

## 2. OVERVIEW OF THE BUSINESS CYCLE

Business cycles are associated with economies that are based on business enterprises rather than agrarian societies or centrally planned economies. A business cycle has four phases i.e. trough, expansion, peak and contraction.

- These phases occur at about the same time throughout the economy. It is important to note that cycles are recurrent rather than periodic; this implies that all phases of cycles do not have the exact same intensity and/or duration.
- Duration of cycles is between 1 and 12 years.

### 2.1 Phases of the Business Cycle

A business cycle consists of four phases:

- 1) Trough:** It is the lowest point of a business cycle.
- 2) Expansion:** It occurs after trough and before its peak. During expansion, aggregate economic activity is increasing. However, unemployment may not decline immediately.

- Spending ↑
- Production ↑
- Unemployment ↓
- GDP ↑
- Investors prefer to invest in cyclical companies as producers of discretionary goods e.g. automobiles.

**Boom:** A later part of an expansion called a boom.

- Labor costs ↑ and leads to a reduction of profits.
- Businesses try to pass on higher production costs to their customers; thus, prices ↑ and → higher inflation.
- Investors may face cash flow problems due to excessive borrowing.
- Economy is said to be overheating.
- During boom, investors prefer riskiest assets; thus, price of riskiest assets ↑.

- 3) Peak:** It is the highest point of a business cycle i.e. Real GDP stops rising and economy has reached its peak. It is referred to as the end of the expansion or boom.

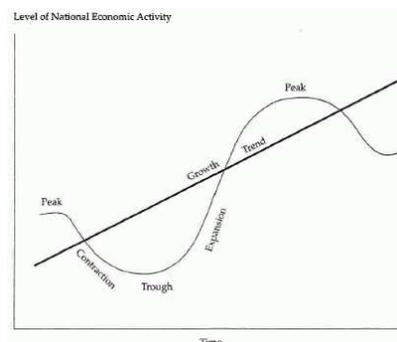
- $AD > AS$
- Wages rise
- Prices rise
- Inflation occurs
- Unemployment will increase.
- The economy starts slowing down either due to

*restrictive* economic policies or due to energy prices shocks or credit crises.

- Due to restrictive domestic economic policies, investors may prefer to buy shares of exporting companies.

- 4) Contraction:** It occurs after the peak and before the trough. It is also called a recession. When aggregate economic activity is declining (though some individual sectors may be growing), it is called a depression. During recession,

- Consumers purchases ↓
- Production ↓
- Real GDP ↓
- Businesses investment ↓
- The demand for labor ↓
- The prices of many commodities ↓
- Wages are less likely to decline, but they tend to rise less rapidly.
- Business profit ↓
- Investors prefer to invest in government securities and shares of companies with steady (or growing) positive cash flows i.e. utilities and producers of staple goods.



#### NOTE:

- Equity stock market is classified as a leading indicator of the economy.
- Peaks and troughs of the country's business cycles can be estimated by analyzing following variables i.e.
  - Unemployment
  - GDP growth
  - Industrial production
  - Inflation

	Early Expansion (Recovery)	Late Expansion	Peak	Contraction (Recession)
<b>Economic Activity</b>	<ul style="list-style-type: none"> <li>Gross domestic (GDP), industrial production, and other measures of economic activity turn from decline to expansion.</li> </ul>	<ul style="list-style-type: none"> <li>Activity measures show an accelerating rate of growth.</li> </ul>	<ul style="list-style-type: none"> <li>Activity measures show decelerating rate of growth.</li> </ul>	<ul style="list-style-type: none"> <li>Activity measures show outright declines</li> </ul>
<b>Employment</b>	<ul style="list-style-type: none"> <li>Layoffs slow (and net employment turns positive), but new hiring does not yet occur and the unemployment rate remains high. At first, business turns to overtime and temporary employees to meet rising product demands.</li> </ul>	<ul style="list-style-type: none"> <li>Business begins full time rehiring as overtime hours rise. The unemployment rate falls to low levels.</li> </ul>	<ul style="list-style-type: none"> <li>Business slows its rate of hiring: however, the unemployment rate continues to fall.</li> </ul>	<ul style="list-style-type: none"> <li>Business first cuts hours and freezes hiring, followed by outright layoffs. The unemployment rate rises.</li> </ul>
<b>Consumer and Business Spending</b>	<ul style="list-style-type: none"> <li>Upturn often most pronounced in housing, durable consumer items, and orders for light producer equipment.</li> </ul>	<ul style="list-style-type: none"> <li>Upturn becomes more broad-based. Business begins to order heavy equipment and engage in construction.</li> </ul>	<ul style="list-style-type: none"> <li>Capital spending expands rapidly, but the growth rate of spending starts to slow down.</li> </ul>	<ul style="list-style-type: none"> <li>Cutbacks appear most in industrial production, housing, consumer durable items, and orders for new business equipment, followed, with a lag, by cutbacks in other forms of capital spending.</li> </ul>
<b>Inflation</b>	<ul style="list-style-type: none"> <li>Inflation remains moderate and may continue to fall.</li> </ul>	<ul style="list-style-type: none"> <li>Inflation picks up modestly.</li> </ul>	<ul style="list-style-type: none"> <li>Inflation further accelerates.</li> </ul>	<ul style="list-style-type: none"> <li>Inflation decelerates but with a lag.</li> </ul>

Source: Volume 2, Reading 15., Exhibit 2.

**Practice: Example 1, Volume 2, Reading 15.**

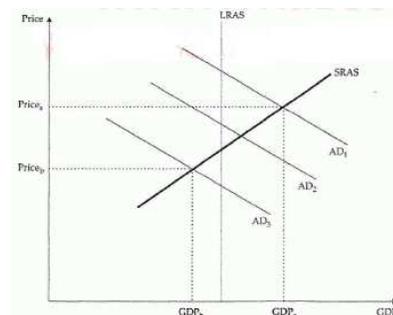


**2.2 Resources Use through the Business Cycle**

When an economy slows down due to tight monetary or fiscal policies,

- AD decreases
- AD curve shifts to the left
- As a result, inventories start to accumulate → production declines.
- Savings ↑ and spending ↓ and further decreases AD and shifts the AD curve even further to the left.
- Due to low capacity utilization, investment spending also decreases.
- Due to increase in bankruptcy risks, banks reduce lending.
- Equilibrium price falls i.e. from  $P_a$  to  $P_b$

- Equilibrium output falls i.e. from  $GDP_a$  to  $GDP_b$ .
- The economy enters into a downward spiral.



