Congressional Budget Office
*Nonpartisan Analysis for the U.S. Congress*

# A Visual Guide to Inflation From 2020 Through 2023

September 2024

# This slide deck summarizes inflation patterns before, during, and after the pandemic.

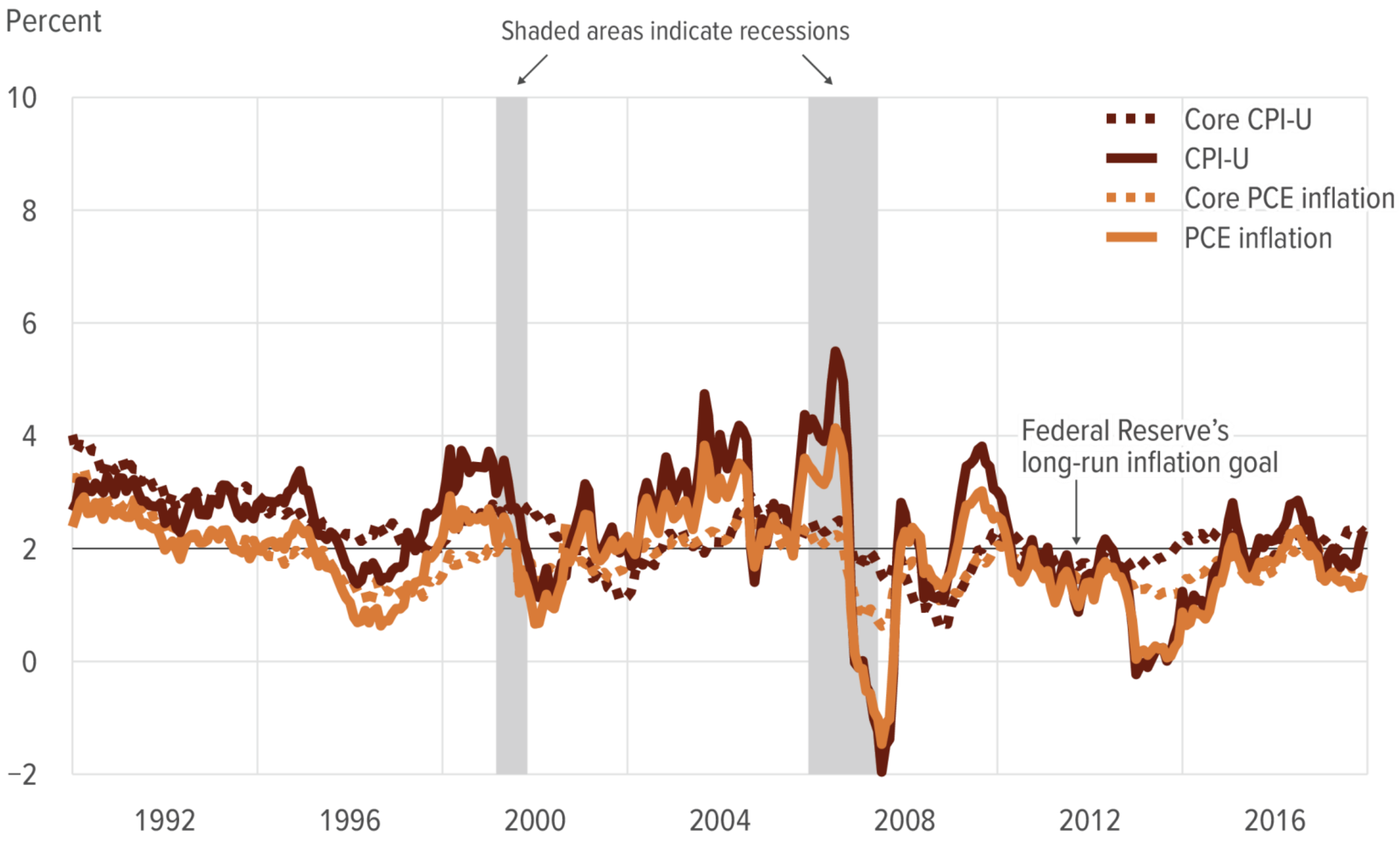
Inflation, the rate at which prices rise over a given period, had been low and stable for the two decades before the pandemic. In early 2020, economywide inflation hovered around the Federal Reserve’s long-run target of 2 percent.

When the pandemic began in 2020, inflation initially fell as many people reduced their social interactions and lessened their consumption of in-person services.

Inflation rose in 2021, driven by supply-side disruptions and heightened demand. Both factors were results of the pandemic and of policies put in place to assist firms and consumers. High inflation continued into 2022 and rose even further that year, propelled by soaring shelter costs, food prices, and energy prices. Rising shelter costs were driven by pandemic-induced demand shifts, whereas increasing food and energy costs followed Russia’s invasion of Ukraine in early 2022.

In 2023, inflation began to cool and approached the Federal Reserve’s long-run goal of 2 percent. Weakening demand for goods and slowing shelter costs combined with softening in food and energy markets brought inflation down.

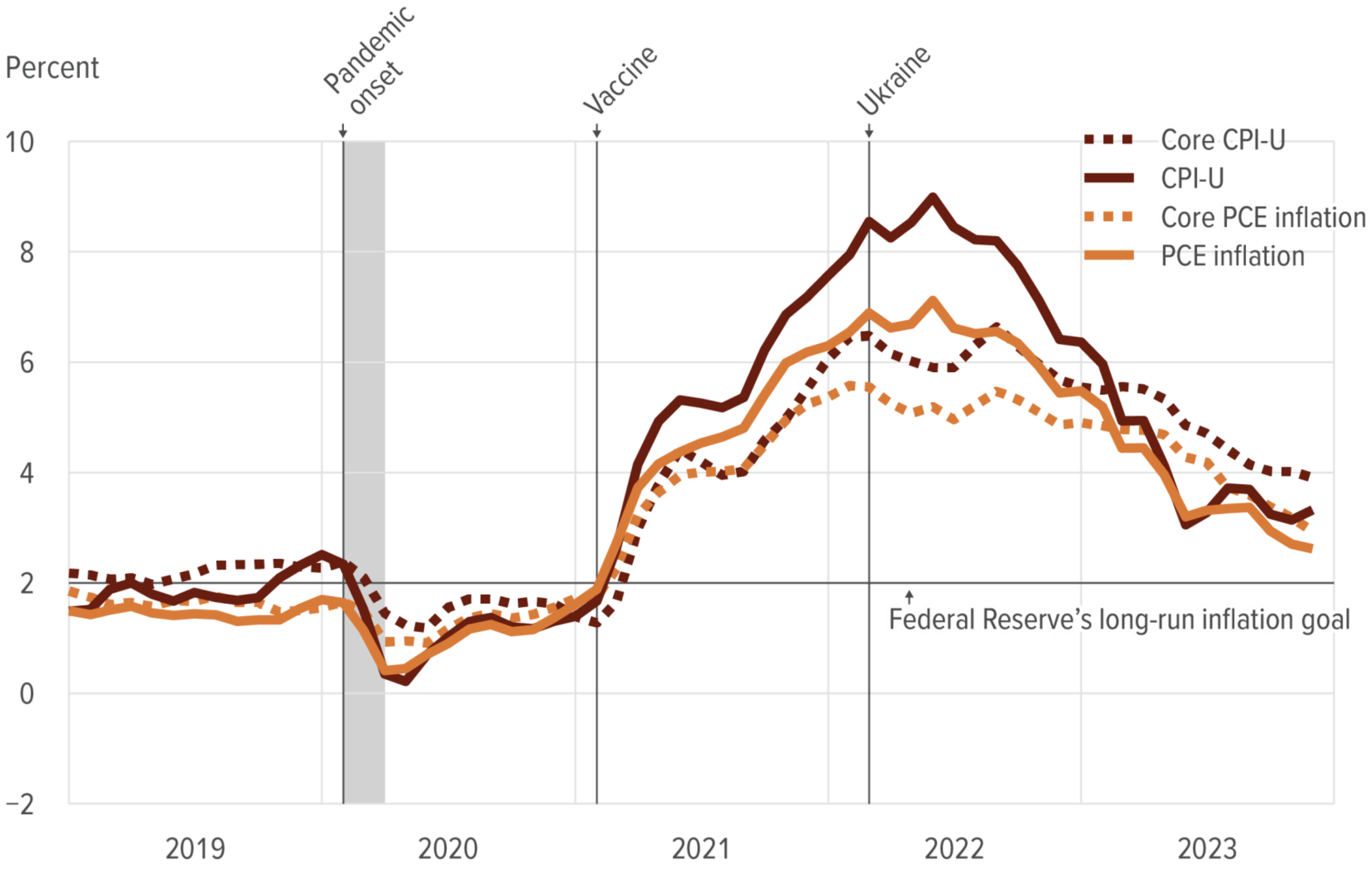
# Inflation Before 2020




For more than two decades before the pandemic, inflation was low and stable, staying near the Federal Reserve's long-run goal of 2 percent.

CPI-U = consumer price index for all urban consumers; PCE = price index for personal consumption expenditures. Core indexes exclude food and energy prices. Growth rates in this section are in year-over-year terms.

# Inflation (2020 Through 2023)




Inflation initially declined when the pandemic began in 2020 and then surged starting in March 2021.

Inflation has fallen since summer 2022 but by the end of 2023 remained higher than before the pandemic.

Shaded areas represent recessions.

# Inflation in the CPI-U and the PCE Price Index

Inflation in the CPI-U outpaced inflation in the PCE price index for three reasons:

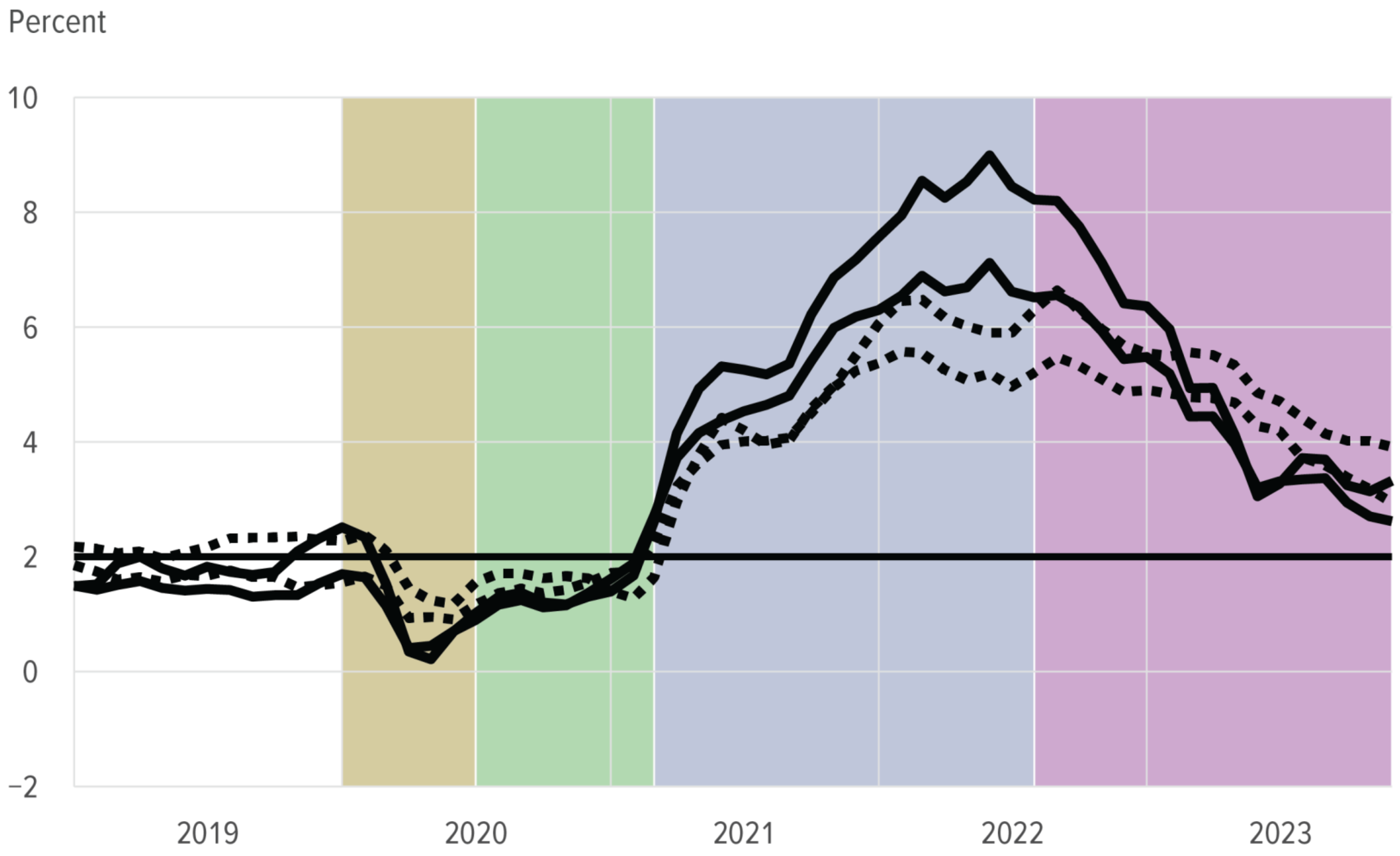
1. Components receive different amounts of weight in each index. For example, some indexes that experienced high inflation in 2022, such as housing services or energy goods and services, are more heavily weighted in the CPI-U than in the PCE price index.

2. The two indexes have different scopes. Unlike the CPI-U, the PCE price index captures expenditures not only by consumers but also by other organizations such as employers and the government on behalf of households. The inclusion of some of those prices causes the PCE price index to grow more slowly than the CPI-U.

3. Inflation in the CPI-U tends to be higher than inflation in the PCE price index because the CPI-U does not account for effects of substitution, whereas the PCE price index allows for substitutions between goods during the year as people buy different items when prices change.

Housing services refers to the category of shelter services, which, as defined by the Bureau of Labor Statistics, measures the flow of housing services that housing units provide to their occupants. The prices of such services are a component of the PCE price index, whereas home prices are not included in the index.

# Four Periods in the Inflation Story




This visual guide shows inflation's recent history in four periods:

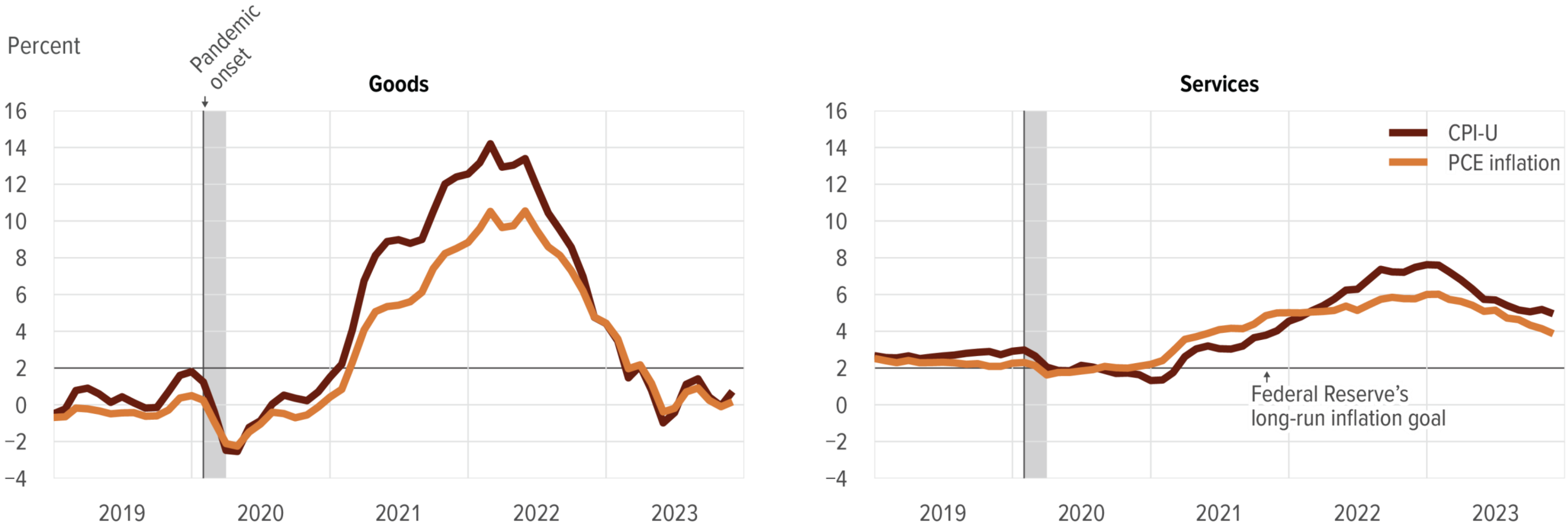
- **the pandemic's onset (January–June 2020)**, including early effects of the pandemic and stimulus;
- **the rebound period (July 2020–February 2021)**, when the economy adapted after the onset of the pandemic;
- **the surge (March 2021–July 2022)**, with a tight labor market, strong demand, and high food and energy prices; and
- **disinflation (August 2022–December 2023)**, when the trend in inflation began to decline.

# Key Inflation Numbers (2020 Through 2023)

| | | PCE price index | | CPI-U | | |
|---|---|---|---|---|---|---|
| **Period** | **Date** | **Overall** | **Core** | **Overall** | **Core** | **Notes** |
| Onset | January 2020 | 1.7 | 1.6 | 2.5 | 2.3 | At the beginning of 2020, inflation is similar to its averages over the past two decades of 1.8 percent for the PCE price index and 2.2 percent for the CPI-U. |
| | March 2020 | 1.1 | 1.5 | 1.5 | 2.1 | Inflation declines as the United States experiences the pandemic and consumer demand plummets. After the sharp and sudden decline in economic activity in March 2020, the U.S. government enacted fiscal aid packages. While the Federal Reserve conducted accommodative monetary policy. |
| | April–May 2020[a] | 0.4 | 0.9 | 0.2 | 1.2 | In spring 2020, overall inflation moderates and halts its initial decline; consumer demand for goods picks up. In April, consumers receive support from the fiscal aid packages and PCE inflation experiences a trough. CPI-U inflation bottoms out in May. |
| Rebound | February 2021 | 1.9 | 1.8 | 1.7 | 1.3 | The economy starts adapting in May 2020, after which inflation slowly rises. In February 2021, inflation nears 2 percent, the Federal Reserve's long-run goal. |
| Surge | April 2021 | 3.7 | 3.2 | 4.1 | 3.0 | Overall inflation rises above 2 percent in March 2021. By April 2021, overall and core inflation move toward 4 percent and 3 percent, respectively, as aggregate demand rebounds with broader vaccination and the end of many stimulative fiscal policies. |
| | February 2022 | 6.5 | 5.6 | 7.9 | 6.5 | Overall and core inflation are both high. Core inflation shows underlying strength as certain core categories, such as housing services, experience a surge in inflation at the start of 2022. In February 2022, just before the invasion of Ukraine, inflation is elevated. |
| | March 2022 | 6.9 | 5.5 | 8.5 | 6.5 | Core inflation remains strong and overall inflation spikes further upward because of surges in food and energy commodity prices in the wake of Russia's invasion of Ukraine. The Federal Reserve begins to unwind the accommodative stance of monetary policy. |
| | June 2022 | 7.1 | 5.2 | 9.0 | 5.9 | Overall measures of inflation peak because of continued upward pressure on oil prices and surging demand in the United States for gasoline and travel. |
| Disinflation | August 2022 | 6.5 | 5.2 | 8.2 | 6.3 | Overall inflation declines, but core inflation stays elevated. |
| | January 2023 | 5.5 | 4.9 | 6.4 | 5.5 | After falling for three consecutive months, inflation rises faster than many experts participating in the *Blue Chip* Consensus Survey or the *Survey of Professional Forecasters* had anticipated at the end of 2022. |
| | December 2023 | 2.6 | 2.9 | 3.3 | 3.9 | Inflation slowed by the end of 2023, but both PCE and CPI-U inflation stayed above prepandemic values. |

a. PCE price index values are from April; CPI-U values are from May.

