



Federal Reserve
Bank of Dallas

What is inflation? Why should we care about inflation?

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Teachers Summer Professional Development Program

What is inflation?

“Inflation is when you pay fifteen dollars for the ten dollar haircut you used to get for five dollars when you had hair” *Sam Ewing*

“Inflation is as violent as a mugger, as frightening as an armed robber and as deadly as a hit man” *Ronald Reagan*

“Low- and middle-income households tend to be more vulnerable to high inflation” *Brookings Institution*

What is inflation?

- Prices are changing all the time - up and down-
 - but we don't say there is inflation every time we see a price increase
- Instead, we say there is inflation when the prices of many of the things we buy rise at the same time and then continue to rise
- Explained another way, inflation is ongoing increases in the general price level for goods and services in an economy over time

What is inflation?

- Prices can change for different reasons and in different ways.
- The prices of individual goods and services can change because the supply or demand for the items has changed.
 - For example, the price of oranges can rise because of a frost in Florida, or the price of parking can go up during a sporting event because more people need parking spots.
- These higher prices are not examples of inflation.
 - In the first place, these higher prices probably won't last for long. The prices of oranges and parking will most likely return to where they were once the supply and demand conditions change again.
 - In the second place, these examples are only for one or two items. Inflation involves lots of items.

How do we measure inflation?

- *So how can we tell when inflation is happening and by how much?*
- We do so by looking at the prices of many items over time
- Government statistical agencies regularly gather information about the prices of thousands of goods and services
- In the case of households, they create a “basket” of goods and services that reflects the items consumed by households.
- The basket does not contain every good or service, but the basket is meant to be a good representation of both the types of items and the quantities of items households typically consume
- They then organize the prices into categories such as "transportation" and "apparel," they combine the prices in each category, and they report the results in various price indexes

How do we measure inflation?

- Agencies use the basket to construct a price index.
 - First, they determine the current value of the basket by calculating how much the basket would cost at today's prices (multiplying each item's quantity by its price today and summing up).
 - Next, they determine the value of the basket by calculating how much the basket would cost in a base period (multiplying each item's quantity by its base period price).
 - The price index is then calculated as the ratio of the value of the basket at today's prices to the value at the base period prices.
 - There is an equivalent but sometimes more convenient formulation to construct a price index that assigns relative weights to the prices of items in the basket.
 - In the case of a price index for consumers, statistical agencies derive the relative weights from consumers' expenditure patterns using information from consumer surveys and business surveys.

How do we measure inflation?

1. Fix the basket: Survey consumer to determine a fixed basket of goods.

2 Pizzas, 4 cokes

2. Find the prices: Find the price of each good in each year

Year	Price of Pizza	Price of Coke
2001	\$10	\$1
2002	\$15	\$2
2003	\$20	\$3

3. Compute the basket's cost: Compute the cost of the basket of goods in each year

2001 $(\$10 \text{ per pizza} \times 2 \text{ pizzas}) + (\$1 \text{ per coke} \times 4 \text{ cokes}) = \24

2002 $(\$15 \text{ per pizza} \times 2 \text{ pizzas}) + (\$2 \text{ per coke} \times 4 \text{ cokes}) = \38

2003 $(\$20 \text{ per pizza} \times 2 \text{ pizzas}) + (\$4 \text{ per coke} \times 4 \text{ cokes}) = \56

How do we measure inflation?

4. Choose a base year and compute the index: Choose one year as a base year (2001) and compute the Consumer Price Index in each year

2001 $(\$24/\$24) \times 100 = 100.0$

2002 $(\$38/\$24) \times 100 = 158.3$

2003 $(\$56/\$24) \times 100 = 233.3$

5. Compute the inflation rate: Use the consumer price index to compute the inflation rate from previous year

Inflation rate: the percentage change in the price index from the preceding period

$$\text{Inflation rate} = \frac{\text{CPI new} - \text{CPI old}}{\text{CPI old}} \times 100$$

