

## MODULE 14 & 15

### INFLATION

(ADAPTED FROM SOUTH-WESTERN PUBLISHING 2004)

IN OTHER WORDS... I DIDN'T WRITE THIS.

MR. HESS  
AP MACROECONOMICS

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## MEASURING THE COST OF LIVING

- **Inflation ( $\pi$ )**

- occurs when the economy's overall price level is rising.

- **Inflation Rate ( $\pi\%$ )**

- the percentage change in the price level from one time period to another.

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## THE CONSUMER PRICE INDEX

- The **consumer price index (CPI)** is a measure of the overall cost of the goods and services bought by a typical consumer.

- The Bureau of Labor Statistics reports the CPI each month.

- It is used to monitor changes in the cost of living over time.

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## THE CONSUMER PRICE INDEX

- When the CPI rises, the typical family has to spend more dollars to maintain the same standard of living.

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## HOW THE CONSUMER PRICE INDEX IS CALCULATED

- **Fix the Basket:** Determine what prices are most important to the typical consumer.
  - The Bureau of Labor Statistics (BLS) identifies a market basket of goods and services the typical consumer buys.
  - The BLS conducts monthly consumer surveys to set the weights for the prices of those goods and services.

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## HOW THE CONSUMER PRICE INDEX IS CALCULATED

- **Find the Prices:** Find the prices of each of the goods and services in the basket for each point in time.

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## HOW THE CONSUMER PRICE INDEX IS CALCULATED

- **Compute the Basket's Cost:** Use the data on prices to calculate the cost of the basket of goods and services at different times.

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## HOW THE CONSUMER PRICE INDEX IS CALCULATED

- **Choose a Base Year and Compute the Index:**
  - Designate one year as the base year, making it the benchmark against which other years are compared.
  - Compute the index by dividing the price of the basket in one year by the price in the base year and multiplying by 100.

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## HOW THE CONSUMER PRICE INDEX IS CALCULATED

- **Compute the inflation rate: ( $\pi\%$ )**

The inflation rate is the percentage change in the price index from the preceding period.

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## HOW THE CONSUMER PRICE INDEX IS CALCULATED

- **The Inflation Rate ( $\pi\%$ )**

– The **inflation rate** is calculated as follows:

$$\text{Inflation Rate in Year 2} = \frac{\text{CPI in Year 2} - \text{CPI in Year 1}}{\text{CPI in Year 1}} \times 100$$

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## CALCULATING THE CONSUMER PRICE INDEX AND THE INFLATION RATE: AN EXAMPLE

### Step 1: Survey Consumers to Determine a Fixed Basket of Goods

4 hot dogs, 2 hamburgers

### Step 2: Find the Price of Each Good in Each Year

Year	Price of Hot Dogs	Price of Hamburgers
2001	\$1	\$2
2002	2	3
2003	3	4

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## CALCULATING THE CONSUMER PRICE INDEX AND THE INFLATION RATE: AN EXAMPLE

### Step 3: Compute the Cost of the Basket of Goods in Each Year

2001	(\$1 per hot dog $\times$ 4 hot dogs) + (\$2 per hamburger $\times$ 2 hamburgers) = \$8
2002	(\$2 per hot dog $\times$ 4 hot dogs) + (\$3 per hamburger $\times$ 2 hamburgers) = \$14
2003	(\$3 per hot dog $\times$ 4 hot dogs) + (\$4 per hamburger $\times$ 2 hamburgers) = \$20

### Step 4: Choose One Year as a Base Year (2001) and Compute the Consumer Price Index in Each Year

2001	$(\$8/\$8) \times 100 = 100$
2002	$(\$14/\$8) \times 100 = 175$
2003	$(\$20/\$8) \times 100 = 250$

### Step 5: Use the Consumer Price Index to Compute the Inflation Rate from Previous Year

2002	$(175 - 100)/100 \times 100 = 75\%$
2003	$(250 - 175)/175 \times 100 = 43\%$

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## HOW THE CONSUMER PRICE INDEX IS CALCULATED

- Calculating the Consumer Price Index and the Inflation Rate: Another Example
  - Base Year is 2002.
  - Basket of goods in 2002 costs \$1,200.
  - The same basket in 2004 costs \$1,236.
  - $CPI = (\$1,236/\$1,200) \times 100 = 103$ .
  - Prices increased 3 percent between 2002 and 2004.

