. And by increasing the household’s income, it makes the household want to consume more leisure and to work fewer hours.

For most households, the higher the real wage rate, the greater is the amount of work that the household chooses to do.

Labor Force Participation
The higher the real wage rate, the more likely it is that a parent will choose to work and so the greater is the labor force participation rate.

Labor Supply Response
A large percentage change in the real wage brings a small percentage change in the quantity of labor supplied.

The Labor Market and Potential GDP

Changes in Potential GDP
Two influences on potential GDP
1. An increase in population
2. An increase in labor productivity

An increase in population
As the population increases and the additional people reach working age, the supply of labor increases. With more labor available, the economy’s production possibilities expand.

Two influences on potential GDP
An increase in population
Increases potential GDP and decreases potential GDP per work hour.

Three factors increase labor productivity:
1. An increase in physical capital
2. An increase in human capital
3. An advance in technology

Changes in Potential GDP
Three factors increase labor productivity:

1. An increase in physical capital
Labor productivity increases. The economy’s production possibilities expand. The demand for labor increases. The real wage rate rises and the quantity of labor supplied increases. Equilibrium employment increases.

2. An increase in human capital
Labor productivity increases. The economy’s production possibilities expand. The real wage rate rises and the quantity of labor supplied increases. Equilibrium employment increases.

3. An advance in technology
Labor productivity increases. The economy’s production possibilities expand. The real wage rate rises and the quantity of labor supplied increases. Again, equilibrium employment increases.

Unemployment at Full Employment
Why is there always some unemployment?

Two broad reasons:
1. Job search
2. Job Rationing

Job Search
The activity of looking for an acceptable vacant job. Other forces on the amount of job search
1. Demographic change
2. Unemployment compensation
3. Structural change

Demographic change
An increase in the proportion of the population that is of working age brings an increase in the entry into the labor force and an increase in the unemployment rate. Another trend is an increase in the number of households with two paid workers.

Unemployment Compensation
An unemployed person who receives generous unemployment-insurance benefits faces a low opportunity cost of job search. In this situation, search is likely to be prolonged.

Structural Change
The pace and direction of technology. Some industries may die and some regions may suffer while other industries are born and other regions flourish. The real wage rate is not the only instrument for rationing jobs. In some industries, the real wage is set above the market equilibrium level. Job rationing is the practice of paying a real wage rate above the equilibrium level and then rationing jobs by some method.

Two reasons why the real wage rate might be set above the equilibrium level are:
1. Efficiency wage
2. Minimum wage

Efficiency wage
An efficiency wage is a real wage rate that is set above the full-employment equilibrium wage rate that balances the costs and benefits of this higher wage rate to maximize the firm's profit. A firm balances productivity gains from the higher wage rate against its additional cost - the efficiency wage.

The Minimum Wage
A minimum wage law determines the lowest wage rate at which a firm may legally hire labor. If the minimum wage is set above the equilibrium wage, the minimum wage is in conflict with the market forces.
The real interest rate, or return on capital, is the nominal interest rate adjusted for inflation.

1. The nominal interest rate is the interest rate expressed in terms of money.
2. The real interest rate is approximately equal to the nominal interest rate minus the inflation rate.

The Real Interest Rate
- The lower the real interest rate, the greater is the amount of investment.
- The opportunity cost of funds is the real interest rate.

If the real interest rate exceeds the expected profit rate, firms should not invest in new capital since they could earn more by loaning the funds to other firms. More investments are profitable at low interest rates, and less are profitable at high interest rates.

Investment Demand
Illustrates the relationship between investment and the real interest rate.

<table>
<thead>
<tr>
<th>Real Interest Rate (percent per year)</th>
<th>Investment (trillions of 1992 dollars)</th>
<th>Expected Profit Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>a 4</td>
<td>Low 1.0</td>
<td>Average 1.2</td>
</tr>
<tr>
<td>b 6</td>
<td>Low 0.8</td>
<td>Average 1.0</td>
</tr>
<tr>
<td>c 8</td>
<td>Low 0.6</td>
<td>Average 0.8</td>
</tr>
</tbody>
</table>

Investment Demand in the United States
Illustrates the relationship between investment and the real interest rate.

Saving Decisions
National Saving
The sum of private saving and government saving.

The main factors affecting household saving are:
1. The real interest rate
2. Disposable income
3. Purchasing power of net assets
4. Expected future income

The Real Interest Rate
The lower the real interest rate, the smaller is the amount of saving and the greater is the amount of consumption.