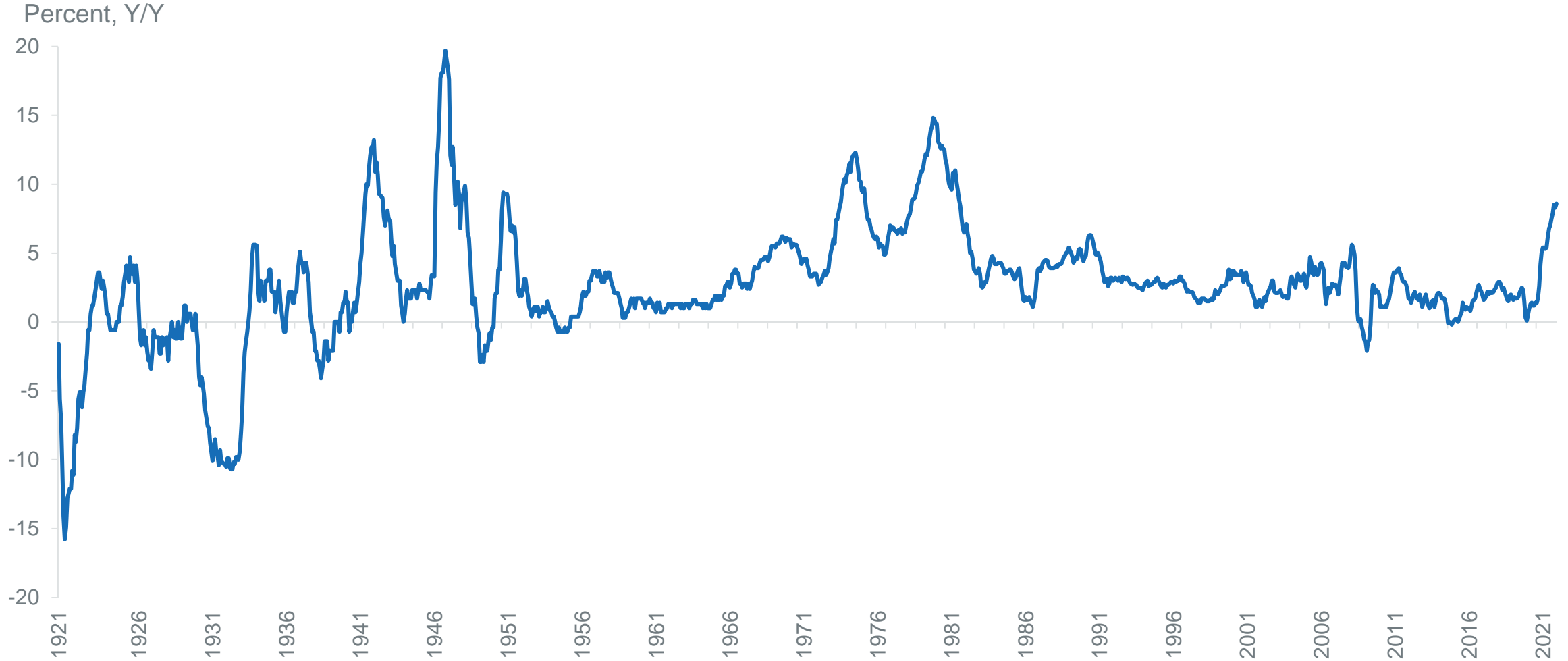
2002 $[(158.3 - 100.0) / 100] \times 100 = 58.3\%$

2003 $[(233.3 - 158.3) / 158.3] \times 100 = 47.4\%$

How do we measure inflation?

- Price indexes are just collections of prices.
 - For example, some indexes contain the prices of items that consumers buy, and others contain the prices of items that businesses buy.
 - Others contain prices only for goods, while others contain prices only for services, and so on.
- If the level of an index is higher now than it was a month or year ago, it tells us that the prices contained in that index are higher on average, which tells us there is inflation.

