DMS 201 : INTRODUCTION TO MANAGEMENT

MODULE-II: FINANCIAL MANAGEMENT

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PART 1: BUSINESS ENVIRONMENT

LECTURE 5: MEASURING THE COST OF LIVING

In this class,
look for the answers to these questions:

- What is the Consumer Price Index (CPI)?
  How is it calculated? What's it used for?

- What are the problems with the CPI? How serious are they?

- How does the CPI differ from the GDP deflator?

- How can we use the CPI to compare Rs amounts from different years? Why would we want to do this, anyway?

- How can we correct interest rates for inflation?

The Consumer Price Index (CPI) and Inflation

- measures the typical consumer's cost of living.

- a measure of the overall cost of the goods and services bought by a typical consumer.

- The consumer price index (CPI) shows the cost of a basket of goods and services relative to the cost of the same basket in the base year. The base year is the benchmark against which other years are compared.

- The index is used to measure the overall level of prices in the economy.

- The percentage change in the consumer price index measures the inflation rate.

- Inflation does not mean that the prices of all goods in the economy are rising. Inflation means that prices on average are rising. In fact, the prices of many electronic goods (such as computers) have fallen over time.

How the CPI Is Calculated

1. ***Fix the "basket."***
   The National Statistical Office (NSO), Ministry of Statistics and Programme Implementation (MoSPI) surveys consumers to determine what's in the typical consumer's "shopping basket."

2. ***Find the prices.***
   It collects data on the prices of all the goods in the basket.

3. ***Compute the basket's cost.***
   Use the prices to compute the total cost of the basket.

How the CPI Is Calculated

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

$$100 \times \frac{\text{cost of basket in current year}}{\text{cost of basket in base year}}$$

5. ***Compute the inflation rate.***
   The percentage change in the CPI from the preceding period.

$$\text{Inflation rate} = \frac{\text{CPI this year } - \text{ CPI last year}}{\text{CPI last year}} \times 100\%$$

EXAMPLE

basket: {4 pizzas, 10 lattes}

year	price of pizza	price of latte	cost of basket
2010	$10	$2.00	$10 X 4 + $2 X 10 = $60
2011	$11	$2.50	$11 X 4 + $2.5 X 10 = $69
2012	$12	$3.00	$12 X 4 + $3 X 10 = $78

Compute CPI in each year

2010: 100 x ($60/$60) = 100

2011: 100 x ($69/$60) = 115

2012: 100 x ($78/$60) = 130

using 2010 base year:
Inflation rate:

$$15\% = \frac{115-100}{100} \times 100\%$$

$$13\% = \frac{130-115}{115} \times 100\%$$

Calculate the CPI

CPI basket:
  {10 Kgs wheat,
   20 Kgs rice}

The CPI basket cost $120 in 2010, the base year.

	price of wheat	price of rice
2010	$4	$4
2011	$5	$5
2012	$9	$6

A. Compute the CPI in 2011.

B. What was the CPI inflation rate from 2011–2012?

Answers

CPI basket:

{10 Kgs wheat,

20 Kgs rice}

The CPI basket cost $120

in 2010, the base year.

	price of wheat	price of rice
2010	$4	$4
2011	$5	$5
2012	$9	$6

A. Compute the CPI in 2011:

Cost of CPI basket in 2011

= ($5 x 10) + ($5 x 20) = $150

CPI in 2011 = 100 x ($150/$120) = 125

Answers

CPI basket:
  {10 Kgs wheat,
   20 Kgs rice}

The CPI basket cost $120
in 2010, the base year.

	price of wheat	price of rice
2010	$4	$4
2011	$5	$5
2012	$9	$6

B. What was the inflation rate from 2011–2012?
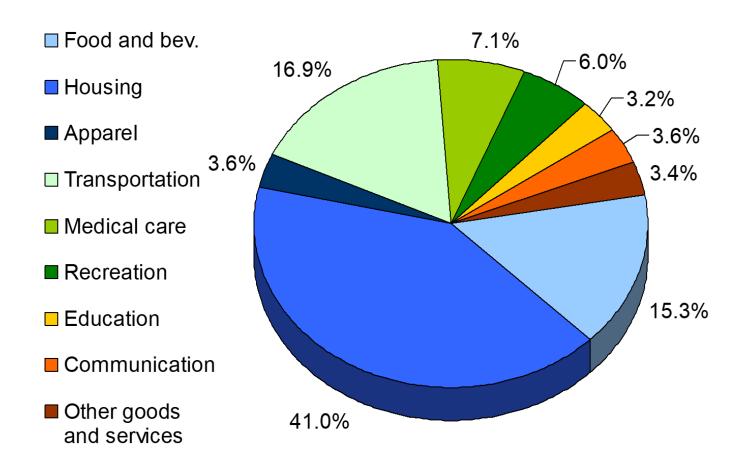
Cost of CPI basket in 2012
  = ($9 x 10) + ($6 x 20) = $210

CPI in 2012 = 100 x ($210/$120) = 175

CPI inflation rate = (175 – 125)/125 = 40%

What's in the CPI's Basket?

Figure shows the makeup of the market basket used to compute the CPI.

Substitution bias

CPI basket:
 {10# wheat,
  20# rice}

In 2010 and 2011, households bought CPI basket.

	wheat	*rice*	*cost of CPI basket*
2010	$4	$4	$120
2011	$5	$5	$150
2012	$9	$6	$210

In 2012, households bought {5 Kgs wheat, 25 Kgs rice}.