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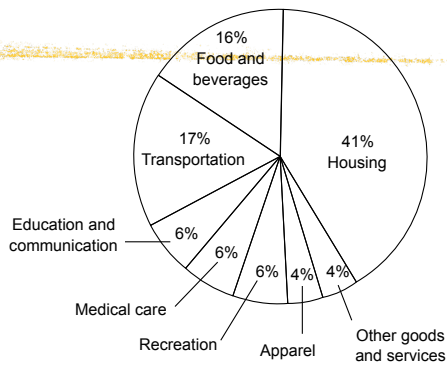
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## FYI: WHAT'S IN THE CPI'S BASKET?



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## PROBLEMS IN MEASURING THE COST OF LIVING

- The CPI is an accurate measure of the selected goods that make up the typical bundle, but it is not a perfect measure of the cost of living.

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## PROBLEMS IN MEASURING THE COST OF LIVING

- Substitution bias
- Introduction of new goods
- Unmeasured quality changes

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## PROBLEMS IN MEASURING THE COST OF LIVING

- Substitution Bias
  - The basket does not change to reflect consumer reaction to changes in relative prices.
    - Consumers substitute toward goods that have become relatively less expensive.
    - The index overstates the increase in cost of living by not considering consumer substitution.

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## PROBLEMS IN MEASURING THE COST OF LIVING

- Introduction of New Goods
  - The basket does not reflect the change in purchasing power brought on by the introduction of new products.
    - New products result in greater variety, which in turn makes each dollar more valuable.
    - Consumers need fewer dollars to maintain any given standard of living.

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## PROBLEMS IN MEASURING THE COST OF LIVING

- Unmeasured Quality Changes
  - If the quality of a good rises from one year to the next, the value of a dollar rises, even if the price of the good stays the same.
  - If the quality of a good falls from one year to the next, the value of a dollar falls, even if the price of the good stays the same.
  - The BLS tries to adjust the price for constant quality, but such differences are hard to measure.

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## PROBLEMS IN MEASURING THE COST OF LIVING

- The substitution bias, introduction of new goods, and unmeasured quality changes cause the CPI to overstate the true cost of living.
  - The issue is important because many government programs use the CPI to adjust for changes in the overall level of prices.
  - The CPI overstates inflation by about 1 percentage point per year.

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## THE GDP DEFLATOR VERSUS THE CONSUMER PRICE INDEX

- The GDP deflator is calculated as follows:

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

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## THE GDP DEFLATOR VERSUS THE CONSUMER PRICE INDEX

- The BLS calculates other prices indexes:
  - The index for different regions within the country.
  - The **producer price index**, which measures the cost of a basket of goods and services bought by firms rather than consumers.

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## THE GDP DEFLATOR VERSUS THE CONSUMER PRICE INDEX

- Economists and policymakers monitor both the GDP deflator and the consumer price index to gauge how quickly prices are rising.
- There are two important differences between the indexes that can cause them to diverge.

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## THE GDP DEFLATOR VERSUS THE CONSUMER PRICE INDEX

- The *GDP deflator* reflects the prices of all goods and services *produced domestically*, whereas...
- ...the *consumer price index* reflects the prices of all goods and services *bought by consumers*.

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## THE GDP DEFLATOR VERSUS THE CONSUMER PRICE INDEX

- The *consumer price index* compares the price of a *fixed basket* of goods and services to the price of the basket in the base year (only occasionally does the BLS change the basket)...
- ...whereas the *GDP deflator* compares the price of *currently produced* goods and services to the price of the same goods and services in the base year.

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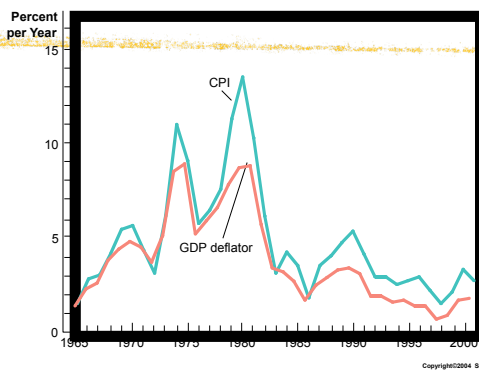
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## TWO MEASURES OF INFLATION



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## CORRECTING ECONOMIC VARIABLES FOR THE EFFECTS OF INFLATION

- Price indexes are used to correct for the effects of inflation when comparing dollar figures from different times.

