

Measuring the Cost of Living ....

# In this chapter, look for the answers to these questions:

- What is the Consumer Price Index (CPI) and how is it constructed?
- Why the CPI is an imperfect measure of the cost of living?
- How to use a price index to compare dollar figures from different times?
- What is the distinction between real and nominal interest rates and how can we correct interest rates for inflation?

# **Cost of Living**

- The amount of money needed to sustain a certain standard of **living** by affording basic **expenses** such as housing, food, and healthcare.
- The **cost of living** is often used to compare how expensive it is to **live** in one city versus another.

# The Consumer Price Index (CPI)

Consumer Price Index is a measure of change in retail prices of goods and services consumed by defined population group in a given area with reference to a base year. This basket of goods and services represents the level of living or the utility derived by the consumers at given levels of their income, prices and tastes. The consumer price index measures changes only in one of the factor, i.e., price.

Consumer price index is used as a measure of inflation in around 157 countries.

The cost of living allowances (COLA) and dearness allowance (DA) of Government employees and wage contracts between labour and employer is based on this index.

# The Consumer Price Index (CPI)

- The origin of Consumer Price Index can be traced to the period after first world war when there was a sharp rise in prices and cost of living. The erosion in the real wages of the workers led to a demand by the workers for compensation. This led to the conduct of socioeconomic surveys among the working classes as a preliminary to the measurement of cost of living.
- Consumer price index numbers were known as " <u>Cost of Living Index Numbers</u>" prior to July 1955. The Sixth International Conference of Labour Statisticians recommended the change in nomenclature from <u>Cost of Living Index to Consumer Price index</u>.

# The Consumer Price Index (CPI).....

- Measures the typical consumer's cost of living
- Measure the changes over time in general level of retail prices of selected goods and services that households purchase for the purpose of consumption.
- Basis of cost of living adjustments in many contracts and in Social Security, like through COST OF LIVING ALLOWANCE (COLA) in USA and DEARNESS ALLOWANCE (DA) in India, Pakistan, and Bangladesh
- Dearness Allowance is cost of living adjustment allowance which the government pays to the employees of the public sector as well as pensioners of the same

# How the CPI is Calculated

# FIVE STEPS

#### 1. Fix the "Basket"

The Bureau of Labour statistics (BLS) in USA surveys typical consumers to determine what's in the consumer's "shopping Basket"

#### 2. Find the Prices

The BLS collects data on the prices of the goods in the basket.

# 3. Compute the Cost of the Basket

Compute the total cost of the basket for year 't'( $C_t$ )  $C_t = \sum (P_{it}Q_{ib})$ , where 'i' varies from '1' to 'N'  $P_{it}$  refers to price of commodity 'i' in year 't' and  $Q_{ib}$  refers to base year quantity of commodity 'i'.

# How the CPI Is Calculated

4. Choose a base year and compute the Index. The CPI in any year equals

5. Compute the inflation rate.

The percentage change in the CPI from the preceding period.

Basket: {4 pizzas, 10 lattes}

| Year | Price of pizza | Price of latte | Cost of basket                        |
|------|----------------|----------------|---------------------------------------|
| 2007 | \$10           | \$2.00         | $$10 \times 4 + $2 \times 10 = $60$   |
| 2008 | \$11           | \$2.50         | $$11 \times 4 + $2.5 \times 10 = $69$ |
| 2009 | \$12           | \$3.00         | $$12 \times 4 + $3 \times 10 = $78$   |

#### Compute CPI in each year using 2007 base year: Inflation rate:

2007: 
$$100 \times (\$60/\$60) = 100$$
  
2008:  $100 \times (\$69/\$60) = 115$   
 $15\% = \frac{115 - 100}{100} \times 100\%$   
2009:  $100 \times (\$78/\$60) = 130$   
 $13\% = \frac{130 - 115}{115} \times 100\%$ 

2009: 
$$100 \times (\$78/\$60) = 130$$
  $= \frac{13\%}{115} \times 100\%$ 

# Calculate the CPI

**CPI** basket:

{10 lbs beef,20 lbs chicken}

The CPI basket cost \$120 in 2004, the base year.

|      | price<br>of beef | price of<br>chicken |
|------|------------------|---------------------|
| 2004 | \$4              | \$4                 |
| 2005 | \$5              | \$5                 |
| 2006 | \$9              | \$6                 |

- A. Compute the CPI in 2005.
- **B.** What was the CPI inflation rate from 2005-2006?