U.S. CPI inflation since 1921



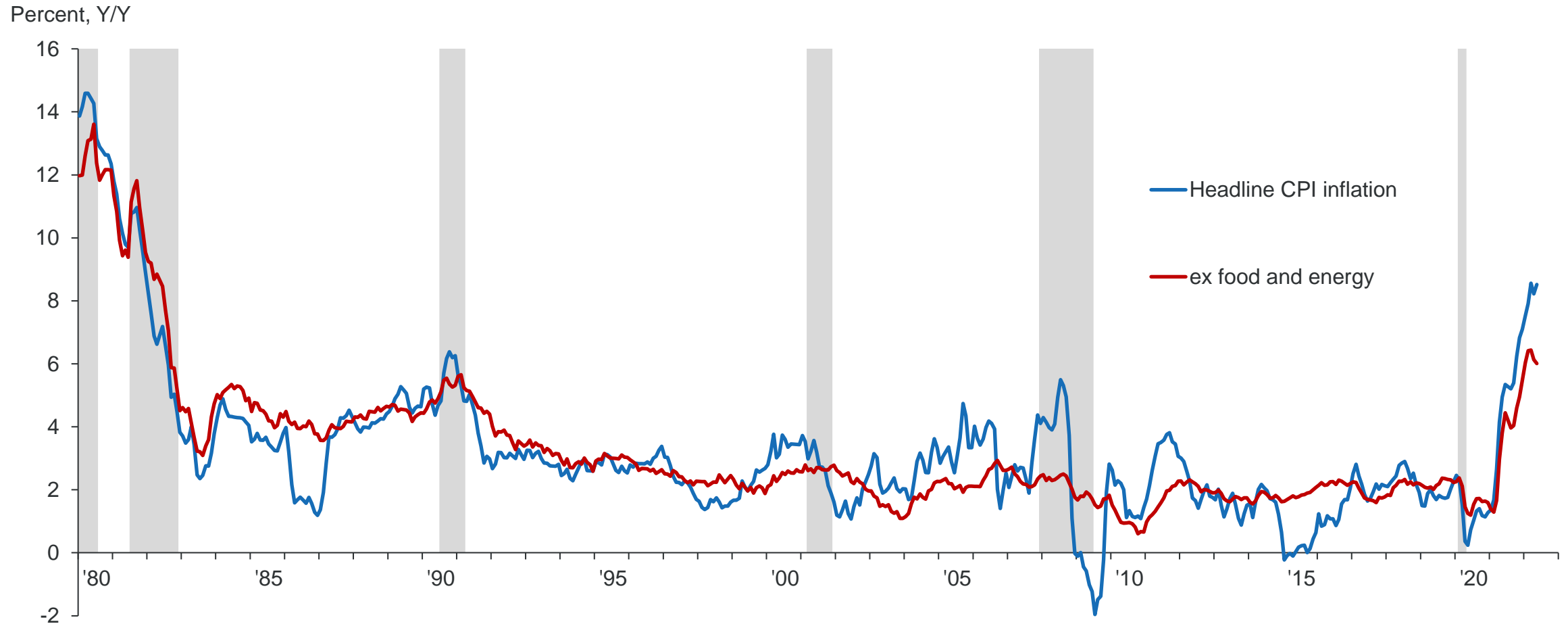
NOTES: Data through May 2022..

SOURCES: Bureau of Labor Statistics.

Why are there so many different price indexes and measures of inflation?

- Different groups typically care about the price changes of some items more than others.
- For example, households are particularly interested in the prices of items they consume, such as food, utilities, and gasoline,
 - while commercial companies are more concerned with the prices of inputs used in production, like the costs of raw materials (coal and crude oil), intermediate products (flour and steel), and machinery.
- Consequently, a large number of price indexes have been developed to monitor developments in different segments of an economy

U.S. CPI inflation highest since 1982



NOTES: Data through May 2022. Shaded bars indicate U.S. recessions.

SOURCES: Bureau of Labor Statistics; National Bureau of Economic Research.

Why are there so many different price indexes and measures of inflation?

- The most broad-based price index is the GDP deflator, as it tracks the level of prices related to spending on domestically produced goods and services in an economy in a given quarter.
- The CPI and the PCE price index focus on baskets of goods and services consumed by households.
- The producer price index (PPI) focuses on selling prices received by domestic producers of goods and services; it includes many prices of items that firms buy from other firms for use in the production process.
- There are also price indexes for specific items such as food, housing, and energy.