# Goods Versus Services Inflation (2020 Through 2023)




Pandemic-induced shifts in consumer demand, toward goods and away from services in 2021 and back toward services in 2022, led to distinct inflation trends between goods and services prices. Inflation in 2021 was driven by higher goods prices, whereas higher inflation in 2022 came from higher services prices.

Shaded areas represent recessions.

# Key Goods and Services Inflation Numbers (2020 Through 2023)

| | | Goods inflation | | Services inflation | | |
|---|---|---|---|---|---|---|
| **Period** | **Date** | **CPI-U** | **PCE** | **CPI-U** | **PCE** | **Notes** |
| Onset | January 2020 | 1.8 | 0.5 | 2.9 | 2.3 | In January 2020, goods inflation was similar to its long-run average of 1.3 percent in the CPI-U and 0.4 percent in the PCE price index, and services inflation was similar to its long-run average of 2.7 percent in the CPI-U and 2.5 percent in the PCE price index. |
| | March 2020 | −0.4 | −0.9 | 2.7 | 2.1 | In March 2020, goods inflation in both the CPI-U and PCE price index becomes negative, meaning that prices for goods decline. Services inflation begins slowly easing as the pandemic reaches the United States and consumer demand declines. |
| Rebound | January 2021 | 1.5 | 0.4 | 1.3 | 2.2 | In January 2021, goods inflation nears its long-run average growth rates; goods consumption is now well above its trend before the pandemic because of strong consumer demand. Services inflation reaches lows around this time, with the CPI-U for services growing by just 1.3 percent in January 2021. |
| Surge | April 2021 | 6.7 | 4.1 | 2.6 | 3.6 | After a surge in real goods consumption in March 2021, goods inflation climbs to 4.1 percent. Services inflation also grows faster as services recovery picks up after the wider uptake of vaccines. |
| | February 2022 | 13.2 | 9.6 | 4.8 | 5.0 | Services inflation picks up in the beginning of 2022 while goods inflation continues growing rapidly. In February 2022, goods inflation was already high before the invasion of Ukraine put further upward pressure on food and energy prices. |
| | March 2022 | 14.2 | 10.5 | 5.1 | 5.0 | Goods inflation spikes upward after the invasion of Ukraine and later sanctions on Russian oil; consumption continues to moderate. Services inflation continues on an upward trend as consumption of services nears its prepandemic trend and as inflation in shelter services surges. |
| Disinflation | August 2022 | 10.4 | 8.6 | 6.8 | 5.4 | In August 2022, goods inflation begins to moderate. During this period, goods inflation is declining but still is far above prepandemic norms. Services inflation starts to rise because of continued upward pressure on rents after a boom in house prices in 2021. |
| | December 2022 | 4.8 | 4.8 | 7.5 | 5.8 | In both the CPI-U and PCE price index at the end of 2022, goods inflation falls significantly and services inflation continues slowly increasing. |
| | December 2023 | 0.7 | 0.2 | 5.0 | 3.9 | The second half of 2023 includes some months with declines in goods prices. By the end of the year, goods prices are almost unchanged from a year earlier. Services inflation in the PCE price index and CPI-U slows during 2023 but stays higher than trends before the pandemic. |

# A Closer Look at Key Intervals

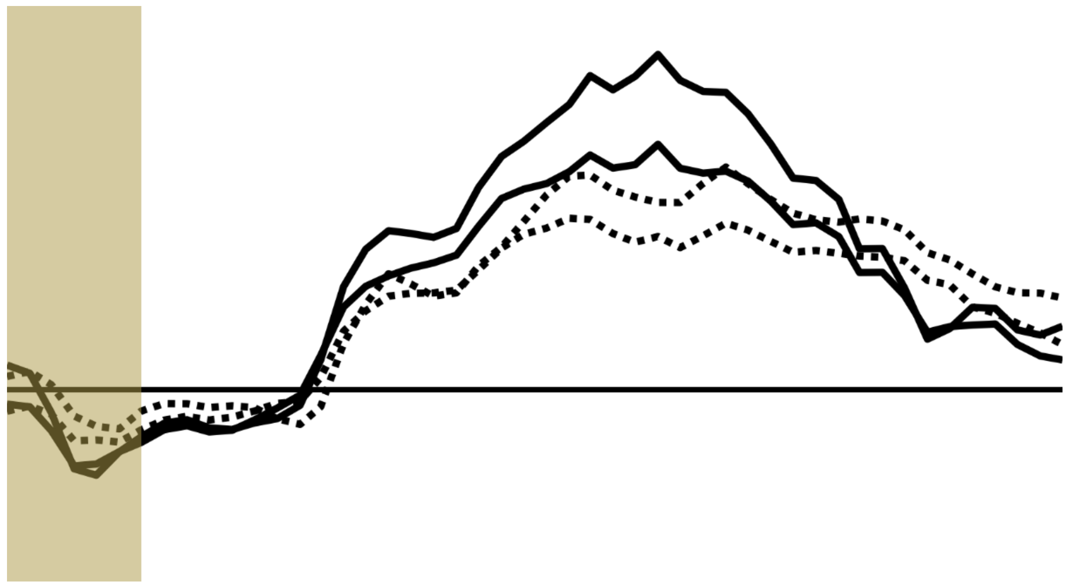
The rest of this presentation focuses on the Federal Reserve's preferred measure of inflation, the PCE price index. The previous section noted key differences in CPI-U and PCE inflation trends over the 2020–2023 period.

Unless otherwise noted, graphs show month-over-month growth rates expressed at annualized rates, which adjust the growth rate from one month to the next to reflect the amount by which inflation would have changed over a year had it continued to grow at that monthly pace. For example, if a price increased by 0.25 percent from December to January, the month-over-month growth rate expressed at an annualized rate for January would be 3.0 percent.

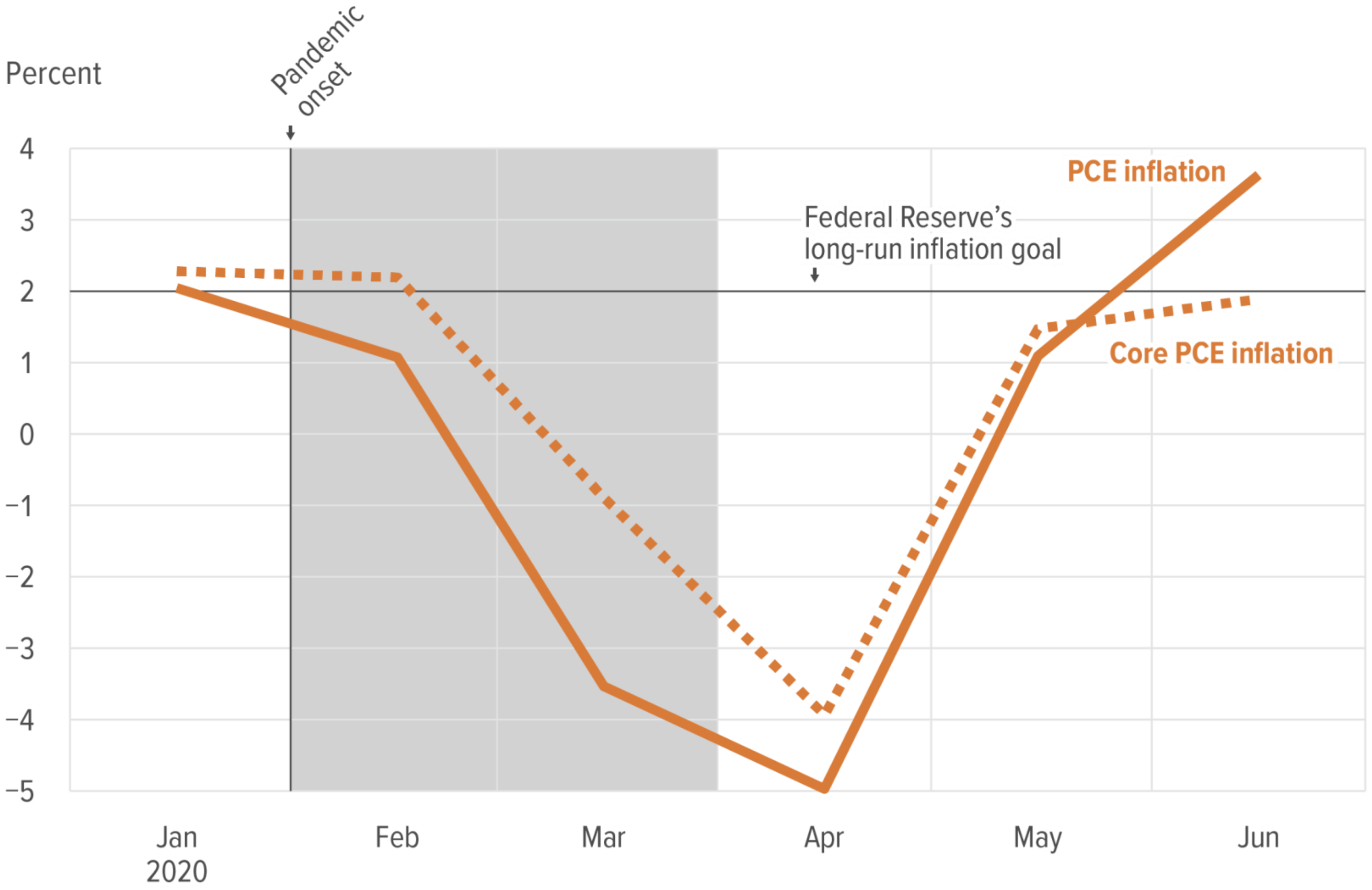
Month-over-month growth rates are often volatile, allowing them to display high-frequency shifts in economic conditions. Some graphs display longer-run trends with less volatile year-over-year growth rates.

# Onset of the Pandemic

January to June 2020



# Onset of the Pandemic

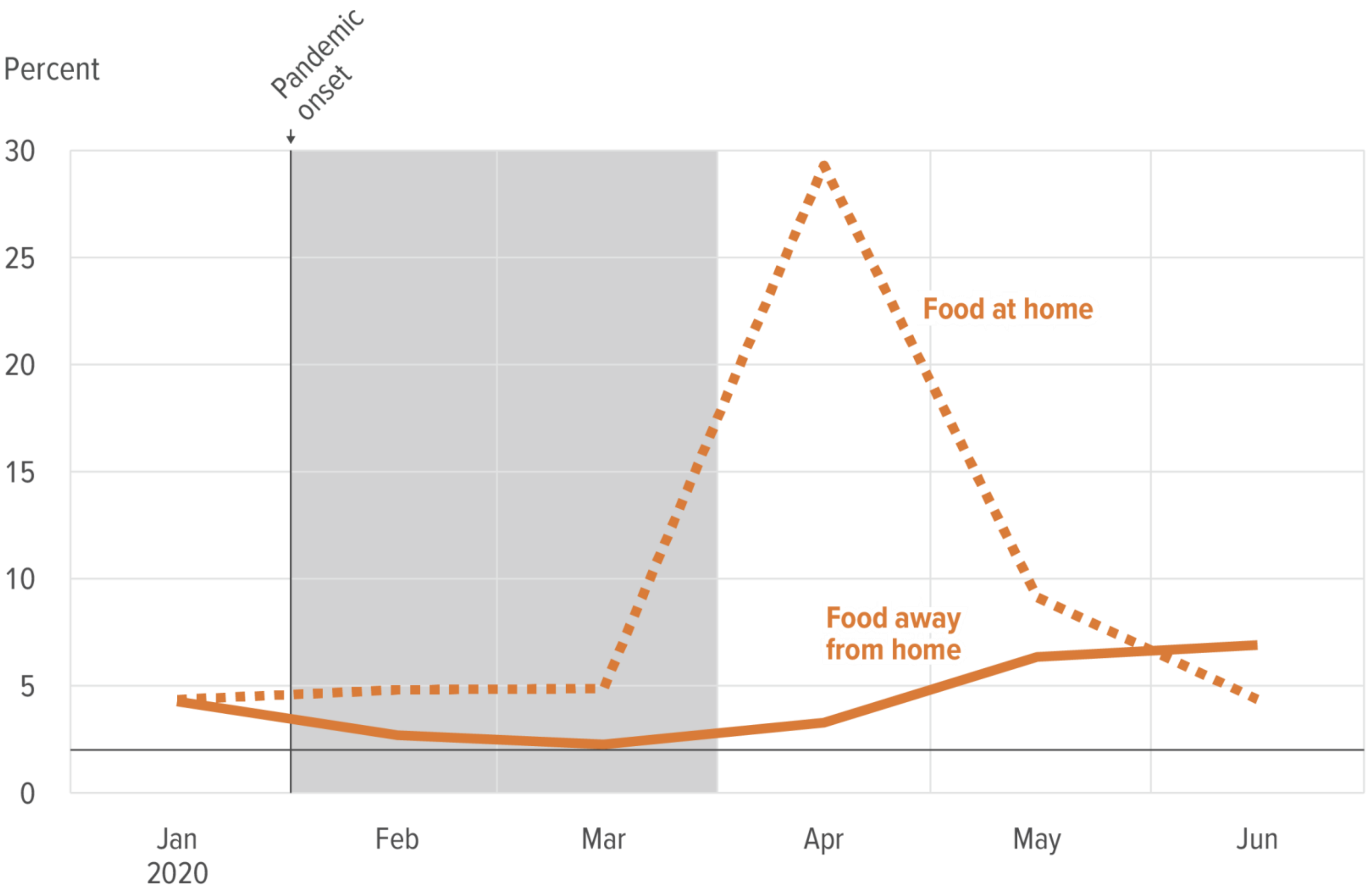



Inflation declined rapidly after a collapse in consumer demand when the pandemic began.

In April 2020, overall PCE inflation fell to −4.9 percent (annualized month-to-month rate) and core PCE inflation fell to −3.9 percent.

Shaded areas represent recessions.

# Food Price Inflation at the Onset of the Pandemic

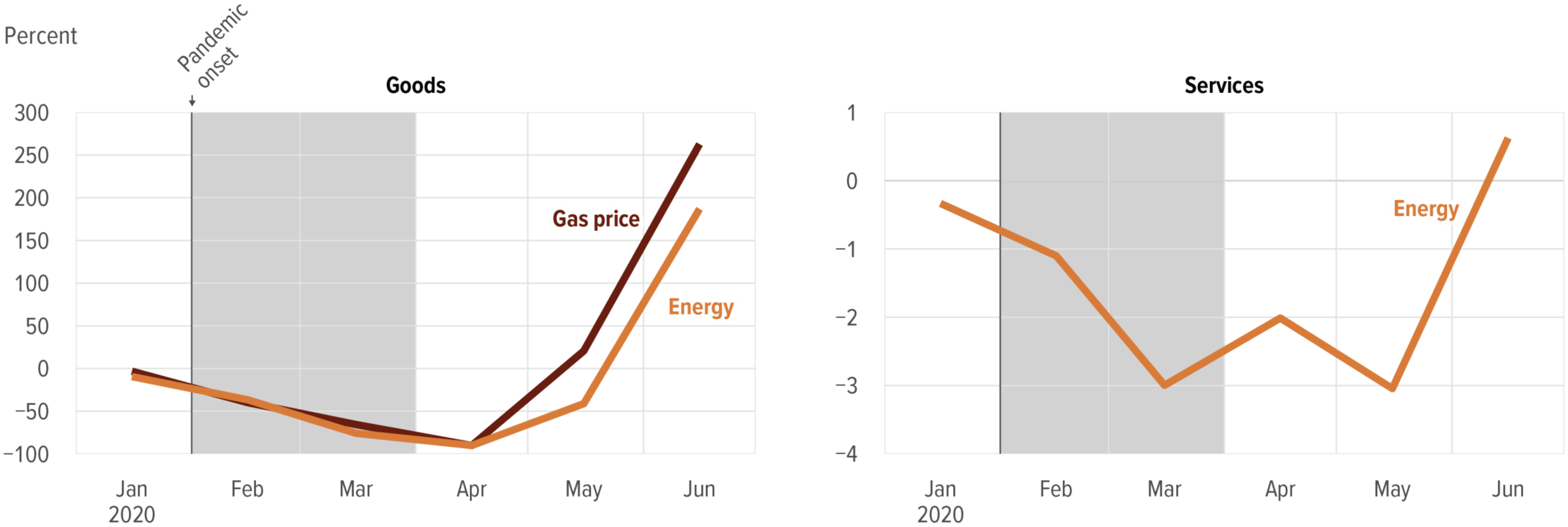



Grocery prices shot up in April 2020 in reaction to the pandemic. Inflation in the PCE price index for food at home reached 29.3 percent in April 2020, the index's highest monthly growth rate since the 1970s.

Prices of restaurant meals, as measured by the PCE index for food away from home, also increased over March–June 2020 as restaurants faced higher operating costs.

Shaded areas represent recessions.

# Energy Price Inflation at the Onset of the Pandemic



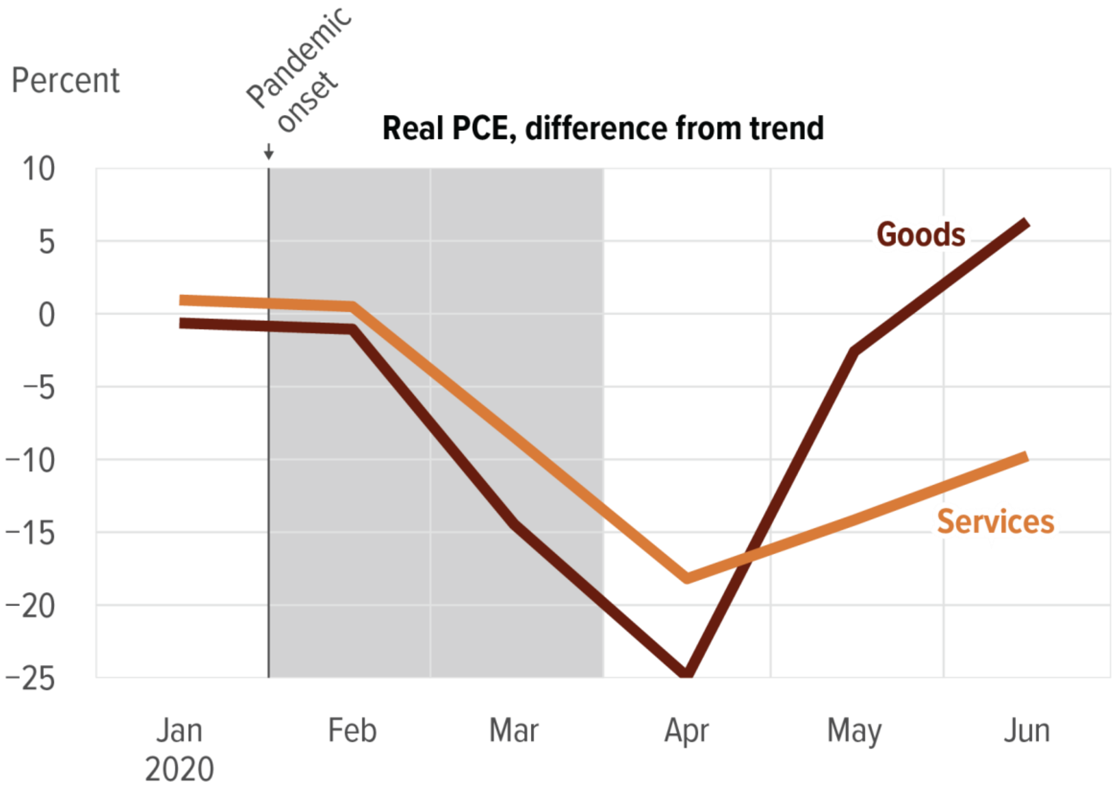

When the pandemic began, energy prices declined as fewer people commuted.

