Inflation

Inflation is an overall increase in the price level in an economy. *Deflation* is the opposite of inflation. Deflation is an overall decrease in the price level. A change in the price of just one or a few goods does not constitute inflation or deflation. After the price level increases, a dollar will buy less than it would before. When there is going to be inflation, people are better off buying now, before prices go up. After the price level falls, a dollar will buy more than it would before. When there is going to be deflation, people are better off waiting to buy later, when prices go down.

If people anticipate inflation, they will build that expectation into their decisions. For example, workers will demand higher wages to keep their purchasing power the same if prices are expected to rise. Then, when inflation leads to higher prices, workers are not hurt or helped because their higher wages allow them to purchase the same amount of goods and services. However, when inflation is *unanticipated*, people do not build it into their decisions, and some people are hurt while others are helped. For example, when there is unanticipated inflation, borrowers are helped while lenders are hurt. People who borrow money receive a loan before prices rise, when the money will buy more. However, they pay the money back later, after prices rise, when the money won't buy as much. With inflation, the borrower gains while the lender loses.

Student Alert: **Inflation is an increase in the price level in the economy. It does not necessarily mean that the price of every good is going up!**

Measuring Price Changes

A *price index* is used to measure price changes in the economy. Price indices combine the prices of a bundle of goods and services and track changes in the price of that bundle over time. The Consumer Price Index, or CPI, is the most familiar price index. It measures changes in the price of a bundle of goods and services commonly bought by consumers. The CPI is based on a market basket of more than 200 categories of goods and services weighted according to how much the average consumer spends on them. Two other price indices are the Producer Price Index (PPI) and the GDP deflator. The PPI measures the average change over time in the selling prices received by domestic producers for their output. The GDP price deflator is the most inclusive index because it takes into account the prices of all goods and services produced.

To construct any price index, economists select a year to serve as the base year (the year used for comparison). The prices of other periods are expressed as a percentage of the base period. The value of a price index in the base year is 100, because prices in the base year are 100 percent of prices in that year. Inflation will raise the price of the market basket, and the price index will rise. Deflation will decrease the price of the market basket, and the price index will fall.

For the CPI, the formula used to measure price change from the base period is

$$\text{CPI} = \frac{\text{cost of market basket in current-year prices}}{\text{cost of market basket in base-year prices}} \times 100.$$

Who Is Hurt and Who Is Helped by Unanticipated Inflation?

Identify whether each of the following examples leads to a person or group being hurt or helped by unanticipated inflation. Circle your response, and explain your answer.

H - the person or group is *hurt* by unanticipated inflation
G - the person or group *gains* from unanticipated inflation
U - it is *uncertain* if the person or group is affected by unanticipated inflation

1. Banks extend many fixed-rate loans.

H G U

Explain:

2. A farmer buys machinery with a fixed-rate loan to be repaid over a ten-year period.

H G U

Explain:

3. Your family buys a new home with an adjustable-rate mortgage.

H G U

Explain:

4. Your savings from your summer job are in a savings account paying a fixed rate of interest.

H G U

Explain:

5. A widow lives entirely on income from fixed-rate corporate bonds.

H G U

Explain:

6. A retired couple lives entirely on income from a fixed-rate pension the woman receives from her former employer.

   H G U

   Explain:

7. A retired man lines entirely on income from Social Security.

   H G U

   Explain:

8. A retired bank official lives entirely on income from stock dividends.

   H G U

   Explain:

9. The federal government has a $14 trillion debt.

   H G U

   Explain:

10. A firm signs a contract to provide maintenance services at a fixed rate for the next five years.

    H G U

    Explain:

11. A state government receives revenue mainly from an income tax.

    H G U

    Explain:

12. A local government receives revenue mainly from fixed-rate license fees charged to businesses.

    H G U

    Explain:

13. Your friend rents an apartment with a three-year lease.

    H G U

    Explain:

14. A bank has loaned millions of dollars for home mortgages at a fixed rate of interest.

    H G U

    Explain:

15. Parents are putting savings for their child's college education in a bank savings account.

    H G U

    Explain:

