

# Inflation and Unemployment

# 13

- CONSUMER PRICE INDEX (CPI)
- GDP DEFLATOR
- COSTS OF INFLATION
- NOMINAL VS. REAL INTEREST RATE
- TYPES OF UNEMPLOYMENT

## THE TWIN EVILS

Both *inflation* and *unemployment* exert an enormous toll on the economy and, therefore, on our standard of living. The cost of unemployment is obvious: an important resource, labor, is being underutilized. This implies that we are not producing as much as if we were using our resources fully. In economic terms, we are producing inside the production possibilities frontier. Moreover, the households that are experiencing unemployment face real hardships.

The costs associated with inflation are less obvious. Many people understand that rising prices can hurt families on fixed incomes, but this is only a minor issue because most incomes keep pace with rising prices. When prices rise, someone benefits—the owners of the firms that produce the goods and services whose prices are rising. In general, rising prices imply rising incomes, so falling real incomes are not a major cost of inflation.

We will see that a more significant cost associated with inflation is the inefficiencies that ensue when people respond to rising prices. Again, we will be producing at a point inside the production possibilities frontier if we do not use our resources efficiently.

In addition, inflation arbitrarily takes purchasing power from some households and puts it in the hands of others. A massive redistribution of wealth is yet another cost of inflation.

The costs to society of rising prices are much more subtle than the blunt and obvious damages caused by unemployment. Nevertheless, it is unclear which economic evil is more pernicious. Only normative conclusions are possible on this question.

## INFLATION

### How Inflation Is Measured

Inflation is a sustained rise in most prices in the economy. The inflation rate is the rate at which prices are rising. It is much easier to define inflation than to measure it.

Each month the Bureau of Labor Statistics (BLS) checks prices on 90,000 items at more than 23,000 retail and service outlets. The BLS checks prices only in urban areas. Because prices are liable to be different in different regions, the BLS must check prices on the same items in every part of the country.

The result of all this effort is the predominant measure of the cost of living in the United States—the consumer price index (CPI). The CPI measures the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services. The BLS computes the CPI for each month.

Consider a simple example where the typical household in the economy consumes 5 packages of cheese and 8 boxes of crackers in a month. If the price of cheese rises to \$2.25 from \$2.00 and the price of crackers climbs to \$1.50 from \$1.25, then the CPI rises to 116.25 from 100. The calculations are shown in Table 13.1. The assumption is that period 1 is the base period, the period to which all other periods are compared.

**Table 13.1 Calculating the Consumer Price Index**

Period 1			
Item	Price	Amount	Cost
Cheese	\$2.00	5	\$10.00
Crackers	\$1.25	8	<u>\$10.00</u>
		Total cost = \$20.00	
		$\text{CPI} = \frac{\text{Total Cost This Period}}{\text{Total Cost Base Period}} \times 100 = \frac{20.00}{20.00} \times 100 = 100$	
Period 2			
Item	Price	Amount	Cost
Cheese	\$2.25	5	\$11.25
Crackers	\$1.50	8	<u>\$12.00</u>
		Total cost = \$23.25	
		$\text{CPI} = \frac{\text{Total Cost This Period}}{\text{Total Cost Base Period}} \times 100 = \frac{23.25}{20.00} \times 100 = 116.25$	
Period 3			
Item	Price	Amount	Cost
Cheese	\$2.35	5	\$11.75
Crackers	\$1.60	8	<u>\$12.80</u>
		Total cost = \$24.55	
		$\text{CPI} = \frac{\text{Total Cost This Period}}{\text{Total Cost Base Period}} \times 100 = \frac{24.55}{20.00} \times 100 = 122.75$	

In period 3, the CPI rises to 122.75. To calculate the inflation rate between any two periods, take the percentage change in the CPI. For example, the inflation rate between periods 2 and 3 is:

$$\text{Inflation Rate} = (122.75 - 116.25) / 116.25 = .0559 = 5.59\%$$

The inflation rate between periods 1 and 3 is:

$$\text{Inflation Rate} = (122.75 - 100.00) / 100.00 = .2275 = 22.75\%$$

These calculations indicate that the cost of living for a typical family in this economy increased 5.59 percent between periods 1 and 2 and 22.75 percent between periods 1 and 3.