What is “underlying” inflation?

- Some price indexes are designed to provide a general overview of the price developments in a broad segment of the economy or at different stages of the production process.
- Because of their comprehensive coverage, these aggregate (also called “total,” “overall,” or “headline”) price indexes are of considerable interest to policymakers, households, and firms.
- However, these measures by themselves do not always give the clearest picture of what the “more sustained upward movement in the overall level of prices,” or underlying inflation, happens to be.
- This is because aggregate measures can reflect events that are exerting only a temporary effect on prices

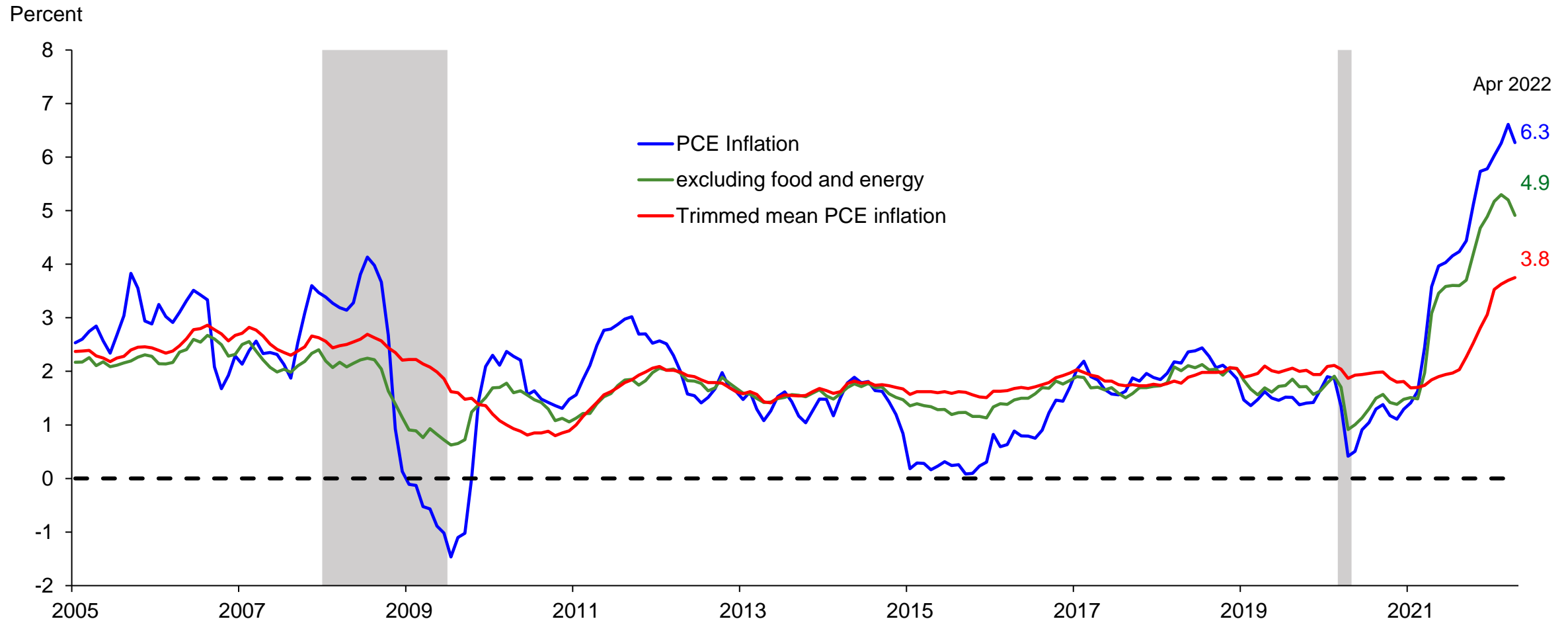
What is “underlying” inflation?

- For example, if a hurricane devastates the Florida orange crop, orange prices will be higher for some time.
- But that higher price will produce only a temporary increase in an aggregate price index and measured inflation.
- Such limited or temporary effects are sometimes referred to as “noise” in the price data because they can obscure the price changes that are expected to persist over medium-run horizons of several years—the underlying inflation rate.