During an economic downturn, businesses will probably not sell physical capital due to following two reasons:

1. Difficulty to find buyers.

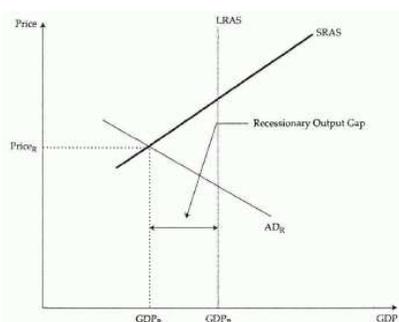
- With passage of time, physical capital becomes obsolete.

In addition,

- When production declines but salaries do not decrease immediately, the excess supply of labor leads to an increase in unemployment.
- In the figure below, the gap between recession output ( $GDP_R$ ) and the potential output ( $GDP_P$ ) is known as the **recessionary output gap**.
- Due to decrease in AD,
  - Wages fall
  - Prices of inputs and capital goods fall
  - Central bank decreases interest rates i.e. expansionary monetary policy.

As a result,

- Inflation rate starts to fall
- Consumers and investment spending  $\uparrow$
- AD  $\uparrow$
- AD curve shifts to the right i.e. due to increase in production, increase in investment due to lower interest rates.
- Demand for inputs and intermediate products increases as a result of inventory rebuilding or restocking by businesses.
- Demand for all factors of production increases.



When AD continues to grow, the boom phase of the cycle starts. A boom may lead to two different results i.e.

- The economy may experience shortages i.e. demand for factors of production  $>$  supply.
- Due to high optimism, businesses may increase production capacity. This may result in supply of capital  $>$  demand of capital.

### 2.2.1) Fluctuations in Capital Spending

Fluctuations in **capital spending** tend to affect the overall economic cycle in 3 stages:

**First stage:** Spending on equipment declines abruptly as final demand starts to decrease. Businesses do not expand production capacity due to decline in profits, sales and free CFs.

**Second stage:** During initial recovery of an economy, sales are still at lower level; as a result, capacity utilization is low and there is no need to expand production capacity. However, orders may slowly increase due to two reasons.

- When economy improves, earnings growth and free CFs  $\uparrow$ . As a result, capital spending increases.
- Due to increase in sales, businesses start to restore investment in equipment with a high rate of obsolescence i.e. software systems.

**Third stage:** Third phase starts much later in the cyclical upturn i.e. after a long period of output growth. Capacity expansion and investment in heavy and complex equipment, warehouses, and factories increase. Capacity utilization starts to rise.

### Economic indicator used to analyze capital spending:

The future direction of capital spending can be observed by analyzing '**orders for capital equipment**'.

**Practice: Example 2,**  
Volume 2, Reading 15.



### 2.2.2) Fluctuations in Inventory Levels

Although, inventories represent a small part of the overall economy, they can have greater effect on economic growth because fluctuations in inventory levels occur rapidly.

The key indicator used to analyze fluctuations in inventory levels is the **inventory-sales ratio**. It reflects the outstanding stock of available inventories to the level of sales.

Fluctuations in **inventory levels** tend to affect the overall economic cycle in 3 stages:

- When sales start to decline, it usually takes time to decrease production. Consequently, inventories accumulate and inventory-sales ratio rises.
- Afterwards, when businesses start to reduce production to dispose of unwanted inventories,  $\rightarrow$  inventory-sales ratio starts to decline toward normal level.
  - It is important to note that increase in production does not necessarily indicate economic improvement because production may rise to deal with the declining inventory levels rather than due to growth in sales. It implies that underlying economic situation is best analyzed by observing final sales level.
- Sales start to increase during economic upturn. But, increase in production  $<$  increase in sales, which leads to decrease in inventories. As a result, inventory-sales ratio falls.
  - In order to restore the ratio to normal level, businesses need to accumulate inventories and

increase production.

**Practice: Example 3,**  
Volume 2, Reading 15.



### 2.2.3) Consumer Behavior

Household consumption represents the largest sector of a developed economy. Measures of household consumption include:

a) Retail sales, utilities sales, household services etc.  
Three major divisions are:

- 1) Durable goods i.e. autos, appliances. Consumption of durable goods is affected by short-term uncertainties.
  - When durables' spending is weak /declining, it indicates a general economic weakness.
  - When durables' spending is rising, it indicates a general economic recovery.
- 2) Non-durable goods i.e. food, medicine, cosmetics, clothing.
- 3) Services i.e. medical treatment, hairdressers etc.

b) Household consumption can be analyzed through consumer confidence or sentiment. Such information can be obtained through surveys. However, these surveys are biased and do not reflect actual consumer behavior.

c) Household consumption can be analyzed through growth in income i.e. after-tax income or disposable income. According to permanent income hypothesis, households adjust consumption based on perceived permanent income level instead of temporary fluctuations in income.

- Savings refer to the percent of household's income that is not spent.
- Saving rate also reflects future perceived uncertainties in income (known as **precautionary** savings).
- Rise in **precautionary** savings indicates consumers' ability to spend despite possible lower income in the future.
- In the short-term, rise in savings may indicate a certain caution among households and economic weakening. However, in the long-term, higher savings may indicate potential for recovery.

**Practice: Example 4,**  
Volume 2, Reading 15.



## 2.3 Housing Sector Behavior

Although, housing sector represents a small part of the overall economy, it can have greater effect on economic growth because of rapid fluctuations in housing sector.