# **Answers**

**CPI** basket:

{10 lbs beef, 20 lbs chicken}

The CPI basket cost \$120 in 2004, the base year.

|      | price<br>of beef | price of<br>chicken |
|------|------------------|---------------------|
| 2004 | \$4              | \$4                 |
| 2005 | \$5              | \$5                 |
| 2006 | \$9              | \$6                 |

# A. Compute the CPI in 2005:

Cost of CPI basket in 2005

$$= (\$5 \times 10) + (\$5 \times 20) = \$150$$

CPI in  $2005 = 100 \times (\$150/\$120) = 125$ 

# **Answers**

CPI basket:

{10 lbs beef, 20 lbs chicken}

The CPI basket cost \$120 in 2004, the base year.

|      | price<br>of beef | price of<br>chicken |
|------|------------------|---------------------|
| 2004 | \$4              | \$4                 |
| 2005 | \$5              | \$5                 |
| 2006 | \$9              | \$6                 |

B. What was the inflation rate from 2005-2006?

Cost of basket in 2006

$$= (\$9 \times 10) + (\$6 \times 20) = \$210$$

CPI in 
$$2006 = 100 \times (\$210/\$120) = 175$$

CPI inflation rate =  $\{(175 - 125)/125\}*100 = 40\%$ 

# ACTIVE LEARNING 2 Consumer Price Index (CPI)

A typical family on Sandy Island consumes only juice and cloth. Last year, which was the base year, the family spent \$40 on juice and \$25 on cloth. In the base year, juice was \$4 a bottle and cloth was \$5 a length. This year, juice is \$4 a bottle and cloth is \$6 a length. Calculate

- a. The CPI basket.
- b. The CPI in the current year.
- c. The inflation rate in the current year.

# **Answers:**

#### a. The CPI basket.

In the base year, the family spent \$40 on juice and juice was \$4 a bottle. So, the family consumed 40/4=10 bottles of juice.

Similarly, the family spent \$25 on cloth and cloth was \$5 a length. So the family consumed 25/5 = 5 lengths of cloth.

Therefor, the CPI basket is 10 bottles of juice and 5 lengths of cloth.

# **Answers:**

# b. The CPI in the current year.

Cost of consumer basket (base year) = 
$$(10 \text{ X } \$4) + (5 \text{ X } \$5) = \$40 + \$25 = \$65$$
  
Cost of consumer basket (current year) =  $(10 \text{ X } \$4) + (5 \text{ X } \$6) = \$40 + \$30 = \$70$ 

CPI in the current year = (70 / 65) X 100 = 107.69

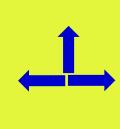
# b. Inflation rate in the current year

= ((107.69 - 100) / 100) X (100) = 7.69% since CPI of base year is 100

### **COMMODITY GROUP (in INDIA) for CPI computation**

| Cereal and<br>Cereal<br>Products   | Pulses and<br>Pulse<br>Products | Oils and Fats                  | Meat - Fish etc                   | Milk and Milk<br>Products | Spices and Condiments                 |
|------------------------------------|---------------------------------|--------------------------------|-----------------------------------|---------------------------|---------------------------------------|
| Vegetables                         | Fruits                          | Sugar - Honey<br>etc           | Non Alcoholic<br>Beverages        | Prepared<br>Meals         | Pan - Supari<br>etc                   |
| Food -<br>beverages and<br>tobacco | Fuel and<br>Lighting            | Housing                        | Clothing and<br>Bedding           | Footwear                  | Clothing -<br>bedding and<br>footwear |
| Medical Care Education             |                                 | Recreation<br>and<br>Amusement | Transport<br>and<br>Communication | Personal<br>Care Items    | Household<br>Requisites               |
| General index                      |                                 | •                              | •CPI is calcu                     | lated for inc             | lividual                              |