Price Indices and Real versus Nominal Values

Real versus Nominal Values

Prices in an economy do not stay the same. Over time the price level changes (i.e., there is inflation or deflation). A change in the price level changes the value of economic measures denominated in dollars. Values that increase or decrease with the price level are called *nominal* values. *Real* values are adjusted for price changes. That is, they are calculated as though prices did not change from the base year. For example, gross domestic product (GDP) is used to measure fluctuations in output. However, since GDP is the *dollar value* of goods and services produced in the economy, it increases when prices increase. This means that nominal GDP increases with inflation and decreases with deflation. But when GDP is used as a measure of short-run economic growth, we are interested in measuring increases or decreases in *output*, not prices. That is why real GDP is a better measure of economic performance—real GDP takes out the effects of price changes and allows us to isolate changes in output. Price indices are used to adjust for price changes. They are used to convert nominal values into real values.

Calculating Price Indices

The first step in converting nominal values to real values is to create a price index. A price index compares the total cost of a fixed market basket of goods in different years. The total cost of the market basket is found by multiplying the price of each item in the basket by the quantity of the item in the basket and then summing the results for all items. The cost of the market basket in the current year is then divided by the cost of the basic market basket in the base year as shown below:

$$\text{Price index} = \frac{\text{current-year cost}}{\text{base-year cost}} \times 100.$$

Multiplying by 100 allows comparison of the index in each year to the base-year index value of 100. The base year always has an index number of 100 since the current-year cost and the base-year cost of the market basket are the same in the base year.

The Consumer Price Index (CPI) is a commonly used price index that measures the price of a market basket of consumer goods. The following example shows how the CPI can be used to measure inflation.

Assume an average consumer buys only three items, as shown in Table 2-4.1.

Table 2-4.1
Prices of Three Goods Compared with Base-Year Price

	Quantity bought in base year	Unit price in base year	Spending in base year	Unit price in Year 1	Spending in Year 1	Unit price in Year 2	Spending in Year 2
Whole pizza	30	$5.00		$7.00		$9.00	
Flash drive	40	$6.00		$5.00		$4.00	
Six-pack of soda	60	$1.50		$2.00		$2.50	
Total	–	–		–		–	

Fill in the blanks in Table 2-4.1.

1. How much would $100 of goods and services purchased in the base year cost in Year 1?

2. What was the percentage increase in prices in this case? Show your calculations.

   The rate of change in this index is determined by looking at the percentage change from one year to the next. If, for example, the CPI were 150 in one year and 165 the next, then the year-to-year percentage change is 10 percent. You can compute the change using this formula:

$$\text{Price change} = \frac{\text{change in CPI}}{\text{beginning CPI}} \times 100.$$

3. What is the percentage increase in prices from the base year to Year 2? _______

Table 2-4.2
Constructing a Price Index

		Year 1		Year 2		Year 3	
Basic market basket item	No. of units	Price per unit	Cost of market basket	Price per unit	Cost of market basket	Price per unit	Cost of market basket
Cheese	2 lbs.	$1.75	$3.50	$1.50	$3.00	$1.50	$3.00
Blue jeans	2 pair	$12.00	$24.00	$15.50		$20.00	$40.00
Gasoline	10 gals.	$1.25	$12.50	$1.60	$16.00	$2.70	
Total	–	–	$40.00	–	$50.00	–	

Fill in the blanks in Table 2-4.2.

4. If Year 1 is selected as the base year, calculate the price index for each year. Show your work.

   (A) Year 1 = _____________

   (B) Year 2 = _____________

   (C) Year 3 = _____________

5. These price indices indicate that there was a 25 percent increase in prices between Year 1 and Year 2.

   (A) What is the percentage increase between Year 1 and Year 3?_____________.

   (B) What is the percentage increase between Year 2 and Year 3?_____________.

Converting Nominal GDP to Real GDP

To use GDP to measure output growth, it must be converted from nominal to real. Let's say nominal GDP in Year 1 is $1,000 and in Year 2 it is $1,100. Does this mean the economy has grown 10 percent between Year 1 and Year 2? Not necessarily. If prices have risen, part of the increase in nominal GDP in Year 2 will represent the increase in prices. GDP that has been adjusted for price changes is called *real* GDP. If GDP isn't adjusted for price changes, we call it *nominal* GDP.