Disposable Income
The greater a household’s disposable income the greater is its saving.

Purchasing Power of Net Assets
Net assets are assets minus debts. The greater the purchasing power of a household’s net assets the less is its saving.

Expected Future Income
The lower a household’s expected future income the greater is its saving.

Saving Supply
Illustrates the relationship between saving and the real interest rate.
Real interest rates are not the same in every country because some countries are riskier than others. If two countries with equal risk had different interest rates, people would want to borrow in the country with a low interest rate and lend in the country with a high interest rate. Interest rates would quickly become equal in the two countries.

<table>
<thead>
<tr>
<th>Real interest rate (percent per year)</th>
<th>Saving (trillions of 1992 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>0.9</td>
</tr>
<tr>
<td>b</td>
<td>1.0</td>
</tr>
<tr>
<td>c</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Equilibrium in the World Economy

Real interest rates are not the same in every country because some countries are riskier than others. If two countries with equal risk had different interest rates, people would want to borrow in the country with a low interest rate and lend in the country with a high interest rate. Interest rates would quickly become equal in the two countries.
Indirect Effect of Government Saving

Government saving has an indirect effect on the world capital market because it influences private saving. A change in government saving changes private saving supply and shifts the PSS curve.

The Barro-Ricardo Effect

The suggestion is that a government deficit has no effect on the real interest rate or investment. Deficit spending requires a government to sell bonds to pay for those expenditures not paid for by taxes. It must collect more taxes in the future to pay the interest on the larger quantity of bonds that are outstanding. Taxpayers can see that their taxes will be higher in the future.

The suggestion is that a government deficit has no effect on the real interest rate or investment. With a smaller expected future income, saving increases. They increase saving by the same amount that the government is dissaving through its deficit.

A Barro-Ricardo Effect

Saving and Investment in the National Economy

Saving supply and investment demand in the world economy determine the world real interest rate. Saving does not necessarily equal investment in a national economy. National investment is financed by national saving plus borrowing from the rest of the world. For the world as a whole, international borrowing equals international lending.

Each nation contributes to world saving and investment and so influences the world real interest rate. A nation’s saving and investment decisions, along with the world real interest rate, determine the amount the nation borrows from or lends to the rest of the world.

Economic Growth Around the World: Catch-Up or Not?

Long-Term Growth Trends

Real GDP Growth in the World Economy

The United States has the highest real GDP per person, and Canada has the second highest. Europe’s Big 4 (France, Germany, Italy, and the United Kingdom) were the third richest countries until 1985 when Japan caught up to them.
The Causes of Economic Growth: A First Look
Preconditions for Economic Growth
1) Markets
2) Property rights
3) Monetary exchange

Activities that Generate Ongoing Economic Growth
1. Saving and Investment in New Capital
2. Investment in Human Capital
3. Discovery of New Technologies

Saving and Investment in New Capital
New capital increases the capital per worker and increases real GDP per hour of labor — labor productivity.

Investment in Human Capital
The accumulated skill and knowledge of human beings is the most fundamental source of economic growth.

Discovery of New Technologies
The discovery and application of new technologies and new goods has increased labor productivity tremendously.

Growth Accounting
The quantity of real GDP supplied (Y) depends on three factors:
1) The quantity of labor (N)
2) The quantity of capital (K)
3) The state of technology (T)

Growth accounting is used to calculate how much real GDP growth results from growth of labor and capital and how much is attributable to technological change.

A key tool is the aggregate production function:

\[ Y = F(N,K,T) \]

Labor Productivity
Labor productivity is real GDP per hour of work. Equals real GDP divided by aggregate labor hours Determines how much income an hour of labor generates

Real GDP per Hour of Work

Growth accounting divides growth into two components.
1) Growth in capital per hour of labor
2) Technological change

Includes everything that contributes to labor productivity growth that is not included in growth in capital per hour

The Productivity Function

A relationship that shows how real GDP per hour of labor changes as the amount of capital per hour of labor changes with a given state of technology. The shape of the productivity function reflects the law of diminishing returns. The law of diminishing returns states that as the quantity of one input increases with the quantities of all other inputs remaining the same, output increases but by ever smaller increments.

How productivity grows

Applying the law of diminishing returns to capital, the law states that if a given number of hours of labor use more capital, the additional output that results from the additional capital gets smaller as the amount of capital increases. The one third rule explains how much less.

