

## **Chapter: Inflation and its social costs**

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## **Learning outcomes**

After you have read this chapter, you should be able to:-

1. Define the term inflation.
2. Explain the causes of inflation.
3. List various measures of inflation.
4. Construct price index, given the data.
5. Notify the recent trends in inflation in India.
6. List various costs of inflation to an economy.
7. Explain the consequences of hyperinflation in an economy.

## **Introduction**

The financial year 2010-11 started with a headline of 11% inflation in April 2010. And inflation has been a disturbing issue in the Indian economic scene in the last few years. Why all economists and policymakers are concerned about curbing inflation in the economy? Even a layman understands that inflation i.e. rise in prices, makes him poorer. Inflation can be seen as a devaluing of the worth of money or fall in the purchase power of the consumer.

Inflation is universal because money supply needs to be raised with time, cost of inputs and wages increases. Is it normal? When does inflation become a cause of worry? We have discussed in last chapter that central bank has macroeconomic tools to contain inflation. But when would it be required?

This chapter is an attempt to understand the phenomenon of **inflation, its measurement and recent trends** in **Section 1**. **Social costs of inflation** will be discussed in **Section 2** and the **causes and costs of hyperinflation** will be studied in **Section 3**.

## **INFLATION**

Inflation is a persistent increase in the general level of prices. Milton Friedman, the Nobel Prize winning economist said: “inflation is always and everywhere a monetary phenomenon”. By saying this he meant that inflation always moves up as and when money supply is more than the growth of economy for a period of time. Inflation has also been defined as “too much money chasing too few goods”. This is what monetarists think. But inflation rate may be as a result of demand-pull and / or supply shock. Let’s study the various other causes of inflation.

### **Causes of inflation**

An economy can experience inflation due to the following reasons:-

#### **a. Demand –Pull Factors**

Prices may rise due to excessive demand. An economy can experience excessive demand due to increase in the population, high rate of investment- which is demand of capital goods, increase in government expenditure and also due to increasing role of black money.

#### **b. Cost push factors**

Price rise could occur due to increase in particular prices or wage rates being passed round the economy. These include rise in wages, profit margins & increasing costs of inputs. Also, fresh taxation also raises the price level.

### **Impact of crude oil prices increase on global commodity prices**

Crude oil price changes are reason for concern as it affects the prices of other commodities in many ways. Prices of following goods changes due to crude oil price change.

- Since crude oil is used in energy generation, prices of energy-intensive commodities are affected, for example, metals.
- Since crude oil is used as fuel it alters the transport cost of commodities especially over long distances.
- Price of inputs used in primary products like fertilizer and fuel changes due to crude oil price changes, which in turn, changes the price of primary products.
- Prices of substitutes of crude oil are also affected.

#### **c. Structural rigidities**

Permanent rigidities exist in most contemporary industrial societies which could be in terms of localized bottlenecks (rigidities in a particular sector of production and specific rigidities of certain factors). For example, there could be insufficiency of resources appearing in a key sector (essential raw material, oil for example).

#### **d. Nature of Economy**

In an open economy, inflation can be imported by flows of international exchanges. It could be final goods imported for direct consumption or some raw material to be used in production.

## Measuring Inflation

Inflation plays a vital role in economic policy making, as well as individual decision making. Consumer Price Index, (CPI) is preferably used as a tool to measure of inflation by economists, policy makers and consumers. The following exercise will help us to understand how CPI is constructed and it will make a distinction between the level of a variable i.e. CPI and the rate of change in the variable i.e. inflation rate. It also helps us to understand what bias in a variable CPI would be considered?

Consider, seven periods viz. base period and then period 1 to 6. Suppose in a base period, you have Rs. 30 to be spent on three goods viz. Good 1, Good 2 and Good 3 each costing Rs.5. Further suppose that aggregation and averaging gives the constituents of a typical basket of a consumer, which is assumed as follows: 3 units of Good1, 2 units of Good 2 and 1 unit of Good 3. whereas , good 4 is introduced in period 5.

