

# L8 APSC221 - Inflation

## Descriptions

**Inflation:** the increase in average price paid for goods and services; results in reduction of purchasing power

**Deflation:** decrease in average price paid for goods and services; results in increase of purchasing power

Inflation is measured as a rate of increase of price over a specified period, as a percentage.

$$\text{CPI} = 100 * (\text{current cost} / \text{base year cost})$$

While CPI is a snapshot of price levels, inflation is the rate of change in those prices. So, when CPI rises, it's a sign of inflation.

## Prices indices boil down to:

### Contract Escalation

Inflation forecasts are used to escalate contracts.

Ex: inflation estimates are used for a contract of 10,000 over 50 years, because in 50 years, 10,000 is worthless.

Ex: minimum wage is tied to CPI and inflation.

Each industry has industry-specific price indices that tie future price increases to those indices.

### Tracking Selling Prices

Companies can compare price changes for its products with those of the industry as a whole.

Used to compare price trends and get a sense of their own competitiveness.

## Economic Evaluation with Inflation

### Actual Dollars (or Current or Nominal)

The value of a dollar at the time of the CF.

These dollars' purchasing power changes due to inflation/deflation.

## Real Dollars (or Constant)

Value of dollars assuming a constant purchasing power.

## Converting between the two

$$R = \frac{A}{(1 + f)^N}$$

$R_{0,N}$ : Real dollars equivalent to A relative to year 0

$A_N$ : Actual dollars in year N

f: inflation rate per year

### Inflation affects MARR.

If inflation is expected, actual dollars returned does not reflect the actual purchasing power of the future CF.

Purchasing power depends on the **real** dollar of the CF.

## Real Interest Rate Calculation

Find  $i'$  based on  $i$  and  $f$ .

$$F = M(1 + i)$$

$$P = \frac{M(1 + i)}{1 + f}$$

$$M(1 + i') = M \frac{1 + i}{1 + f}$$

$$i' = \frac{1 + i}{1 + f} - 1$$

Find  $IRR'$  based on  $IRR$  and  $f$

$$\sum \frac{R_t}{(1 + i')^t} = 0$$

$$IRR_{real} = \frac{1 + IRR_{actual}}{1 + f} - 1$$

$$IRR_{actual} = IRR_{real} + f + IRR_{real} * f$$

or

$$MARR_{actual} = MARR_{real} + f + MARR_{real} * f$$

The actual MARR and actual IRR are related in the same way to the real MARR and real IRR.

Actual incorporates inflation, while real does not.

If inflation is accurately used, PW is:

1. PW of actual dollars at actual MARR; or
2. PW of real dollars at real MARR

Projected cash flows are often stated in real dollars.

The challenge is recognizing that we have an actual MARR but real cash flows.

## Evaluation Methods

1. Work with real CFs and find the real MARR using an estimated inflation
2. Adjust the real CFs for inflation and apply the actual MARR; or
3. Work with mixed cash flows, use both real and actual rates (MARR or IRR) using equation;  
**requires a clear delineation in your mind of real vs actual CFs**