The One Third Rule
Robert Solow of MIT discovered that on average, with no change in technology, a 1 percent increase in capital per hour of labor brings a one third of a 1 percent increase in real GDP per hour of labor.

Accounting for the Productivity Growth Slowdown and Speedup
We can use the one third rule to study U.S. productivity growth and the productivity growth slowdown.

1960 to 1973
- The economy grew due to rapid technological changes.
- Real GDP per hour expanded by 39 percent.
- Capital per hour increased by 24 percent.
- With no change in technology, the economy would have expanded by only 8 percent (1/3 of 24 percent).

1973 to 1983
- Predominantly, the reason for the productivity growth slowdown can be attributed to a decline in the rate of technological change.
- Real GDP per hour expanded by 8 percent.
- Capital per hour increased by 15 percent.
- With no change in technology, the economy would have expanded by 5 percent (1/3 of 15 percent).

1983 to 1995
- The economy grew due to more rapid technological change.
- Real GDP per hour expanded by 18.5 percent.
- Capital per hour increased by 11 percent.
- With no change in technology, the economy would have expanded by only 3.7 percent (1/3 of 11 percent).

Growth Accounting and the Productivity Growth Slowdown

Technological Change During the Productivity Growth Slowdown
Technology was directed toward coping with two major problems.
1) Energy price shocks
2) The environment

Energy Price Shocks
19731974 and 1979—1980
The Neoclassical Economics of Population Growth:

1. The population explosion of eighteenth century. Europe that created the classical theory of population eventually ended.
2. Made classical theory less relevant.

Technological change

The rate of technological change influences the rate of economic growth, but economic growth does not influence the pace of technological change. Technological change results from chance.

The Basic Idea

- These technological advances bring new profit opportunities.
- Businesses expand and new businesses are created to exploit the newly profitable technologies.
- Investment and savings increase.
- The economy enjoys new levels of prosperity and growth.
- According to the neoclassical growth theory, the prosperity will persist because there is no classical population growth induced to lower wages.

Growth will stop if technology stops advancing for two reasons:

1. high profit rates
2. diminishing returns to capital

Target Rate and Long-Run Saving

- If the real interest rate exceeds the target rate, the supply of capital decreases.
- If the real interest rate is less than the target rate, the supply of capital increases.
- If the real interest rate is equal to the target rate, the supply of capital is constant.

Throughout the process, real GDP grows but the growth rate gradually decreases and eventually ends. Ongoing capital advances are constantly increasing the demand for capital, raising the real interest rate and inducing saving. The process repeats as long as technology advances, creating an on-going process of long-term economic growth.

Problems with Neoclassical Growth Theory

All economies have access to the same technologies, and capital is free to roam the globe seeking the highest available rate of return. This implies that growth rates and income levels per person around the globe converge. In reality, this convergence is slow and does not appear imminent for all countries.

Neoclassical Growth Begins

According to the neoclassical growth theory, the prosperity will persist because there is no classical population growth induced to lower wages.

Businesses expand and new businesses are created to exploit the newly profitable technologies.

These benefits are not included in real GDP.

The Environment

The 1970s saw an expansion of laws and resources devoted to protecting the environment and improving the quality of the workplace.

- These benefits are not included in real GDP.

Growth Theory

Three theories that attempt to explain what causes economic growth and makes growth rates vary are:

1. Classical Growth Theory
2. Neoclassical Growth Theory
3. New Growth Theory

Classical Growth Theory

The view that real GDP growth is temporary and that when real GDP per person rises above the subsistence level a population explosion eventually brings real GDP per person back to the subsistence level. Thomas Malthus is given most of the credit for the theory, hence the name Malthusian theory.

The Basic Idea: The World of 1776

Real GDP has increased and the real wage rate has increased. But the classical economists believe that this new situation can't last because it will induce a population explosion. The modern theory of population growth explains that the population growth is influenced by economic factors.

Modern Theory of Population Growth

If there is any relationship between income levels and population growth, it is the opposite of that feared by the classical economists. In reality, the relationship is weak. The relation is so weak that it can be said that the rate of population growth is virtually independent of the rate of economic growth.

Subsistence real wage rate - to explain the high rate of population growth

- The subsistence real wage rate is the minimum real wage rate needed to maintain life.
- If the actual real wage rate is less than the subsistence real wage rate, some people cannot survive and the population decreases.