To compute real GDP in a given year, use the following formula:

$$\text{Real GDP} = \text{nominal GDP}/(\text{price index}/100).$$

To compute real output growth in GDP from one year to another, subtract real GDP for Year 2 from real GDP in Year 1. Divide the answer (the change in real GDP from the previous year) by real GDP in Year 1. The result, multiplied by 100, is the percentage growth in real GDP from Year 1 to Year 2. (If real GDP declines from Year 1 to Year 2, the answer will be a negative percentage.) Here's the formula:

$$\text{Output growth} = \frac{(\text{real GDP in Year 2} - \text{real GDP in Year 1})}{\text{real GDP in Year 1}} \times 100.$$

For example, if real GDP in Year 1 = $1,000 and in Year 2 = $1,028, then the output growth rate from Year 1 to Year 2 is 2.8%: (1,028 – 1,000) / 1,000 = .028, which we multiply by 100 in order to express the result as a percentage.

To understand the impact of output changes, we usually look at real GDP per capita. To do so, we divide the real GDP of any period by a country's average population during the same period. This procedure enables us to determine how much of the output growth of a country simply went to supply the increase in population and how much of the growth represented improvements in the standard of living of the entire population. In our example, let's say the population in Year 1 was 100 and in Year 2 it was 110. What was real GDP per capita in Years 1 and 2?

Year 1

$$\text{Real GDP per capita} = \frac{\text{Year 1 real GDP}}{\text{population in Year 1}} = \frac{\$1{,}000}{100} = \$10.$$

Year 2

$$\text{Real GDP per capita} = \frac{\$1{,}028}{110} = \$9.30.$$

In this example, real GDP per capita fell even though output growth was positive. Developing countries with positive output growth but high rates of population growth often experience this condition.

Use the information in Table 2-4.3 to answer the following questions.

Table 2-4.3
Nominal and Real GDP

	Nominal GDP	Price index	Population
Year 3	$5,000	125	11
Year 4	$6,000	150	12

6. What is the real GDP in Year 3? ____________

7. What is the real GDP in Year 4? ____________

8. What is the real GDP per capita in Year 3? ____________

9. What is the real GDP per capita in Year 4? ____________

10. What is the rate of real output growth between Years 3 and 4? ____________

11. What is the rate of real output growth per capita between Years 3 and 4? ____________
(*Hint:* Use per capita data in the output growth rate formula.)

The Costs of Inflation

Unanticipated inflation helps some people and hurts others. For example, borrowers are helped by unanticipated inflation while lenders are hurt. However, even anticipated inflation results in costs for the economy. There are three types of costs that result from inflation: shoe leather costs, menu costs, and unit of account costs.

Shoe leather costs: increased transaction costs caused by inflation.

The term *shoe leather costs* comes from the idea that inflation results in the need for more trips to the bank and store, wearing out peoples' shoe leather. While technological advances have decreased the amount of walking required to conduct transactions, shoe leather costs still exist in the form of actions that people must take as a result of inflation. Shoe leather costs can be quite substantial in an economy with *hyperinflation* (very high inflation rates).

Menu costs: the cost of changing a listed price.

Inflation requires firms to incur a cost to change their prices. As a result of inflation, firms must change the tag on the product or shelf, the information attached to a UPC code in a computer, the sticker price on a car, or reprint a restaurant menu (the origin of the term). With hyperinflation, menu costs can cause consumers and merchants to abandon prices listed in their local currency. Menu costs can be substantial in times of high inflation.

Unit of account costs: the cost of having a less reliable unit of measurement.

One of the uses of money is as a unit of account. Prices are used to compare the value of goods and services. Inflation can decrease the usefulness of prices for comparisons because it changes the purchasing power of a currency over time.

1. For each situation, place an X in the box representing the cost of inflation that is best represented.

Situation	Shoe leather costs	Menu costs	Unit of account costs
(A) Your favorite local restaurant raises its prices and has to print new advertisements.			
(B) Workers in Germany in 1922 are paid and shop three times a day due to hyperinflation.			
(C) You have to change your automatic bill payment in your online banking account because the rent for your apartment went up.			
(D) You remember when the price of gasoline was $1.25 per gallon.			
(E) You work at your local grocery store and place new higher price stickers on the store's shelves.			
(F) Your weekly grocery bill increases, but the amount of groceries you purchase does not.			