The following table provides the data on price change of three goods in the economy:-

Good	Base Period	Period1	Period2	Period3	Period4	Period5	Period6
Good 1	5	5	5	10	10	5	10
Good 2	5	10	5	5	5	10	10
Good 3	5	5	10	5	10	10	5
Good 4						10	5

Cost of basket will now be calculated with varying prices in each period. Now Price Index can be constructed by dividing the cost of the goods and services in the representative basket in the current period by the cost of the same representative basket in the base period and then multiplying it by 100. This gives the following results:-

### Price Index & inflation rates for basket of 3 goods computed for six periods

PERIOD (1)	PRICE INDEX (2)	INFLATION RATE %(3)
Base year	100	NA
First year	150	50
Second year	117	-22
Third year	133	14
Fourth year	150	13
Fifth year	167	11
Sixth year	183	10

Inflation rates are calculated by computing percent change in price Index compared to previous period.

In the construction of Price Index (in year 5 & 6), we ignored good 4, which was introduced in period 5 in market. Similarly Consumer Price Index (CPI) also ignores the introduction of new products while constructing price index.

Also, a fixed basket was assumed throughout which might not be the case in real life. When price of good 2 increased in period 1, consumer might substitute Good 2 for Good 1 or Good 3. Does CPI's limitation of substitution bias lead to overestimation of inflation.

Another important thing to learn from this example is that as prices sometimes decline between periods like from period 1 to period2: so one gets a negative inflation rate. Fall in prices is referred to as "Deflation".

## **Indicators of inflation**

Following indicators are used to calculate and study inflation in an economy.

- (a) The Index number of wholesale Prices: it excludes services.
- (b) The consumer Price Index (CPI): it includes both consumer goods and services.
- (c) The Gross domestic product (GDP) deflator: the deflator is obtained by dividing the GDP at current prices by the GDP at constant prices. The GDP deflator indicates growth of GDP in a particular year due to rise in prices (discussed at length in chapter on National income accounting).

WPI (Whole sale price Index) represents the rate of increase in the wholesale prices of products. However, what matters to the common man is the consumer price. Though prices in the wholesale market grow at slower pace about 2-3 percent, the consumer prices measured in terms of CPI grow at a much faster pace ( about 8-9) percent.

The way the two indices are calculated differ, both in weightage assigned to products as well as the kinds of items included in the basket of products.

## **Recent Trends in India**

At present, there are five different price indices namely, wholesale Price Index (WPI), Consumer Price Index for Industrial work (CPI-IW), Consumer Price Index for Urban Non-Manual Employees (CPI-UNME), the Consumer Price Index for Agricultural laborers (CPI-AL) and CPI for Rural Laborers (CPI-RL). CPI-IW is the most well known of the consumer price indicators as it is used for wage indexation. Wholesale Price Index has always continued to be the most prominent of the headline inflation in the Indian

economy because of its weekly availability. It is an economy wide index, which covers close to 676 commodities.

If one looks at the table below, the value for two indices- WPI and CPI-IW& that of GDP deflator has been on a consistent rise since 1999- 2000. The figures in parentheses are all positive indicating that Indian economy is experiencing inflation in the last few years.

In India, inflation is due to both cost-push & demand pull factors. Due to drought of 2002 or bad weather conditions or like in petroleum prices, India experienced inflation in last decade. According to Economic Survey of 2007-08, inflation in India is a structural as well as monetary phenomenon.

Year / indies	WPI*	CPI (IW)*	GDP consumption deflator*
Price indices based on 1999-2000 = 100			
1999-00	100.00	100.0	100.0
2000-01	107.1 (7.1)	103.8 (3.8)	103.5 (3.5)
2001-02	111.0 (3.6)	108.3 (5.1)	106.8 (3.2)
2002-03	114.8 (3.4)	112.6(3.8)	109.8(2.9)
2003-04	121.1 (5.5)	116.9 (3.7)	113.8(3.0)
2004-05	128.9 (6.5)	121.4(3.6)	117.0(2.8)
2005-06	134.6 (4.4)	126.8(4.7)	120.5(3.0)
2006-07	141.9 (5.4)	135.3(6.6)	126.7(5.1)

Source: Economic Survey 2007-08

\*Figures in the parentheses are year on year inflation.