Neoclassical Growth Begins

New technologies and more capital increase the productivity of labor.

The subsistence real wage rate. When the real wage rate exceeds the subsistence level, the population increases.

Neoclassical Growth Theory

Holds that real GDP per person grows because technological change induces saving and investment that makes capital per person grow.

Muhammad Firman (University of Indonesia - Accounting)
The pace of discoveries is not determined by chance. It depends on how many people are looking for a new technology and how intensively they are looking.

Discoveries and Profits
Profit spurs technological change. Competition forces firms to seek lower-cost methods of production or new and better products. Eventually, discoveries are copied and profits disappear.

Two other facts are key to new growth theory:
1) Discoveries can be used by many people at the same time.
2) Physical activities can be replicated.

Discoveries Used by All:
Once a profitable new discovery has been made, everyone can use it. As the benefits spread, free resources become available because nothing is given up when they are used.

Replicating Activities:
The economy does not experience diminishing returns when it adds new factories identical to existing ones. Therefore, real GDP per person increases and does so indefinitely as long as people can undertake research and development that yields a higher return than the target real interest rate.

New Growth Theory
Sorting Out the Theories
Probably none is exactly correct
Classical theory reminds us that our physical resources are limited and that with no advances in technology we must eventually hit diminishing returns. Neoclassical theory reaches essentially the same conclusion, but not because of a population explosion. It emphasized diminishing returns to capital and we cannot keep growth just by accumulating capital. New growth theory emphasized the possible capacity of human resources to innovate at a pace that offsets diminishing returns.

CHAPTER 27
Expenditure Multipliers

Fixed Prices and Expenditure Plans
In the very short term, firms’ prices are fixed. The quantities they sell depend on demand, not supply. The Aggregate Implications of Fixed Prices
1) Because each firm’s price is fixed, the price level is fixed.
2) Because demand determines the quantities that each firm sells, aggregate demand determines the aggregate quantity of goods and services sold, which equals GDP.

The aggregate expenditure model explains fluctuations in aggregate demand by identifying the forces that determine expenditure plans.

Expenditure Plans
The components of aggregate expenditure are:
1) Consumption expenditure
2) Investment
3) Government purchases of goods and services
4) Net exports (exports minus imports)

Aggregate planned expenditure is equal to planned consumption expenditure plus planned investment plus planned government purchases plus planned exports minus planned imports. In the very short term all are fixed except planned consumption expenditure and planned imports. They depend on the level of GDP.

A Two-Way Link Between Aggregate Expenditure and GDP
1) An increase in real GDP increases aggregate planned expenditure
2) An increase in aggregate expenditure increases real GDP

How does real GDP influence planned consumption expenditure and saving?
Consumption Function and Saving Function
We are going to focus on the relationship between consumption expenditure and disposable income when other factors are constant. The reason: disposable income and consumption expenditures are interrelated.

The main factors that influence consumption and saving are:
1) Real interest rate
2) Disposable income
3) Purchasing power of net assets
4) Expected future income

Consumption Function and Saving Function
The consumption function shows the relationship between consumption expenditure and disposable income. The saving function shows the relationship between saving and disposable income.
income increases saving by $0.25 trillion. The MPS is $0.25 trillion divided by $1.

The MPS plus the MPC always equals 1. Therefore, the MPC is 0.75.

Marginal Propensities to Consume and Save

\[ \frac{\Delta C}{\Delta Y} = \frac{\Delta S}{\Delta Y} = \frac{\Delta Y_D}{\Delta Y} = 1 \]

Divide both sides of the equation by the change in disposable income to obtain:

\[ \frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y} = 1 \]

These two values are the marginal propensity to consume and the marginal propensity to save, so:

\[ MPC = MPS = 1 \]

Slopes and Marginal Propensities

The slopes of the consumption function and the saving function are the marginal propensities to consume and save.

Other Influences on Consumption Expenditure and Saving

1. Changes in disposable income leads to movements along the consumption function and saving function.
2. A change in any other factor that influences consumption expenditure and saving shifts both the consumption function and the saving function.

The other factors that change consumption expenditure and saving are:
1) Real interest rates
2) The purchasing power of net assets
3) Expected future income

Shifts in the Consumption and Saving Function

Consumption as a Function of Real GDP

Consumption changes when disposable income changes. Disposable income changes when either real GDP changes or net taxes change. Holding taxes constant, consumption depends not only on disposable income, but also on real GDP. Imports are also influenced by real GDP.