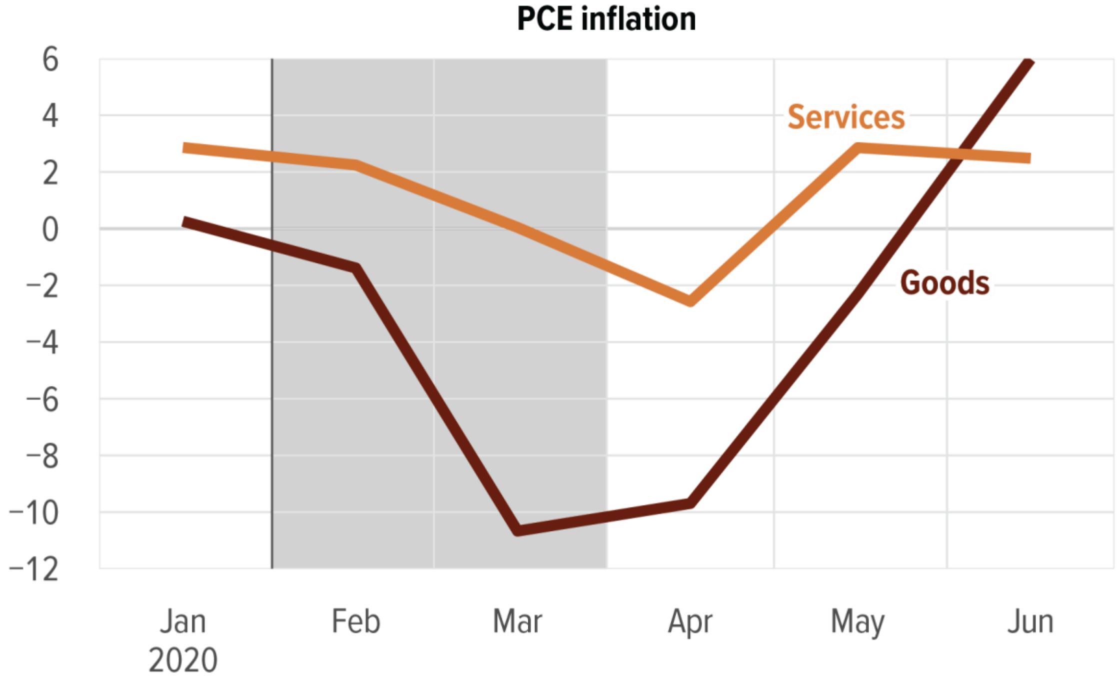
Energy goods inflation increased in May 2020 after a surge of demand for gasoline combined with scaled-back output from OPEC.

In June 2020, inflation in energy services prices increased after higher demand for household electricity owing to more time spent at home.

Gas price = U.S. regular all formulations gasoline price; energy = PCE gasoline and other energy goods and PCE electricity and gas services. Percent change is annualized rate. Shaded areas represent recessions.

# Goods and Services Inflation at the Onset of the Pandemic




When the pandemic began, goods and services inflation declined because of a collapse in consumer demand. But by May 2020, inflation in both goods and services began to near prepandemic trends.

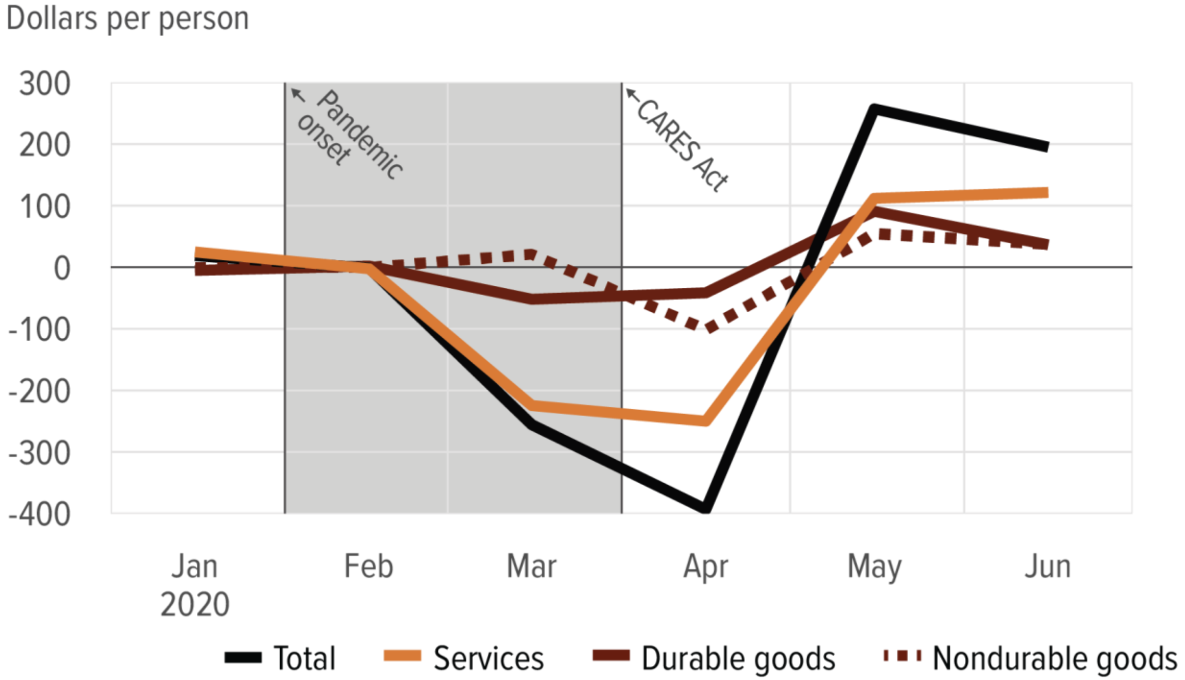
By June, goods inflation surged when demand for goods surpassed firms' ability to meet demand.

By contrast, services inflation stayed lower during the same period because of low demand for in-person services.

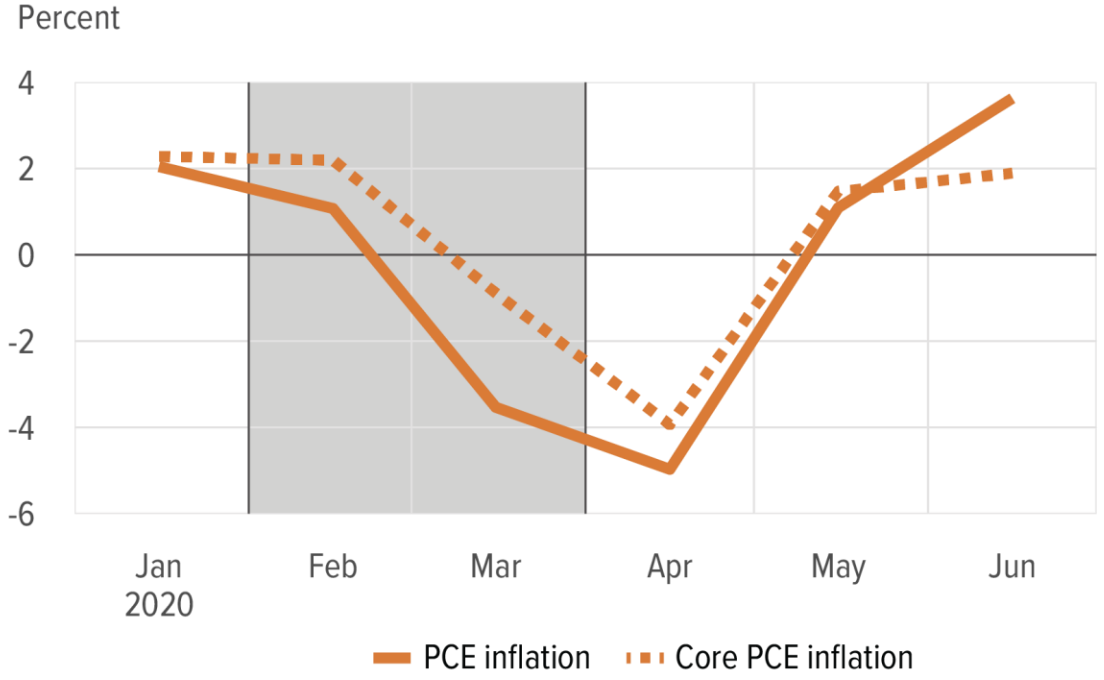
Real PCE = real consumer spending adjusted to remove the effects of inflation. Shaded areas represent recessions.

# Fiscal Policy at the Onset of the Pandemic

**Change in nominal consumer spending**




**Inflation**

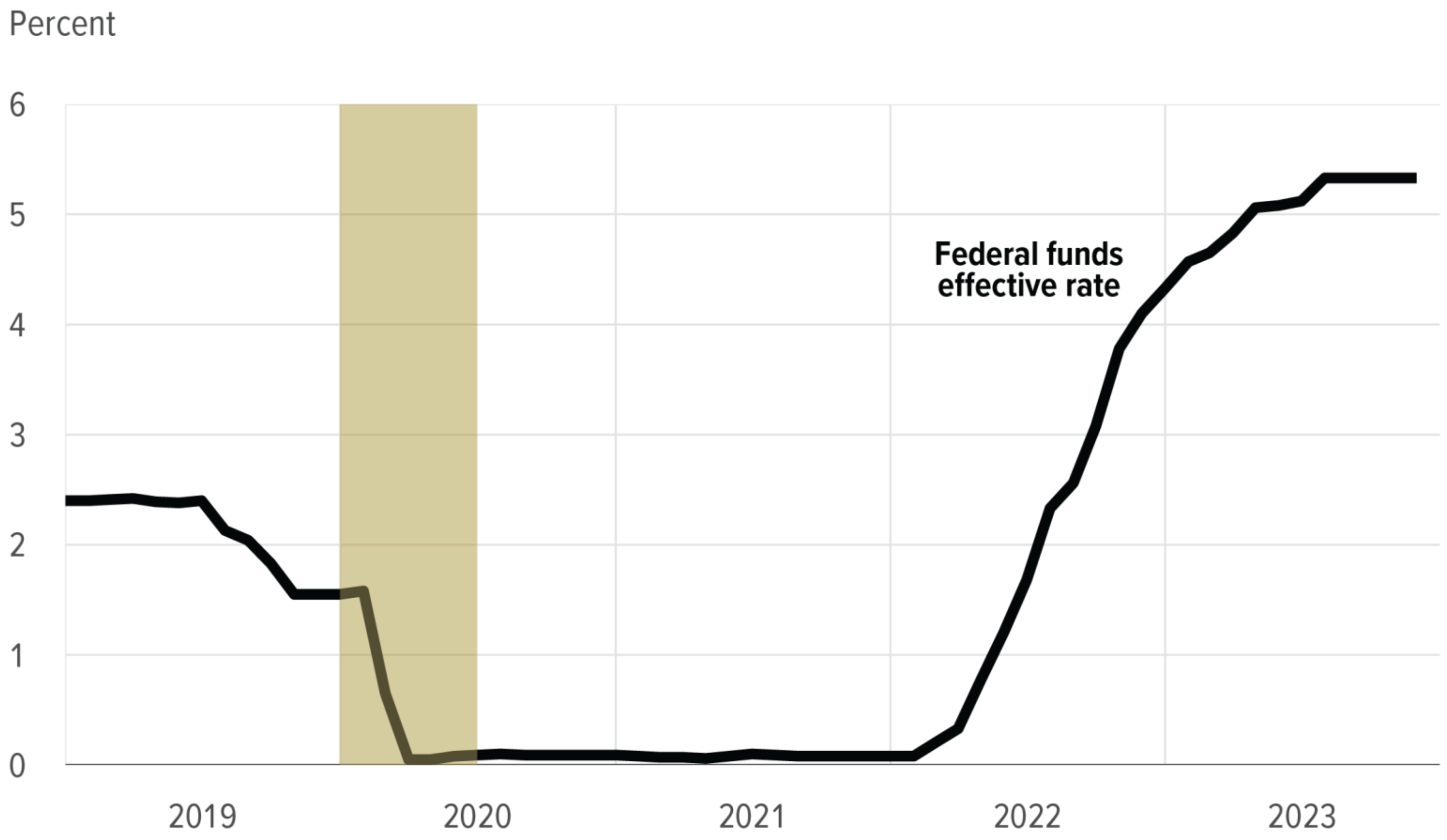



After the sharp decline in economic activity in March 2020, the U.S. government enacted fiscal aid packages, including three rounds of stimulus checks sent to households in 2020 and 2021.

The largest of those fiscal aid packages was the $2.3 trillion (10 percent of GDP) Coronavirus Aid, Relief, and Economic Security (CARES) Act* enacted in March 2020.

*Public Law 116-136. Shaded areas represent recessions. See [www.cbo.gov/publication/56334](http://www.cbo.gov/publication/56334) for more information.

# Monetary Policy at the Onset of the Pandemic

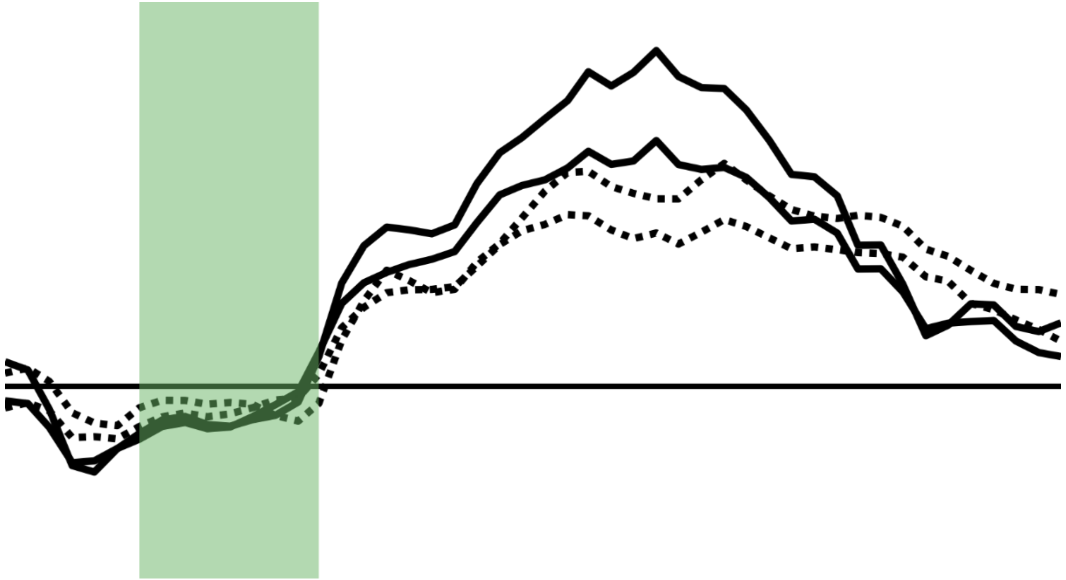



In 2020, the Federal Reserve cut the federal funds rate and held it at zero. The first cut of 50 basis points happened on March 3, with a second of 100 basis points on March 15. Those rate cuts were implemented to help support consumer demand and access to credit.

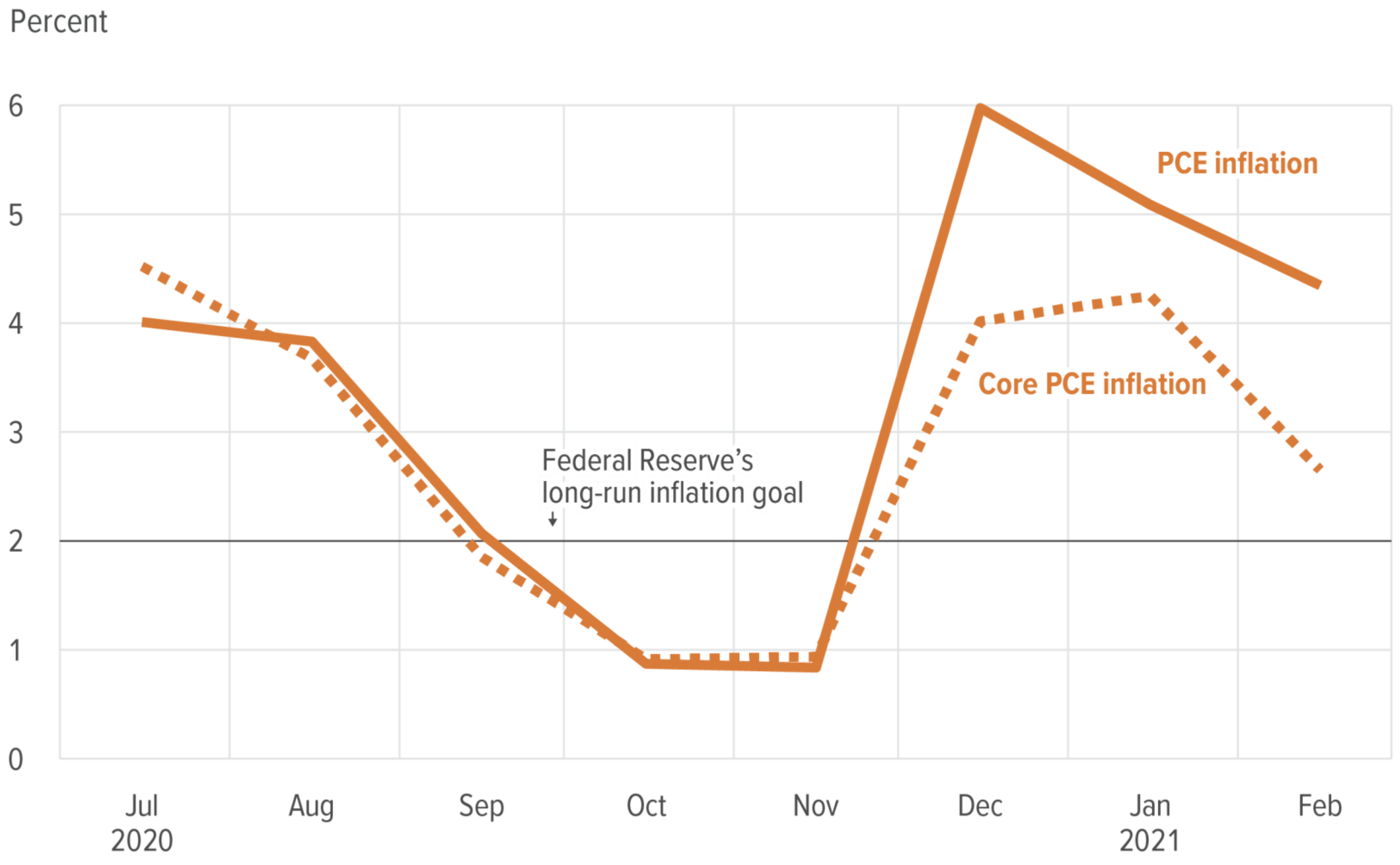
During this period, the Federal Reserve resumed quantitative easing—that is, the purchase of Treasury and mortgage-backed securities to further support the economy.