What is “underlying” inflation?

- Underlying inflation is another way of referring to the inflation component that would prevail if the transitory effects or noise could be removed from the price data.
- From the perspective of a monetary policymaker, it is easy to understand the importance of distinguishing between temporary and more persistent (longer-lasting) movements in inflation.
- If a monetary policymaker viewed a rise in inflation as temporary, then she may decide there is no need to change interest rates, but if she viewed a rise in inflation as persistent, then her recommendation might be to raise interest rates in order to slow the rate of inflation.
- Consumers and businesses can also benefit from differentiating between temporary and more persistent movements in inflation.
- For these reasons, a number of alternative measures have been developed to measure underlying inflation.

Inflation pressures started in sectors hard hit by COVID but have broadened out



SOURCE: Bureau of Economic Analysis. Federal Reserve Bank of Dallas.

What is hyperinflation?

- When inflation is extremely high and typically accelerating (prices are rising rapidly and generally at an increasing pace), an economy experiences hyperinflation, which is usually associated with or can cause social upheaval and civil unrest.
- The best known example of hyperinflation occurred in Germany between World War I and World War II.
- More recent examples include Venezuela starting in 2017, Zimbabwe in the 2000s, and Yugoslavia in the 1990s.
- One common definition of hyperinflation is when inflation is more than 50 percent per month. In some extreme cases, hyperinflation can be so intense that prices double within a matter of days.

What is hyperinflation?



Hyperinflation in Europe during the early 1900s. Prices in Germany skyrocketed during the early 1920s as the country experienced hyperinflation. Consumers needed baskets of money to purchase even small items or even burned the virtually worthless paper marks, the German currency at the time.

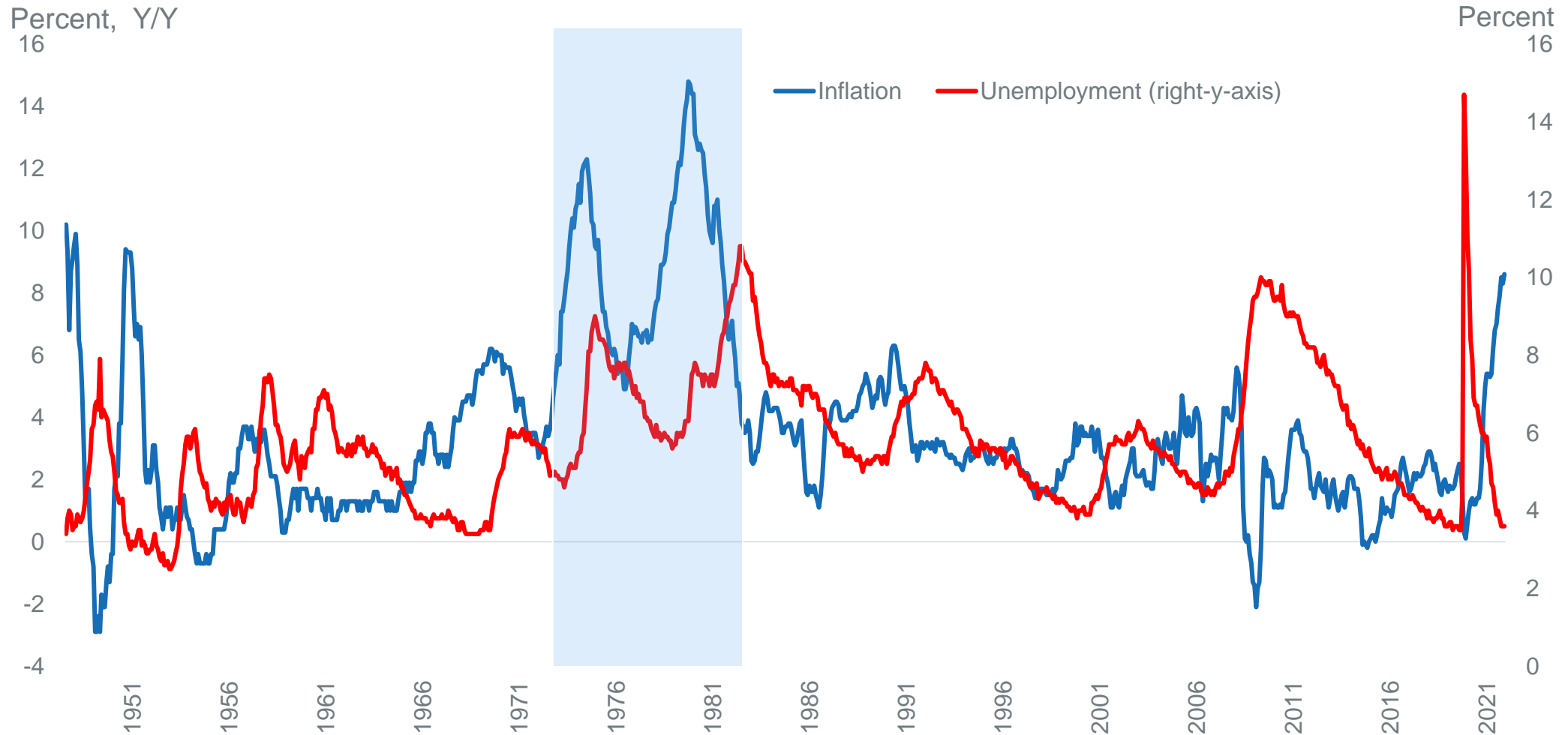
Is disinflation the same as deflation?