(Fix basket by considering representatives from all category of consumer goods



CPI is calculated for individual commodity group and together also
CPI is calculated for Urban, Rural and Urban + Rural region

|      | INDIA                |  |      |                      |  |      |                      |
|------|----------------------|--|------|----------------------|--|------|----------------------|
| YEAR | CPI (BASE YEAR 2010) |  | YEAR | CPI (BASE YEAR 2010) |  | YEAR | CPI (BASE YEAR 2010) |
| 1960 | 2.53                 |  | 1981 | 11.01                |  | 2001 | 56.39                |
| 1961 | 2.57                 |  | 1982 | 11.88                |  | 2002 | 58.82                |
| 1962 | 2.66                 |  | 1983 | 13.29                |  | 2003 | 61.05                |
| 1963 | 2.74                 |  | 1984 | 14.40                |  | 2004 | 63.35                |
| 1964 | 3.11                 |  | 1985 | 15.20                |  | 2005 | 66.04                |
| 1965 | 3.40                 |  | 1986 | 16.53                |  | 2006 | 69.87                |
| 1966 | 3.77                 |  | 1987 | 17.98                |  | 2007 | 74.32                |
| 1967 | 4.26                 |  | 1988 | 19.67                |  | 2008 | 80.53                |
| 1968 | 4.40                 |  | 1989 | 21.06                |  | 2009 | 89.29                |
| 1969 | 4.38                 |  | 1990 | 22.95                |  | 2010 | 100.00               |
| 1970 | 4.60                 |  | 1991 | 26.13                |  | 2011 | 108.91               |
| 1971 | 4.74                 |  | 1992 | 29.21                |  | 2012 | 119.24               |
| 1972 | 5.05                 |  | 1993 | 31.06                |  | 2013 | 131.18               |
| 1973 | 5.90                 |  | 1994 | 34.24                |  | 2014 | 139.92               |
| 1974 | 7.59                 |  | 1995 | 37.75                |  | 2015 | 146.79               |
| 1975 | 8.02                 |  | 1996 | 41.13                |  | 2016 | 154.05               |
| 1976 | 7.41                 |  | 1997 | 44.08                |  | 2017 | 159.18               |
| 1977 | 8.03                 |  | 1998 | 49.91                |  | 2018 | 165.45               |
| 1978 | 8.23                 |  | 1999 | 52.24                |  | 2019 | 171.62               |
| 1979 | 8.75                 |  | 2000 | 54.34                |  | 2020 | 182.99               |
| 1980 | 9.74                 |  | 2000 | J <del>4</del> .34   |  | 2021 | 192.38               |

Source: <a href="https://data.worldbank.org/indicator/FP.CPI.TOTL?locations=IN">https://data.worldbank.org/indicator/FP.CPI.TOTL?locations=IN</a>

Which is likely to have the larger effect on the CPI, a 2 percent increase in the price of food or a 3 percent increase in the price of diamond rings? Explain.

#### **ANSWER:**

The 2 percent increase in the price of food will increase the CPI by more because the portion of the market basket consisting of food is much larger than the portion consisting of diamond rings.

#### **Substitution Bias**

- Over time, some prices rise faster than others.
   say, apples become cheaper to pears
- Consumers substitute toward goods that become relatively cheaper
  - So, consumers purchase more of apples
- The CPI misses this substitution because it uses a fixed basket of goods.
  - So, CPI will take expensive pears of same quantity as before.
- Thus, the CPI overstates increases in the cost of living.