# The Rebound

July 2020 to February 2021



# The Rebound: July 2020 to February 2021



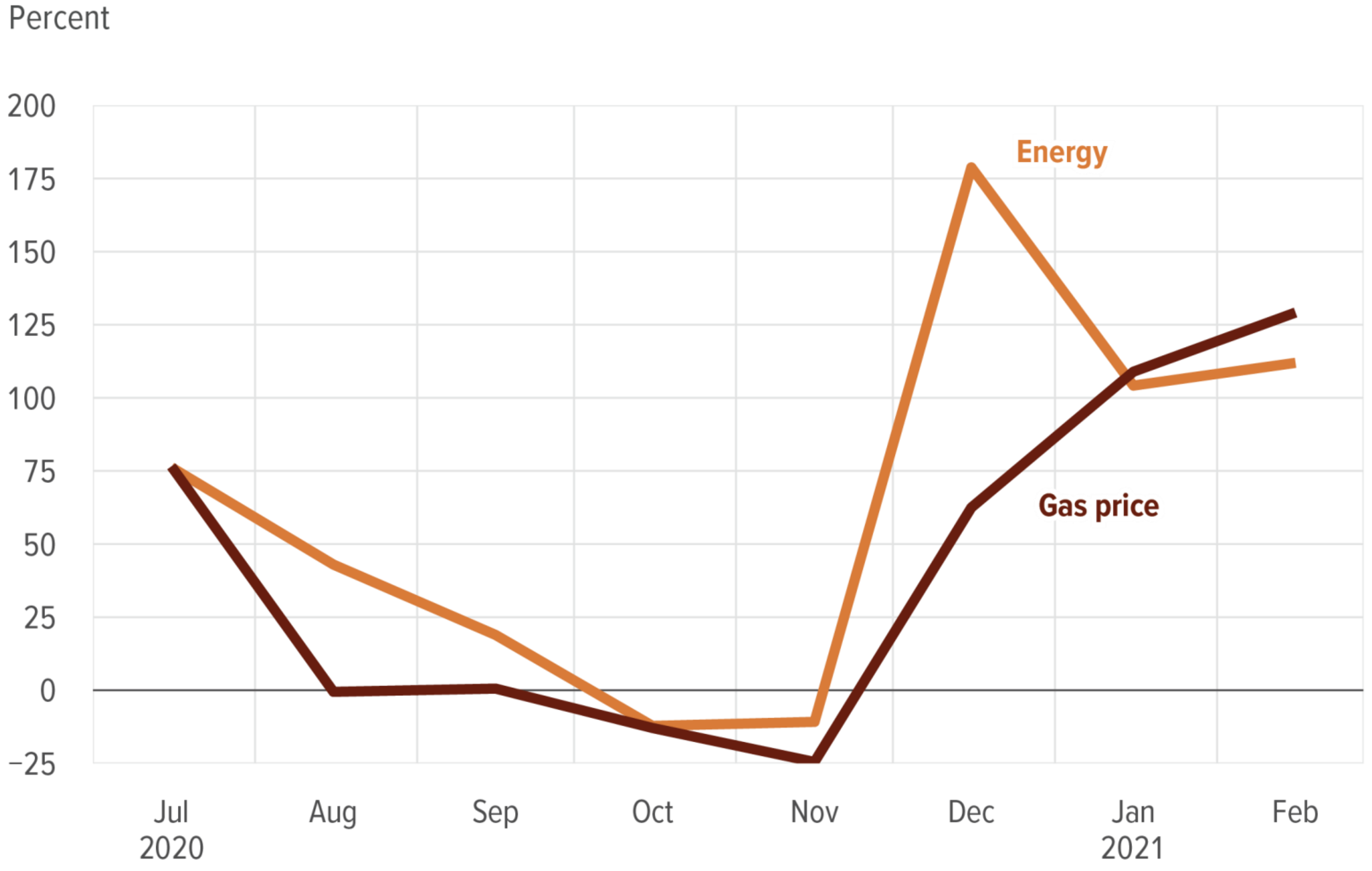

Inflation fluctuated around its long-run average of 2 percent during the initial rebound. Inflation eased below 2 percent between July and November but surged in December.

# Food Price Inflation During the Rebound in Inflation

During the rebound period, food prices increased. From July 2020 to February 2021, the food away from home index increased by an average annualized rate of 4.3 percent—far above the series long-run average of 2.8 percent.

After a period of volatility, inflation in the PCE price index for food at home reached a growth rate of 1.8 percent in February 2021 (the series long-run average growth rate over the two decades before the pandemic). The PCE price index for food at home makes up 8 percent of overall PCE.

# Energy Price Inflation During the Rebound in Inflation

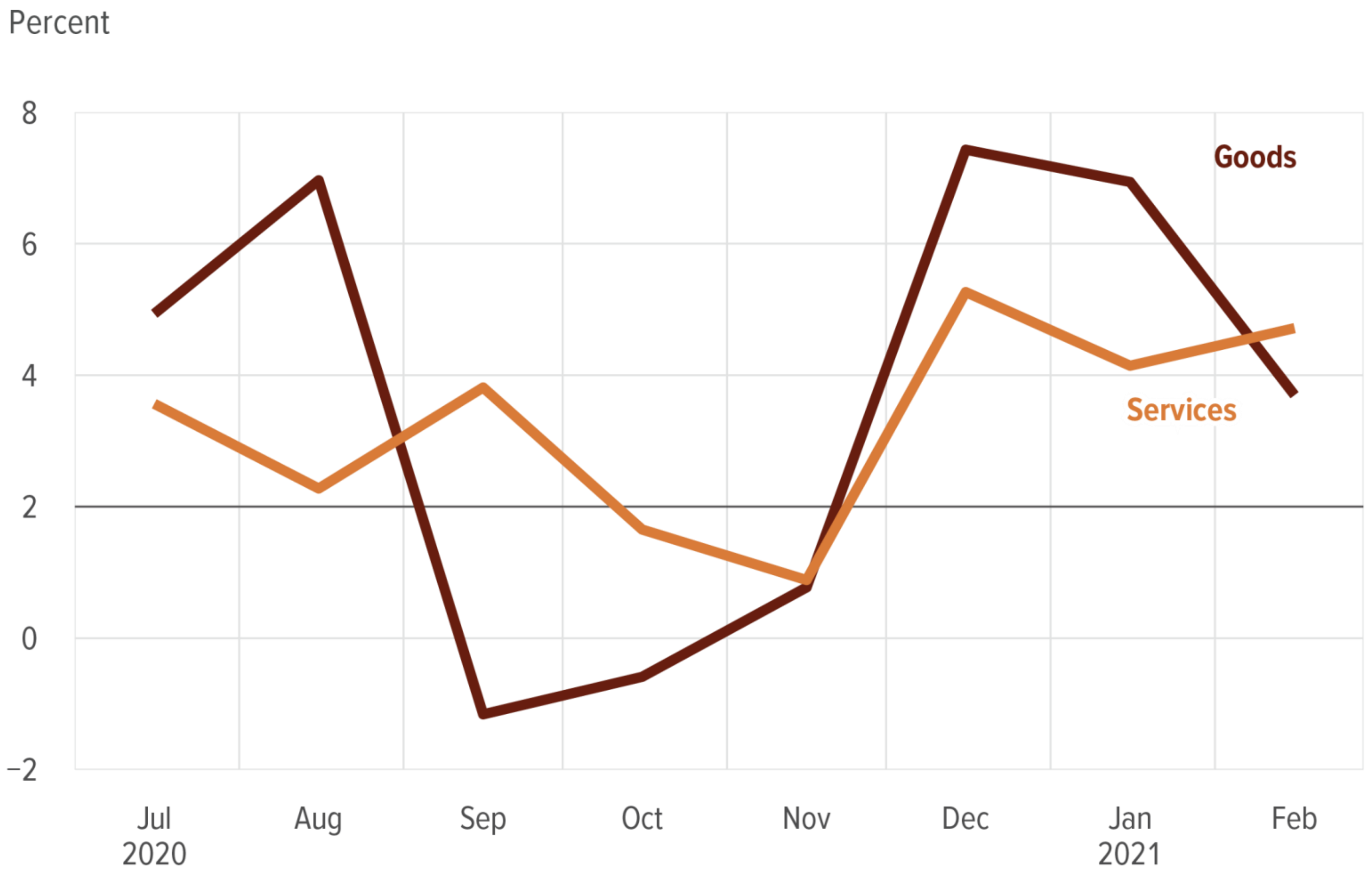



At the end of 2020, energy goods prices began to increase. In December, energy goods inflation surged, propping up overall inflation; inflation in the index for energy goods reached 179 percent.

By February 2021, oil prices rose to $59 per barrel (after a low of $16.60 in April 2020). As a result, in February gas prices rose by 129.2 percent and energy goods prices rose by 112.0 percent.

Gas price = U.S. regular all formulations gasoline price; energy = PCE gasoline and other energy goods. Percent change is annualized rate. The December annualized growth rate of 179 percent reflects an increase of 8.9 percent from November to December.

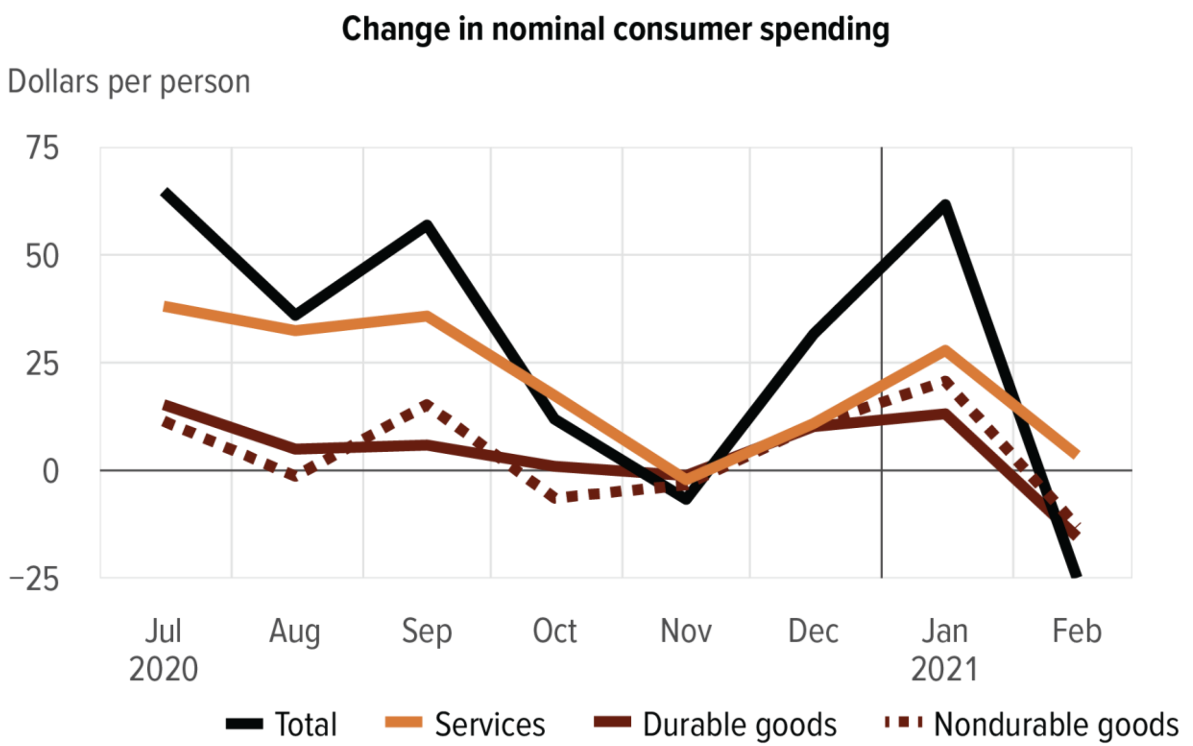
# Goods and Services Inflation During the Rebound in Inflation

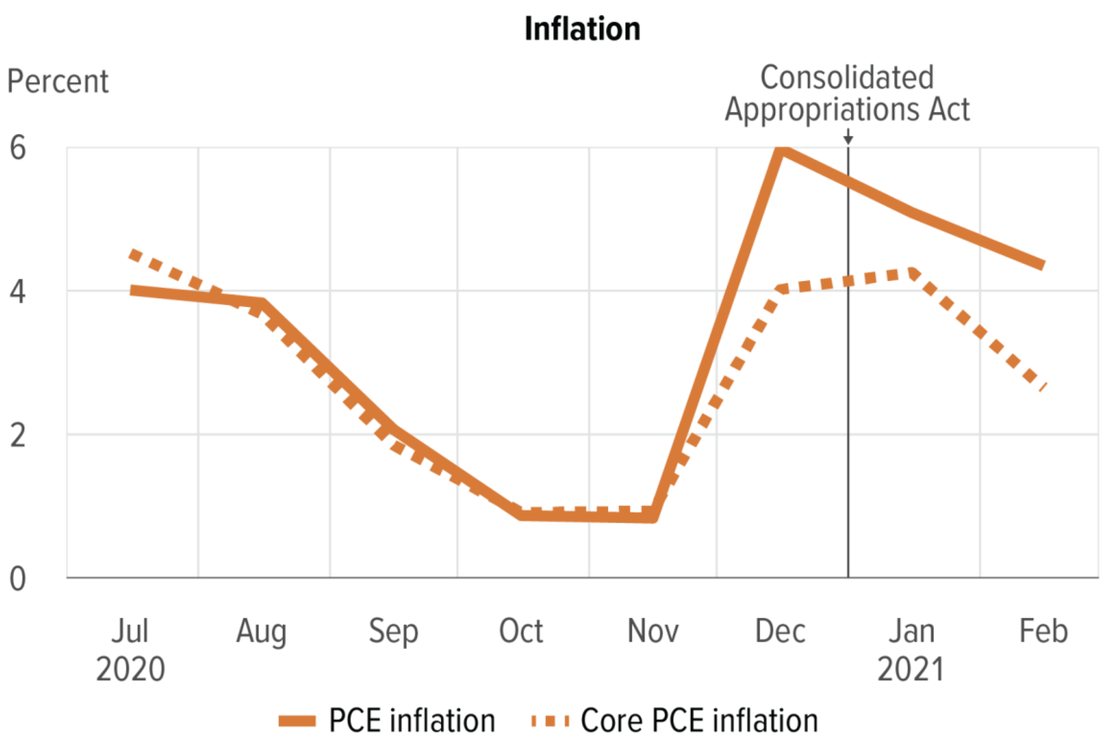



Goods inflation remained elevated and volatile during the rebound period.

Services inflation remained steadier as weak demand for in-person services offset rising costs for many in-person services.

# Fiscal Policy During the Rebound in Inflation



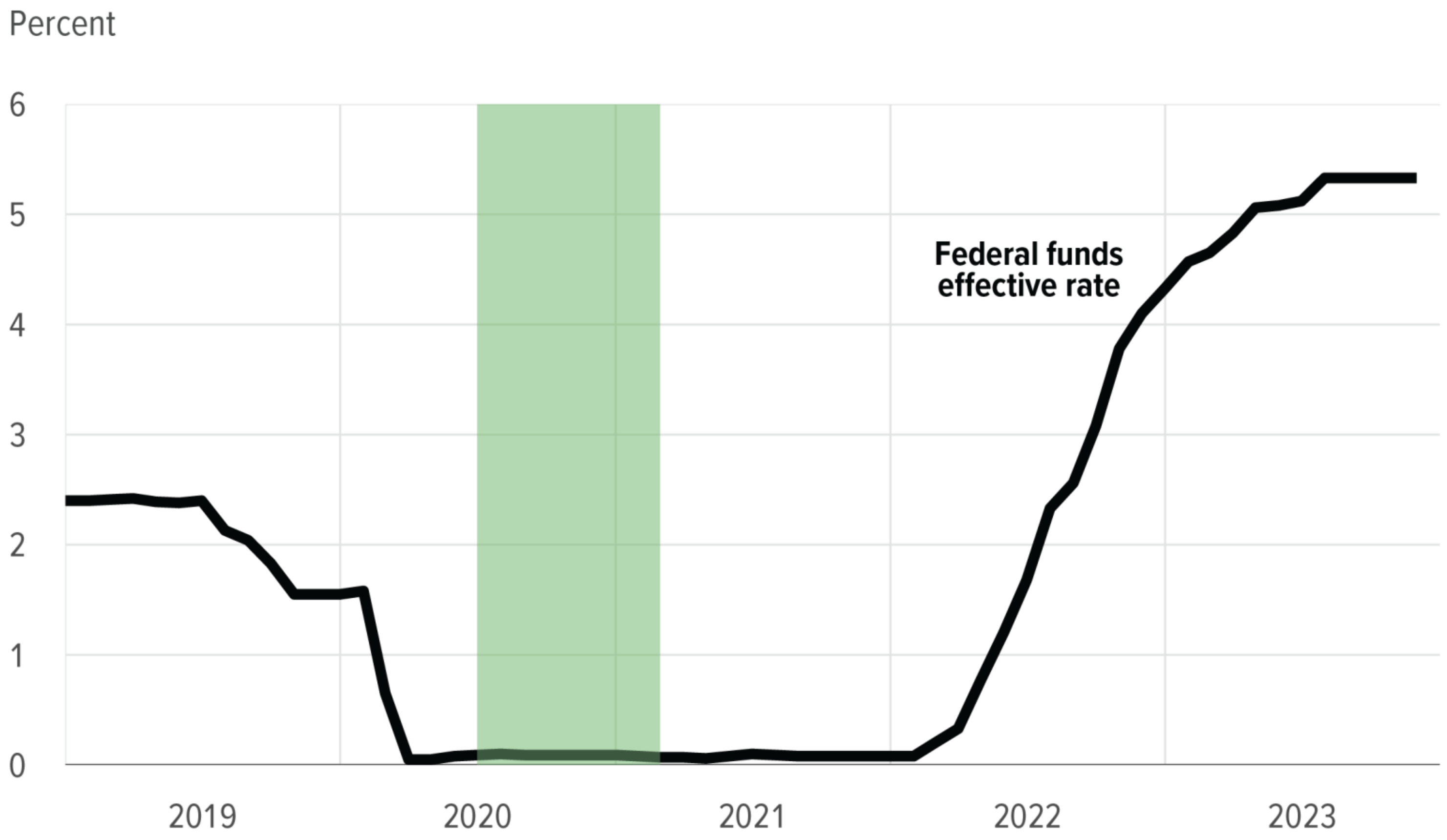




In December 2020, an additional $900 billion (4 percent of GDP) in fiscal aid was enacted as part of the Consolidated Appropriations Act, 2021,* with fiscal aid checks disbursed to households in January 2021. Consumer spending reacted quickly.

Most measures of inflation were growing above 2 percent because of high supply-chain stress and strengthening demand during this time.

*P.L. 116-260. See www.cbo.gov/publication/56913 for more information.