WPI has been on a rise since the first half of 2006. The futures trading system especially in products like cereals, pulses, milk, sugar & edible oils; is being blamed for the same.CPI–IW remained high even in 2009-10 ( in double digits from July 2009 to July 2010) . The major contributors to high CPI –IW inflation were food & housing.

### New WPI series comes into effect

A new series of the wholesale price index with 2004-05 was released on September 14, 2010. A comparison of the weighting diagram and number of commodities between old and new series for the groups are drawn in the table below:

Items	Weights		No. of commodities	
	New series(base : 2004-05)	Old series (base: 1993-94)	New series(base : 2004-05)	Old series (base: 1993-94)
All commodities	100.00	100.00	676	435
Primary articles	20.12	22.03	102	98
Food articles	14.34	15.40	55	58
Non food & miner	5.78	6.63	47	44
Fuel & power	14.91	14.23	55	41
Manufactured items	64.97	63.75	555	318
Food products	9.97	11.54	57	41
Non food products	55.0	52.21	498	277

The new series would have a different weight, in line with the changes in the economy. Some of the important items included in the new series basket are flowers, lemons, crude petroleum in the primary articles and ice- cream, canned meat, palm oil, readymade/instant food powder, mineral water, computer stationery, leather products, scooters- motor cycle tyres, polymers, petrochemical intermediates, granite, marble, gold and silver, construction material, refrigerators, computers, dish antenna, transformers, micro wave ovens, communication equipment, TV sets, VCDs, washing machines, and auto parts in manufactured products.

### New Consumer Price Index

India adopted a new consumer price index (CPI) in February 2010 which will reflect actual movement of prices at the micro level. The Central Statistics Office (CSO), introduced the new series of consumer price indices for all India with effect from January 2011, with 2010 as the base year.

The consumer indices will be available for 5 major groups- food, beverages and tobacco; fuel and light; clothing, bedding and footwear; and miscellaneous.

Source: The Office of the Economic Adviser, Ministry of Commerce and Industry.

designing long-term policy. Core inflation, which was 0.55 percent in November 2009, reached its peak in April 2010 at 8.07 per cent.

## **COST OF INFLATION**

An economy which is experiencing inflation has to bear many costs and policymakers, economists and especially politicians are concerned to make arrangements and take steps to curb inflation because of public pressure. Inflation is keenly watched and widely debated by all the stakeholders in the economy as it is considered to be a serious economic problem. Let's study what are the costs that an economy has to face in advent of inflation.

### **The costs of expected inflation**

If suppose, every week prices rising by half percent. What would be the cost of such predictable inflation?

#### **1. Falling purchasing power**

When there is inflation it seems at first that now you would be able to command lesser number of goods. But is it really true? If you pay higher prices for the goods and services then the seller gets higher income and so do you when you charge higher price. So now it seems that if nominal incomes keep pace with inflation rate then fall in purchasing power is just a fallacy. Therefore, inflation itself does not lower real purchasing power of the consumer.

#### **2. Shoe leather cost**

When an economy faces inflation, value of money is eroded. To save on that, public chooses to keep money in the banks. But how is it ensured that money is

not losing its value. The solution to this is the interest rate offered on the deposits one's make. The nominal interest rate is at which people pay/receive interest payments to/from the commercial banks. The real interest rate is adjusted nominal interest rate for the effect of inflation in order to tell us at what pace the purchasing power of our deposited money is growing or at least is not eroding.

$$\text{Real interest rate} = \text{Nominal interest rate} - \text{inflation}$$

So whenever inflation is prevalent in the economy, nominal interest rate adjusts to the rate of inflation to keep the real interest rate constant. This adjustment of nominal interest rate to the inflation rate is known as *Fisher effect*.

Inflation creates cost on the public with regard to distortion in the amount of money they should hold. A higher inflation leads to higher interest rate via fisher effect and also lower real money balances. Then people will hold lower money balance on an average and this would mean they would make frequent trips to the bank to withdraw money. They might withdraw Rs.1000 instead of Rs.2000 once a week. This cost of wearing out of one's shoes (while making frequent trips to banks) is metaphorically called the **shoe leather cost** of inflation.

