

Data Practice with FRED “Measures of Inflation” Objectives

In this FRED data practice, you will learn:

- About different ways to measure inflation (CPI, (steps 4-14), GDP deflator (step 15))
- Different ways to locate data time series in the FRED database (tags, search and browse (steps 2-4, & 15))
- Definitions for inflation, consumer price index (CPI), index, and price level (steps 1-5), core inflation (step 13)
- To view and interpret data in a FRED series (steps 5)
- Calculate the inflation rate from one year to another (step 7)
- To edit graphs in FRED (step 8-) by:
 - changing units (steps 9 & 17)
 - Downloading data from a series (step 10)
 - adding a series to a graph (steps 11-12, & 18-19)
 - adding multiple series to a graph (step 13)
 - Interpret graphs (step 14)

Measures of Inflation

Inflation is an important component of the Federal Reserve’s evaluation of its policy measures. Economists, politicians, policymakers, and the public all want to know the change in the general price level and if the price level is generally rising or falling. The government has several measures for inflation. This exercise will guide you through accessing them and ask some questions about the data you find.

1. The first step in this exercise is to find the Consumer Price Index for Urban Consumers. **Start at the FRED website, <http://research.stlouisfed.org/fred2>.**
2. As you follow along in this exercise, the red arrows and circles show you where to access the information. Click the **Tags** tab.



3. In the **Find Tags** search box type **CPI**, and hit enter. (Using Tags is a quick way to find a data series. See our video tutorial on using tags for more information). Then click on the **cpi** link in the results box.



There are several measures of the CPI; one is the Consumer Price Index for All Urban Consumers: All Items (CPI-U: All Items). Other measures break out the components of CPI—products such as food, energy, housing, and medical care. To begin, we first look at the CPI-U: All Items. Then we will examine the energy component of the index and make some comparisons.

4. Choose the **Consumer Price Index for All Urban Consumers: All Items, Seasonally Adjusted (SA)**. It is usually the first item on the list. **Click the Series title** to see the graph.

Home > FRED® Economic Data > Tags

Series with Tag

5,092 Series with Tag:

- cpi [X]

Select tags below to filter series. [Learn about tags.](#)

Related Tags

Search Tags

- Sources
- Seasonal Adjustments
- Frequencies
- Geography Types
- Geographies
- Concepts
- All
- nsa x 4,920

Series 1 - 50 1 2 3 4 5 6 7 Next » [102]

Selected Series: Sort by: Popularity

Consumer Price Index for All Urban Consumers: All Items ██████████
 CPIAUCSL, 1947-01 to 2012-04, Monthly, Index 1982-84=100, Seasonally Adjusted (1 day ago)
 usa nation monthly sa bls consumer cpi urban all items

Consumer Price Index for All Urban Consumers: All Items ██████████
 CPIAUCNS, 1913-01 to 2012-04, Monthly, Index 1982-84=100, Not Seasonally Adjusted (1 day ago)
 usa nation monthly bls nsa consumer cpi urban all items

Consumer Price Index in the United States ██████████

5. Notice that the data for CPI are an **index**. The number (**on the left axis**) represents a **price level** of a basket of goods purchased at different points in time. To view the data in your browser, choose **View Data** (on the left side, under **Tools**). For the most recent observations, click **Last 5 Observations** link above the graph.

Home > FRED® Economic Data > Categories > Prices > Consumer Price Indexes (CPI)

Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)

2012-04: **229.177** Index 1982-84=100 Last 5 Observations
 Monthly, Seasonally Adjusted, Updated: 2012-05-15 8:49 AM CDT

SHARE

Other Formats

- Monthly, Not Seasonally Adjusted

Tags

- usa x 40,507
- monthly x 25,122
- bls x 21,125
- nation x 14,141
- sa x 10,478
- cpi x 5,092
- urban x 4,400

Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)
 Source: U.S. Department of Labor: Bureau of Labor Statistics

(Index 1982-84=100)

