

INTRODUCTION TO ECONOMICS

Inflation & Money^a



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^aBased on Ch. 24 of “*Principles of Economics*” by Betsey Stevenson & Justin Wolfers.

Chapter Objective

- Evaluate the rate of inflation and its consequences.



Alex Larson/Alamy

Roadmap (1 of 4)

- **Measuring Inflation**

 - Understand what inflation is and how to measure it.

- Different Measures of Inflation

 - Pick the right inflation measure for the task at hand.

- Adjusting for the Effects of Inflation

 - Learn to account for the influence of inflation before making big decisions.

- The Role of Money and the Costs of Inflation

 - Analyze the role of money so that you can assess the costs of inflation.

What is Inflation?

Inflation is a generalized rise in the overall level of prices.

Inflation is also a decline in the purchasing power of money.

How is Inflation Measured?

The **consumer price index** (CPI) is an index that tracks the average price consumers pay over time for a representative “basket” of goods and services.

The CPI is a closely watched indicator.

How Is the Inflation Rate Calculated?

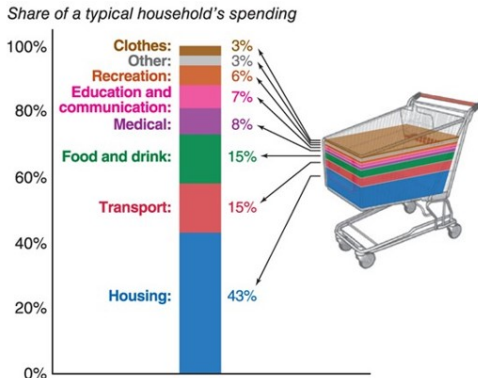
Not all prices rise by the same amount.

The **inflation rate** is the annual percentage increase in the average price level.

$$\text{Inflation rate} = \left(\frac{\text{Price level this year} - \text{Price level last year}}{\text{Price level last year}} \right) \times 100$$

CPI Construction – Step 1

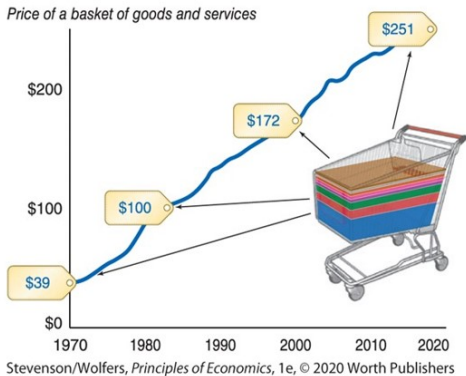
Find out what people typically buy.



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CPI Construction – Step 2

Collect prices from the stores where people do their shopping.

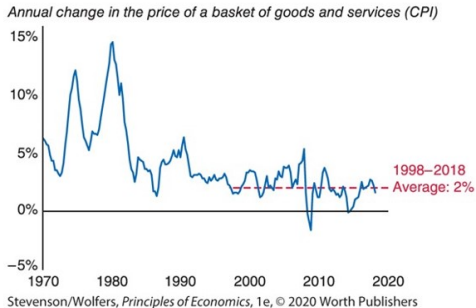


CPI Construction – Step 3

Tally up the price of the basket of goods and services.

CPI Construction – Step 4

Calculate the inflation rate.



Do the Economics: Calculate an Inflation Rate

Let's calculate the inflation rate experienced by one simple consumer: Max, an average American dog.



Dustin Johnston

Calculating Inflation – Step 1

Step 1:
What do dogs buy?

Max's basket of
goods and services

730 cans of
dog food

6 bags of
kibble

2 vet visits

2 chew toys

Calculating Inflation – Step 2

Step 1: What do dogs buy?	Step 2: Collect prices	
Max's basket of goods and services	Price in 2018	Price in 2019
730 cans of dog food	\$1.80 per can	\$1.85 per can
6 bags of kibble	\$40 per bag	\$41 per bag
2 vet visits	\$60 per visit	\$65 per visit
2 chew toys	\$10 per toy	\$11 per toy