A. Compute cost of the 2012 household basket.

B. Compute % increase in cost of household basket over 2011–12, compare to CPI inflation rate.

Answers

CPI basket:
  {10# wheat,
  20# rice}

Household
basket in 2012:
  {5# wheat,
  25# rice}

	wheat	*rice*	*cost of CPI basket*
2010	$4	$4	$120
2011	$5	$5	$150
2012	$9	$6	$210

A. Compute cost of the 2012 household basket.

($9 x 5) + ($6 x 25) = $195

Answers

CPI basket:
  {10# wheat,
  20# rice}

Household basket in 2012:
  {5# wheat,
  25# rice}

	wheat	rice	cost of CPI basket
2010	$4	$4	$120
2011	$5	$5	$150
2012	$9	$6	$210

B. Compute % increase in cost of household basket over 2011–12, compare to CPI inflation rate.

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

CPI inflation rate from previous problem = 40%

Problems with the CPI:
Substitution Bias

- Over time, some prices rise faster than others.

- Consumers substitute toward goods that become relatively cheaper, mitigating the effects of price increases.

- The CPI misses this substitution because it uses a fixed basket of goods.

- Thus, the CPI overstates increases in the cost of living.

Problems with the CPI:
Introduction of New Goods

- The introduction of new goods increases variety, allows consumers to find products that more closely meet their needs.

- In effect, Rs become more valuable.

- The CPI misses this effect because it uses a fixed basket of goods.

- Thus, the CPI overstates increases in the cost of living.

Problems with the CPI:
Unmeasured Quality Change

- Improvements in the quality of goods in the basket increase the value of each rupee.

- The NSO 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.

Problems with the CPI

- Each of these problems causes the CPI to overstate cost of living increases.

- The NSO has made technical adjustments,
  but the CPI probably still overstates inflation
  by about 0.5-1 percent per year.

CPI vs. GDP deflator

In each scenario, determine the effects on the
CPI and the GDP deflator.

A. Starbucks raises the price of Frappuccinos.

B. A local manufacturer raises the price on industrial tractors it produces.

C. **Armani** raises the price of the jeans it sells in India.

Answers

A. Starbucks raises the price of Frappuccinos.

The CPI and GDP deflator both rise.

B. A local manufacturer raises the price on industrial tractors it produces.

The GDP deflator rises, the CPI does not.

C. **Armani** raises the price of the jeans it sells in India.

The CPI rises, the GDP deflator does not.

Contrasting the CPI and GDP Deflator

The GDP deflator reflects the prices of all goods produced domestically, while the CPI reflects the prices of all goods bought by consumers.

Imported consumer goods:
- included in CPI
- excluded from GDP deflator

Capital goods:
- excluded from CPI
- included in GDP deflator (if produced domestically)

The basket:
- CPI uses fixed basket
- GDP deflator uses basket of currently produced goods & services

This matters if different prices are changing by different amounts.

Correcting Variables for Inflation:
Comparing Rupee Figures from Different Times

- Inflation makes it harder to compare rupee amounts from different times.

- Example: Suppose the minimum wage
    - Rs 1.15 in Dec 1964
    - Rs 7.25 in Dec 2010

- Did min wage have more purchasing power in Dec 1964 or Dec 2010?

- To compare, use CPI to convert 1964 figure into "2010 Rs"…

Correcting Variables for Inflation:
Comparing Dollar Figures from Different Times

$$\begin{array}{ccc} \text{Amount} \\ \text{in today's} \\ \text{Rs} \end{array} = \begin{array}{c} \text{Amount} \\ \text{in year } T \\ \text{Rs} \end{array} \times \dfrac{\text{Price level today}}{\text{Price level in year } T}$$

- In our example,
  - "year *T*" is 12/1964, "today" is 12/2010
  - Min wage was Rs 1.15 in year *T*
  - CPI = 31.3 in year *T*, CPI = 220.3 today

The minimum wage in 1964 was Rs8.09 in 2010 Rs.

$$\text{Rs8.09} = \text{Rs1.15} \times \dfrac{220.3}{31.3}$$

Note: the ratio of price levels = 220.3/31.3 = 7.04. This means that the cost of living has increased by a factor of 7.04. The Rs1.15 minimum wage in December 1964 could have purchased $8.09 worth of goods and services if prices in 1964 equaled their December 2010 levels.

Correcting Variables for Inflation:
Comparing Dollar Figures from Different Times

- Researchers, business analysts, and policymakers often use this technique to convert a time series of current-Rs (nominal) figures into constant-Rs (real) figures.

- They can then see how a variable has changed over time after correcting for inflation.

- Example: the minimum wage…

Correcting Variables for Inflation:
Real vs. Nominal Interest Rates

Example: Sai Saver deposits Rs 1,000 into a bank account that pays an annual interest rate of 10%. A year later, he withdraws Rs 1,100.

What matters to Sai is the purchasing power of his money.

a. If there is zero inflation, his purchasing power has risen by 10%.

b. If there is 6% inflation, his purchasing power has risen by about 4%.

c. If there is 10% inflation, his purchasing power has remained the same.

d. If there is 12% inflation, his purchasing power has declined by about 2%.

e. If there is 2% deflation, his purchasing power has risen by about 12%.

Correcting Variables for Inflation:
Real vs. Nominal Interest Rates

The nominal interest rate:
- the interest rate <u>not</u> 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 rate
= (nominal interest rate) – (inflation rate)

Correcting Variables for Inflation:
Real vs. Nominal Interest Rates

Example:

- Deposit Rs1,000 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 Rs1000 deposit has grown 5.5%.

SUMMARY

- 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.