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## DOLLAR FIGURES FROM DIFFERENT TIMES

- Do the following to convert (inflate) Babe Ruth's wages in 1931 to dollars in 2001:

$$\text{Salary}_{2001} = \text{Salary}_{1931} \times \frac{\text{Price level in 2001}}{\text{Price level in 1931}}$$

$$= \$80,000 \times \frac{177}{15.2}$$

$$= \$931,579$$

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## THE MOST POPULAR MOVIES OF ALL TIMES, INFLATION ADJUSTED

DOMESTIC GROSSES  
Adjusted for Ticket Price Inflation\*

Note: This chart only shows the top 200 movies, regardless of sorting.

Rank	Title (click to view)	Studio	Adjusted Gross	Unadjusted Gross	Year
1	Gone with the Wind	MGM	\$1,626,459,200	\$198,476,439	1939
2	Star Wars	Fox	\$1,433,862,700	\$460,998,007	1977
3	The Sound of Music	Fox	\$1,146,443,800	\$158,671,368	1965
4	E.T.: The Extra-Terrestrial	Un.	\$1,141,927,400	\$435,110,554	1982
5	Titanic	Par.	\$1,090,569,500	\$658,672,302	1997
6	The Ten Commandments	Par.	\$1,054,550,000	\$65,500,000	1956
7	Jaws	Un.	\$1,031,034,500	\$200,000,000	1975
8	Doctor Zhivago	MGM	\$999,280,400	\$111,371,910	1965
9	The Exorcist	WB	\$890,323,300	\$232,906,145	1973
10	Snow White and the Seven Dwarfs	Dis.	\$877,450,000	\$184,925,486	1937
11	101 Dalmatians	Dis.	\$804,333,500	\$144,880,014	1961
12	The Empire Strikes Back	Fox	\$790,354,150	\$295,475,007	1980
13	Star-Hier	MGM	\$788,900,000	\$74,000,000	1959
14	Avatar	Fox	\$782,904,900	\$760,507,635	2009
15	Return of the Jedi	Fox	\$757,178,300	\$209,306,177	1983

\*Numbers from Feb. 2013  
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## INDEXATION

- When some dollar amount is automatically corrected for inflation by law or contract, the amount is said to be **indexed** for inflation.

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## REAL (R%) AND NOMINAL INTEREST (I%) RATES

- Interest represents a payment in the future for a transfer of money in the past.

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## REAL (R%) AND NOMINAL INTEREST (I%) RATES

- The **nominal interest (i%)** rate is the interest rate usually reported and not corrected for inflation ( $\pi\%$ ).
  - It is the interest rate that a bank pays.
- The **real interest rate (r%)** is the nominal interest rate that is corrected for the effects of inflation ( $\pi\%$ ).

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## REAL (R%) AND NOMINAL INTEREST (I%) RATES

- You borrowed \$1,000 for one year.
- Nominal interest rate was 15%.
- During the year inflation was 10%.

Real interest rate = Nominal interest rate - Inflation

$$r\% = i\% - \pi\%$$

$$r\% = 15\% - 10\%$$

$$r\% = 5\%$$

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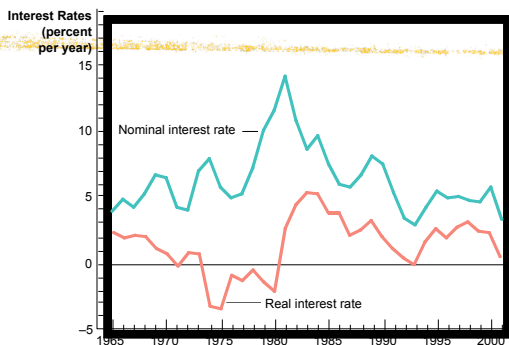
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## REAL AND NOMINAL INTEREST RATES



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## SUMMARY

- The consumer price index shows the cost of a basket of goods and services relative to the cost of the same basket in the base year.
- The index is used to measure the overall level of prices in the economy.
- The percentage change in the CPI measures the inflation rate.

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## SUMMARY

- The consumer price index is an imperfect measure of the cost of living for the following three reasons: substitution bias, the introduction of new goods, and unmeasured changes in quality.
- Because of measurement problems, the CPI overstates annual inflation by about 1 percentage point.

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## SUMMARY

- The GDP deflator differs from the CPI because it includes goods and services produced rather than goods and services consumed.
- In addition, the CPI uses a fixed basket of goods, while the GDP deflator automatically changes the group of goods and services over time as the composition of GDP changes.

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## SUMMARY

- Dollar figures from different points in time do not represent a valid comparison of purchasing power.
- Various laws and private contracts use price indexes to correct for the effects of inflation.
- The real interest rate equals the nominal interest rate minus the rate of inflation

$$r\% = i\% - \pi\%$$

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