In the real world, many complications arise when calculating the CPI that are not apparent in this simple example. For instance, what should be done when the quality of a product changes? The price of automobiles has risen dramatically since the 1950s, but so has the quality of the product. A new car these days comes with seat belts and air bags—safety devices that were not available in earlier versions of the product. Quality improvements such as this account for some portion of the price increase. The CPI overstates the amount of inflation since it does not account for all quality improvements.

This is just one example of how the CPI can overstate cost of living increases. A 1996 study from a bipartisan commission concluded that the CPI overstates inflation by more than one percentage point a year. The discrepancy is important because most income maintenance programs, such as Social Security, adjust their benefit payments with the CPI.

### The GDP Deflator

Inflation can be measured with another statistic—the GDP deflator. In the previous chapter we discussed how GDP and real GDP are calculated. Both of these statistics can be used to obtain the GDP deflator through a simple formula:

$$\text{GDP Deflator} = (\text{GDP}/\text{Real GDP}) \times 100$$

In 2016 GDP was \$18,569.1 billion, while real GDP equaled \$16,662.1 billion. Therefore, the GDP deflator for 2016 was 111.4 (=  $(18,569.1/16,662.1) \times 100$ ). Table 13.2 shows GDP, real GDP, and the GDP deflator over the years.

To calculate the inflation rate between any two years, simply take the percentage change in the GDP deflator. By what percent did prices rise from 2006 to 2016? 17.5 percent (=  $(111.4 - 94.8)/94.8$ ). In other words, there was 17.5 percent inflation between 2006 and 2016.

**Table 13.2 GDP, Real GDP, and the GDP Deflator**

Year	GDP Deflator = $\frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$		Real GDP = $\frac{\text{Nominal GDP}}{\text{GDP Deflator}} \times 100$	
	Nominal GDP (billions of \$)	Real GDP (billions of chained 2009 \$)	Real GDP (billions of chained 2009 \$)	GDP Deflator
2006	13,855.9	14,613.8	14,613.8	94.8
2007	14,477.6	14,873.7	14,873.7	97.3
2008	14,718.6	14,830.4	14,830.4	99.2
2009	14,418.7	14,418.7	14,418.7	100.0
2010	14,964.4	14,783.8	14,783.8	101.2
2011	15,517.9	15,020.6	15,020.6	103.3
2012	16,155.3	15,354.6	15,354.6	105.2
2013	16,691.5	15,612.2	15,612.2	106.9
2014	17,393.1	15,982.3	15,982.3	108.8
2015	18,036.6	16,397.2	16,397.2	110.0
2016	18,569.1	16,662.1	16,662.1	111.4

Source: U.S. Department of Commerce, Bureau of Economic Analysis

The GDP deflator, like the CPI, measures the level of prices in the economy. The inflation rates derived from the GDP deflator, however, do not match the inflation rates obtained from the CPI. Both inflation gauges suggest the same general pattern of inflation over the years.

The GDP deflator ignores import prices. If the price of imported beer increased, the CPI would rise in response, but not the GDP deflator. Still, for most years the CPI and the GDP deflator do not differ markedly.

In some instances we may have data on the GDP deflator and GDP; then we can calculate real GDP with the following formula:

$$\text{Real GDP} = (\text{GDP}/\text{GDP Deflator}) \times 100$$

In 2016 GDP was \$18,569.1 billion and the GDP deflator equaled 111.4. Therefore, real GDP was \$16,662.1 billion ( $= (18,569.1/111.4) \times 100$ ).

## The Costs of Inflation

Many people think that the most damaging aspect of inflation is that it erodes purchasing power. It is true that any household whose income does not keep pace with inflation will be hurt. But for the vast majority of households, incomes keep pace with, if not exceed, price increases.