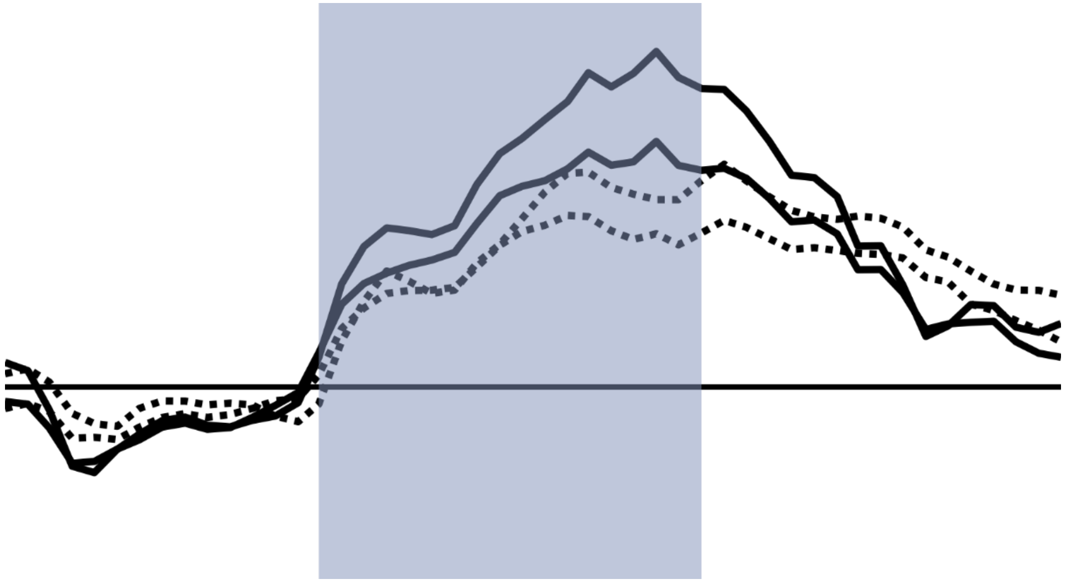
# Monetary Policy During the Rebound in Inflation



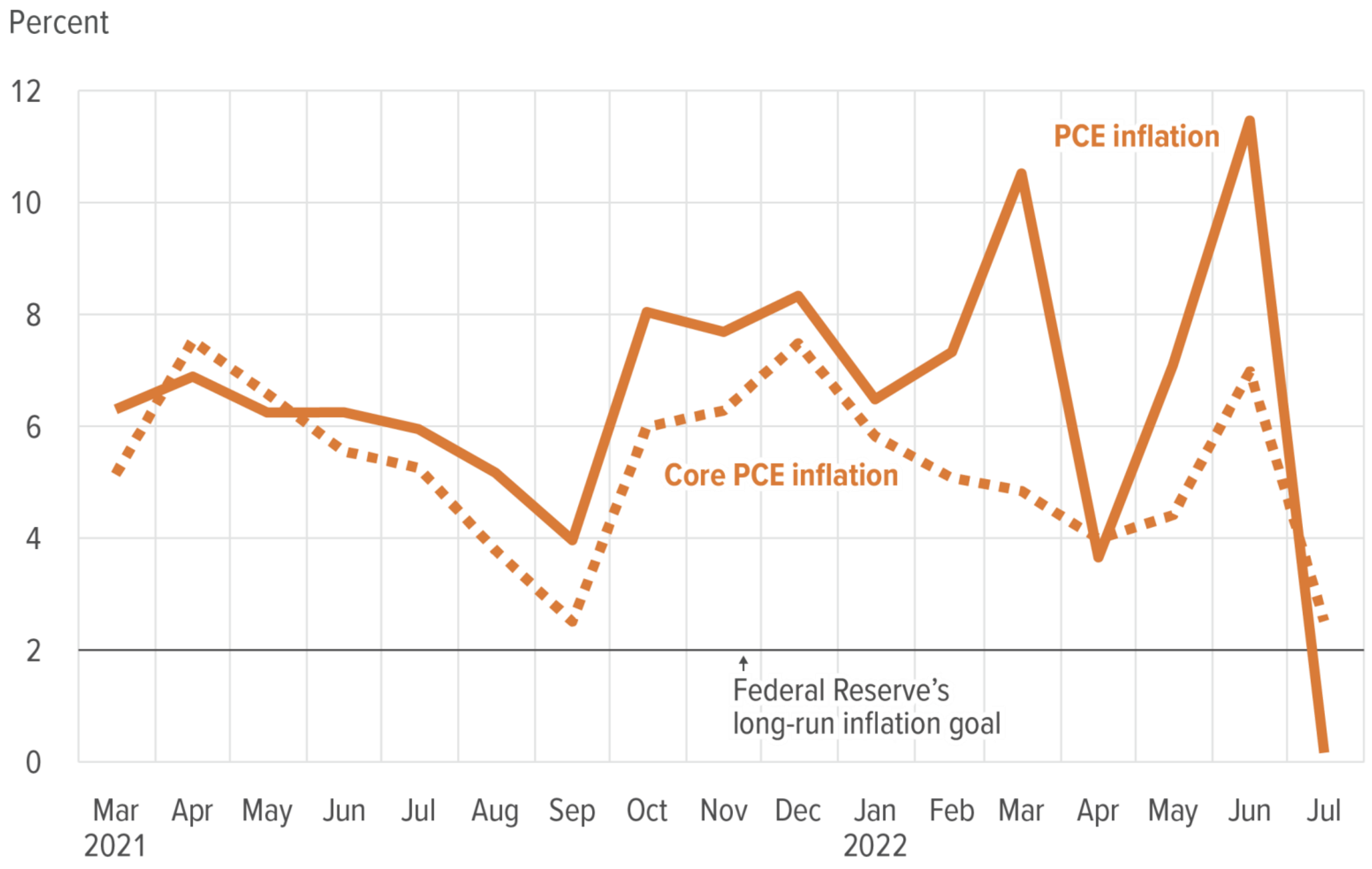

The Federal Reserve continued holding the federal funds rate at zero during the rebound.

# The Inflation Surge

March 2021 to July 2022

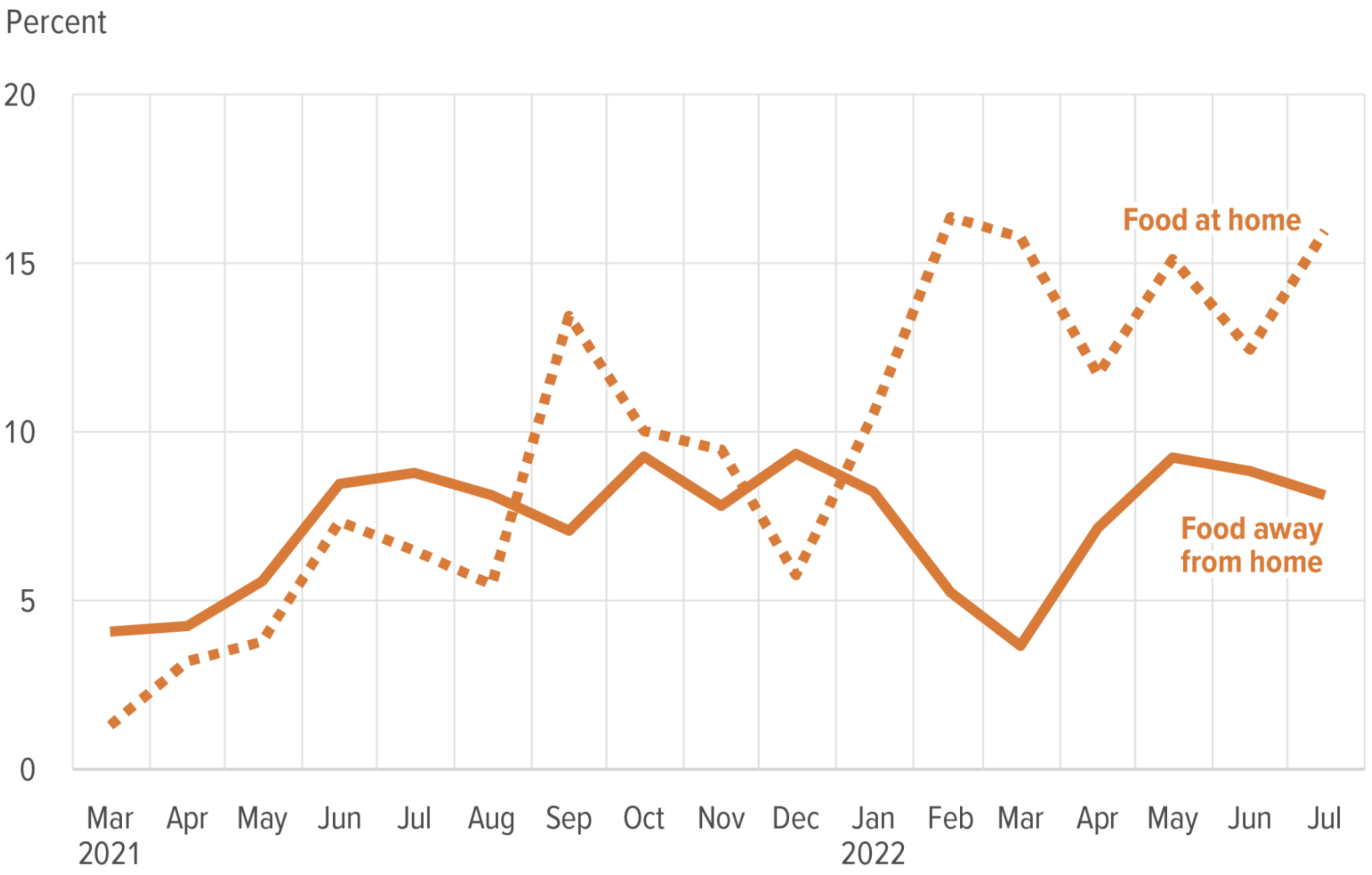


# The Inflation Surge: March 2021 to July 2022




Inflation ran above the Federal Reserve's long-run goal of 2 percent throughout the period.

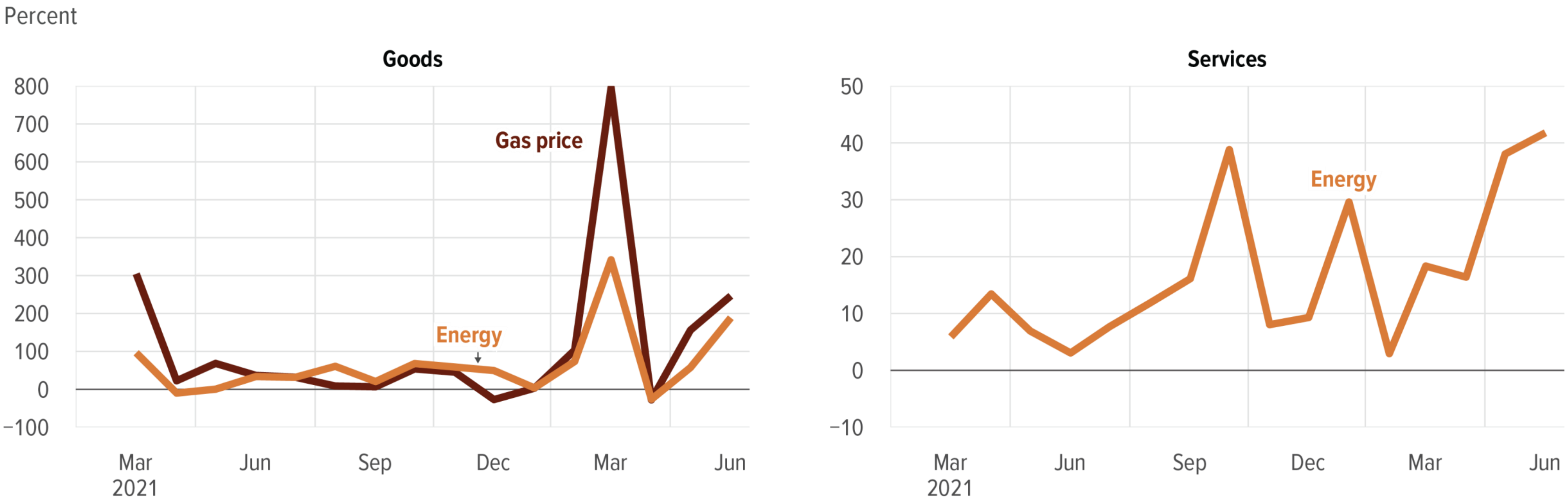
# Food Price Inflation During the Inflation Surge




Inflation in food prices accelerated rapidly after March 2021. Food price inflation remained high after March 2022 in part because of the rise in grain and energy prices after the invasion of Ukraine.

By July 2022, inflation in the PCE price index for food away from home was 8.1 percent, with inflation in the PCE price index for food at home at 16.0 percent.

# Energy Price Inflation During the Inflation Surge



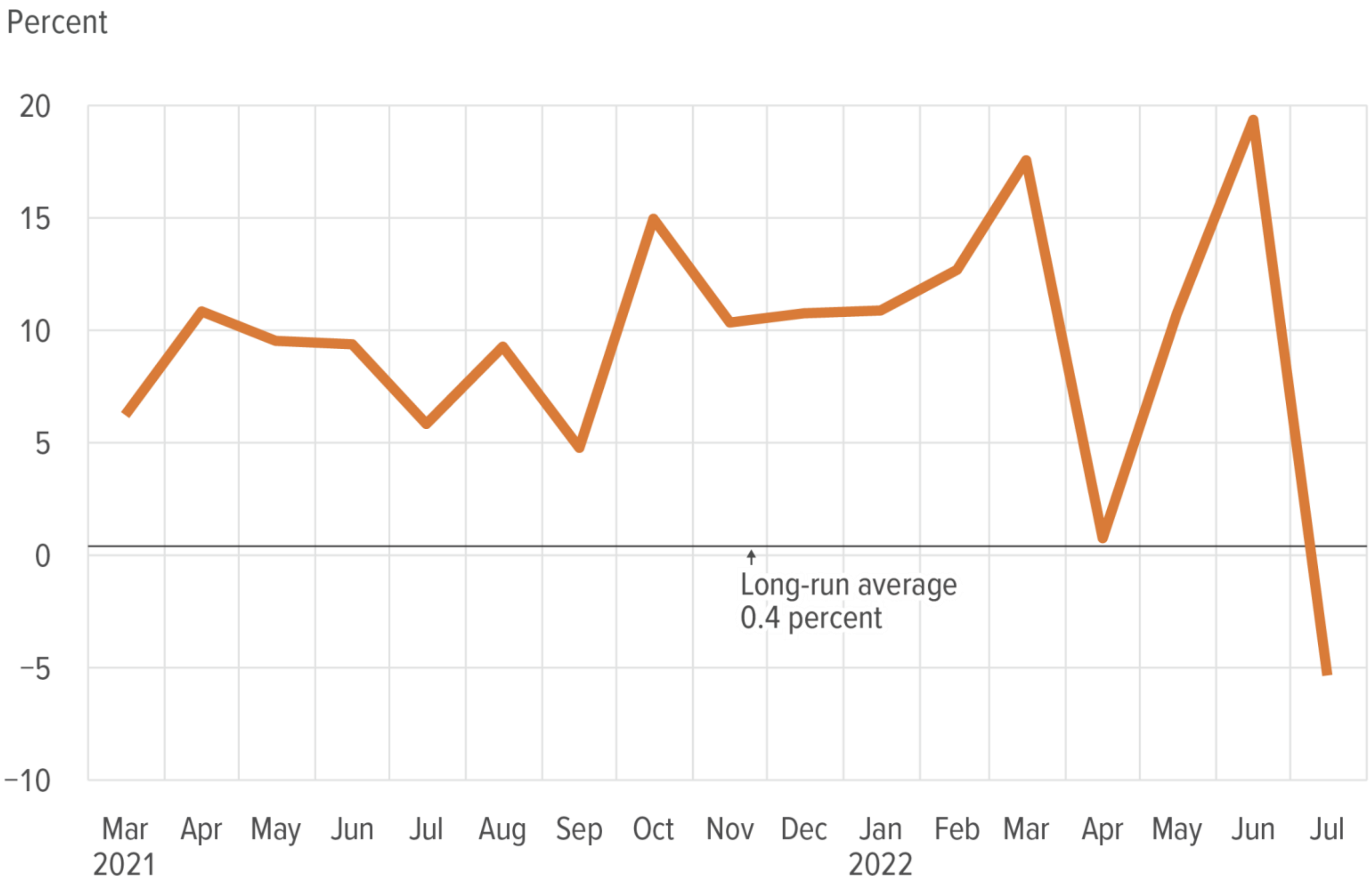

After the invasion of Ukraine, several countries embargoed Russian oil imports, causing spikes in energy goods prices in March 2022.

Pressures then escalated on supply chains, exerting more strain on prices of many goods and services.

The rise in energy services prices was not as immediate as the increase in energy goods prices.

Gas price = U.S. regular all formulations gasoline price; energy = PCE gasoline and other energy goods and PCE electricity and gas services. Percent change is annualized rate.

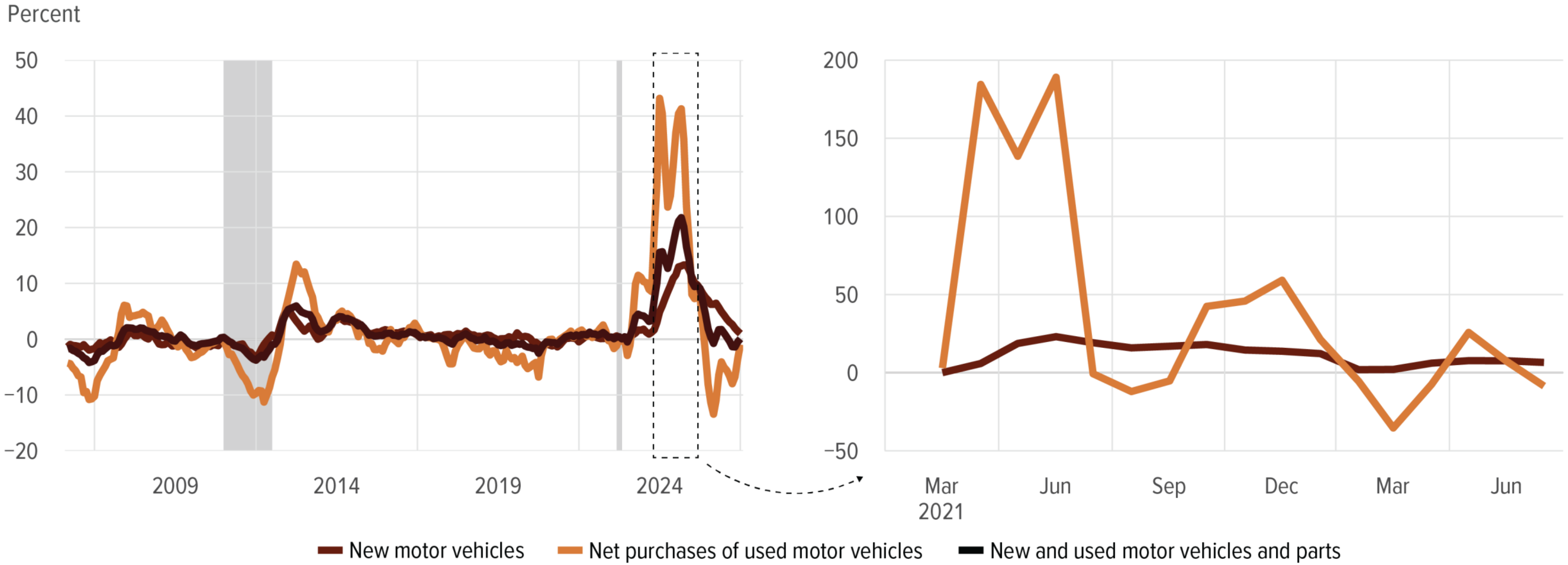
# Goods Inflation During the Inflation Surge




From March 2021 to July 2022, goods inflation averaged 9.2 percent in the PCE price index.

Over the two decades before the pandemic (1999–2019), that measure had averaged 0.4 percent.