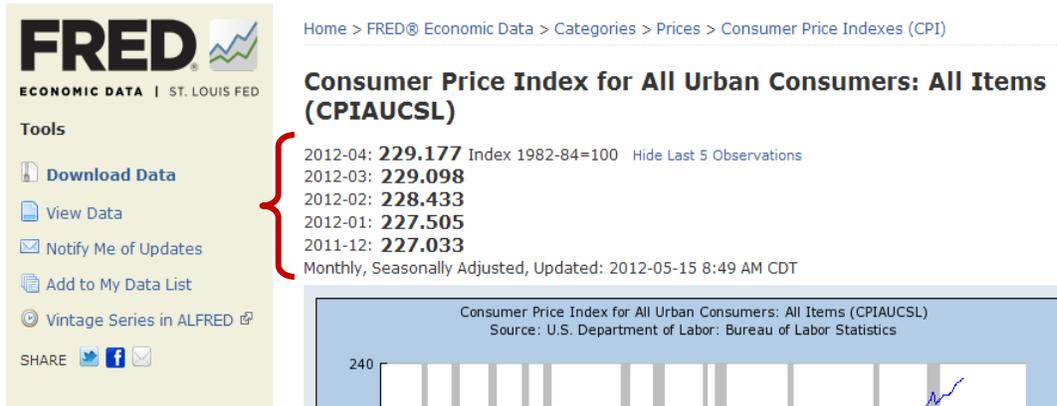
240
200
160
120
80
40
0

1940 1950 1960 1970 1980 1990 2000 2010 2020

Shaded areas indicate US recessions.
 2012 research.stlouisfed.org

Type: Line Size: Medium Range: Max Log Scale: Left Units: Levels
 Notes: Growth Rate Calculations | US recession dates

6. Then the **last five data observations** will display.



7. Calculate the inflation rate from February 2011 to February 2012. Hints: You'll need to either **View Data** or **Download Data** to see the data. The formula to use is:

$$\text{Inflation rate in year 2} = \frac{\text{CPI in year 2} - \text{CPI in year 1}}{\text{CPI in year 1}} \times 100.$$

8. Next, edit the CPI: All Items graph. After editing the graph, you will add the CPI for energy (CPI: Energy). CPI: Energy is a subset of the entire Consumer Price Index.

- Start with Consumer Price Index for All Urban Consumers (which you just had up).
- Click on the **Edit Graph** link.