#### **Substitution Bias**

|            | bas    | Lot. |
|------------|--------|------|
| <b>O</b> I | ı vası | NGI. |

{10 kg chicken, 20 kg fish}

The CPI basket cost (10X100)+(20X80)=2600 in 2005, the base year.

| } | Year | price of<br>chicken (Rs) | price of<br>fish (Rs) |
|---|------|--------------------------|-----------------------|
|   | 2005 | 100                      | 80                    |
|   | 2010 | 150                      | 100                   |

In 2010, price of chicken increases (50%) more than price of fish (25%). Since fish is relatively cheaper, the consumption basket now consists of 5 kg chicken and 25 kg fish.

CPI (old commodity basket) =(10X150)+(20X100)= 3500

CPI (new commodity basket) =(5X150)+(25X100)= 3250 CPI measures a larger increase in cost of living (3500) than consumers actually experience (3250)

#### **Introduction of New Goods**

- The introduction of new goods increases variety.
- Consumers have a wider variety of goods and services to choose.
- Example: TV adding to visiting movie as the choice of entertainment.
- This makes every dollar more valuable, which lowers the cost of maintaining the same level of economic wellbeing.
- The CPI misses this effect because the market basket is not revised often enough and these new goods are left out of the bundle of goods and services included in the basket.
- Thus, the CPI overstates increases in the cost of living?

#### **Unmeasured Quality Change**

- Improvements in the quality of goods in the basket increase the value of each dollar.
- Example:
  - LED lighting in place of CFL lighting
  - Introduction of fuel efficient vehicles.
- The Bureau of Labor Statistics (BLS) tries to account for quality changes but probably misses some, as quality is hard to measure.
- Thus, the CPI overstates increases in the cost of living.

#### **Unmeasured Quality Change**



An incandescent light bulb produces light by heating a filament wire to a high temperature until it glows. A CFL contains a mixture of argon and mercury gases that produces invisible ultraviolet light (UV) when the gas is excited by electricity.

An LED contains
electrons that recombine
with electron holes,
releasing energy in the
form of photons and
illuminating the bulb.

- Each of these problems causes the CPI to overstate cost of living
- The Bureau of Labor Statistics (BLS) has made technical adjustments, but the CPI probably still overstates inflation by about <u>01%</u> per year.
- Technical adjustments in CPI are important because Social Security payments and many contracts have COLAs tied to the CPI.

# **Substitution bias**

#### **CPI** basket:

{10# beef, 20# chicken}

2004-05:

Households bought CPI basket.

| Year | Beef | Chicken | Cost of basket |
|------|------|---------|----------------|
| 2004 | \$4  | \$4     | \$120          |
| 2005 | \$5  | \$5     | \$150          |
| 2006 | \$9  | \$6     | \$210          |

2006: Households bought {5 lbs beef, 25 lbs chicken}.

- A. Compute cost of the 2006 household basket.
- B. Compute percentage increase in cost of household basket over 2005-06, compare to CPI inflation rate.

# **Answers**

#### **CPI** basket:

{10# beef, 20# chicken}

Household basket in 2006: {5# beef, 25# chicken}

| Year | Beef | Chicken | Cost of basket |
|------|------|---------|----------------|
| 2004 | \$4  | \$4     | \$120          |
| 2005 | \$5  | \$5     | \$150          |
| 2006 | \$9  | \$6     | \$210          |

A. Compute cost of the 2006 household basket.

$$(\$9 \times 5) + (\$6 \times 25) = \$195$$

# **Answers**

#### **CPI** basket:

{10# beef, 20# chicken}

Household basket in 2006: {5# beef, 25# chicken}

| Year | Beef | Chicken | Cost of basket |
|------|------|---------|----------------|
| 2004 | \$4  | \$4     | \$120          |
| 2005 | \$5  | \$5     | \$150          |
| 2006 | \$9  | \$6     | \$210          |

B. Compute % increase in cost of household basket over 2005-06, compare to CPI inflation rate.

Rate of increase: (\$195 - \$150)/\$150 = 30%

CPI inflation rate from previous problem = 40%

# Correcting Economic Variables Affected for Inflation

- Inflation makes it harder to compare dollar amounts from different times.
- Example: the minimum wage
  - **\$1.15 in Dec 1964**
  - **\$5.85** in Dec 2007
- Did min wage have more purchasing power in Dec 1964 or Dec 2007?
- To compare, use CPI to convert 1964 figure into "today's dollars"...