# New and Used Vehicle Inflation During the Inflation Surge

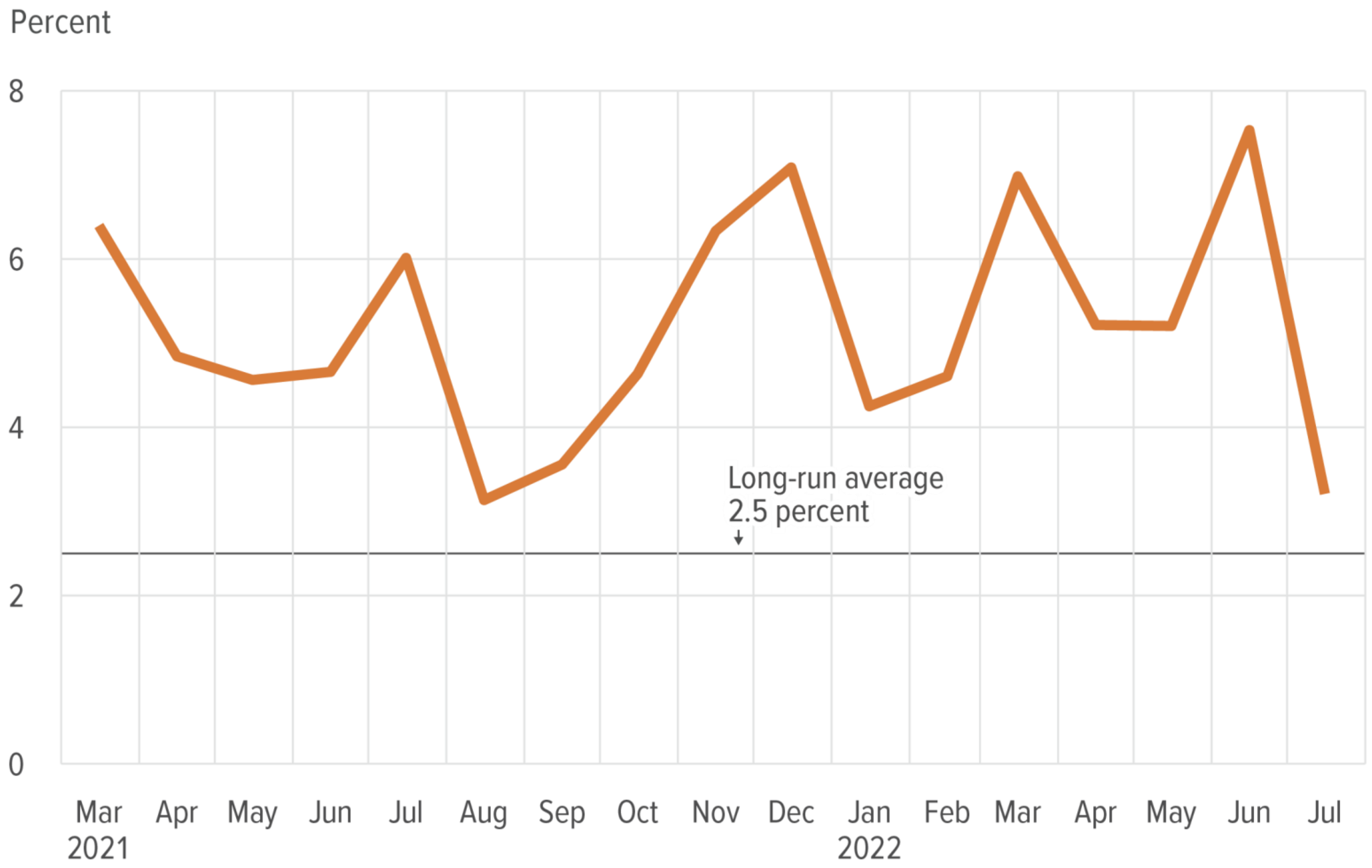



Much of the initial surge came from durable goods categories. Prices for new and used vehicles saw a surge in inflation over prepandemic norms owing to the combined effects of supply-chain stress and high demand.

Demand increased as the economy recovered because many households had excess savings and pent-up demand for travel.

The figure on the right uses year-over-year growth rates. Shaded areas represent recessions.

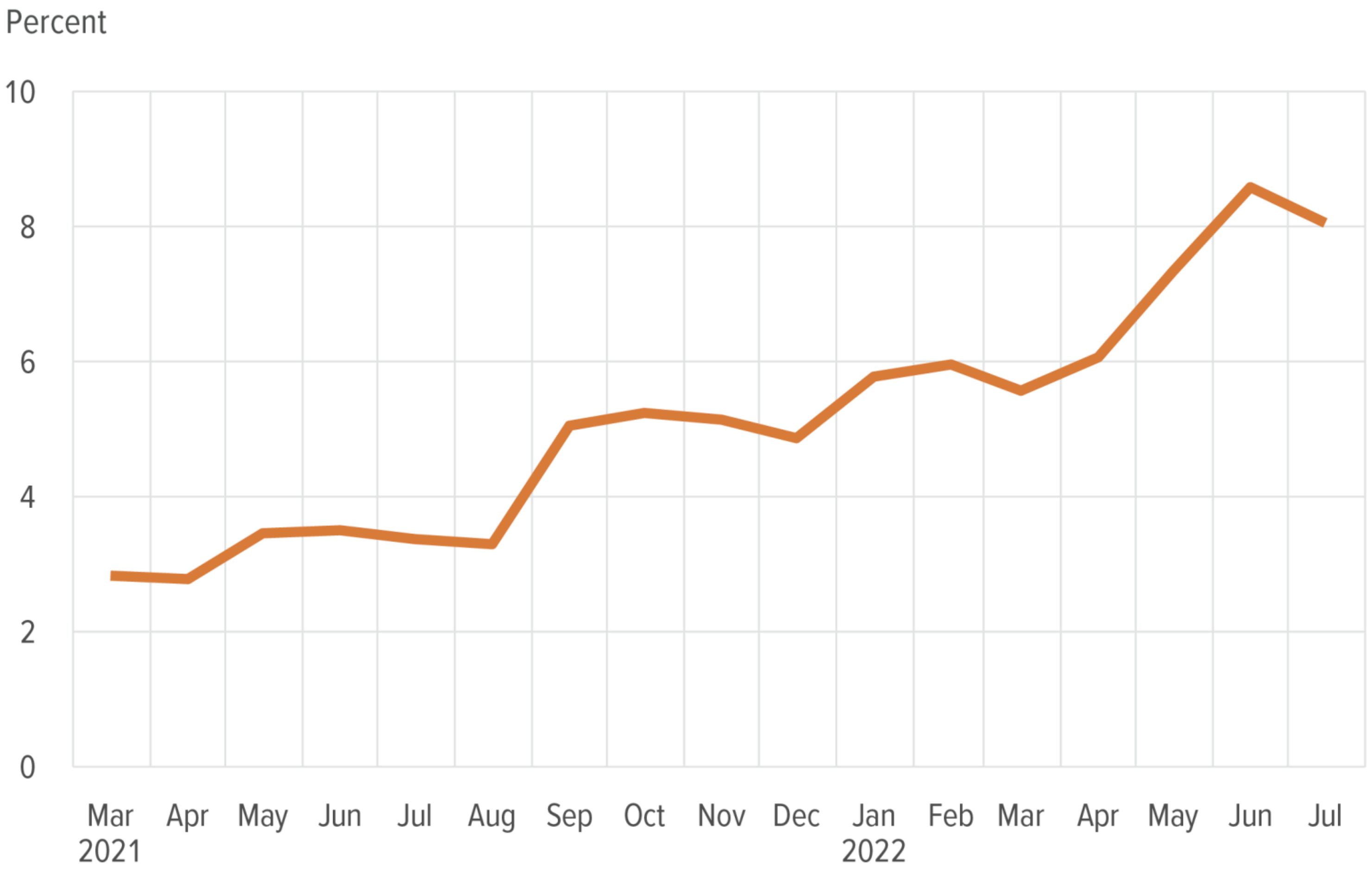
# Services Inflation During the Inflation Surge




From March 2021 to July 2022, services inflation in the PCE price index averaged 5.2 percent. Over the two decades before the pandemic, that measure had averaged 2.5 percent.

Thus, although services inflation was elevated over this period, it was not as far above prepandemic trends as goods inflation. This period's higher inflation in both goods and services indicated that inflation was becoming more broad based.

# Housing Services Inflation During the Inflation Surge



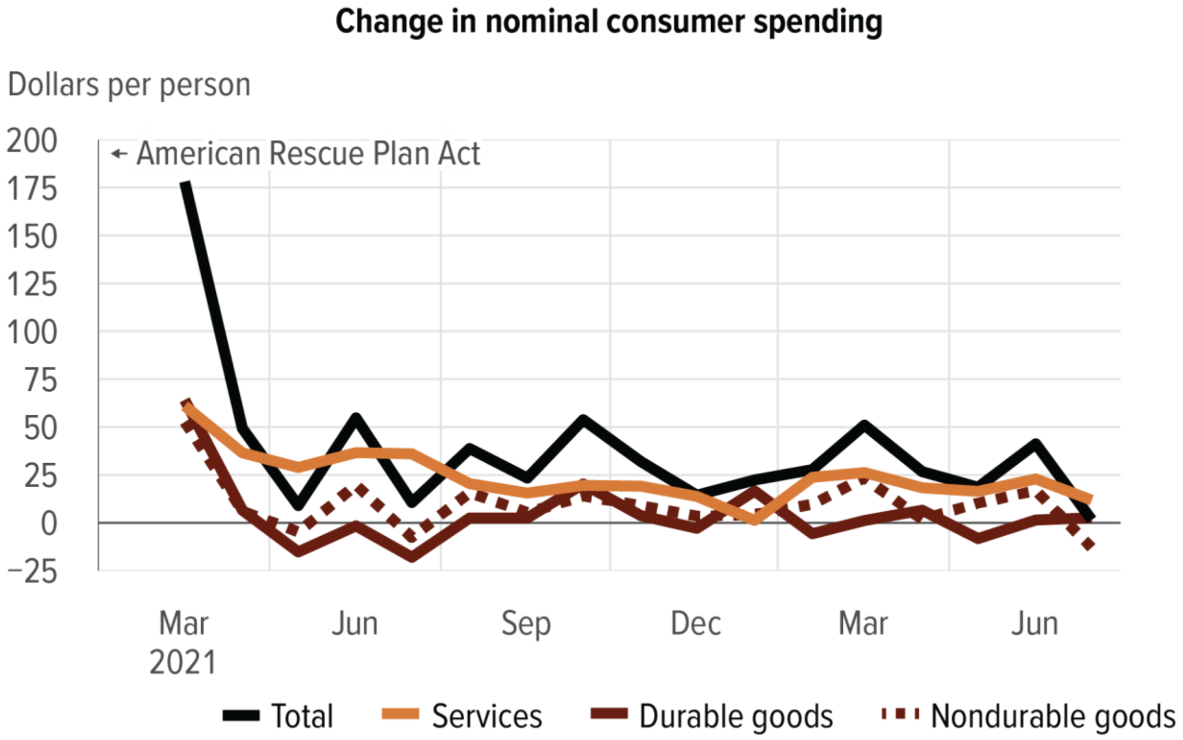

Core inflation began rising in the second quarter of 2022 because housing services, a category composed of rent and owners' equivalent rent, started experiencing a surge of inflation.

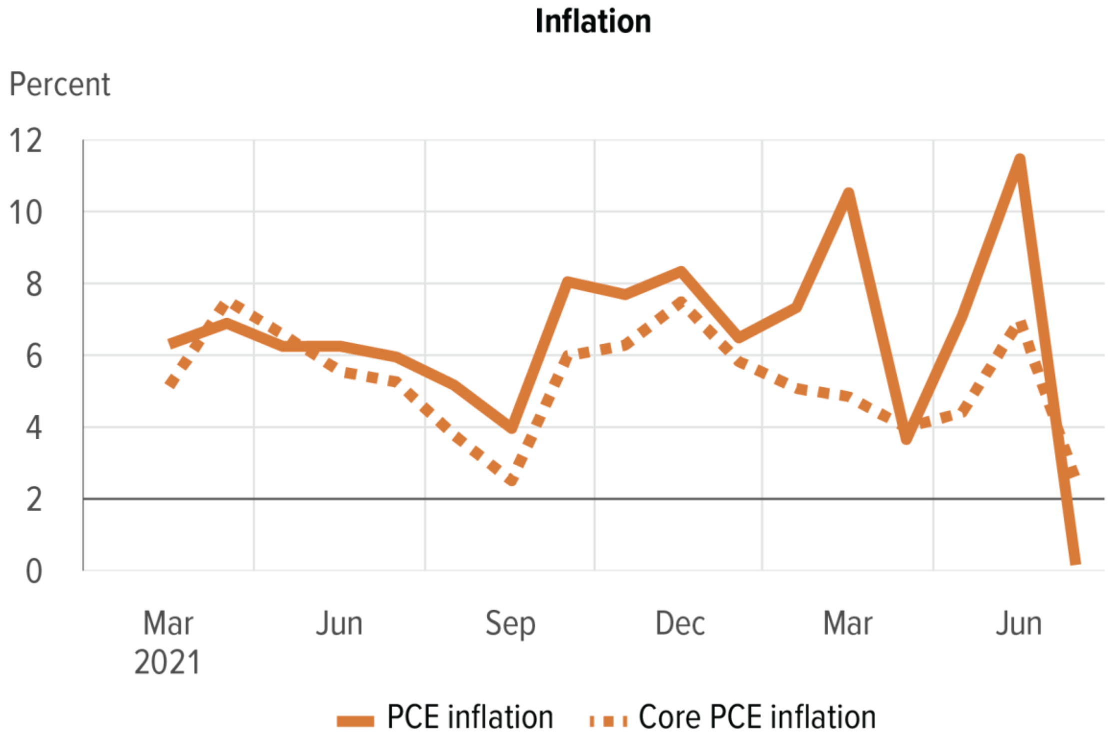
The category makes up 17 percent of the core PCE price index and boosted overall and core inflation measures in 2022.

That surge was partly anticipated because home prices, which tend to act as leading indicators of housing services costs, had already surged a year earlier.

Owners' equivalent rent is the implicit rent that homeowners would pay if they rented their homes.

# Fiscal Policy During the Inflation Surge

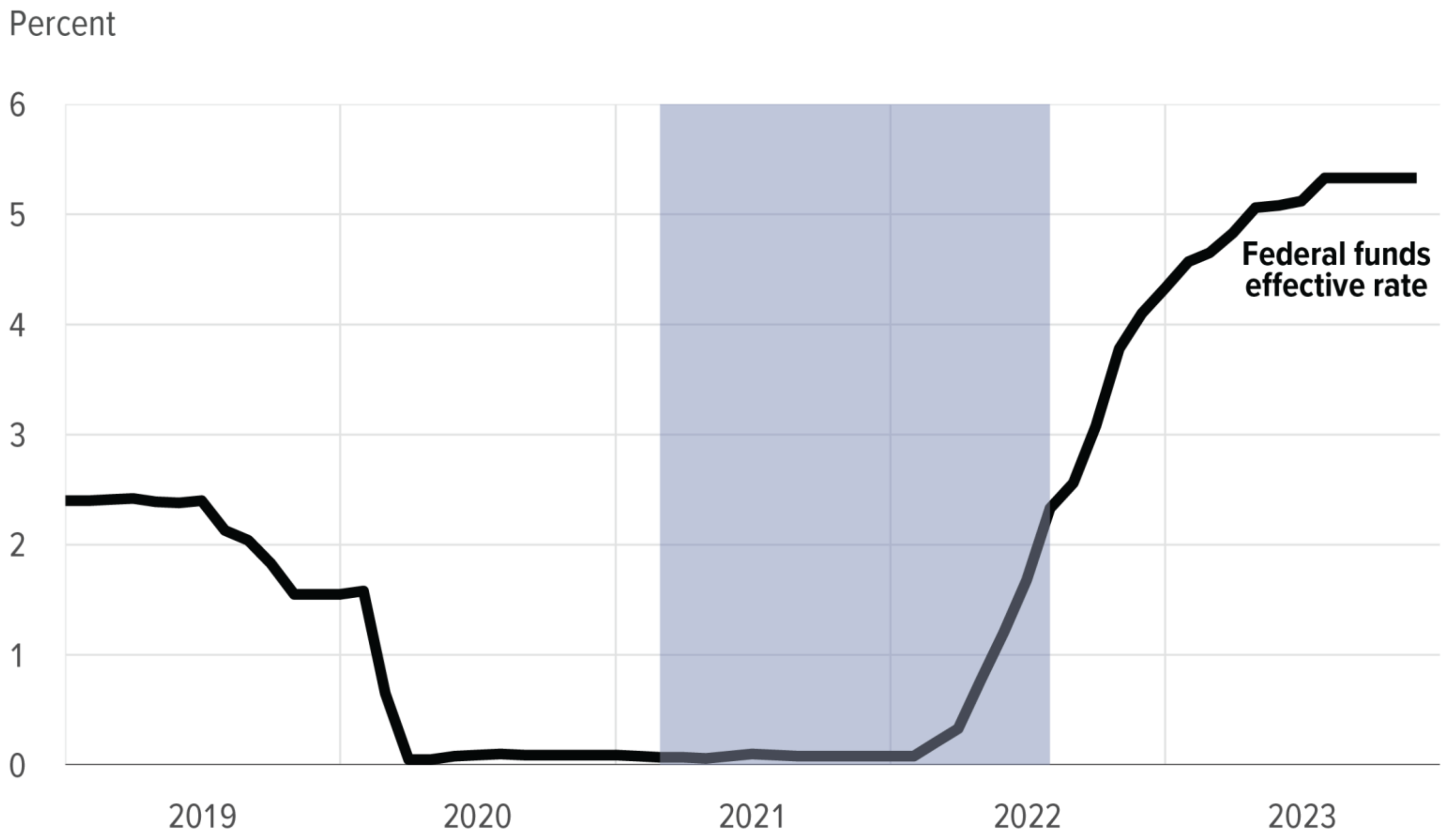



The $1.9 trillion (8.5 percent of GDP) American Rescue Plan Act was enacted in March 2021, when inflation was already above prepandemic norms owing to strong demand and constrained supply.* Inflation rose even further after the act.

*P.L. 117-2. See www.cbo.gov/publication/57056 for more information.

# Monetary Policy During the Inflation Surge



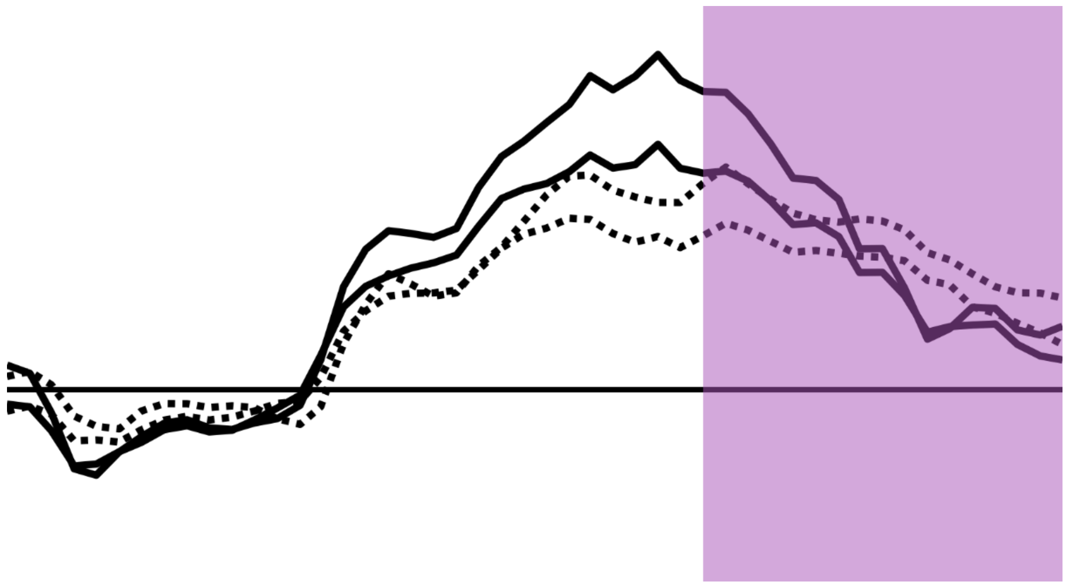

The Federal Reserve held the federal funds rate near zero and continued its policy of quantitative easing until March 2022.