To understand why, consider the circular flow diagram presented earlier in the text (page 34). If the prices paid for goods and services produced by firms increases, firms take in more revenue. If this revenue is not passed back to households in the form of higher wages or rent, the firms make more profits. But someone owns the firms and the profits become their income. More specifically, the profits are returned to households in the form of dividends. So higher prices always translate into higher levels of income.

1. Inflation can be detrimental even if a household's income rises as fast as prices. This is because the value of savings accounts, trust funds, and other forms of financial wealth will be worth less than before the inflation. In other words, inflation erodes the purchasing power of savings. Savings play an important role in the economy. Households, businesses, and governments often need to borrow funds. Inflation discourages savings.
2. Another problem with inflation is the resources that are wasted dealing with higher prices. Firms have to print new brochures, restaurants need to produce new menus, and price lists in all the media will have to be revised. This takes time and effort. Resources that could have been used more productively are deployed to cope with rising prices. The misallocation of resources because of inflation is sometimes called "menu costs."
3. A final issue associated with inflation has to do with borrowing and lending in inflationary conditions. Lenders can be hurt by inflation because the dollars they loaned out are repaid at a later date with dollars that are not worth as much because of inflation. Imagine lending a friend \$100 for a year at 10 percent interest. A year later the friend repays you \$110. But suppose prices had risen 12 percent over the course of the loan. Your \$110 could not even buy what your \$100 could a year ago.

**TIP**  
Inflation can be measured with a variety of statistics. The most common measures of inflation are the percentage change in the consumer price index and the percentage change in the GDP deflator.

By the same token, borrowers could benefit from inflation because they get to repay their borrowings with inflated dollars. Why don't banks get hurt by inflation? Aren't they big lenders? They are, but they are also smart enough to add an inflation surcharge onto the interest rate that they charge. When a bank lends \$100 dollars to your friend it might charge 22 percent—10 percent for his real return and 12 percent to cover the cost of inflation that he expects over the course of the loan.

The idea that some lenders would protect themselves from inflation by charging higher interest on loans was codified into a formula by Irving Fisher in the early 1900s; the formula is known as "Fisher's Hypothesis":

$$\text{Nominal Interest Rate} = \text{Real Interest Rate} + \text{Expected Inflation}$$

The nominal interest rate is the rate actually paid. The real interest rate is the actual return the lender receives net of inflation.

The end result is that lenders who do not anticipate inflation will be hurt, but the borrower would benefit in this case. The biggest lender in the economy is households if you consider putting money in a bank account a loan to the bank. Notice that the nominal interest rate paid by banks is not adjusted upward for expected inflation. Households are big lenders who do not anticipate inflation; therefore, they will be hurt by rising prices.

The federal government is the biggest borrower in the United States' economy. It stands to benefit from inflation because it can repay its borrowings with inflated dollars.

If you think about it, inflation works just like a tax, because households are major lenders and the government is a major borrower. It is as if Uncle Sam reaches into your wallet every night while you sleep and slips out just a little cash so that you don't even notice. The inflation tax is the result of the federal government benefiting from inflation while households are harmed. This redistribution of wealth from lenders to borrowers is yet another cost of inflation. The costs of inflation are summarized in Table 13.3.

**Table 13.3 The Costs of Inflation**

- Financial wealth is eroded
- Savings are discouraged
- Menu costs—resources are misallocated with rising prices
- Inflation tax—wealth is redistributed from lenders to borrowers

## UNEMPLOYMENT

The costs associated with unemployment are obvious. Households will encounter hardships, maybe even hunger. Unemployment means that a resource, labor, is not being used to its fullest potential. We are producing inside the production possibilities frontier. We could be producing more and enjoying more goods and services.

Unemployment is a problem during recessions—periods when real GDP is declining. During a recession fewer goods and services are being produced. The amount of labor and other resources required for production is reduced and people find themselves out of work.

The unemployment rate is defined as the number of unemployed persons divided by the labor force. The labor force does not include retired persons, those too young to work, and anyone who has not been actively seeking employment. In order to be counted as unemployed you have to be out of work and looking for a job.