- In our example,
  - year *T* = Dec1964, "today" = Dec 2007
  - Min wage = \$1.15 in year *T*
  - CPI = 31.3 in year *T*, CPI = 211.7 today

The minimum wage in 1964 was \$7.78 in today's (2007) dollars.

$$$7.78 = $1.15 \times \frac{211.7}{31.3}$$

- Researchers, business analysts and policymakers often use this technique to convert a time series of current-dollar (nominal) figures into constant-dollar (real) figures.
- They can then see how a variable has changed over time after correcting for inflation.
- Example: the minimum wage, from Jan 1950 to Dec 2007...

# ACTIVE LEARNING 6 Converting to "today's dollars"

Annual tuition and fees, average of all public fouryear colleges & universities in the U.S.

- 1986-87: \$1,414 (1986 CPI = 109.6)
- 2006-07: \$5,834 (2006 CPI = 203.8)

After adjusting for inflation, did students pay more for college in 1986 or in 2006?

(Hint: Convert the 1986 figure to 2006 dollars and compare)

# **Answers**

Annual tuition and fees, average of all public fouryear colleges & universities in the U.S.

- 1986-87: \$1,414 (1986 CPI = 109.6)
- 2006-07: \$5,834 (2006 CPI = 203.8)

# Solution

Convert 1986 figure into "today's dollars"

$$$1,414 \times (203.8/109.6) = $2,629$$

After correcting for inflation it is observed that students pay more tuition and fees in 2006 since \$5,834 > \$2,629

# Indexation

A dollar amount is indexed for inflation if it is automatically corrected for inflation, by law or in a contract.

For example, the increase in the CPI automatically determines

- the COLA in USA and DA in India in many multiyear labor contracts
- the adjustments in Social Security payments and federal income tax brackets

# **Indexation**

Consternation Corporation has an agreement with its workers to index completely the wage of its employees using the CPI. Consternation Corporation currently pays its production line workers Rs75 an hour and is scheduled to index their wages today. If the CPI is currently 130 and was 125 a year ago, how much the firm should increase the hourly wages of its workers?

# Answer

Current CPI is 130 against 125, a year ago.

So the value of Rs. 75 paid a year ago is  $(130/125) \times 75 = Rs. 78$ 

Therefore, the firm should increase wage by 78 - 75 = Rs.3 per hour

## Correcting Economic Variables affected for Inflation:

### **Real vs. Nominal Interest Rates**

#### The nominal interest rate:

- is quite simply the stated interest rate of a given bond or loan.
- is the rate that is agreed and paid

#### The real interest rate:

- reflects the true return on savings as well as the true cost of investment.
- measures the percentage increase in purchasing power the lender receives when the borrower repays the loan with interest

Real interest rate = (Nominal interest rate) – (Inflation rate)

### Correcting Economic Variables affected for Inflation:

### **Real vs. Nominal Interest Rates**

#### The nominal interest rate:

- not corrected for inflation
- the rate of growth in the dollar value of a deposit or debt

#### The real interest rate:

- corrected for inflation
- the rate of growth in the purchasing power of a deposit or debt

Real interest rates can not only be positive or negative, but can also be higher or lower than nominal rates.

#### **Analyse:-**

- 1. What happens during inflation period &
- 2. What happens during deflation (negative inflation period) ???

## Correcting Economic Variables affected for Inflation:

### **Real vs. Nominal Interest Rates**

### Example:

- Deposit \$1,000 for one year.
- Nominal interest rate is 9%.
- During that year, inflation is 3.5%.
- Real interest rate
  - = Nominal interest rate Inflation
  - = 9.0% 3.5% = 5.5%
- The purchasing power of the \$1000 deposit has grown 5.5%.