### 3. Menu costs

Inflation also arises because high inflation causes firms to bring changes in their prices printed in menu cards more often. This procedure is costly as it requires print and distribution of a new catalog. These costs arose due to high inflation are called **menu costs**, because the firms often revise the price list in their menu cards whenever the rate of inflation is high.

#### **4. Inflation induced Tax distortions**

Another factor which add to the inflation because some provisions in the tax code do not consider the effects of inflation. One of the classic examples of this is when tax laws fail to deal with inflation in case of tax on capital gains. Suppose you buy a stock today for say Rs.100 and sell it a year from now for Rs.115. It seems reasonable for the government to tax your capital gain of Rs.15(Rs.115-100). Suppose again that your economy has inflation rate of 15% over the same period. Then, in that case, you have not earned any real income from this investment. But tax code fails to take into account the effect of inflation and government levies a tax on nominal rather than real income earned. This is how; inflation distorts tax imposition and individual's liability.

#### **5. Relative – price variability and misallocation of resources**

Inflation arises due to the fact that since firms face menu costs; they change prices frequently, which brings variation in relative prices. For example, McDonalds revises its menu prices in the month of January every year. If the rate of inflation is zero, then the firm's prices relative to the overall price level are constant over the year. But if inflation is 0.5 percent per month, then at the end of the year firm's relative prices fall by 6 percent. Firm's prices would be relatively high early in the year and sales tend to be low. Prices would be relatively low later in the year and sales tend to be high. Hence, inflation not only brings variability in relative prices but it also allocates the resources inefficiently.

#### **6. Inconvenience**

Another cost of inflation is the inconvenience of living in a world where prices are changing and brings changes in the value of rupee. Money is used as a yardstick

for measuring economic transactions and therefore, when an economy experiences inflation, that yardstick is changing in length. Lets consider an example how changing price level complicates one's planning about how much to save for the future. If suppose, prices were to remain same even after thirty years from now, i.e., when an individual retires. Then, a rupee saved today and invested at a fixed nominal interest rate would yield fixed rupee tomorrow. If, economy experiences inflation then real value of the investment would change and retiree's living standard depends on the real value of the rupee. Now, individual is in a flux what to save for the retirement; since inflation could alter individual's financial plans.

### **The costs of unexpected inflation**

Effect of unexpected inflation in terms of costs is more destructive than anticipated and regular inflation. Unexpected inflation leads to arbitrary redistribution of wealth in an economy. It can be understood better by seeing how it works by examining long-term loans. Largely most loan agreements have a fixed nominal interest rate, which is sum of real interest rate, and an expected rate of inflation for the same term period. If inflation turns out to be different from what was expected by both the parties then the ex post real return that the debtor pays to the creditor is different from what both parties expected. The debtor gains and the creditor loses if inflation is more than expected and inversely if inflation is lower than expected, the creditor gains and the debtor loses. Suppose loan agreement states that a sum of Rs.100 is provided at the rate of 10% (rate of expected inflation) for a year. Suppose actual inflation turns out to be 15%, debtor gains as he/she repays the loan with less real amount. On the other hand, if inflation turns out to be 5%, creditor gains because the repayment is worth more than expected in real terms.

### **The free silver movement, the election of 1896, and the Wizard of Oz**

The redistributions of wealth caused by unexpected changes in the price level are often a source of political turmoil, as evidenced by the Free silver movement in nineteenth century. From 1880 to 1896 the price level in the United States fell 23 percent. This deflation was good for creditors, primarily the bankers of the Northeast, but it was bad for debtors, primarily the farmers of the south and west. One proposed solution to this problem was to replace the gold standard with the bimetallic standard, under which both gold and silver can be minted into coins. The move to bimetallic standard would increase the money supply and stop the deflation.

The silver movement dominated the presidential election of 1896. William McKinley, the Republican nominee, campaigned on a platform of preserving the gold standard. William Jennings Bryan, the Democratic nominee, supported the bimetallic standard.