Calculating Inflation – Step 3

Step 1: What do dogs buy?	Step 2: Collect prices		Step 3: Tally up the costs	
Max's basket of goods and services	Price in 2018	Price in 2019	Cost in 2018 (= Price in 2018 x Quantity)	Cost in 2019 (= Price in 2019 x Quantity)
730 cans of dog food	\$1.80 per can	\$1.85 per can	730 x \$1.80 = \$1,314	730 x \$1.85 = \$1,351
6 bags of kibble	\$40 per bag	\$41 per bag	6 x \$40 = \$240	6 x \$41 = \$246
2 vet visits	\$60 per visit	\$65 per visit	2 x \$60 = \$120	2 x \$65 = \$130
2 chew toys	\$10 per toy	\$11 per toy	2 x \$10 = \$20	2 x \$11 = \$22
Cost of Max's basket			\$1,694	\$1,749

Calculating Inflation – Step 4

Step 1: What do dogs buy?	Step 2: Collect prices		Step 3: Tally up the costs	
Max's basket of goods and services	Price in 2018	Price in 2019	Cost in 2018 (= Price in 2018 x Quantity)	Cost in 2019 (= Price in 2019 x Quantity)
730 cans of dog food	\$1.80 per can	\$1.85 per can	730 x \$1.80 = \$1,314	730 x \$1.85 = \$1,351
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2 vet visits	\$60 per visit	\$65 per visit	2 x \$60 = \$120	2 x \$65 = \$130
2 chew toys	\$10 per toy	\$11 per toy	2 x \$10 = \$20	2 x \$11 = \$22
Cost of Max's basket			\$1,694	\$1,749

$$\text{Step 4: Calculate the inflation rate} = \frac{\$1,749 - \$1,694}{\$1,694} \times 100 = 3.2\%$$

Activity: Examining Inflation in the US

Go to the Federal Reserve Economic Data website (FRED), and create a chart of annual inflation using the CPI since 1970.

1. What trends do you see?
2. Are prices always rising?

Clicker Question (1 of 3)

Goods	Price in 2018 (base year)	Price in 2019
300 cups of coffee	\$2.50 per cup	\$2.75
10 textbooks	\$150 per book	\$175 per book
50 pizzas	\$8.00 per pizza	\$9.00 per pizza

The cost of the basket in 2019 is

1. \$375.
2. \$3,025.
3. \$2,650.
4. \$5,675.

Clicker Question (1 of 3)

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The cost of the basket in 2019 is

1. \$375.
2. \$3,025. **correct**
3. \$2,650.
4. \$5,675.

Clicker Question (2 of 3)

Goods	Price in 2018 (base year)	Price in 2019
300 cups of coffee	\$2.50 per cup	\$2.75
10 textbooks	\$150 per book	\$175 per book
50 pizzas	\$8.00 per pizza	\$9.00 per pizza

The inflation rate between 2018 and 2019 is

1. 100%.
2. 10%.
3. 14%.
4. -12%.

Clicker Question (2 of 3)

Goods	Price in 2018 (base year)	Price in 2019
300 cups of coffee	\$2.50 per cup	\$2.75
10 textbooks	\$150 per book	\$175 per book
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The inflation rate between 2018 and 2019 is

1. 100%.
2. 10%.
3. 14%. **correct**
4. -12%.

Challenges with Measurement

- Quality improvements can hide price decreases.
- New products can make you better off, reducing your cost of living.
- You can save yourself money without sacrificing much.
 - **Substitution bias:** The overstating of inflation occurs because people substitute toward goods whose prices rise by less.

Review: Measuring Inflation

- Over time, inflation erodes the purchasing power of money.
- The CPI is an important indicator of inflation rates in the U.S. economy.
- To calculate CPI, you need to know what the average consumer buys and how much each item costs.
- The CPI is stated as an index to make it easier to track inflation rates over time.
- Several factors result in the CPI overstating inflation including quality improvements, new products, and the substitution bias.

Roadmap (2 of 4)

- Measuring Inflation

Understand what inflation is and how to measure it.

- **Different Measures of Inflation**

Pick the right inflation measure for the task at hand.

- Adjusting for the Effects of Inflation

Learn to account for the influence of inflation before making big decisions.

- The Role of Money and the Costs of Inflation

Analyze the role of money so that you can assess the costs of inflation.

Which Inflation Measure is Used for Cost-of-living Adjustments?

The CPI is the most widely accepted measure of the change in cost of living.

