Lesson 18-1 – Inflation Concepts and CPI

Meaning and Effect of Inflation

- Inflation is a rise in the general level of prices of goods and services in an economy over a period of time.
- Inflation is also an erosion in the purchasing power of money.
- ie. $100 now versus $100 in the future
  - Inflation makes future dollars less valuable than present dollars.
  - Purchasing power changes over time.

Inflation Rate Examples:

- A sandwich that cost $3.00 last year and $3.06 this year is an example of annual inflation of 2% for an individual item.
- If the average price of a loaf of bread moves from $3.49 last year to $3.63 this year, the commodity ‘bread’ has inflated by 4.0% per year.
- If a market basket of goods used by the average individual costs $153.24 this year versus $150.00 last year, general consumer prices have risen by 2.163% per year.

Average Inflation Rate Example

What is the average inflation rate over 2 years?

Base Price = $100 (year 0)

Inflation rate (year 1) = 4%

Inflation rate (year 2) = 8%

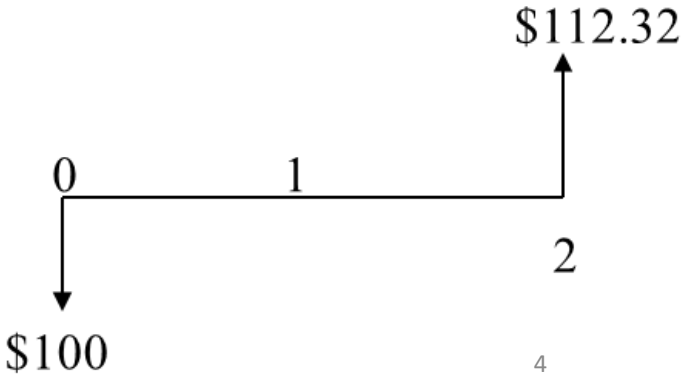
Step 1: Find the actual inflated price at the end of year 2.

$100 (1 + 0.04) (1 + 0.08) = $112.32

Step 2: Find the average inflation rate by solving the following equivalence equation.

$100 (1+ f)^2 = $112.32

f = 5.98%



Yearly & Average Inflation Rates Example

What are the annual inflation rates and the average inflation rate over 3 years?

Year	Cost
0	$504,000
1	$538,000
2	$577,000
3	$629,500

Solutions:

Inflation rate during year 1 (f_1):

($538,400 - $504,000) / $504,000 = 6.83%

Inflation rate during year 2 (f_2):

($577,000 - $538,400) / $538,400 = 7.17 %

Inflation rate during year 3 (f_3):

($629,500 - $577,000) / $577,000 = 9.10%

The average inflation rate over 3 years is

$f = (629,500/504,000)^{1/3} - 1 = 0.0769 = 7.69\%$

Inflation Example

A university scholarship established 25 years ago was $10,000. It was increased this year to $18,000. If the average inflation rate over those 25 years was 3% per year, has the increase been enough to offset inflation?

Solution:

Amount required to offset inflation

F = 10,000(*F*/*P*, 3%, 25)

= 10,000(2.0938)

= $20,938 which is > $18,000

Therefore, the increase is not enough to offset inflation.

Effect of Inflation

- Inflation reduces the purchasing power of money in the future, ie. inflation causes the price levels of goods and services to rise as time increases.
  - Industrialized countries endeavour to maintain annual inflation at a level between 1% and 3%.
- Disinflation is reduction in the rate of inflation.
- Deflation occurs when the rate of inflation becomes negative over a period of time. A decrease in the average price paid for goods in services over time which results in an increase in purchasing power.

Hyperinflation occurs when a country experiences very high and usually accelerating rates of inflation, rapidly eroding the real value of the local currency.

German banknotes being pulped for use as waste paper

Banknotes used to light the stove
Berlin: 9 August 1923

In Germany, from January 1922 to November 1923, the average price level increased by a factor of 20 billion, doubling every 28 hours.

http://www.investopedia.com/video/play/monetary-inflation/

Inflation in Engineering Economics

- Prices are likely to change over the life of an engineering project due to inflation or deflation
- Chapter 14 deals with how to take inflation into account when evaluating projects
- Forecasts of inflation are used to estimate how prices in a project will change over time (usually an increase).

Measure of Inflation

- The inflation (deflation) rate is the rate of increase (decrease) in average prices of goods and services over a specified period.
- A number of price indices are available to measure inflation, depending upon the type of goods or services we are dealing with.
- The most common price index is the Consumer Price Index (CPI)
- There is also the Producer Price Index (PPI)
- and Commodity specific indexes (ie. Construction labour, iron-ore indexes)

Price Change with Indexes

- Comparing 2010-based dollars with 2015-based dollars is like comparing apples and oranges.

  Why?

- Price indexes describe the relative price fluctuation of goods and services.

$$\%\ increase, n = \frac{Index\ (n) - Index(n-1)}{Index(n-1)} \times 100\%$$

Consumer Price Index (CPI)

- The CPI is a composite price index that measures price changes in food, shelter, medical care, transportation, apparel, and other selected goods and services used by average individuals and families.
- To compute the CPI, Statistics Canada periodically measures the cost to purchase a standard bundle (or ‘basket’) of goods and services based on prevailing prices.

Consumer Price Index Continued…

- The current cost of the bundle of goods and services is compared to the cost of the same bundle in a base year.
- The current base year is 2002, and the CPI of the base year (2002) is 100.
- The CPI at a particular point in time is:

  100 x (current $) / ($ in base year)

	Canada (map)				
Products and product groups[3]	**June 2017**	**May 2018**	**June 2018**	**May 2018 to June 2018**	**June 2017 to June 2018**
	2002=100			Percentage change	
All-items	130.4	133.4	133.6	0.1	2.5
Food [4]	143.6	144.6	145.6	0.7	1.4
Shelter [5]	137.8	140.4	140.5	0.1	2.0
Household operations, furnishings and equipment	122.7	122.8	122.6	-0.2	-0.1
Clothing and footwear	92.5	95.4	94.2	-1.3	1.8
Transportation	131.8	139.7	140.5	0.6	6.6
Health and personal care	124.4	125.9	126.3	0.3	1.5
Recreation, education and reading	114.9	116.5	115.6	-0.8	0.6
Alcoholic beverages and tobacco products	161.2	168.1	168.9	0.5	4.8

https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000413

Price Indexes Example

An item with a cost of $1200 in 1997 is estimated to cost $2100 in 2009. If the cost index in 1997 was 435, what is the cost index for 2009?

Solution:

$$\frac{CPI_2}{CPI_1} = \frac{Price_2}{Price_1}$$

$$Index_2 = 435\left(\frac{2100}{1200}\right)$$

$$Index = 761.25$$

Price Indexes Example

The food category index was 114.5 in 2008, and is currently 129.5. What would $100 worth of groceries today have cost back in 2008?

Solution:

$$\frac{CPI_2}{CPI_1} = \frac{Price_2}{Price_1}$$

$$Price1 = \$100\left(\frac{114.5}{129.5}\right)$$

$$Price1 = \$88.42$$

Why Does Inflation Occur?

- Inflation depends on four things:

1. Money supply
   - If there is too much money in the system in relation to goods and services, the value tends to decrease. If more money enters the country than leaves, the money supply increases.
2. Exchange rates
   - Prices change to reflect the comparative value of currencies in different countries

Why Does Inflation Occur?

3. Cost-push
   - Producers of goods and services push the cost of increasing operating costs to consumers.

4. Demand-pull
   - More demand (exceeding supply) tends to increase prices.