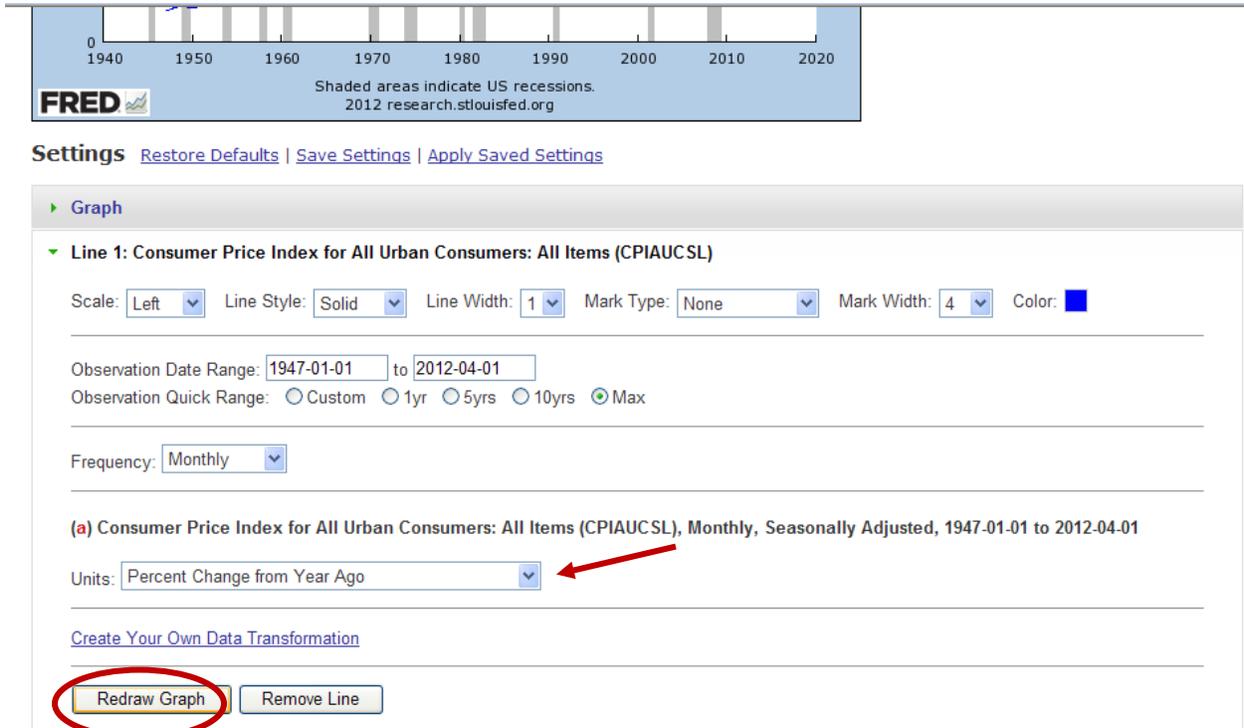


That will bring up a graph to which series can be added, units can be changed, and time period covered can be modified (e.g., 5 years, 1 year).

9. Graph Settings are found below the graph, scroll down to find the units.

- **Change** the display of the units to **“Percent Change from Year Ago”**
- Click **Redraw Graph**.

This is a common way to describe inflation—the change year over year.



Settings [Restore Defaults](#) | [Save Settings](#) | [Apply Saved Settings](#)

► **Graph**

▼ **Line 1: Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)**

Scale: Line Style: Line Width: Mark Type: Mark Width: Color:

Observation Date Range: to
Observation Quick Range: Custom 1yr 5yrs 10yrs Max

Frequency:

(a) Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL), Monthly, Seasonally Adjusted, 1947-01-01 to 2012-04-01

Units: ←

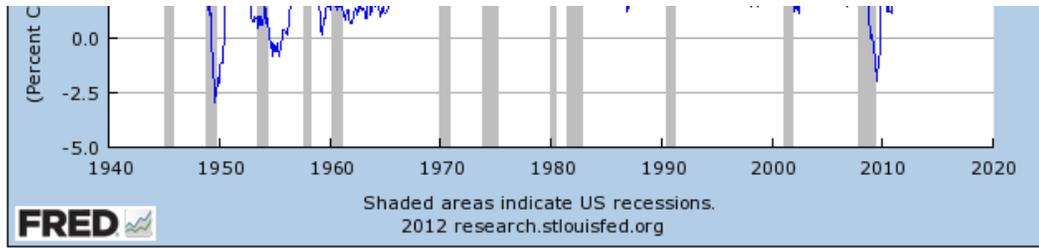
[Create Your Own Data Transformation](#)

10. For more detailed information, you can choose to **Download Data in Graph**. What was the rate of inflation (compared with the previous year) in July 2009?



11. Next, scroll down below the graph to the “**Add Data Series**” section.
- Open it and type **CPI energy** in the search box. The search box automatically makes suggestions based on the words entered.
 - For the comparison, **choose Consumer Price Index for All Urban Consumers: Energy (SA)**.

Once you select it, those data will be added to a new line on the graph. Notice that the data are automatically represented in the same manner as Line 1 CPI data (percent change from a year ago).



Settings [Restore Defaults](#) | [Save Settings](#) | [Apply Saved Settings](#)

► **Graph**

► **Line 1: Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)**

▼ **Add Data Series**

To: New Line Line 1 [What's This?](#)

Search: [Browse](#)

[Notes on arc](#)

MY ACCOUNT:

FOLLOW THE

ABOUT: Empl

SERVICES: FR

RESEARCH: T

HELP: Data: s
More Help

TOOLS: FRED

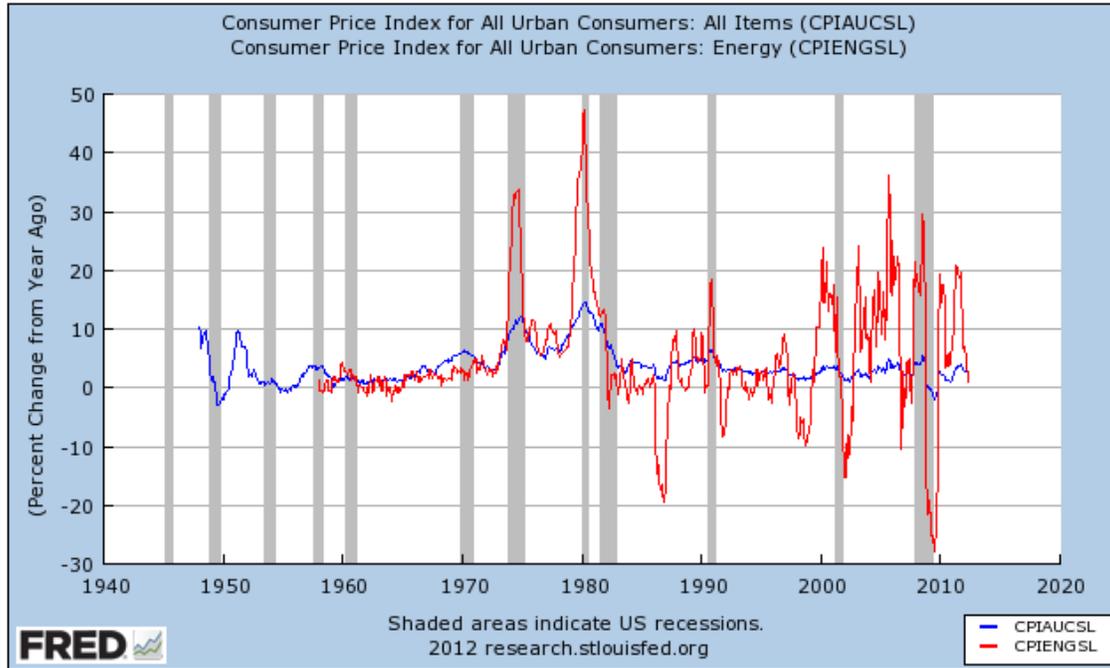
OUR SITES: S

- Consumer Price Index for All Urban Consumers: All Items Less Food & Energy
CPILFESL, M, Index 1982-84=100, SA
- Consumer Price Index for All Urban Consumers: All Items Less Food & Energy
CPILFENS, M, Index 1982-84=100, NSA
- Consumer Price Index for All Urban Consumers: Energy**
CPIENGSL, M, Index 1982-84=100, SA
- Consumer Price Index for All Urban Consumers: Energy
CPIENGNS, M, Index 1982-84=100, NSA
- Chained Consumer Price Index for all Urban Consumers: All items less food and energy
SUUR000SA0L1E, M, Index Dec 1999=100, NSA
- Consumer Price Index for All Urban Consumers: All Items Less Energy
CPILEGSL, M, Index 1982-84=100, SA
- Consumer Price Index for All Urban Consumers: All Items Less Energy
CPILEGNS, M, Index 1982-84=100, NSA

12. The graph now shows the **CPI-U All Items (in blue)** and the **CPI-U Energy (in red)**
Note the legend for the graph is in the lower-right corner.

FRED Graph

[Download Data in Graph](#) | [Print](#) | [PDF](#) | [Link](#) | [View Saved Graphs](#) | [Save Graph](#) | [Help](#)



Settings [Restore Defaults](#) | [Save Settings](#) | [Apply Saved Settings](#)