- Housing sector is highly sensitive to interest rates relative to other sectors because mostly home purchases are financed with a mortgage i.e. the lower (greater) the mortgage rates, the greater (lower) the home buying and construction activity.
- Housing sector also follows its own internal cycle i.e.
  - When housing prices are low relative to average incomes, and when mortgage rates are also low, → the cost of owning a house ↓, and → demand for housing ↑.
  - When the expansionary cycle matures, housing prices and mortgage rates rise disproportionately i.e. despite of increase in household incomes, housing costs may rise.
  - When housing costs rise, house sales slowdown and result in cyclical downturn in home buying. Afterwards, as the inventory of unsold houses accumulates, construction activity decreases.
  - If housing prices have risen rapidly in the recent past, home buying may increase in response to increase in housing prices to gain exposure to the expected price appreciation. However, due to large inventory of unsold homes, real estate prices eventually fall.
- House buying is affected by following factors:
  - Housing prices
  - Rate of family formation
  - Speculation on housing prices

## 2.4 External Trade Sector Behavior

An economy with a large external trade sector is highly affected by the business cycles of the large open economies in the world.

**Imports respond to domestic cycle:** All else equal, when domestic GDP growth increases → demand for purchases of goods and services from abroad increases and → imports rise.

**Exports respond to cycles in the rest of the world:** All else equal, when foreign GDP growth increases → exports rise. If these external cycles are strong (all else equal), exports will grow in spite of decline in domestic economy growth.

- When a domestic currency appreciates,
  - Foreign goods seem cheaper than domestic goods to the domestic population, → imports rise (all else equal).
  - Exports become expensive on global markets, → exports fall (all else equal).
- Currency depreciation has opposite effects.
- It is important to note that currency movements will only have a significant effect on trade and the balance of payments when they occur in a single direction for some period of time.

### 3. THEORIES OF THE BUSINESS CYCLE

#### 3.1 Neoclassical and Austin Schools

**Neoclassical analysis** is based on the concept of free markets and general equilibrium i.e. all markets reaches equilibrium due to the 'invisible hand'.

- It is based on "Say's Law" i.e. supply creates its own demand.
- Money is neutral in both the short run and the long run in the classical model, because prices adjust rapidly to restore equilibrium i.e. through barter transactions.
- According to free markets,
  - All resources are used efficiently based on the principle of  $MC = MR$ .
  - The government has limited role in the economy.
  - There is no involuntary unemployment of labor or capital.
  - The economy will quickly readjust to any shifts in either the AD or AS curve, through lower interest rates and lower wages. This implies that decline in demand will not lead to recession and fluctuations in AD or AS will be only temporary.
- In the Neoclassical school, the business cycles are considered temporary disequilibria.

**Austrian school:** Unlike neoclassical school, the Austrian school is based on two important factors i.e. *money* and *government*. According to the Austrian theory, business cycles are caused by misguided government intervention e.g. to increase GDP and employment, a government may use expansionary monetary policies i.e.

- Market interest rate falls → businesses overinvest (investment spending ↑), → AD shifts right and → results in an inflationary gap.
- Afterwards, investment spending ↓, → AD shifts leftwards.
- In order to reach a new equilibrium, all prices including wages must decrease.

**Recommendation to deal with fluctuations in the economy under Neoclassical and Austrian Schools:** No government intervention is needed in the economy to deal with recession. The economy will readjust itself through free markets i.e. market price will fall until supply equals demand and factors of production are fully employed.

**Criticism:** It is difficult to achieve new equilibrium through reduction in generalized price and wage.

**Theory of innovations:** Theory of innovations is related to individual industries. According to this theory, innovation can create crises that only affect the individual industry affected by the new invention.

#### 3.2.1) Keynesian School

Keynesian theories focus on fluctuations of aggregate demand (AD). Keynesian school criticizes the neoclassical and Austrian school adjustment mechanism i.e. it is difficult to achieve new equilibrium through reduction in generalized price and wage because:

- Wages are downward sticky. Even if wages fall, it results in decline in AD. Hence, demand for all sorts of goods decline and moves in "domino effect" through the economy i.e. AD curve enters into a downward spiral and continuously shifts towards left.
- Also, growth cannot be increased simply by expansionary monetary policy (lowering interest rates).

Hence, Keynes suggested that when recession occurs, government should intervene in the form of expansionary **fiscal policy** i.e. increasing government spending and/or decreasing taxes. However, it should be noted that Keynes did not advocate a continuous presence of the government in the economy.

**The practical criticisms about Keynesian Fiscal Policy are:**

- 1) When government spending > taxes, government runs a Fiscal deficits. Fiscal deficits may lead to higher government debt.
- 2) Keynesian cyclical policies are focused on the short-term only. In the long-run, expansionary policy may lead to **unsustainable** fast economic growth, higher inflation and other problems.
- 3) Fiscal policies are implemented with a time lag. So choosing the right policy today depends on where we think the economy will be in the future. This creates problems, because forecasts of the future state of the economy are imperfect.

**Practice:** Example 7,  
Volume 2, Reading 15.



### 3.2.2) Monetarist School

Monetarists' theory focuses on *maintaining a steady growth of the money supply* and a very limited government intervention in the economy. According to Monetarists school, business cycles may occur due to two reasons:

- i. Exogenous shocks
- ii. Government intervention

According to Monetarists school,

- Boom and inflation occurs when money supply (M2) grows too fast.
- Recession occurs when money supply (M2) grows too slowly.

**The monetarist school (Milton Friedman) criticized Keynesian for following four main reasons:**

- 1) The Keynesian model ignores the role of money supply.
- 2) The Keynesian model is not logically sound because it does not take into account a complete representation of utility-maximizing agents.
- 3) Keynes theory focused on short-term; thus, it failed to consider the long-term impact of government intervention i.e. fiscal deficit may result in growing government debt and high cost of interest on this debt.
- 4) The timing of governments' economic policy responses was not certain and fiscal policies are implemented with a time lag which may make them less effective.

### 3.3 The New Classical School

The New Classical School approach is known as New Classical Macroeconomics because it focused on deriving macroeconomics conclusion through sound microeconomic foundations i.e. individuals maximizing utility on the basis of rational expectations and companies maximizing profits.