- No
- Disinflation refers to a slowdown in the inflation rate, as would be the case if the inflation rate moves from 6 percent to 4 percent. The overall price level is still rising, but at a slower pace than before

What is stagflation?

- Stagflation refers to the combination of relatively high inflation and a very weak economy.
- The US experienced two bouts of stagflation during the 1973–75 and 1980 recessions, when inflation (as measured by the year-over-year change in the CPI) was above 10 percent even as the unemployment rate was rapidly rising

U.S. inflation and unemployment

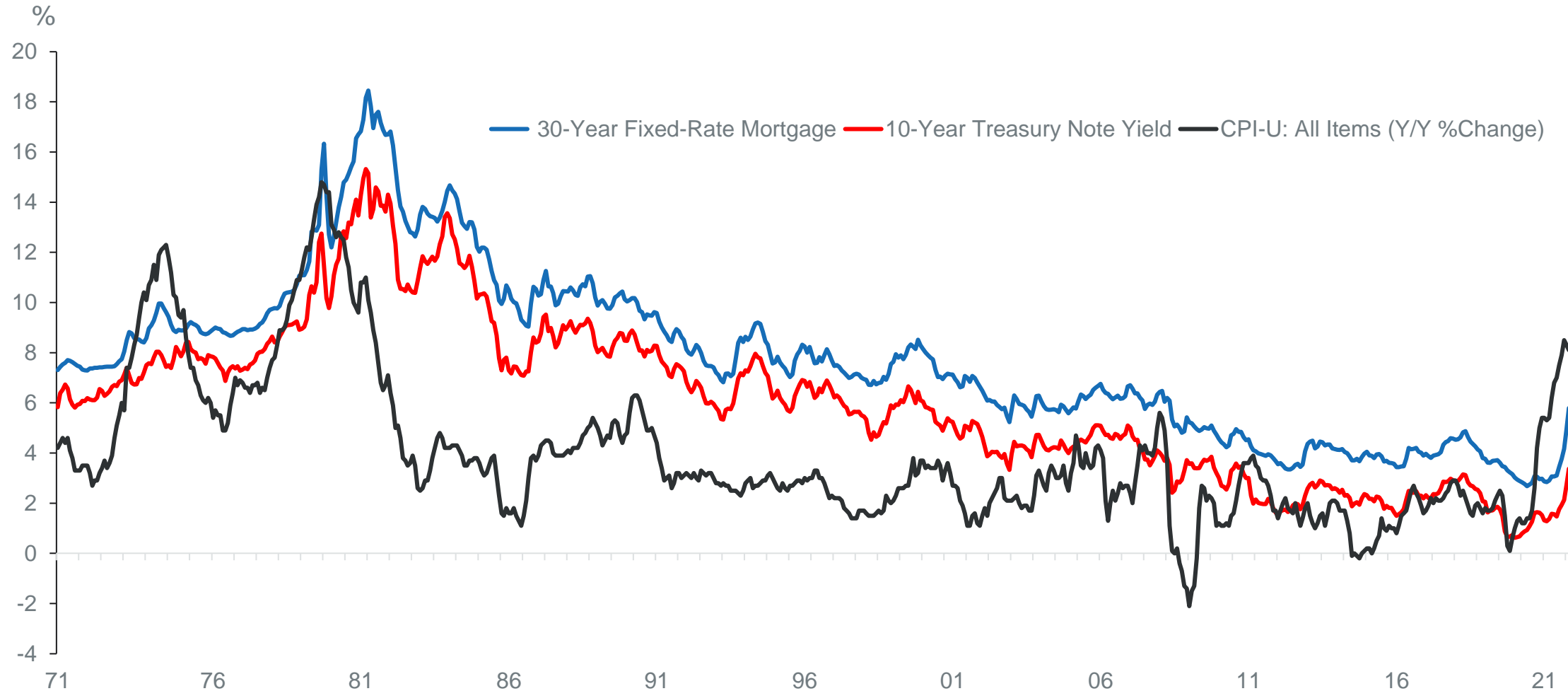


NOTES: Data through May 2022..
SOURCES: Bureau of Labor Statistics.

Why should we care about inflation?

- Inflation affects everyone in the economy, and it often imposes some costs, although it can also provide some benefits.
- High rates of inflation as well as deflation are problematic for an economy.
- The more harmful effects of inflation, however, stem from its unpredictability—that is, the fact that movements in inflation from period to period cannot be perfectly anticipated

Increasing inflation translates into higher nominal interest rates



NOTES: Seasonally adjusted. CPI All Urban Consumers 1982-84=100. Data are through April 2022.

SOURCES: Bureau of Labor Statistics, Federal Home Loan Mortgage Corporation and Federal Reserve Board, adjustments by the Dallas Fed.

What problems does inflation cause?



Menu costs.

Businesses have to update materials in which their prices appear (think of a restaurant that needs to print new menus, or retailers that must print new catalogues or update price tags). At higher inflation rates, these businesses would need to expend more resources to change prices more frequently, or else their prices may be further from their desired level after accounting for the movements of competitors' prices.



Those on fixed incomes lose.

For people whose pensions or incomes are fixed in nominal terms, rising prices reduce the real purchasing power of those incomes and pensions.