The Bureau of Labor Statistics (BLS) reports the unemployment statistics based on two broad surveys taken each month. One survey contacts employers and asks about employment levels at various business establishments, while the other survey interviews households. Economists classify the unemployed into five general categories:

1. Those who are able to work, but not actively seeking employment because they are discouraged about their prospects for finding employment, are referred to as *discouraged workers* or the *hidden unemployed*. This situation is unfortunate because these people lack basic skills or suffer from other problems and have a difficult time finding work. Discouraged by their prospects, they no longer bother to pursue employment. These people do not show up in the unemployment statistics because they are not considered to be part of the labor force; thus the name “hidden” unemployment.
2. A form of unemployment that does show up in the official statistics is *structural unemployment*. The structurally unemployed are out of work because the economy is structured, or set up, to their disadvantage. For instance, there may be welders looking for work in Cleveland, but the welding jobs are in Dallas. Or welders may be out of work in Boston, but their are plenty of secretarial jobs open in that same area. Since it is often difficult for a person to relocate or retrain, structural unemployment is not easily remedied.
3. Some persons are able to find work for only a portion of the year due to the seasonal nature of their jobs. These individuals are considered to be *seasonally unemployed* as long as they actively look for work in the off-season. Farmers and construction workers may fall into this category.
4. As mentioned previously, unemployment rises during the contractionary phase of the business cycle. Individuals who lose their jobs during a recession and the corresponding slowdown in production are said to be *cyclically unemployed*. They are out of work specifically because of the business cycle. Hopefully, these people will be back to work when production picks up during the next expansion.
5. Finally, a number of persons are not working because they are in between jobs. Someone who is scheduled to begin a new job next month and does not presently hold a job is considered to be *fictionally unemployed*. It is unlikely that people will be able to switch jobs without some time off. Indeed, some people take advantage of this time to relax or move their households and get their affairs in order. Also, someone who quits one job to look for another is considered to be fictionally unemployed. Finally, new entrants into the labor market, such as graduates looking for work or a stay-at-home parent re-entering the work force, are considered frictionally unemployed.

In 2016 the labor force was estimated to be 159.2 million persons, while the unemployed numbered 7.8 million. This implies an unemployment rate of 4.9 percent ( $= 7.8/159.2$ ). Some analysts contend that the unemployment picture is actually much worse than this figure indicates. For one, the 4.9 percent does not count hidden unemployment. Remember, those too discouraged to look for work are not counted as being unemployed or even in the labor force. They are simply not counted.

Another factor to consider is that persons who are working part time are counted as if they are fully employed, even if they would like to have a full-time job. Again, the reported statistic of 4.9 percent understates the unemployment problem.

A related point to keep in mind is that 4.9 percent is the average unemployment rate across the nation. There are sections of the country where the rate is much higher and sec-

**TIP**

People who are not actively looking for work are not in the labor force and therefore are not counted as unemployed.

tions where it is lower. Moreover, it is well known that the unemployment rate is worse for certain groups within the population, such as teenagers.

Many of the people counted as being unemployed are merely frictionally unemployed. In fact, it is estimated that of the 7.8 million persons unemployed in 2016, anywhere from 2 to 4 million are frictionally unemployed. Indeed, economists consider the economy to be at full employment when the unemployment rate reaches the 4 to 5 percent range since the frictionally unemployed account for about that much of the unemployment rate. If the unemployment rate were to fall further, inflation would most likely be a problem. The full employment rate of unemployment is sometimes called NAIRU for the nonaccelerating inflation rate of unemployment. A related concept is the natural rate of unemployment. This is what the unemployment rate would be if there was no cyclical unemployment.

Despite the criticisms of the unemployment statistic, the fact remains that it is tabulated in the same manner each time, so that a drop in the rate means a larger portion of the labor force is working. The unemployment rate is a useful statistic, but care should be taken with its interpretation.