- The New classical models are dynamic because they focus on fluctuations in the economy over many periods.
- Under the New classical models, general equilibrium is based on all prices rather than one price i.e. when an economic agent faces external shocks (e.g. changes in technology, changes in tastes, and changes in world prices), it optimizes its choices to obtain the highest utility. And when all agents act in similar fashion, → the markets gradually move toward equilibrium.

#### 3.3.1) Models without Money: Real Business Cycle Theory

According to Real business cycle (RBC) theory, the **real shocks** to the economy are the primary cause of business cycles.

**Real factors** include AS (e.g. increase in AS leads to lower prices) and AD (e.g. increase in AD leads to higher prices).

Examples of real shocks:

- Shocks to the production function
- Shocks to the size of the labor force
- Shocks to the real quantity of government purchases
- Shocks to the spending and saving decisions of consumers

**Nominal or monetary factors include** money supply, velocity of money i.e. when an economy is in equilibrium,

- Higher money supply leads to higher prices.
- Higher velocity of money leads to higher prices.

The RBC theory suggests no government intervention in the economy with discretionary fiscal and monetary policy.

Under RBC theory, equilibrium is reached through free and efficient markets which implies that

- Unemployment can only be short-term and only frictional unemployment will exist.
- In addition, only that person will be unemployed who either does not want to work or demands too high wages.

Basic RBC models focus on the utility function i.e. if the individual prefers leisure much more than consumption; he/she will forego consumption and instead prefers to remain unemployed to enjoy more leisure when the salary in the market is low.

RBC models assumed that money was unimportant for the business cycle because transactions could occur with barter.

Unlike other theories, RBC theories focus on fluctuations of aggregate supply (AS). According to RBC theory, supply shocks (e.g. advances in technology or changes in the relative prices of inputs) cause AS curve to shift.

- A new technology increases potential GDP and makes the long-run AS to shift to the right. However, it should be noted that short-run AS will not jump to the new equilibrium immediately because all companies cannot adopt the new technology at once.
- When energy prices increase,
  - Short-run:** In the short-run, AS shifts to the left. It results in higher equilibrium price and lower equilibrium GDP.
  - Long-run:** In the long-run, due to **substitution effect**, companies and households start to use less of the expensive energy inputs; as a result, long-run AS will shift right (i.e. higher GDP).

**Criticism:** During a recession, in spite of willing to work and demanding lower wages, people are unemployed. In addition, besides real shocks, an economy can also face fluctuations due to shocks from monetary policy.

### 3.3.2) Models with Money

Under the monetarist theory of the business cycle, fluctuations in the quantity of money are the primary source of business cycle fluctuations in economic activity. For example,

- Expansionary monetary policy results in unsustainable growth in the economy (i.e. economy overheats), → demand exceed supply, → prices rise and inflation occurs.
- Central bank uses tight monetary policy to control inflation i.e. interest rates ↑, → cost of borrowing ↑. Consequently, demand for goods and services declines, AD curve shifts leftwards, GDP falls and a recession occurs.

#### Neo Keynesian School:

**A. New Classical School v/s Neo Keynesian School:** Like the New Classical School, the Neo Keynesian School focused on deriving macroeconomics conclusion through sound microeconomic foundations. In contrast to the New Classical School, the Neo-

Keynesian School assumes downward "sticky" prices and wages.

- According to the Neo-Keynesian models, markets do not reach equilibrium immediately and flawlessly; hence, markets may remain in disequilibrium state for a long time. Therefore, government intervention may be necessary to eliminate unemployment and bring markets toward equilibrium. Markets do not reach equilibrium immediately due to following factors:
  - Wages are downwardly sticky and do not decrease immediately with increase in unemployment.
  - Menu costs i.e. it is costly for companies to continuously adjust prices e.g. it would be costly for a restaurant to print new menus daily with updated prices.
  - Businesses require some time to recognize their production.

#### B. New Classical RBC v/s Neo-Keynesian models:

- Unlike New Classical Models, Neo-Keynesian assumes that prices do not adjust quickly to changes in demand and supply.

## 4. UNEMPLOYMENT AND INFLATION

### 4.1 Unemployment

Generally,

- Just when the recovery starts, unemployment is at its highest level.
- At the peak of the economy, unemployment is at its lowest level.

During an expansionary phase and when demand for labor > supply of labor, → unemployment is very low, → inflation occurs. Due to expectations of rising prices, workers demand higher wages. Because of an upward pressure on wages, employers are also induced to increase prices in advance to keep their profit margins stable and results in a price-wage inflationary spiral. To control inflation, central bank may adopt tight monetary policy; however, these policies may lead to a deep recession.

#### Definitions:

**Employed:** A person with a job is referred to as employed. This number excludes people working in the informal sector e.g. unlicensed cab drivers.

**Labor force:** The labor force is the total number of workers i.e. it is the sum of the employed and the

unemployed. This number excludes retirees, children, stay-at-home parents, fulltime students and other categories of people who are neither employed nor actively seeking employment.

**Unemployed:** A person is unemployed if he or she is temporary jobless and is looking for a job or is waiting for the start date of a new job. Some special categories include:

- *Long-term unemployed:* A person who has been without a job for a long time i.e. more than 3- 4 months but is still looking for a job.
- *Frictionally unemployed:* A person is frictionally unemployed if he/she just left one job and are about to start another job. Frictional unemployment results from the time that it takes to match workers with jobs.
- *Structural unemployment* refers to unemployment that is due to changes in the structure of demand for labor; e.g., when certain skills become obsolete or geographic distribution of jobs changes.

**Unemployment rate:** It is the ratio of unemployed to labor force.

**Activity (or participation) ratio:** It is the ratio of labor force to total population of working age (i.e. persons between 16 and 64 years of age).

**Underemployed:** A person is referred to as underemployed if he/she has a job but has the qualification to do a significantly higher-paying job.

**Discouraged worker:** Discouraged worker is a person who would like to work but has given up looking for jobs after an unsuccessful search. Discouraged workers are not part of labor force; thus they are not included in the official unemployment rate.