Tax implications.

There are also costs associated with tax laws, which generally do not take into account the effects of inflation, especially when calculating capital gains. Even if workers receive wage increases to match inflation, higher wages can raise tax liabilities and result in their after-tax incomes' not keeping up with higher prices.



Shoe-leather costs.

Because higher inflation leads to higher interest rates, people will generally want to economize on the amount of cash that they carry in order to leave more of it in the bank where it can earn interest. Consequently, people will incur the cost of more trips to the bank.

What problems does inflation cause?



Borrowers and lenders

Interest rates specified in loan agreements typically incorporate a component based on the expected rate of inflation over the length of the loan. If inflation turns out to be *higher* than expected, then the *debtor* benefits because the repayment (adjusted for inflation) turns out to be *lower* than what the two parties anticipated. If inflation turns out to be *lower* than expected, then the *creditor* benefits because the inflation-adjusted repayment will be *higher* than what was anticipated by both parties. Consequently, unanticipated inflation transfers wealth across borrowers and lenders arbitrarily.



Savings and investment decisions.

When inflation becomes less predictable, then both consumers and firms will face greater **uncertainty**. Because the decisions of consumers and firms depend on their view of future conditions, greater uncertainty can cause them to alter their plans. For example, higher uncertainty about future inflation will also extend to greater uncertainty about interest rates, wages, taxes, and profits. In response, businesses may delay or postpone hiring decisions and expenditures on new buildings and equipment, while households may cut back on consumption and save more. Both of these types of responses can lead to reduced spending and lower activity in an economy.