## Interpretation....

# (Nominal interest rate, inflation rate & purchasing power of people)

- The higher the rate of inflation, the smaller the increasing in purchasing power.
- Rate of inflation > Nominal interest
  - => Real interest < 0 => purchasing power falls.
- Rate of inflation < Nominal interest</p>
  - => Real interest > 0 => purchasing power increases
- Rate of inflation = Nominal interest
  - => Real Interest = 0 => No change in purchasing power
- If inflation rate = 0 => Real interest = Nominal interest
  - => Purchasing power increases by rate of nominal interest.

(Real interest rate = Nominal interest rate – inflation rate)

### ACTIVE LEARNING 8

## Nominal vs. Real Interest

Rajesh deposits Rs.10000 in SBI account and a year after the deposit yields Rs. 10,500. If inflation was 5 percent during the year the money was deposited, what happens to Rajesh's purchasing power.

### **ANSWER**

A year after Rs. 10000 yields Rs. 10,500

The nominal rate of interest is

 $((10500 - 10000)/10000) \times 100 = 5\%$ 

Rate if inflation was 5% during the year.

Hence the real interest is 5 - 5 = 0

This indicates that real purchasing power remains constant.

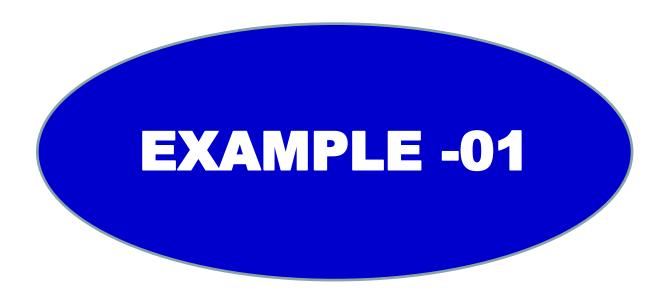
- The producer price index, which measures the cost of a basket of goods and services bought by firms rather than consumers.
- The PPI measures prices paid by producers, and is reported for three different levels of production:
  - Finished goods
  - ✓ Intermediate goods
  - Crude goods
- This index measures the degree of inflation in the eyes of producers.

- The PPI compares the average costs of a standard set of products, often called a basket of goods, over time at the wholesale level.
- Wholesale, meaning, the cost before a product gets to the consumer, i.e., price charged by the wholesaler and not the retailer.
- As a matter of fact, the PPI used to be known as the Wholesale Price Index (WPI).

- Wholesale Price Index (WPI) is one of the oldest data published by the BLS and has been compiled since 1902.
- The name was changed from the WPI to the PPI with the intention to re-emphasize the fact that the PPI was based on price received by producers of goods and services from whoever made the purchase

(Bureau of Labor Statistics, 2014).

- An increase in PPI indicates an increase in CPI.
- An increase in prices of raw materials being supply to producers to create their final product greatly affects their wholesale pricing to retailers.
- As a result retailers charge extra per unit of a good from consumers and CPI increases.
- It is considered to be leading indicators of future consumer prices (<u>early inflationary</u> warning)



# Movieville (A hypothetical Economy)

Suppose we live in Movieville and our hypothetical market basket is made up of movie related goods and services.

|               | 2006 Statistics |        | 2007 Statistics |         | 2008 Statistics |         |
|---------------|-----------------|--------|-----------------|---------|-----------------|---------|
| Product       | Quantity        | Price  | Quantity        | Price   | Quantity        | Price   |
| Movie Tickets | 12              | \$8.00 | 12              | \$10.00 | 8               | \$12.00 |
| Popcorn       | 6               | \$4.00 | 4               | \$5.00  | 2               | \$5.50  |
| Soda          | 10              | \$2.50 | 8               | \$3.00  | 7               | \$3.50  |

# Caclulating Our "CPI"

- We first need to determine the base year.
- Suppose we choose the base-year to be 2006
- The quantities purchased in 2007 and 2008 are irrelevant, because we are assuming the household buys the same market basket of goods each month.
- So the consumption basket is 12 movie tickets, 6 popcorns and 10 soda.