## SUMMARY

- Inflation and unemployment are serious economic problems. Inflation causes the misallocation of resources and an arbitrary redistribution of income. Inflation is typically a problem when the economy is overheated—growing faster than normal. But inflation can also occur during recessions. Later we shall see why.
- Unemployment occurs when the economy is operating below its potential. Our most important resource is labor, and unemployment exists when this resource is not being fully utilized. We could have produced more and enjoyed more goods and services if not for the unemployment.
- We have reviewed the major statistics that measure unemployment and inflation and found that they are not perfectly accurate. It is important to understand how the numbers are generated so that their potential deficiencies can be anticipated. For instance, if the price of imported oil is rising rapidly, it is critical to know that the GDP deflator will not reflect this increase. The GDP deflator does not include the prices of imported products. The CPI does.

The most important question concerning inflation and unemployment has been ignored in this chapter: What causes inflation and unemployment? A complete answer is provided in the chapters ahead.

## TERMS

**Consumer Price Index (CPI)** measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services

**Cyclical Unemployment** loss of jobs by individuals during a recession and the corresponding slowdown in production

**Fisher's Hypothesis** Nominal Interest Rate = Real Interest Rate + Expected Inflation

**Frictional Unemployment** state of being out of work because the person is in between jobs

**GDP Deflator** measure of the level of prices in the economy

**Hidden Unemployment** describing those who are able to work but who are not actively seeking employment because they are discouraged about their prospects for finding employment

**Inflation** a sustained rise in most prices in the economy

**Menu Costs** the misallocation of resources because of inflation

**Natural Rate of Unemployment** the unemployment rate if there was no cyclical unemployment

**Nonaccelerating Inflation Rate of Unemployment (NAIRU)** the full employment rate of unemployment; when employment falls below this rate, inflation accelerates

**Seasonal Unemployment** state of being out of work because of the time of year

**Structural Unemployment** state of being out of work because the economy is structured, or set up, to a person's disadvantage

**Unemployment Rate** the number of unemployed persons divided by the labor force

## FORMULAS

$$\text{CPI} = \frac{\text{Total Cost This Period}}{\text{Total Cost Base Period}} \times 100$$

$$\text{Inflation Rate} = \frac{\text{CPI (This Period)} - \text{CPI (previous period)}}{\text{CPI (previous period)}} \times 100$$

$$\text{GDP Deflator} = (\text{Nominal GDP/Real GDP}) \times 100$$

$$\text{Real GDP} = (\text{Nominal GDP/GDP Deflator}) \times 100$$

$$\text{Nominal Interest Rate} = \text{Real Interest Rate} + \text{Expected Inflation}$$

$$\text{Unemployment Rate} = \text{Number of Unemployed/Civilian Labor Force}$$



## MULTIPLE-CHOICE REVIEW QUESTIONS

- The CPI is calculated for each \_\_\_\_\_ by \_\_\_\_\_.  
(A) week; the Bureau of Economic Analysis  
(B) month; the Bureau of Economic Analysis  
(C) month; the Bureau of Labor Statistics  
(D) quarter; the Bureau of Economic Analysis  
(E) quarter; the Bureau of Labor Statistics
- If the CPI goes to 150 from 120, then prices have  
(A) risen 20 percent.  
(B) risen 25 percent.  
(C) fallen 30 percent.  
(D) risen 30 percent.  
(E) risen 150 percent.
- According to experts, the CPI  
(A) overstates increases in the cost of living.  
(B) understates increases in the cost of living.  
(C) accurately estimates changes in the cost of living.  
(D) could over- or underestimate changes depending on the season.  
(E) should be abandoned in favor of the GDP deflator.
- When products improve in quality the CPI will  
(A) automatically increase.  
(B) automatically decrease.  
(C) become negative.  
(D) overestimate the inflation rate.  
(E) underestimate the inflation rate.
- The GDP deflator  
I. is used to calculate inflation rates.  
II. is an alternative to the CPI.  
III. is more accurate than the CPI.  
(A) Only I is true.  
(B) I and II are true.  
(C) I and III are true.  
(D) II and III are true.  
(E) I, II, and III are true.
- If nominal GDP equals \$5,000 and real GDP equals \$4,000, then the GDP deflator equals  
(A) 125.  
(B) 1.25.  
(C) 800.  
(D) .8.  
(E) 300.
- If nominal GDP equals \$6,000 and the GDP deflator equals 200, then real GDP equals  
(A) \$30.  
(B) \$3,000.  
(C) \$12,000.  
(D) \$1,200.  
(E) \$1,200,000.
- Which of the following is NOT a major cost of inflation?  
(A) Resources will be misallocated.  
(B) Wealth will be redistributed.  
(C) Savings will be discouraged.  
(D) Real incomes will fall.  
(E) Financial wealth will be eroded.
- The term "menu costs" refers to  
(A) fewer choices due to inflation.  
(B) financial assets being worth less due to inflation.  
(C) "à la carte" savings falling.  
(D) food prices rising due to inflation.  
(E) resource misallocation due to inflation.
- Inflation  
(A) encourages households to save more.  
(B) does not affect savings in the economy.  
(C) forces households to save more.  
(D) forces households to save less.  
(E) discourages savings.