- During deep recessions, many discouraged workers stop looking for a job. As a result, the unemployment rate may decrease in spite of weak economy.
- Hence, we should observe both participation rate and the unemployment rate to understand whether unemployment is decreasing because of an improved economy or because of an increase in discouraged workers.

**Hidden unemployment:** It includes discouraged workers and underemployed people.

**Voluntarily unemployed:** A person is referred to as voluntarily unemployed when he/she is not willing to work because he is in school, retired early, or very rich. Such people are also not considered in the labor force in unemployment statistics.

#### 4.1.1) The Unemployment Rate

The unemployment rate is the ratio of unemployed to labor force. It indicates % of the overall workforce who are unemployed but are willing to work if they could find it. However, unemployment rate is considered a **lagging economic indicator** of the business cycle and is not helpful in pointing to cyclical directions due to following two reasons:

- 1) The unemployment rate reflects a past economic condition because the labor force changes in response to the economic environment. In addition, during deep recession, many discouraged workers stop looking for a job. As a result, the unemployment rate may decrease in spite of poor job market situation. In contrast, when an economy improves, people start searching for a job but since it takes time to get the job, the unemployment rate may increase in spite of strong job market situation.
  - Some agencies prefer to measure the workforce in terms of the working-age population because it remains constant regardless of the state of the labor market. But the flaw in this approach is that it includes unemployed people who have severe disabilities and could never seek work.
- 2) Businesses are reluctant to adjust their labor in response to business cycles i.e. they are reluctant to lay off people during recession and reluctant to hire people as the recovery develops.

#### Flaws in Unemployment rate:

Unemployment rate:

- Does not include discouraged workers
- Includes part-time workers
- Does not measure underemployment
- It is important to note that when comparing unemployment among countries, analysts must take into account different unemployment measurement methods used by different countries.

#### 4.1.2) Overall Payroll Employment and Productivity Indicators

**Payroll growth** is a measure used to get a better picture of the employment cycle i.e.

- When payroll shrinks, it indicates weak economy.
- When payroll rises, it indicates economic recovery.

However, it is a biased measure because it is difficult to count employment in smaller businesses.

Some other measures include:

**Hours worked (particularly overtime):** When businesses start reducing (increasing) work hours particularly overtime, it indicates economic weakness (recovery).

**Use of temporary workers:** When businesses start reducing (increasing) part-time and temporary staff, it indicates economic weakness (recovery).

**Productivity (i.e. output ÷ hours worked):**

- When output falls in a downturn but businesses tend to keep workers on the payroll → productivity declines. It indicates sign of economic weakness.
- Similarly, productivity rises as output recovers.

#### NOTE:

Productivity generally increases with advancement of technology or improved training techniques. When such changes are strong enough, they can lead to increase in unemployment; however, these effects occur over long-term.

## 4.2

## Inflation

Inflation refers to a continuous (not one time) increase in the overall level of prices in an economy. During inflation, the value of money actually decreases.

**Inflation rate:** The inflation rate is the % change in a price index. It is pro-cyclical i.e. it increases and decreases with the cycle, but with a lag of a year or more.

- It is used to get a better picture of the state of the economy, expected changes in monetary policy,

- expected changes in political risks etc.
- It is used by Central bank in conducting monetary policy.
- A high inflation rate combined with a high (slow) economic growth and low (high) unemployment indicates that the economy is in the state of overheating (stagflation i.e. stagnation + inflation).

Various price indices are used to measure the overall price level (known as aggregate price level).

**Stagflation:** Stagflation (stagnation plus inflation) refers to an economic state with a high inflation rate, high level of unemployment and economic slowdown. When an economy is in state of stagflation, short-term economic policy is not considered effective; rather, the economy should be left to correct itself.

#### 4.2.1) Deflation, Hyperinflation and Disinflation

**Deflation:** Deflation refers to a *persistent decrease* in aggregate price level i.e. negative inflation rate (< 0%).

- During deflation, the value of money (or purchasing power of money) increases.
- The liability (in fixed monetary amounts) of a borrower increases in real terms during deflation.
- Due to decrease in price level, revenue of typical companies also decline. Consequently, investment spending ↓, layoff ↑ → unemployment ↑ → economy further contracts.

#### NOTE:

To avoid deflation, developed economies prefer an inflation rate of around 2% per year.

**Hyperinflation:** Hyperinflation refers to an *extremely rapid increase* in aggregate price level i.e. high inflation rate e.g. 500 to 1000% per year. During hyperinflation, consumers' spending increases at a faster rate in expectation of further increase in future prices and money circulates more rapidly.

Hyperinflation occurs due to:

- Expansionary fiscal policy i.e. increase in government spending without any increase in taxes.
- Increase in the supply of money by the Central bank to support government spending.
- Shortage of supply of goods created during or after a war, economic regime transition or prolonged economic distress due to political instability.

**Disinflation:** Disinflation refers to *decrease* in the inflation rate i.e. from around 15 to 20% to 5 or 6%. Disinflation is not the same as deflation because even after a period of disinflation, the inflation rate remains positive and the aggregate price level keeps rising.

#### 4.2.2) Measuring Inflation: The Construction of Price Indices

**Price Index:** A price index represents the average prices of basket of goods and services. A price index is calculated as follows.

**Example to calculate Laspeyres price index:**

Time	January 2010		February 2010		
	Goods	Quantity	Price	Quantity	Price
Rice	50 kg	¥3/kg	70kg	¥4/kg	
Gasoline	70 liters	¥4.4/liter	60liters	¥4.5/liter	

Value of consumption basket in **Jan 2010** = value of rice + value of gasoline =  $(50 \times 3) + (70 \times 4.4) = ¥458$ .

- To weight the price in the index, a price index uses the relative weight of a good in a basket. Thus,

Value of consumption basket in **Feb 2010** = value of rice + value of gasoline =  $(50 \times 4) + (70 \times 4.5) = ¥515$ .