This debate over silver found its memorable expression in a children's book, *The Wizard of the Oz* written just after 1896 election, it tells a story of Dorothy, a girl lost in a strange far land far from her home in Kansas. Dorothy (representing the American values) makes three friends: a scare crow (the farmer), a tin wood man (the industrial worker) and a lion whose roar exceeds its might (William Jennings Bryan). Together they made a perilous yellow brick road (gold standard), hoping to find the wizard who will help the Dorothy return home. Eventually, they arrive in Oz (Washington), where everyone sees the world through green glasses (money). The wizard (William McKinley) tries to be all things to all people but turns out to be fraud. Dorothy's problem was solved when she learns about the magical powers of her silver slippers.

Although the Republicans won the election of 1896 and the United States stayed on a gold standard, the Free Silver advocates got the inflation that they wanted. Around the time of election, gold was discovered in Alaska, Australia, and South Africa. In addition, gold refiners devised the cyanide process, which facilitated the extraction of gold from ore. These developments led to increases in the money supply and in prices. From 1896 to 1910 the price level rose 35 percent.

Source: N. Gregory Mankiw, 4<sup>th</sup> edition, 2007.

Individuals with fixed pensions are also hurt by unexpected inflation. Since, workers and firms decide on a fixed nominal amount of pension to be given when the worker retires. As explained in our previous example, worker loses when inflation is high because he

fixed pension that has a lower worth when he retired. Like any debtor, firm will be looser if inflation is less than anticipated.

Given the impact of inflation on the position of a debtor and creditor; it is confusing that contracts in nominal terms are still widespread. One might expect some sort of indexation to the changing price level. In the economies where inflation is high and volatile, indexation is prevalent. Hence, loans are made available at floating interest rate than at a fixed interest rate.

## **HYPERINFLATION**

When inflation surpasses the benchmark of 50 % per month i.e. approximately a little above 1% per day, it is termed as *Hyperinflation*. This high rate of inflation when amalgamated over several months becomes a source of significant increases in the level of prices. Therefore, it can be said that a 50% inflation rate per month would imply above 100 times increase in the level of prices over a year and further 2 million times increase over 3 years.

### **The causes of hyperinflation**

Excessive growth in the money supply causes hyperinflation. The price level immediately rises when money is printed by the Central Bank. And hyperinflation results when it prints money speedily. A condensing of the rate of money growth by the Central Bank can stop hyperinflation.

Whenever the government faces budget deficit, it seeks to borrow but fails to do so as the lenders consider the government as a bad credit risk. It then resorts to deficit financing to cover up the budget deficit which consequences into speedy money growth and hyperinflation.

Fiscal problems get rigorous with the advent of hyperinflation. Real tax revenue falls due to delays in tax collection and consequently inflation rises. Thus, the government's reliance on seignior age is self-reinforcing. Fast money creation causes hyperinflation, which results into higher budget deficits, and consequently more speedily money is created.

The government assembles the political will for the reduction in the spending of the government and tax increase when the scale of the trouble becomes evident. These suggested fiscal reforms spot to the reduction in the requirement for seignior age, which in turn permits the reduction in money growth. It can be, therefore, said that if inflation is forever a monetary phenomenon then the conclusion of hyperinflation is time and again a fiscal phenomenon.

### **The costs of hyperinflation**

It is a unanimously accepted fact that hyperinflation takes a high toll on the society. The costs of extreme inflation are similar to that of hyperinflation. It's just that due to the severity of the costs of hyperinflation, they are more noticeable.

A great amount of time and energy is devoted by the business executives towards cash management. They are forced to divert this time and energy from more socially important activities such as production and investments decision when cash loses its value quickly i.e. the economy runs less efficiently during hyperinflation. In the nutshell, we can say that the shoe leather costs associated with reduced money holdings are very severe under hyperinflation.

Menu costs become significant at the times of hyperinflation, as firms are required to change the prices frequently. Regular business practices of printing and distribution of catalogs with fixed prices become unfeasible. For instance, once in 1920's in Germany, a

waiter in a restaurant had to call out new prices every half hour on every table at the time of hyperinflation.