Relative price changes.

When the price of an item increases, it is important to know how the size of that price change compares to the sizes of other price changes. For example, when the price of an item increases more than the prices of other items, its **relative price** increases, and consumers will substitute toward relatively cheaper items. If the price change matches those of other items, then the item's relative price has not changed and would not induce a substitution. The more unpredictable inflation is, the harder it is for consumers to determine the relative price change of items and the harder it becomes for them to spend their income efficiently.



The inflation outlook.

When inflation becomes less predictable, consumers and businesses spend more time, attention, and income trying to monitor and forecast inflation, as well as making plans and taking actions to protect themselves from its effects.

Why does the Fed care about inflation?

- Central banks, like the Federal Reserve, are established to foster economic prosperity and social welfare
- As with central banks in many other countries, the Federal Reserve has been given more specific objectives by the government, including those related to inflation, to meet these goals
- In other words, “price stability”

What is the Federal Reserve's "dual mandate"?

- The Federal Reserve is specifically charged by Congress with objectives that were originally established in the Federal Reserve Act of 1913.
- These objectives were clarified in 1977 by an amendment to the Federal Reserve Act that charged the Federal Reserve "to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates."
- The goals of maximum employment and stable prices are often called the "dual mandate."

Does the Federal Reserve have a specific target for inflation?

- In January 2012, the Federal Open Market Committee (FOMC)—the Federal Reserve's body that sets national monetary policy—first published its "Statement on Longer-Run Goals and Monetary Policy Strategy."
- In the statement, the FOMC announced that it believed that "inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures, is most consistent over the longer run with the Federal Reserve's statutory mandate."
- Thus, the FOMC's 2 percent PCE inflation objective was born.

Does the Federal Reserve have a specific target for inflation?

- The FOMC still views 2 percent inflation over the longer run as its definition of price stability.
- To reach this longer-term goal and to promote maximum employment, the FOMC indicated that it would now seek to achieve inflation that averages 2 percent over time.
- From a practical standpoint, this means that when inflation has been running persistently below 2 percent, the FOMC will likely aim to achieve inflation moderately above the 2 percent target for some time in order to return the average to 2 percent.
- This strategy is termed “flexible average inflation targeting,” or FAIT.

Why doesn't the Federal Reserve set an inflation strategy target of 0 percent?

- Even though inflation entails a variety of costs for society, most central banks—including the Federal Reserve—do not aim to have zero inflation.
- Economists tend to focus on two benefits of having a small but positive amount of inflation in an economy.
 - The first benefit of low, positive inflation is that it helps to buffer the economy from falling into deflation, which entails just as many problems as inflation, if not more.
 - The second benefit of a small amount of inflation is that it may improve labor market efficiency by reducing the employers' need to lower workers' nominal wages when economic conditions are weak.
- This is what is meant by a modest level of inflation serving to "grease the wheels" of the labor market by facilitating real wage cuts.

Does the Fed focus on underlying inflation because it doesn't care about certain price changes?

- Monetary policymakers typically devote considerable time to discussing measures of underlying inflation, and that attention is sometimes interpreted as a lack of awareness or concern on their part with certain price changes, such as those of food or energy.
- But policymakers are concerned with all price changes, and they look at a large number of indicators when deciding on what actions to take to meet their objectives.

Does the Fed focus on underlying inflation because it doesn't care about certain price changes?

- For policymakers of the Federal Reserve, it is important to recognize that measures of underlying inflation serve as a guide for the conduct of policy and not as an objective of policy.
- One of the objectives of monetary policy is 2 percent total inflation as measured by the PCE price index, and this objective includes food and energy.
- But when deciding what actions to take to meet this objective, policymakers need to understand which prices changes are likely to be short-lived and which are likely to persist in order to choose the appropriate policy actions.
- Measures of underlying inflation provide policymakers with insights into which movements in aggregate inflation are likely to be transitory and thereby help them to undertake the actions best suited to achieve desired outcomes.

Thank you!

Source: <https://www.clevelandfed.org/en/our-research/center-for-inflation-research/inflation-101>

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