- The price index on the base period is usually set to 100. In this example, Jan 2010 is the base year. So the price index in Jan 2010 is 100. Then,

**Price index in Feb 2010** =  $(515/458) \times 100 = ¥ 112.45^*$   
**Inflation rate** =  $(112.45 / 100) - 1 = 12.45\%$

\* it is Laspeyres price index.

Source: Volume 2, Reading 15, Exhibit 5.

**Laspeyres index:** It is a price index that is created by using a fixed consumption basket.

- Most price indices around the world are Laspeyres indices because the survey data regarding the consumption basket are only available with a time lag.
- The consumption basket is updated every five years (in most of the countries).

#### Biases in Laspeyres index:

i. **The substitution bias:** The basket does not change to reflect consumer reaction to changes in *relative* prices e.g. consumers substitute toward relatively cheaper goods. Hence, the Laspeyres Index overstates the measured inflation rate and results in an upward bias by not considering consumer substitution.

- The substitution bias can be resolved by using chained price index formula. For example:

**a) Fisher Index:** It is the geometric mean of the Laspeyres index.

**b) Paasche Index:**

$$\text{Paasche Index (Feb 2010)} = I_P = \frac{(70 \times 4) + (60 \times 4.5)}{(70 \times 3) + (60 \times 4.4)} \times 100 = 116.03^*$$

\* Data is taken from exhibit 5 Volume 2, Reading 15.

The value of the Fisher Index is calculated as follows:

$$\text{Fisher Index (Feb 2010)} = \sqrt{I_P \times I_L} = \sqrt{116.03 \times 112.45} = 114.23$$

where,  $I_L$  = Laspeyres index

**ii. The Quality bias:** When the quality of a good improves over time, the value of a dollar rises, even if the price of the good stays the same. Hence, the Laspeyres Index overstates the measured inflation rate and results in an upward bias by not adjusted for quality.

- Quality bias can be resolved by using **Hedonic pricing technique**.

**iii. New product bias:** Since, the Laspeyres Index is based on fixed basket of goods and services, it does not include new products. New products benefit consumers by providing them greater variety, which in turn increases the *value* of dollar. Hence, the Laspeyres Index overstates the measured inflation rate and results in an upward bias by not including new products.

- New products bias can be resolved by introducing new products into the basket over time.

**NOTE:**

It is relatively easy to resolve the quality bias and new product bias.

**4.2.3) Price Indices and Their Usage**

**A. Consumer price index (CPI):** CPI reflects the prices of a basket of goods and services that is typically purchased by a normal household. CPI is used to compare the price of a fixed basket of goods and services to the price of the basket in the base year.

**CPI is a Laspeyres index.** Most of the countries use their own consumer price index (CPI) to measure inflation in the domestic economy. It is difficult to compare CPIs of different countries because of:

- Different names
- Different weights to various categories of goods and services.
- Different scope of the index e.g. some countries collect data for CPI which covers both urban and rural areas.

**Uses:**

- CPI is used by U.S.'s Treasury inflation protected securities (TIPS) to adjust the bond's principal according to the U.S. CPI-U index.
- The terms of labor contracts and commercial real estate leases may adjust periodically according to the CPI.
- CPI is used by Central bank to monitor inflation.

**Flaw in CPI:** Since, CPI-U is a Laspeyres index, it has upward biases.

**B. Personal consumption expenditures (PCE) index:** PCE is a price index that reflects all personal consumption (i.e. complete range of consumer spending) rather than just a basket. **PCE index is a Fisher index.**

- Due to upward biases in CPI, Fed prefers to use PCE index.

**C. Producer price index (PPI):** PPI measures the cost of a basket of raw materials, intermediate inputs, and finished products. It is also known as wholesale price index WPI.

- PPI can affect future CPI because producers pass increase in prices eventually to consumers.
- PPI include items i.e. fuels, farm products, machinery & equipment, chemical products etc. These products are further categorized by stage-of-processing categories i.e. raw materials, intermediate materials, finished goods.
- Like CPI, scope and weights of PPI vary among countries.

**Flaw in PPI or WPI:** It understates market prices because it does not consider retail margins.

**D. GDP deflator:** Financial analysts also use GDP deflator, which measures the price of the basket of goods and services produced within an economy in a given year.

**Headline Inflation:** It is an inflation rate that is calculated using a price index that includes all goods and services in an economy. The ultimate objective of policymakers is to control headline inflation.

**Flaws:**

- It is affected by short-term fluctuations in food and energy prices. Therefore, headline inflation is considered a noisy predictor of future inflation.
- It does not accurately detect movements in a sub-index or a relative price, which are useful for analyzing the prospects of an industry or a company.

Where,

- **Sub-index:** Price index for a particular category of goods or services is known as sub-index.

- o **Relative prices:** The price of a specific good or service in comparison with those of other goods and services is called relative price.

**Core Inflation:** It is an inflation rate that is calculated using a price index that includes all goods and services except food and energy prices, which tend to be unpredictable.

- Core inflation is a less volatile measure of inflation; therefore, policymakers prefer to use core inflation.
- Domestically driven inflation is better reflected by core inflation because the changes in the prices of food and energy are internationally determined and do not reflect domestic business cycle.

**For detail:** Example 11, Volume 2, Reading 15.

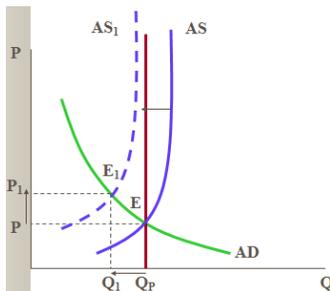


**Practice:** Example 12, Volume 2, Reading 15.



**4.2.4.1 Cost-push Inflation**

Cost-push inflation is a type of inflation caused by substantial increase in the costs of production (i.e. increase in the cost of important inputs where no suitable alternative is available) e.g. increase in labor wages, costs of raw materials etc. It is also known as wage-push inflation.



Lower unemployment rate results in labor shortages, which consequently puts upward pressure on wages. Due to increase in wages, AS curve shifts to the left, resulting in increase in price and decrease in output.

**NOTE:**

Since, unemployment fails to consider economy's full labor potential, some practitioners prefer to observe **participation rate of people in the workforce**.