In a similar fashion, at the times of hyperinflation, relative prices also don't reveal the exact shortage. It gets very complex for the customers also to shop for the best price as prices fluctuate significantly and recurrently. Consumer's behavior also gets distorted in a variety of ways due to extremely volatile and fast expanding prices.

Finally, one should learn to live with the hassle of life with hyperinflation. The existing monetary system is not executing its best to facilitate exchange as it is equally troublesome to carry money to the grocery store as it is to carrying the groceries back home. The ready solution accomplished by the government is to add more and more ZEROS to the paper currency but it has failed to keep pace with the out bursting price level.

In due course, the costs of hyperinflation become unendurable as the functions of money as a store of value, medium of exchange and unit of account get defeated. Barter replaces money as a common medium of exchange and more stable unofficial monies cigarettes replace the official money.

## **SUMMARY**

- Inflation in an economy could be due to five reasons: increase in money supply, excessive demand, rise in cost of production, structural rigidities and international flow of goods.
- There are three indicators of inflation in an economy: Wholesale Price Index (WPI), Consumer Price Index (CPI) and GDP Deflator.
- India has been experiencing inflation in recent years. In 2009, India witnessed double digit inflation.

- The costs of expected inflation include shoe leather costs, menu costs, cost of tax distortions, relative price variability and inconvenience of making inflation corrections. In addition, unexpected inflation causes arbitrary redistributions of wealth between debtor and creditor.
- Hyperinflations usually initiate when government resorts to deficit financing to cover up its budget deficits. The severity of most of the costs of inflation enhances during hyperinflation.

## GLOSSARY

- *Inflation*: Inflation is a persistent increase in the general level of prices.
- *Demand pull inflation*: When prices rise due to excessive demand in the economy then it is said that inflation is demand pull inflation.
- *Cost push inflation*: when price rise is observed due to supply shocks or rise in prices of inputs then inflation is said to be cost push inflation.
- *CPI*: Consumer Price Index represents the rate of increase in the consumer prices of a basket of goods and services.
- *WPI*: Whole sale price Index represents the rate of increase in the wholesale prices of products.
- *Core inflation*: Core inflation is a measure of inflation that excludes items that face volatile price movement, notably food and energy.
- *Fisher effect*: the one-to-one adjustment of the nominal interest rate to the inflation rate is known as Fisher effect.
- *Shoe leather cost*: The inconvenience of reducing money holding is metaphorically called the shoe leather cost of inflation, because walking to the bank more often causes one's shoes to wear out more quickly.
- *Hyperinflation*: Hyperinflation is very rapid growth in the rate of inflation in which money loses its value to a point where alternative mediums of exchange.

## **EXERCISES**

### **Short answer questions**

Q1. In a country experiencing a low rate of inflation it is quoted from a newspaper: “low inflation has a downside: 45 million recipients of social security and other benefits will see their checks go up by just 2.8 percent next year.”

- a. Why does inflation lead to increase in social security and other benefits?
- b. Is this effect cost of inflation? Why or why not?

Q2. State whether following statements are true or false. Why or why not?

- a. Inflation is a monetary phenomenon.
- b. Inflation leads to fall in purchasing power.
- c. Inflation hurts borrowers and helps lenders.

Q3. If inflation rises from 6 to 8 percent what happens to real and nominal interest rates according to the fisher effect?

### **Long answer questions**

Q1. What is inflation and what are its causes? How is it measured?

Q2. List all the costs of inflation and rank them according to how important you think they are.

Q3. How does inflation affect the ability of money to serve its functions- medium of exchange, unit of account and store of value?

## **Numericals**

Q1. If CPI in a country is 113 in year 2010-11 and its value changes to 133 in year 2011-12. What can we say about inflation rate in the economy? If over the same period WPI's value decreased from 109 to 101. How would you explain such changes in the economy?

Q2. In a country, the velocity of money is constant. Real GDP grows by 5 percent per year, the money stock grows by 14 percent per year and the nominal interest rate is 11 percent. What is the real interest rate?

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