# Calculate Expenditures on Base-Year Quantities (2006)

For the CPI we use "Current Prices" and "Constant Quantities", i.e., quantity of 2016.

P<sub>2006</sub> x Q<sub>2006</sub> =
(12 x \$8.00) Movie Tickets
(6 x \$4.00) Popcorn
(10 x \$2.50) Soda

= \$145.00

### Calculate the Cost of the Market Basket in 2007

For the CPI we use "Current Prices" and "Constant Quantities", i.e., quantity of 2016.

 $P_{2007} \times Q_{2006} =$ 

(12 x \$10.00) Movie Tickets

(6 x \$5.00) Popcorn

(10 x \$3.00) Soda

= \$180.00

#### Calculate the Cost of the Market Basket in 2008

For the CPI we use "Current Prices" and "Constant Quantities", i.e., quantity of 2016.

```
P<sub>2008</sub> x Q<sub>2006</sub> = (12 x $12.00) Movie Tickets
```

(6 x \$5.50) Popcorn

(10 x \$3.50) Soda

= \$212.00

# To calculate the CPI we use the following formula:

$$CPI = \frac{Expenditures\_in\_the\_Current\_Year}{Expenditures\_in\_the\_Base\_Year} \times 100$$

$$CPI = \frac{Cost\_of\_Basket\_in\_Current\_Year}{Cost\_of\_Basket\_in\_Base\_Year} \times 100$$

## Calculate the CPI for 2006

CPI<sub>2006</sub> = (Cost of Basket<sub>2006</sub>/Cost of Basket<sub>2006</sub>) x 100

 $CPI_{2006} = (145/145) \times 100 = 100$ 

The value of the CPI is always equal to 100 in the baseyear.

## Calculate the CPI for 2007 and 2008

CPI<sub>2007</sub> = (Cost of Basket<sub>2007</sub>/Cost of Basket<sub>2006</sub>) x 100

 $CPI_{2007} = (180/145) \times 100 = 124.14$ 

CPI<sub>2008</sub> = (Cost of Basket<sub>2008</sub>/Cost of Basket<sub>2006</sub>) x 100

 $CPI_{2008} = (212/145) \times 100 = 146.21$ 

## Calculating the Inflation Rate from the CPI

Remember, the CPI is a measure of the average overall price-level, not the inflation rate.

To Calculate the inflation rate we use our growth rate formula.

$$Percent\_Change = \% \Delta = \frac{New\_Value - Old\_Value}{Old\_Value} \times 100$$

# Calculate the inflation rate from 2006 to 2007 and from 2007 to 2008

Inflation<sub>06-07</sub> =  $[(CPI_{2007} - CPI_{2006})/CPI_{2006}] \times 100$ 

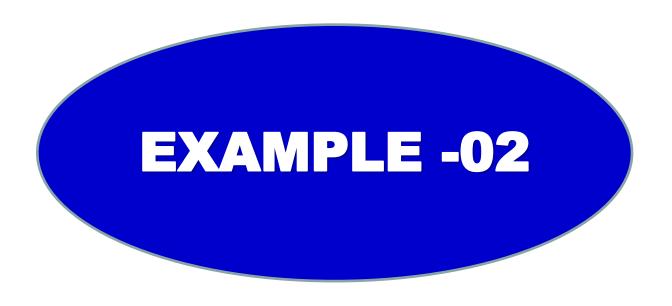
Inflation<sub>06-07</sub> =  $[(124.14 - 100)/100] \times 100$ 

Inflation<sub>06-07</sub> = 24.14%

Inflation<sub>07-08</sub> =  $[(CPI_{2008} - CPI_{2007})/CPI_{2007}] \times 100$ 

Inflation<sub>07-08</sub> =  $[(146.21 - 124.14)/124.14] \times 100$ 

Inflation<sub>07-08</sub> = 17.78%



# Correcting Economic Variables for the effect of Inflation (by using CPI)

Example: Babe Ruth was paid \$80,000 in 1930. How much would that be worth in 2009 dollars? The CPI in 1930 was approximately 16.5 and the CPI in 2009 is 215.8.