**Non-accelerating inflation rate of unemployment (NAIRU) or Natural rate of unemployment (NARU):** The natural rate of unemployment is achieved when labor markets are in balance that is the number of job seekers equals the number of job vacancies. NARU does not mean zero unemployment; it is the unemployment rate

at which the inflation rate will not rise because of a shortage of labor. The natural rate of unemployment is also referred to as the full employment.

- NARU is a better measure than unemployment rate because it better indicates when an economy will face bottlenecks in the labor market and wage-push inflationary pressures.
- It should be noted that the NARU is not fixed; rather, it depends on the demographic makeup of the labor force and the laws and customs of the nations. For example, if the skill set of a large part of the workforce does not meet the hiring need of the employers, the NARU of such an economy can be quite high.
- Also, the concept of NARU or NAIRU is not related to any particular school of macroeconomic models.

**Issues with NARU and NAIRU:**

- 1) They are not directly observable.
- 2) NARU or NAIRU is not fixed; it changes over time with changes in technology, social factors and economic structure.

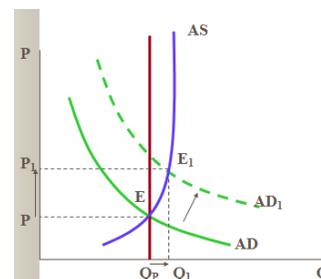
- Various **Wage-cost indicators** include hourly wage gauges, weekly earnings, and overall labor costs.
- **Productivity (i.e. output per hour):**
  - o The greater the productivity, the lower the price is charged by businesses for each unit of output to cover hourly labor costs.
  - o Also, the greater the productivity, the faster the wages can increase without putting undue upward pressure on businesses' costs per unit of output.

**Unit labor cost (ULC) indicator**

$$= \frac{\text{Total labor compensation per hour per worker}}{\text{Output per hour per worker}}$$

**4.2.4.2 Demand-pull Inflation**

Demand-pull inflation arises when demand in an economy increases at a faster rate than that of supply. It tends to occur when spending is greater than the productive capability of the economy, rate of capacity utilization is high, and when an economy is close to or at full employment level (i.e. actual GDP is close to potential GDP).



Similarly, inflation decreases or deflation arises when economy operates below its potential GDP level or the

rate of capacity utilization is low. As a result, there is less supply pressure.

According to Monetarists school, inflation is basically a monetary phenomenon i.e. increase in the supply of money results in increased liquidity → which results in rapid rise in demand and consequently leads to inflation.

- Accelerations in money growth (without any specific reason) indicate the potential for inflationary pressure.
- If growth in money supply > growth of nominal GDP, it indicates the potential for inflationary pressure. Opposite occurs when money growth < growth in nominal GDP.

**Velocity of Money:**

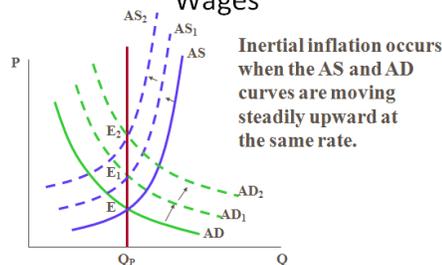
$$\text{Velocity of money} = \frac{\text{Nominal GDP}}{\text{Money Supply}}$$

- Prices are stable when velocity of money remains stable around a constant or a historical trend.
- When velocity falls, it may indicate the potential for inflationary pressure. However,
  - If velocity has fallen due to decrease in Nominal GDP rather than increase in money supply, it may indicate potential for cyclical upswing.
  - If velocity has fallen due to an increase in the money supply, then it may indicate potential for inflationary pressures.
- When velocity rises e.g. due to decrease in money supply, it indicates shortage of money in the economy and disinflation.

**4.2.5) Inflation Expectations**

Expectations about inflation can cause inflation to occur. Such expectations can make inflation to persist in an economy even after its initial cause has disappeared. It may result in an upward spiral of prices and wages and inflation continues to rise.

**Upward Spiral of Prices and Wages**



It is quite difficult to measure inflation expectations.

- Inflation expectations can be measured by observing past inflation trends because market participants largely *extrapolate* their past experiences.
- Inflation expectations can be measured using surveys of inflation expectations. But these surveys are biased by the way questions are asked.
- Inflation expectations can be measured by comparing interest available on TIPS and with other non-inflation adjusted government bonds e.g. Suppose
  - Today's yield on 10-year nominal bond of a certain country is 4%.
  - The yield on 10-year inflation-protected bond of the same country is 2%.
 Hence,  
 Market is pricing in = 4% – 2% = 2% average annual inflation over the next 10 years.

**NOTE:**

Calculating inflation expectations using this method is not reliable because the market for inflation-linked bonds is relatively small; also, yields on inflation-linked bonds can be influenced by other market factors i.e. demand & supply.

**Practice: Example 16, Volume 2, Reading 15.**



**5. ECONOMIC INDICATORS**

An economic indicator is a variable that provides information on the state of the overall economy. There are three types of economic indicators.

**1. Leading economic indicators (LEI):** Leading indicators are variables that change before real GDP changes. They are useful for predicting the economy's future state, usually short-term.

**2. Coincident economic indicators:** Coincident economic indicators are variables that change at the same time that real GDP changes. They provide information regarding present/current state of the economy.

**3. Lagging economic indicators:** Lagging economic indicators are variables that change after real GDP changes. They provide information regarding the economy's past condition.