Automatically adjusting wages, benefits, tax brackets, and the like to compensate for inflation is called **indexation**.

Which Inflation Measure Is Used for Monetary Policy?

Monetary policy focuses on the personal consumption *expenditure deflator*.

The Federal Reserve sets its inflation target using the personal consumption expenditure (PCE) deflator.

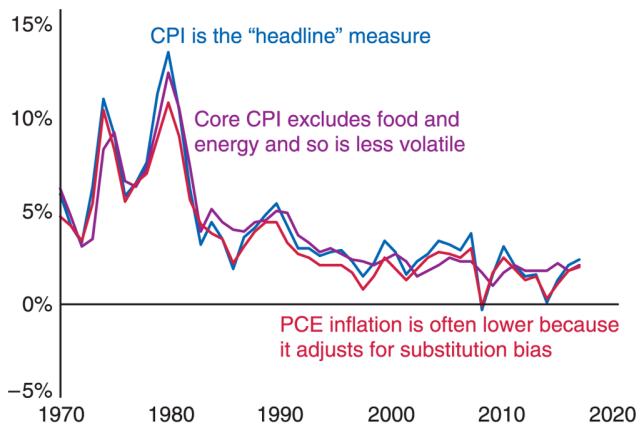
It uses a slightly different basket of goods and services compared to the CPI.

Which Inflation Measure is Used by Forecasters?

Forecasters look for the underlying trends in inflation.

They use core *inflation*, which excludes food and energy.

Alternative Measures of Inflation Move Together



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How Are Changes in Business Prices Measured?

Businesses experience different prices than consumers, so they need different measures.

- **Producer price index (PPI):** A price index that tracks the price of inputs into the production process.
- **GDP deflator:** A price index that tracks the price of all goods and services produced domestically.

Clicker Question (3 of 3)

You are a buyer at an auto factory that is facing rising input costs. Your manager asks you to determine if your competitors are also experiencing rising input prices. Which measure of prices should you use?

1. CPI
2. PPI
3. Core inflation
4. GDP deflator

Clicker Question (3 of 3)

You are a buyer at an auto factory that is facing rising input costs. Your manager asks you to determine if your competitors are also experiencing rising input prices. Which measure of prices should you use?

1. CPI
2. PPI **correct**
3. Core inflation
4. GDP deflator

Review: Alternate Measures of Inflation

- Different measures of inflation are better suited for different tasks.
- The CPI is used for cost-of-living adjustments.
- The personal consumption expenditure (PCE) deflator is used by the Federal Reserve.
- Core inflation is used by forecasters.
- The producer price index and the GDP deflator are used by businesses.

Roadmap (3 of 4)

- **Measuring Inflation**
Understand what inflation is and how to measure it.
- **Different Measures of Inflation**
Pick the right inflation measure for the task at hand.
- **Adjusting for the Effects of Inflation**
Learn to account for the influence of inflation before making big decisions.
- **The Role of Money and the Costs of Inflation**
Analyze the role of money so that you can assess the costs of inflation.

Comparing Dollars over Time

How do we compare monetary values over time when prices are changing?

For example, which Star Wars movie had the greatest adjusted box office take?

Inflation Adjustment Formula

$$\text{Today's dollars} = \text{Another time's dollars} \times \frac{\text{Price level today}}{\text{Price level over time}}$$

Do the Economics: Adjusting Box Office Takes

Movie	Release year	Box office take in the release year (millions)
<i>Star Wars</i>	1977	\$307
<i>The Empire Strikes Back</i>	1980	\$209
<i>Return of the Jedi</i>	1983	\$253
<i>The Phantom Menace</i>	1999	\$431
<i>Attack of the Clones</i>	2002	\$302
<i>Revenge of the Sith</i>	2005	\$380
<i>The Clone Wars</i>	2008	\$35
<i>The Force Awakens</i>	2015	\$937
<i>The Last Jedi</i>	2017	\$620

Real and Nominal Variable

A variable measured in dollars is a **nominal variable**.

A variable that has been adjusted to account for inflation is a real variable.

$$\text{Real value in 2012-dollars} = \text{Nominal value in years } t \text{ dollars} \times \frac{\text{Price level in 2011}}{\text{Price level in year } t}$$

Examples of when You Should Focus on Real Variables

1. To analyze whether you are becoming better paid (real wage)
2. To assess whether your stocks have become more valuable (real wealth)
3. To evaluate whether your sales staff are performing better (real revenues)

Real and Nominal Interest Rates

The stated interest rate without a correction for the effects of inflation is a **nominal interest rate**.