11. Rising prices are a problem because
- (A) money in household savings accounts can now buy fewer goods and services.
  - (B) household incomes generally do not rise with prices.
  - (C) the economy could run out of money.
  - (D) borrowers have to repay loans with more dollars.
  - (E) households are encouraged to save more.
12. Fisher's Hypothesis states that
- (A) the real interest rate equals the nominal interest rate plus the inflation rate.
  - (B) the nominal interest rate equals the real interest rate minus the inflation rate.
  - (C) the nominal interest rate equals the unemployment rate plus the real interest rate.
  - (D) the nominal interest rate equals the unemployment rate minus the real interest rate.
  - (E) the nominal interest rate equals the real interest rate plus the inflation rate.
13. Sue loses her job at a shoe factory when the economy falls into a recession. Sue is
- (A) frictionally unemployed.
  - (B) cyclically unemployed.
  - (C) seasonally unemployed.
  - (D) structurally unemployed.
  - (E) a discouraged worker.
14. There is a strong demand for welders in California but Bill, an unemployed welder, lives in New York. Bill is
- (A) frictionally unemployed.
  - (B) cyclically unemployed.
  - (C) structurally unemployed.
  - (D) considered to be a hidden worker.
  - (E) not counted in the ranks of the unemployed.
15. It is unlikely that the unemployment rate will ever fall to zero because of
- (A) frictional unemployment.
  - (B) cyclical unemployment.
  - (C) government policies.
  - (D) corporate policies.
  - (E) the aged and infirm in our population.

## FREE-RESPONSE REVIEW QUESTIONS

Inflation exerts significant costs on the economy. Specifically, explain how inflation

1. causes a misallocation of resources.
2. discourages savings.
3. redistributes wealth from lenders to borrowers.

## Multiple-Choice Review Answers

- |        |        |         |         |
|--------|--------|---------|---------|
| 1. (C) | 5. (B) | 9. (E)  | 13. (B) |
| 2. (B) | 6. (A) | 10. (E) | 14. (C) |
| 3. (A) | 7. (B) | 11. (A) | 15. (A) |
| 4. (D) | 8. (D) | 12. (E) |         |

## Free-Response Review Answers

1. Inflation causes a misallocation of resources. Resources are spent dealing with rising prices and the repercussions of rising prices. Instead, these resources could have been spent producing more goods and services for the constituents of the economy to enjoy. For example, some firms will have to print new catalogs and revise their websites when the prices of their products change. This time and effort would not have been expended if prices had not risen. Some households will take the trouble to stock up on goods whose prices are expected to rise. The effort and storage costs are another misallocation of resources.
2. Inflation erodes the value of financial assets. Savings accounts, trust funds, and other accounts cannot buy as many products when the prices of those products rise. Why save if inflation will simply eat away at the value of savings?
3. Inflation allows borrowers to repay their loans with dollars that are not worth as much as the ones they borrowed. Lenders, on the other hand, are being repaid with dollars that have lost some of their value. Shrewd lenders understand this and charge higher rates of interest to cover the inflation that may occur over the course of a loan. However, lenders who do not anticipate inflation will be hurt while those who borrow from them will benefit.