Import Function

The greater the U.S. real GDP, the larger is the quantity of U.S. imports, other things remaining the same. The marginal propensity to import is the fraction of an increase in real GDP that is spent on imports.

Real GDP with a Fixed Price Level

How does aggregate expenditure plans interact to determine real GDP when the price level is fixed?

1. First, we will study the relationship between aggregate planned expenditure and real GDP.
2. Second, we’ll learn about the key distinction between planned expenditure and actual expenditure.
   - An aggregate expenditure schedule lists aggregate planned expenditure generated at each level of real GDP.
   - An aggregate expenditure curve is a graph of the aggregate expenditure schedule.
- Induced expenditure is the sum of the components of aggregate expenditure that vary with real GDP.
- Autonomous expenditure is the sum of the components of aggregate expenditure that are not influenced by real GDP.

Actual aggregate expenditure is always equal to real GDP. However, aggregate planned expenditure is not necessarily equal to actual aggregate expenditure and therefore is not necessarily equal to real GDP.

Actual and planned expenditure sometimes differ because firms might end up with more inventories than planned or with less inventories than planned.

**Equilibrium Expenditure**

Equilibrium expenditure is the level of aggregate expenditure that occurs when aggregate planned expenditure equals real GDP. When aggregate planned expenditure and actual aggregate expenditure are unequal, a process of convergence toward equilibrium expenditure occurs.

**Convergence to Equilibrium**

When actual and planned expenditure are unequal, unplanned changes in business inventories (investment) occur. GDP either increases or decreases until actual expenditures equal planned expenditures.

**Equilibrium Expenditure**

<table>
<thead>
<tr>
<th>Real GDP (yield)</th>
<th>Original aggregate planned expenditure (AEo)</th>
<th>New aggregate planned expenditure (AE1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>a 5.25</td>
<td>a’ 5.75</td>
</tr>
<tr>
<td>6</td>
<td>b 8.00</td>
<td>b’ 6.50</td>
</tr>
<tr>
<td>7</td>
<td>c 6.75</td>
<td>c’ 7.25</td>
</tr>
<tr>
<td>8</td>
<td>d 7.50</td>
<td>d’ 8.00</td>
</tr>
</tbody>
</table>

The Multiplier

A fall in real interest rates, a wave of innovation, or an increase in the demand for U.S. exports will lead to an increase in autonomous expenditure. The multiplier is the amount by which a change in autonomous expenditure is magnified to determine the change in equilibrium expenditure and real GDP.

**The Basic Idea of the Multiplier**

Suppose that investment increases. This means that aggregate expenditure and real GDP increases. Disposable income increases. Consumption expenditures increase. Aggregate expenditure increases again. Real GDP, disposable income, and consumption expenditure increase more. The initial increase in investment brings an even bigger increase in aggregate expenditure because it induces an increase in consumption expenditure.

**The Size of the Multiplier**

The multiplier is the amount by which a change in autonomous expenditure is multiplied to determine the change in equilibrium expenditure that it generates. The multiplier is (from the table shown earlier):

Multiplier = \[
\frac{\text{Change in equilibrium expenditure}}{\text{Change in autonomous expenditure}} = \frac{\$2 \text{ trillion}}{50.5 \text{ trillion}} = 4
\]

The Multiplier and the Marginal Propensity to Consume and Save

The larger the marginal propensity to consume, the larger the multiplier. A change in real GDP equals the change in consumption expenditure plus the change in investment:

\[
\Delta Y = MC \Delta C
\]

But the change in consumption expenditure is determined by the change in real GDP and the marginal propensity to consume:

\[
\Delta C = MPC \Delta Y
\]

Substituting \( MPC + \Delta Y \) in the previous equation we get:

\[
\Delta Y = (MPC \Delta Y) - \Delta I
\]

Solving \( \Delta Y \) for we get:

\[
\Delta Y = \frac{\Delta I}{1 - MPC}
\]

Dividing both sides of this equation by we get:

\[
\text{Multiplier} = \frac{\Delta Y}{\Delta I} = \frac{1}{1 - MPC}
\]

Using this formula, with MPC = 0.75, the multiplier is:

\[
\text{Multiplier} = \frac{1}{(1 - 0.75)} = \frac{1}{0.25} = 4
\]

The Multiplier Process

**Imports and Income Taxes**
The marginal propensity to import and the marginal tax rate also affect the multiplier. Imports and income taxes reduce the multiplier.