The interest rate in terms of changes in your purchasing power is a **real interest rate**.

$$\text{Real rate} = \text{Nominal rate} - \text{Inflation rate}$$

Overcoming Money Illusion

The (mistaken) tendency to focus on nominal dollar amounts instead of inflation-adjusted amounts is called **money illusion**.

Issues from Money Illusion

Money illusion is a problem because it can

- distort prices.
- lead to mispricing.
- create nominal wage rigidity.

Nominal wage rigidity is the reluctance to cut nominal wages.

Distribution of Nominal Wage Changes

Share of people getting each size nominal wage rise



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Review: Adjusting for the Effects of Inflation

- The inflation adjustment formula should be used to adjust for changing prices over time.
- Nominal variables are measured in dollars, while real variables are adjusted to account for inflation.
- Real variables should be used to make most decisions.
- Real interest rates adjust for inflation to show you the change in your purchasing power.
- Money illusion can lead to bad decisions.

Roadmap (4 of 4)

- Measuring Inflation

Understand what inflation is and how to measure it.

- Different Measures of Inflation

Pick the right inflation measure for the task at hand.

- Adjusting for the Effects of Inflation

Learn to account for the influence of inflation before making big decisions.

- **The Role of Money and the Costs of Inflation**

Analyze the role of money so that you can assess the costs of inflation.

What Is Money?

Money is any asset regularly used in transactions.

Functions of Money

Medium of exchange ⇒ Money is used to buy goods and services

Unit of account ⇒ Money is a common unit used to measure economic value

Store of value ⇒ Money can be saved

Discussion Question: Alternative Monies

During WWII, prisoners of war often used leather boots as money.

Why was this possible?

What issues are involved with using a commodity like a boot as money?

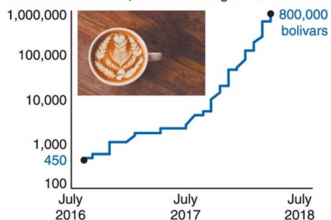
Costs of Hyperinflation

Hyperinflation is an extremely high rate of inflation.

Hyperinflation makes most aspects of life harder and erodes all the functions of money.

Hyperinflation in Venezuela

Venezuelan bolivars, shown on a log scale



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Costs of Expected Inflation

Hyperinflation is an extreme example.

Some inflation in the economy is normal.

Costs associated with expected inflation include the following:

- **menu costs.**
- **shoe-leather costs.**

Costs of Unexpected Inflation

Sometimes inflation is not anticipated.

Costs associated with unexpected inflation include the following:

- confusing the signals that prices send.
- redistributing income.

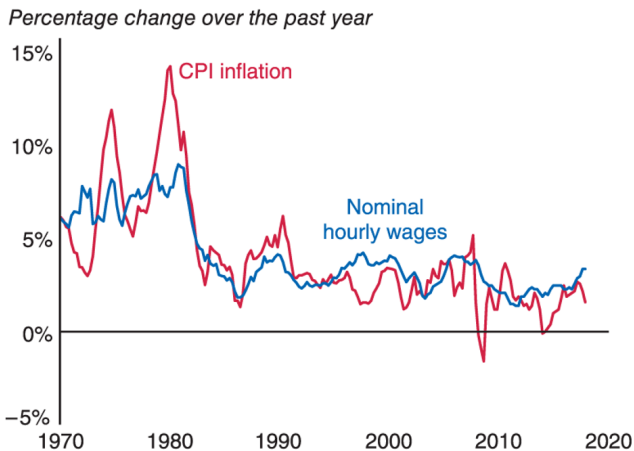
The Inflation Fallacy

The mistaken belief that inflation destroys purchasing power is the **inflation fallacy**.

Often all prices are rising, including wages and salaries.

Real values matter!

Nominal Wages Grow in Lockstep with Inflation



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Key Takeaways

- Don't think in nominal terms.
- Index for inflation.
- When inflation is high, spend more time looking for cheaper alternatives.
- When inflation is high, avoid holding cash.
- Hedge against inflation risk.