#### **ANSWER**

Value in 2009 Dollars

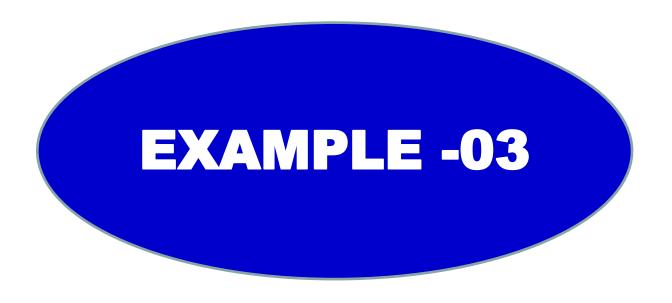
= Value in 1930 Dollars x (CPI2009/CPI1930)

Value in 2009 Dollars =  $$80,000 \times (215.8/16.5)$ 

= \$1,046,303.03

# Interpretation of Result...

This tells us that if you were paid \$1,046,303.03 today, you would be able to *purchase roughly the same amount of goods and services* Babe Ruth could have purchased in 1930 with a salary of \$80,000. This calculation adjusts a nominal variable, the Babe's salary for the effects of inflation.



## Nominal vs. Real Interest Rates Example #03(i):-

You lend out \$100. Inflation rate is 15%. A year later you get paid back \$120.

What is the nominal and real interest rate?

Nominal interest rate is 20%.

Real interest rate was 5%

## Nominal vs. Real Interest Rates Example #03(ii):-

You lend out \$100.

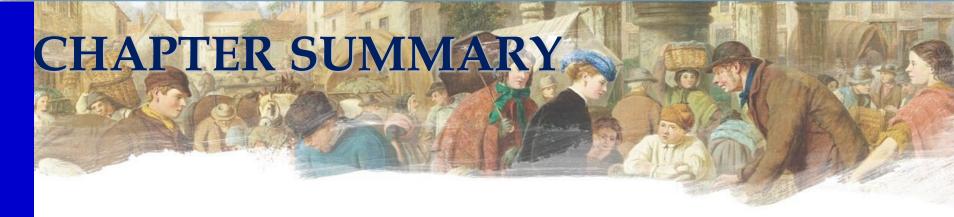
Prices are expected to increased 20%.

In a year you get paid back \$110.

What is the nominal and what is the real interest rate?

Nominal interest rate is 10%. Real rate was 10 - 20 = -10%

In reality, you get paid back an amount with less purchasing power.



- The Consumer Price Index is a measure of the cost of living. The CPI tracks the cost of the typical consumer's "basket" of goods & services.
- The CPI is used to make Cost of Living Adjustments and to correct economic variables for the effects of inflation.
- The real interest rate is corrected for inflation and is computed by subtracting the inflation rate from the nominal interest rate.

## <u>Practice Question (From Text Book – Ch: 24)</u> Measuring the Cost of Living

| <b>Question for Review</b> | Problems & Application |  |  |
|----------------------------|------------------------|--|--|
| 1                          | 2 a, b                 |  |  |
| 4                          | 3 a, b, c              |  |  |
| 5                          | 4 a, b                 |  |  |
|                            | 6 a, b, c, d           |  |  |
|                            | 7 a, b, e              |  |  |
|                            | 9 a, b                 |  |  |

## Interdependence and Gains from Trade

## **Practice Question (From Text Book – Ch: 03)**

| Question for Review |  | Problems & Application |               |  |
|---------------------|--|------------------------|---------------|--|
| 1                   |  | 1                      | A, B          |  |
| 2                   |  | 2                      | B, C, D, E, F |  |
| 3                   |  | 3                      | A, B, C       |  |
| 5                   |  | 4                      | A, B, C       |  |
| 6                   |  | 5                      | A, B          |  |
|                     |  | 7                      | A, B, C       |  |
|                     |  | 8                      | A, B, C       |  |
|                     |  | 11                     | A, B, C,      |  |