### The Multiplier and the Slope of the AE Curve

The multipliers are

- For a 45° line: 1
- For a 45° line: 2
- For a 45° line: 3
- For a 45° line: 4

### Business Cycle Turning Points

#### An Expansion Begins

An expansion is triggered by an increase in autonomous expenditure that increases aggregate planned expenditure. At the trough of the business cycle, aggregate planned expenditure exceeds real GDP. Business inventories decline. Production increases and incomes decrease. The multiplier effect causes the expansion to gain speed.

#### A Recession Begins

A recession is triggered by a decrease in autonomous expenditure that decreases aggregate planned expenditure. At the peak of the business cycle, real GDP exceeds aggregate planned expenditure. Unplanned inventories begin to increase. Production decreases and incomes decrease. The multiplier effect causes the recession to take hold.

#### The Next U.S. Recession?

The U.S. economy has been in a business cycle expansion since 1991. Inventories began to increase in 1994, but they were planned increases. Recessions will occur — predicting them far in advance with any accuracy is virtually impossible.

#### The Multiplier and the Price Level

When firms reduce inventories below the desired level, they increase production. At some point, they also increase their prices. When firms inventories are above the desired level, they decrease production. Eventually, they cut their prices. We will use the aggregate supply-aggregate demand model to study the determination of real GDP and the price level. We must understand the distinction between the aggregate expenditure and aggregate demand. Furthermore, we must understand the distinction between their corresponding curves.

The aggregate expenditure curve illustrates the relationship between the aggregate planned expenditure and real GDP. The aggregate demand curve illustrates the relationship between aggregate demand and the price level. Let’s look at how these are related.

### Aggregate Expenditure and the Price Level

The aggregate demand curve is downward sloping for two main reasons:

1. **Wealth effect**
2. **Substitution effects**

### The Multiplier and the Price Level

---

<table>
<thead>
<tr>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) If some factor other than a change in the price level increases autonomous expenditure, the AE curve shifts upward and the AD curve shifts rightward.</td>
</tr>
<tr>
<td>2) The size of the AD curve shift depends on the change in autonomous expenditure and the multiplier.</td>
</tr>
</tbody>
</table>

### The Multiplier in the Short Run

#### An Increase in Aggregate Demand in the Short Run

When price level effects are taken into account, an increase in investment still has a multiplier effect on real GDP, but the effect is smaller than it would be if the price level were fixed. The steeper the slope of the short-run aggregate supply curve, the larger is the increase in the price level and the smaller is the multiplier effect on real GDP.

---

<table>
<thead>
<tr>
<th>The Multiplier in the Short Run</th>
</tr>
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<tr>
<td><strong>An increase in investment increases aggregate planned expenditure</strong></td>
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<td><strong>but the price level rises, which decreases aggregate planned expenditure</strong></td>
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An Increase in Aggregate Demand in the Long Run
- In the long run, an increase in aggregate demand leaves real GDP unchanged but increases the price level.
- In the long run, the multiplier is zero.

Review
A change in the price level shifts the AE curve and brings a movement along the AD curve. A change in autonomous expenditure that is not caused by a change in the price level shifts both the AE curve and the AD curve, and the multiplier determines the magnitude of the shift in the AD curve.

In the short run, the increase in real GDP that results from an increase in autonomous expenditure is smaller than the increase in aggregate demand. In the long run, an increase in aggregate demand leaves real GDP unchanged but increases the price level. In the long run, the multiplier is zero.

The Algebra of the Multiplier

The Federal Budget
The federal budget is the annual statement of the expenditures and tax revenues of the government of the United States together with the laws and regulations that approve and support those expenditures and taxes.

The federal budget's two purposes are:
1) To finance the activities of the federal government.
2) To stabilize the economy.

Fiscal policy is the use of the federal budget to achieve macroeconomic objectives such as full employment, sustained economic growth, and price stability.

The Institutions and Laws

The Roles of the President and Congress
The President proposes a budget to Congress each February. After Congress has passed those acts into law or vetoes them, the President approves or vetoes the entire budget bill. The President does not have the veto power to eliminate specific items in a budget bill and approve others known as line item veto.

The US Federal Budget Time Line in 2000

The Employment Act of 1946
—It is the continuing policy and responsibility of the Federal Government to use all practicable means...to coordinate and utilize all its plans, functions, and resources...to promote maximum employment, production, and purchasing power.