In March 2022, the Federal Reserve increased the target rate for the federal funds rate by 25 basis points, beginning the tightening cycle.

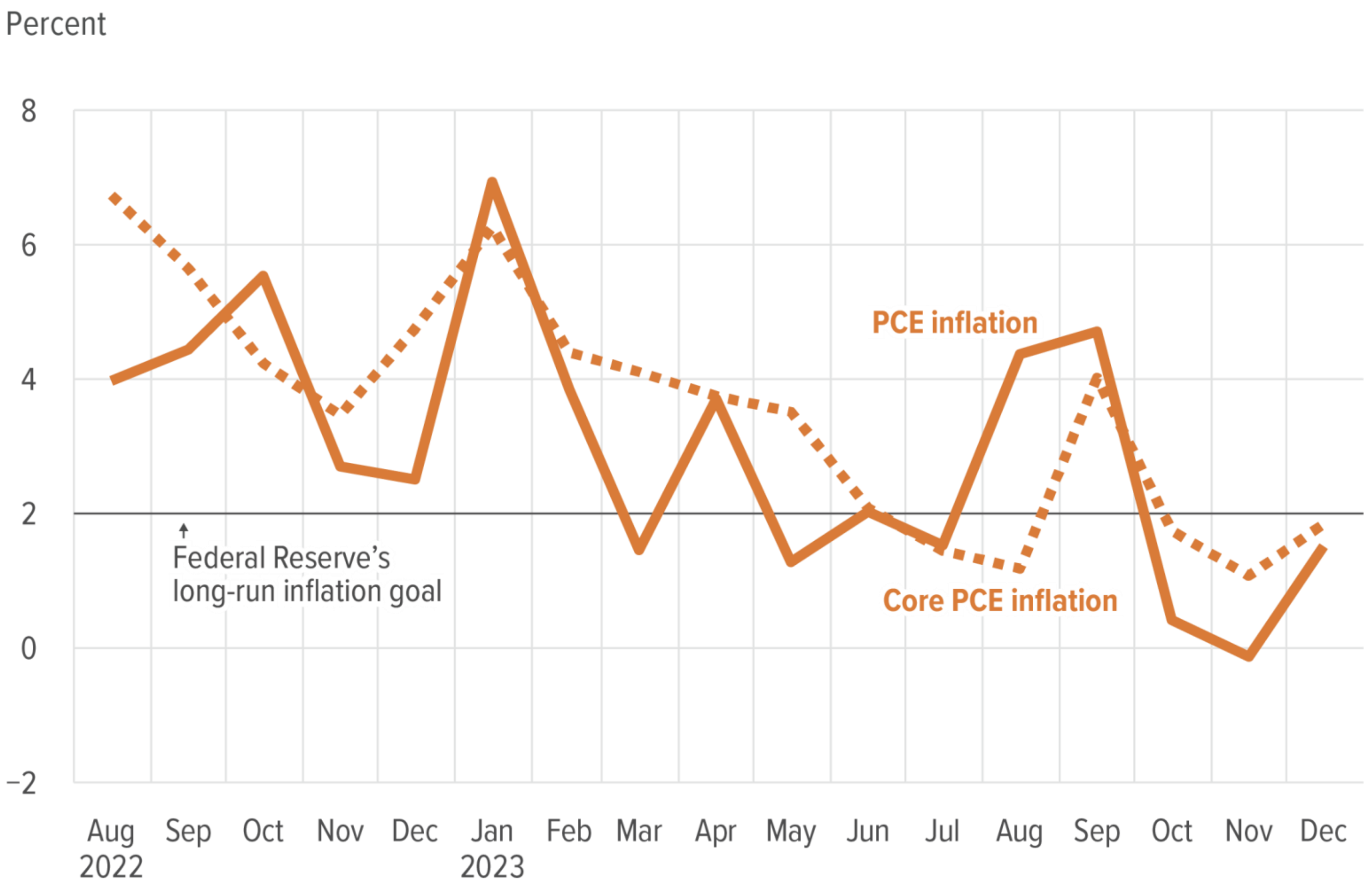
Between March and July 2022, the Federal Reserve increased the federal funds rate by 225 basis points, reaching a target range of 2.25 percent to 2.50 percent in July.

# Disinflation

August 2022 to December 2023



# Disinflation: August 2022 to December 2023

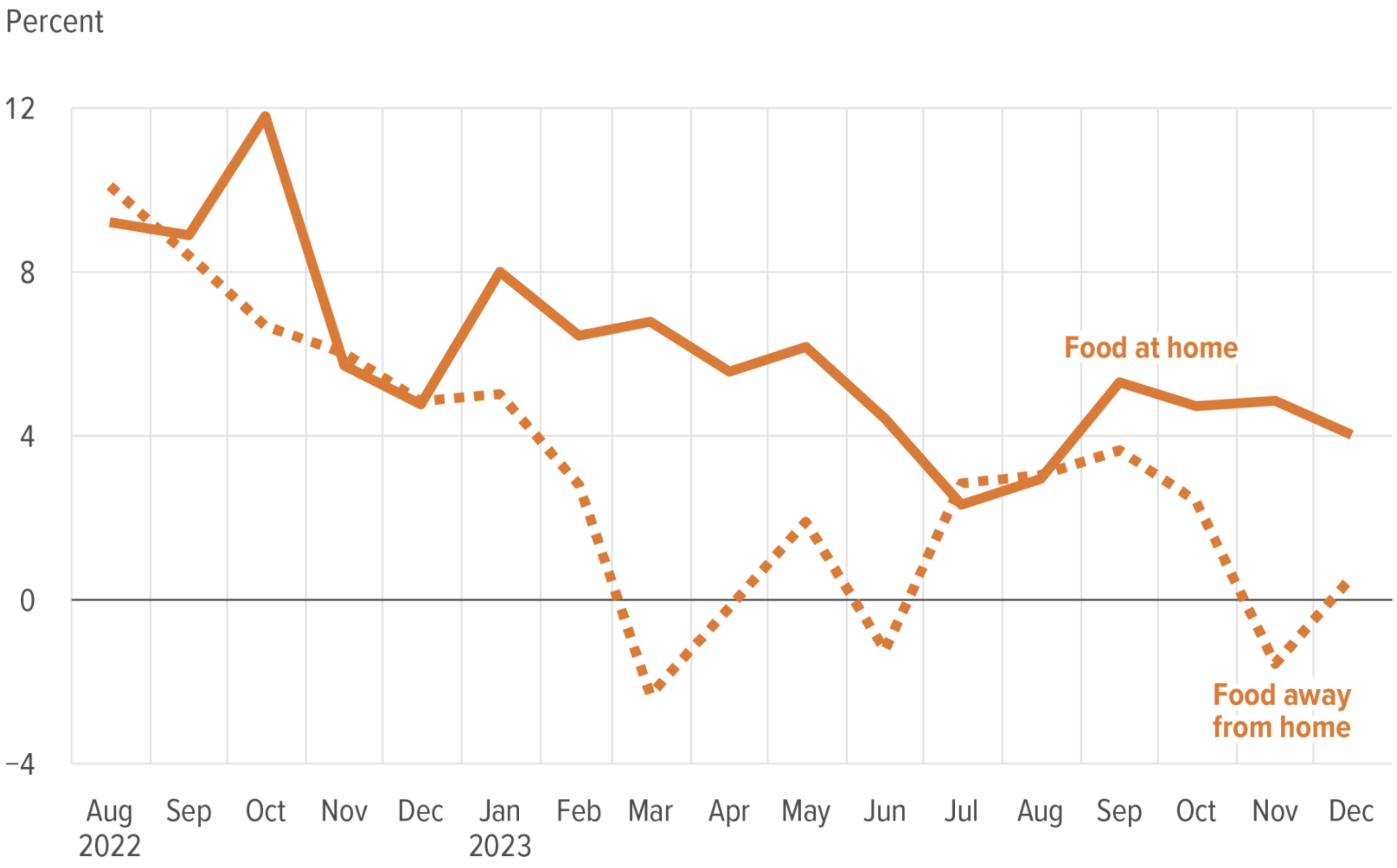



Inflation began cooling at the end of 2022. Prices showed some upward momentum at the beginning of 2023 as consumer spending stayed strong.

However, inflation began to near the Federal Reserve's long-run goal of 2 percent by the second half of 2023.

Pandemic-induced supply-chain stress during this period dissipated, alleviating upward pressures on some prices and causing inflation to fall quickly.

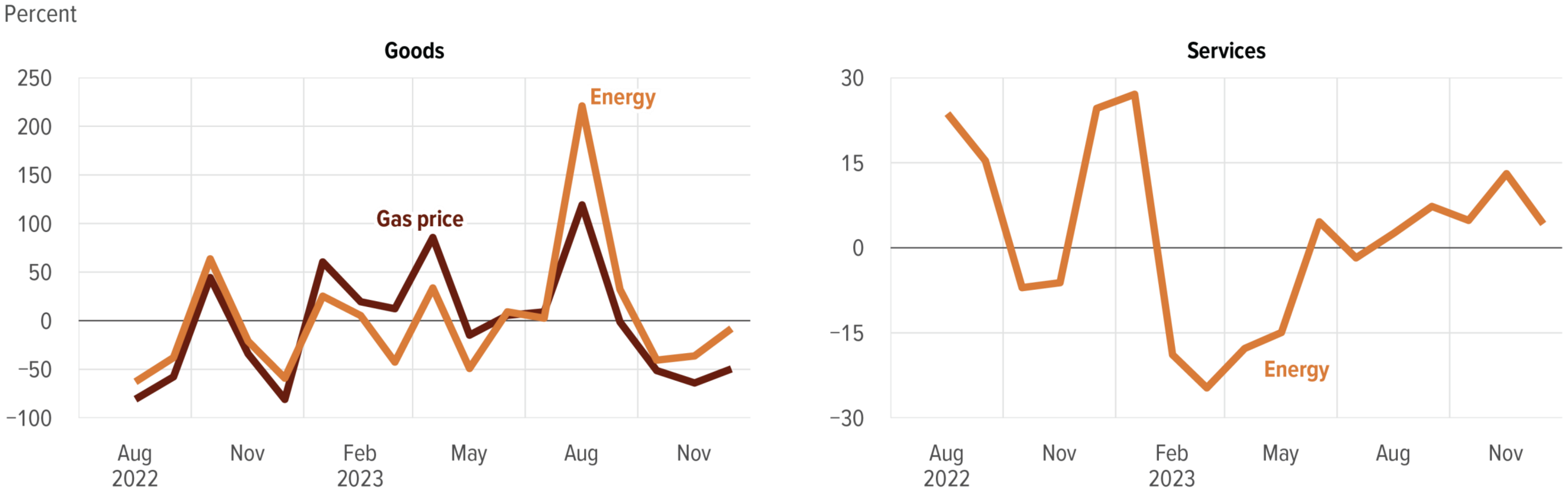
# Food Price Inflation During Disinflation




Inflation in the food at home and food away from home categories eased gradually over 2023. The food at home category experienced some declines caused by easing supply-side pressures.

Although supply-chain stresses eased, the supply of certain foods also had to recover from other specific shocks. For instance, some food prices are sensitive to increases in labor costs, which began easing in the second half of 2022.

# Energy Price Inflation During Disinflation

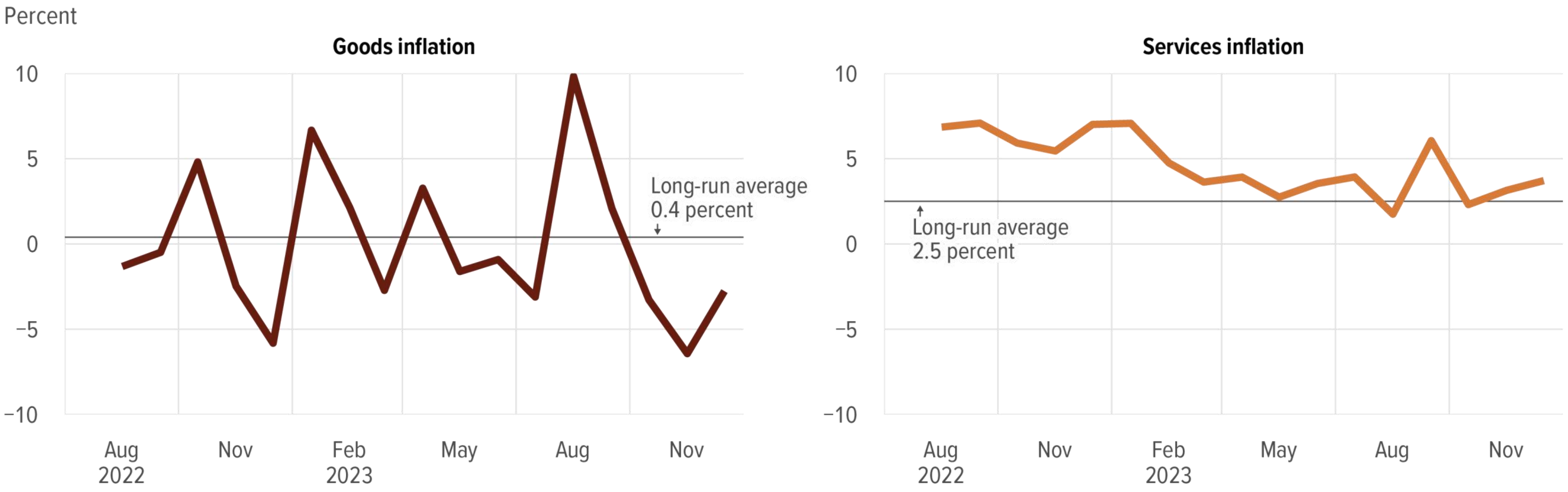



Energy goods prices experienced some volatility in 2023 but stayed low throughout much of the first half of the year. Energy services prices experienced negative inflation throughout most of early 2023, meaning that those prices fell.

Both energy goods and services experienced stronger supply and weaker than usual demand, due partly to a warm winter.

Gas price = U.S. regular all formulations gasoline price; energy = PCE gasoline and other energy goods and PCE electricity and gas services. Percent change is annualized rate.

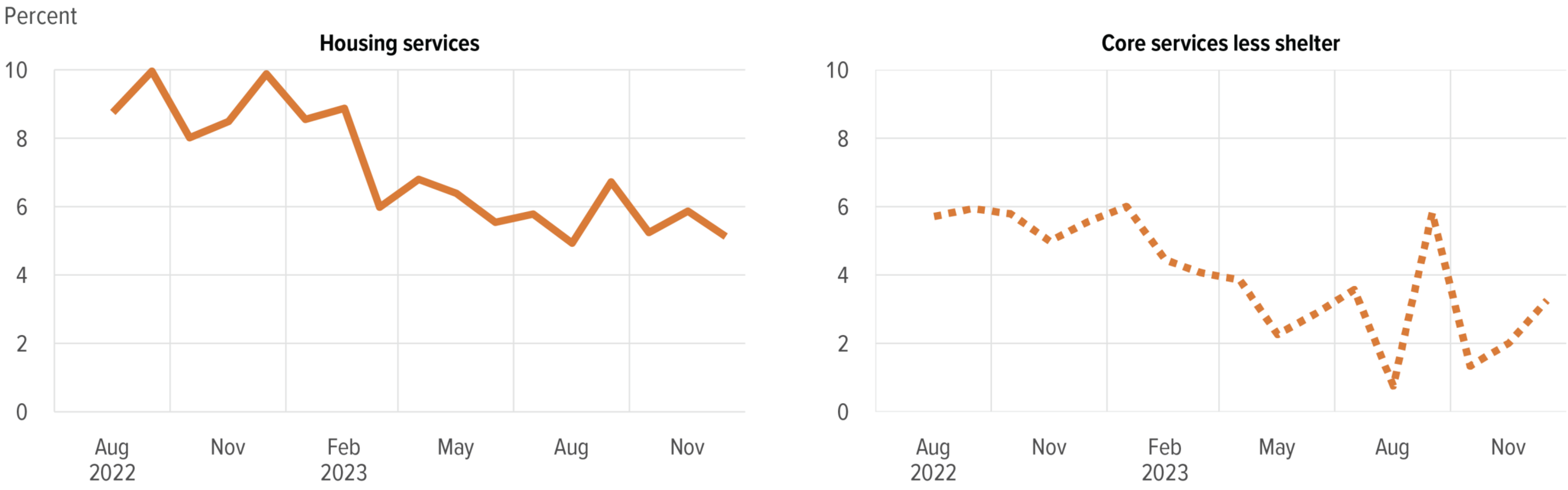
# Goods and Services Inflation During Disinflation




Goods inflation fell at the end of 2022 and stayed low in 2023. However, goods inflation remained volatile and sensitive to disruptions to supply and demand.

Services inflation showed greater resilience in 2022 but began to ease in 2023, nearing its long-run average of 2.5 percent in the second quarter.