Indicator and Description	Reason
<b>Leading</b>	
1. Average weekly hours, manufacturing	Because businesses will cut overtime before laying off workers in a downturn and increase it before rehiring in a cyclical upturn, these measures move up and down before the general economy.
2. Average weekly initial claims for unemployment insurance	This measure offers a very sensitive test of initial layoffs and rehiring.
3. Manufacturers' new orders for consumer goods and materials	Because businesses cannot wait too long to meet demands for consumer goods or materials without ordering, these gauges tend to lead at upturns and downturns. Indirectly, they capture changes in business sentiment as well, which also often leads to cycle.
4. Vendor performance, slower deliveries diffusion index	By measuring the speed at which businesses can complete and deliver an order, this gauge offers a clear signal of unfolding demands on businesses.
5. Manufacturers' new orders for non-defense capital goods	In addition to offering a first signal of movement, up or down, in an important economic sector, movement in this area also indirectly captures business expectations.
6. Building permits for new private housing units	Because most localities require permits before new building can begin, this gauge foretells new construction activity.
7. S&P 500 Stock Index	Because stock prices anticipate economic turning points, both up and down, their movements offer a useful early signal on economic cycles.
8. Money Supply, real M2	Because money supply growth measures the tightness or looseness of monetary policy, increase in money beyond inflation indicates easy monetary conditions and a positive economic response, whereas decline in real M2 indicates monetary restraint and a negative economic response.
9. Interest rate spread between 10-year treasury yields and overnight borrowing rates (federal funds rate)	Because long-term yields express market expectations about the direction of short-term interest rates, and rates ultimately follow the economic cycle up and down, a wider spread, by anticipating short rate decreases, also anticipates an economic downturn.
10. Index of Consumer Expectations, University of Michigan	Because the consumer is about two-thirds of the U.S. economy and will spend more or less freely according to his or her expectations, this gauge offers early insight into future consumer spending and consequently directions in the whole economy.
<b>Coincident</b>	
1. Employees on non-agricultural payrolls	Once recession or recovery is clear, businesses adjust their fulltime payrolls.
2. Aggregate real personal income (less transfer payments)	By measuring the income flow from non-corporate profits and wages, this measure captures the current state of the economy.
3. Industrial Production Index	Measures industrial output, thus capturing the behavior of the most volatile part of the economy. The service sector tends to be more stable.
4. Manufacturing and trade sales	In the same way as aggregate personal income and the industrial production index, this aggregate offers a measure of the current state of business activity.

Lagging	
1. Average Duration of Unemployment	Because businesses wait until downturns look genuine to lag off, and wait until recoveries look secure to rehire, this measure is important because it lags the cycle on both the way down and the way up.
2. Inventory–sales ratio	Because inventories accumulate as sales initially decline and then, once a business adjusts its ordering, become depleted as sales pick up, this ratio tends to lag the cycle.
3. Change in unit labor costs	Because businesses are slow to fire workers, these costs tend to rise into the early stages of recession as the existing workforce is used less intensely. Late in the recovery when the labor market gets tight, upward pressure on wages can also raise such costs. In both cases, there is a clear lag at cyclical turns.
4. Average bank prime lending	Because this is a bank administered rate, it tends to lag other rates that move either before cyclical turns or with them.
5. Commercial and industrial loans outstanding	Because these loans frequently support inventory–sales ratio.
6. Ratio of consumer installment debt to income	Because consumers only borrow heavily when confident, this measure lags the cyclical upturn, but debt also overstates cyclical downturns because households have trouble adjusting to income losses, causing it to lag in the downturn.
7. Change in consumer price index for services	Inflation generally adjusts to the cycle late, especially the more stable services area.

Source: Volume 2, Reading 15, Exhibit 7.

**Interpretation:** For example,

- An increase in the reported ratio of consumer installment debt to income indicates an ongoing economic recovery because it is a lagging indicator i.e. it occurs after cyclical upturns.
- An increase in the S&P 500 Index indicates *future* economic growth because it is a leading indicator i.e. it occurs before an increase in aggregate economic activity (all else equal).
- However, if the S&P 500 index is increasing but the aggregate index is falling, it does not indicate positive future economic growth.
- When the spread between 10-year U.S. Treasury yields and the federal funds widens (narrows), it predicts rise (fall) in short-term rates and a rise (fall) in economic activity.
- Both inventory-sales and unit labor costs increase (decline) after a recession (peak).
- When real personal income increases (decreases), it predicts economic recovery (economic slowdown).
- If LEI increased by a small amount on two consecutive observations, it may indicate that a modest economic expansion is expected.

**Important:**

All Economic indicators are not equally useful for predicting economic cycles. For example, some indicators are good predictors for economic expansions but poor predictors for recessions.

## 5.1 Popular Economic Indicators

**Composite economic indicator:** It is an aggregate measure of leading, lagging and coincident indicators.

- In the U.S., the composite leading indicator is known as the **index of leading economic indicators (LEI)**. It is composed of 10 components.
- CLI (Composite Leading Indicators) indices are consistent across countries, and therefore can be easily used for comparison purposes.

**Diffusion index:** The diffusion index reflects the proportion of the index's components that are moving up or down e.g. if 8 out of 10 components are pointing upward, then it may indicate economic upturn.

**The Euro zone leading index includes:**

1. Economic sentiment index
2. Residential building permits
3. Capital goods orders
4. The Euro Stoxx Equity Index
5. M2 money supply
6. An interest rate spread
7. Euro zone Manufacturing Purchasing Managers Index
8. Euro zone Service Sector Future Business Activity

## Expectations Index

**Euro zone v/s U.S. leading index:**

- Unlike U.S., Europe has a services component in its business activity measures.
- Some of the measures of overtime and employment included in U.S. leading index are not included in Europe.

**Japan's leading index includes:**

1. New orders for machinery and construction equipment
2. Real operating profits
3. Overtime worked
4. Dwelling units started
5. Six-month growth rate in labor productivity
6. Business failures
7. Business confidence (Tankan Survey)
8. Stock prices
9. Real M2 money supply
10. Interest rate spread

**Japan v/s U.S. leading index:**

- Like U.S. (but unlike Europe), Japan includes labor market indicators.
- Unlike U.S. and Europe, Japan includes a measure of business failures.

**5.2 Other Variables Used as Economic Indicators**

**Aggregate cyclical measures:** These measures may include surveys of industrialist, bankers, labor associations, and households on the state of their finances, level of activity and their confidence in the future.

**Practice:** Example 19  
Volume 2, Reading 15.



**Practice:** CFA Institute's End of  
Chapter Practice Problems and  
FinQuiz Questions.