# Services Inflation During Disinflation

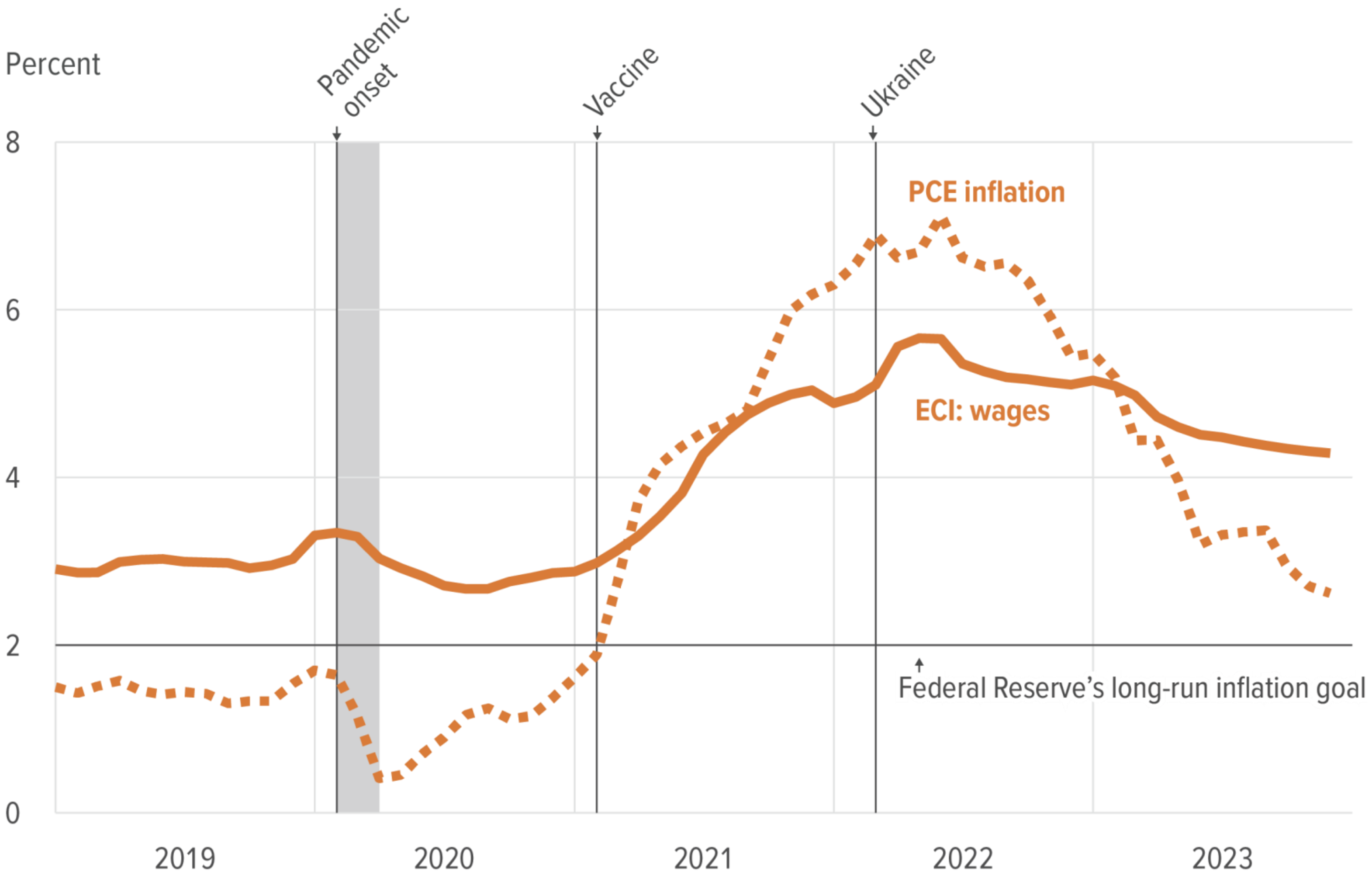



Core services inflation has stayed elevated, influenced largely by the notable increase in housing services inflation, which reached 10 percent in September 2022.

Even when housing services are excluded, core services inflation stayed elevated, albeit less so.

Housing services refers to the category of shelter services, which, as defined by the Bureau of Labor Statistics, measures the flow of housing services that housing units provide to their occupants. The prices of such services are a component of the PCE price index, whereas home prices are not included in the index.

# Wage Growth: Strong Despite Disinflation

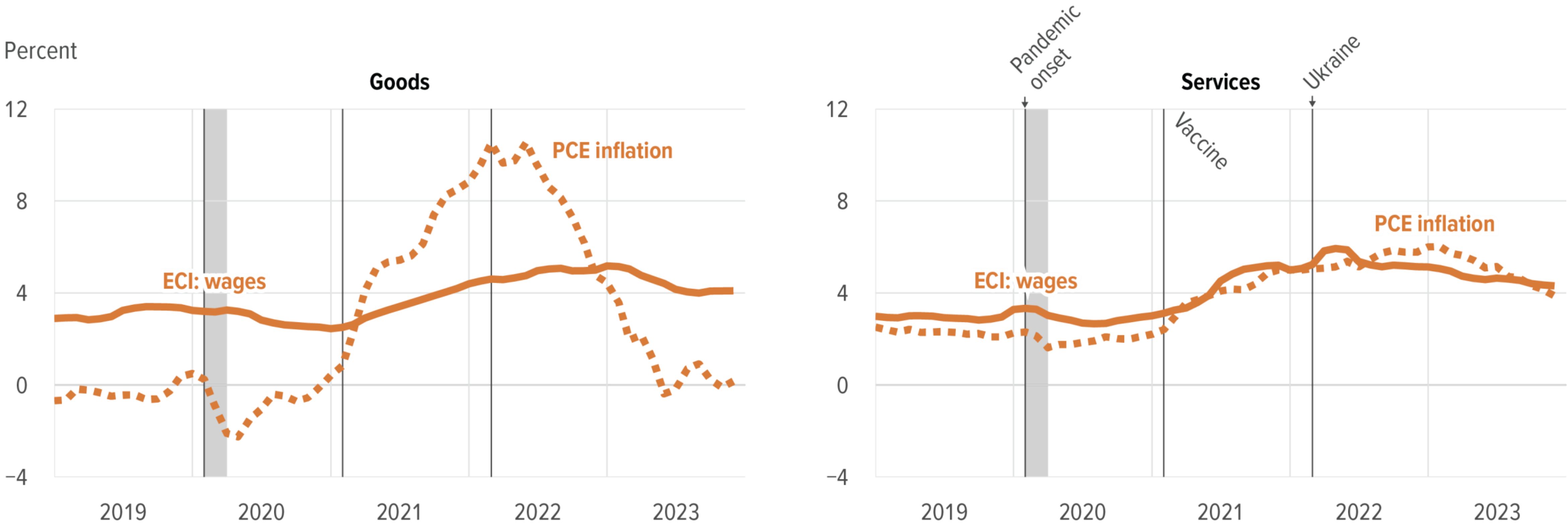



Wage growth is one factor that might sustain elevated inflation after 2023.

The employment cost index (ECI), a commonly used measure of wage and compensation growth, has not slowed as rapidly as PCE inflation in 2022 and 2023.

Shaded areas represent recessions.

# Wages and Inflation Across Economic Sectors

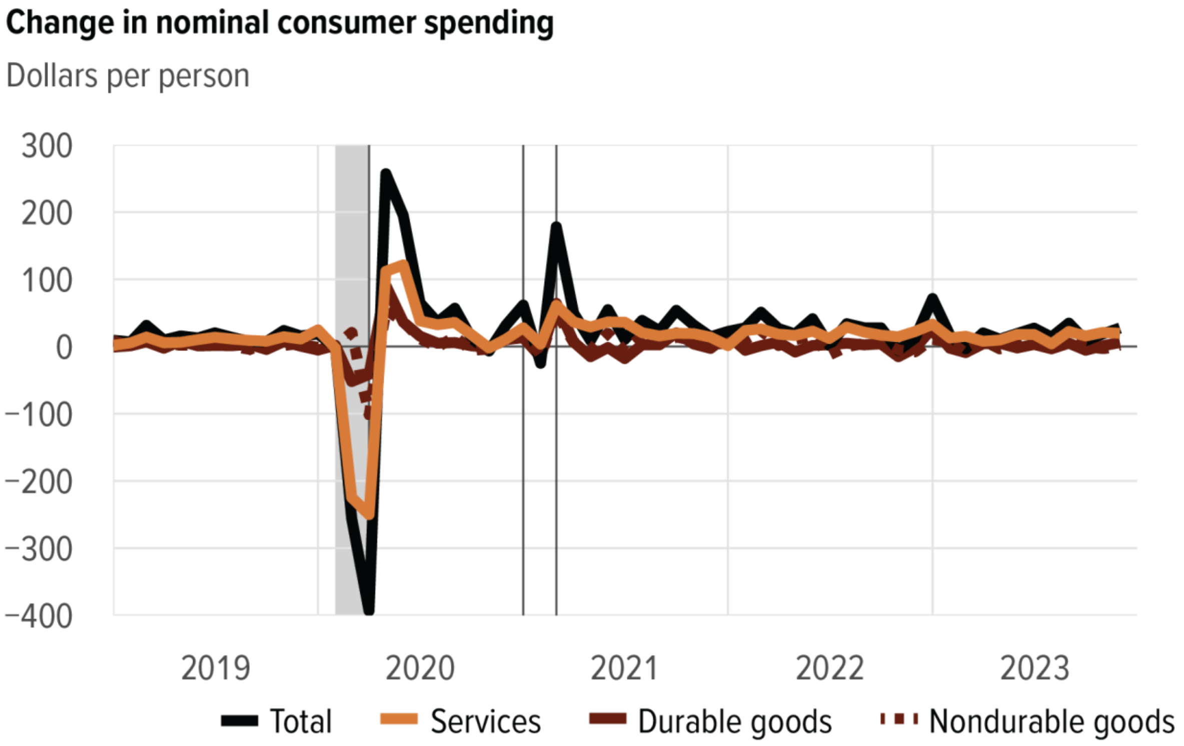


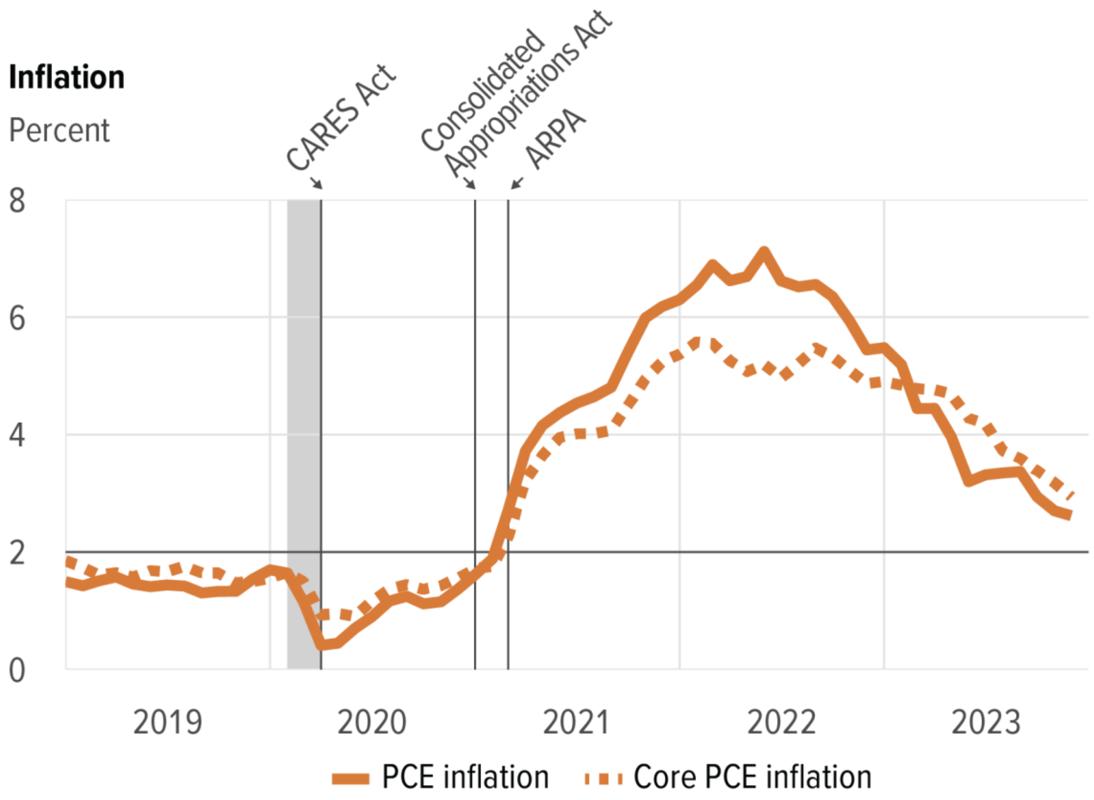

Elevated ECI inflation could affect services prices, which are sensitive to wage growth and tend to exhibit persistent inflation.

Services inflation and wages in service industries are closely linked, unlike the less correlated inflation between goods prices and wages in goods-producing industries.

Both figures use year-over-year growth rates. Shaded areas represent recessions.

# Fiscal Policy During Disinflation



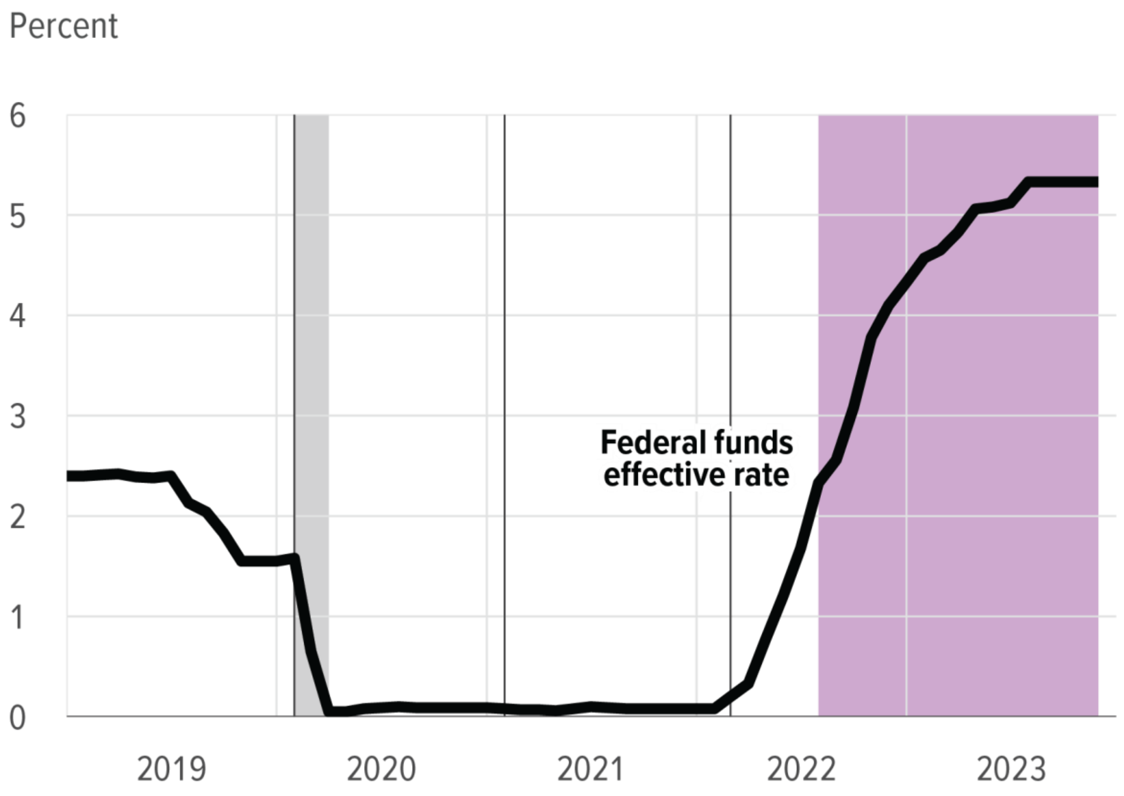



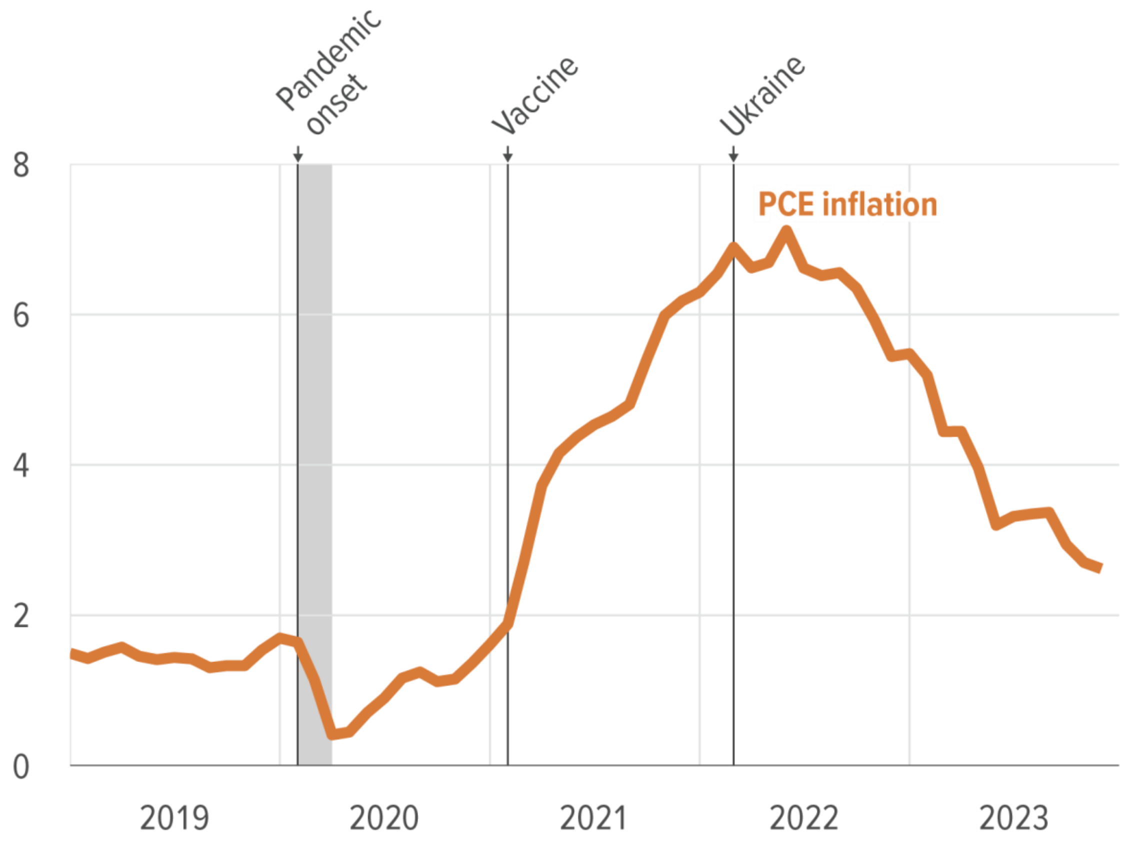

This period saw the end of many stimulative policies.

From 2020 to 2022, fiscal stimulus coincided with many global supply disruptions—in labor and product markets—that restricted supply and put upward pressure on prices. Together, increased demand and constrained supply led to higher inflation. In 2023, those upward pressures on supply and demand eased, leading to disinflation.

The figure on the right uses year-over-year growth rates. Shaded areas represent recessions.

# Monetary Policy During Disinflation




The Federal Reserve increased interest rates and gradually reduced its holdings of Treasury and mortgage-backed securities throughout 2022 and the first half of 2023. The central bank paused interest rate increases in the second half of 2023 amid indications of easing inflation. In 2023, the federal funds effective rate reached 5.3 percent, its highest value since 2007.

The left figure shows the federal funds effective rate, the interest rate at which depository institutions trade federal funds. The figure on the right uses year-over-year growth rates. Shaded areas represent recessions.

# Resources

Data sources: Board of Governors of the Federal Reserve System, Bureau of Economic Analysis, Bureau of Labor Statistics, and Energy Information Administration.

Congressional Budget Office, *An Update to the Budget and Economic Outlook: 2024 to 2034* (June 2024), www.cbo.gov/publication/60039.

Chandler Lester, *How CBO Projects Inflation*, Working Paper 2024-01 (Congressional Budget Office, February 2024), www.cbo.gov/publication/59877.

# About This Document

This document was prepared to enhance the transparency of the work of the Congressional Budget Office and to encourage external review of that work. In keeping with CBO's mandate to provide objective, impartial analysis, the document makes no recommendations.

Chandler Lester prepared the document, with guidance from Robert Arnold, Richard DeKaser (formerly of CBO), and Devrim Demirel. Nicholas Abushacra, Aaron Betz, Kyoung Mook Lim, and Christine Ostrowski fact-checked the document.

Mark Doms, Jeffrey Kling, and Phillip Swagel reviewed the document. Gabe Waggoner edited it, and Casey Labrack created the graphics, with formatting assistance from Jorge Salazar. The document is available at www.cbo.gov/publication/60480.

CBO seeks feedback to make its work as useful as possible. Please send comments to communications@cbo.gov.