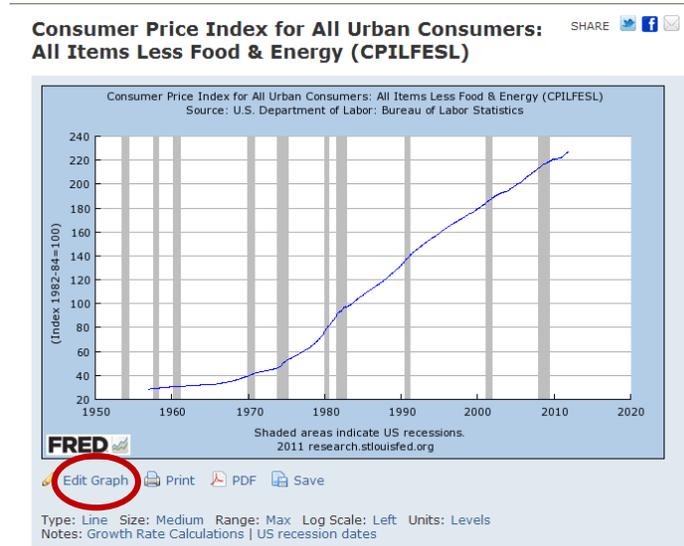
- ▶ Graph
- ▶ Line 1: Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)
- ▶ Line 2: Consumer Price Index for All Urban Consumers: Energy (CPIENGSL)
- ▶ Add Data Series

13. CPI-U measures that have food and energy removed (the two most volatile parts of CPI) are often referred to as **core** or **underlying inflation**. When a news headline or the FOMC statement refers to a core inflation measure, it typically is referring to CPI-U Less Food and Energy.

Using some of the earlier skills of locating data, locate the seasonally adjusted data for **CPI-U less food and energy**.

The screenshot shows the FRED Economic Data website interface. At the top, there is a navigation bar with the Federal Reserve Bank of St. Louis logo and the text 'ECONOMIC RESEARCH FEDERAL RESERVE BANK OF ST. LOUIS'. To the right of the logo is a search bar labeled 'Search FRED'. Below the navigation bar is a secondary menu with links for 'FRED Economic Data', 'Data Tools', 'Publications', 'Working Papers', 'Economists', and 'More'. On the far right of this menu is a link for 'St. Louis Fed Home'. The main content area is titled 'Series with Tags' and shows a list of search results. On the left side, there is a sidebar with the 'FRED' logo and a section titled '98 Series with Tags:' which lists 'core [X]' and 'cpi [X]'. A red arrow points from this sidebar to the first search result. The first result is 'Consumer Price Index for All Urban Consumers: All Items Less Food & Energy' (CPIUFESL), which is highlighted with a red box. Below the title, it shows the series ID 'CPIUFESL', the date range '1957-01 to 2012-04', the frequency 'Monthly', the index base 'Index 1982-84=100', and the adjustment 'Seasonally Adjusted (1 day ago)'. Below the title and description, there are tags: 'usa nation monthly sa bls consumer cpi urban all items core'. The second result is 'Consumer Price Index for All Urban Consumers: All Items Less Food & Energy' (CPIUFENS), which is not seasonally adjusted. The third result is 'Chained Consumer Price Index for all Urban Consumers: All items less food and energy' (SUUR0000SA0L1E), which is not seasonally adjusted.

Now add either CPI-U Food or the CPI-U Energy as a separate line on the graph. The steps are illustrated below.



Settings [Restore Defaults](#) | [Save Settings](#) | [Apply Saved Settings](#)

▶ **Graph**

▶ **Line 1: Consumer Price Index for All Urban Consumers: All Items Less Food & Energy (CPILFESL)**

▼ **Add Data Series**

To: New Line Line 1 [What's This?](#)

Search: [Browse](#)

Notes on arc

Research

- Consumer Price Index for All Urban Consumers: All Items Less Food & Energy
CPILFESL, M, Index 1982-84=100, SA
- Consumer Price Index for All Urban Consumers: Food
CPIUFDNS, M, Index 1982-84=100, NSA
- Consumer Price Index for All Urban Consumers: All Items Less Food & Energy
CPILFENS, M, Index 1982-84=100, NSA
- Consumer Price Index for All Urban Consumers: Food**
CPIUFDSE, M, Index 1982-84=100, SA
- Consumer Price Index for All Urban Consumers: Food away from home
CUUR000SEFV, M, Index 1982-84=100, NSA
- Consumer Price Index for All Urban Consumers: Food and Beverages
CPIFABSL, M, Index 1982-84=100, SA
- Chained Consumer Price Index for all Urban Consumers: All items less food and energy
SUUR000SA0L1E, M, Index Dec 1999=100, NSA

FRED Add-In for Microsoft® Sign In The FRED Network®

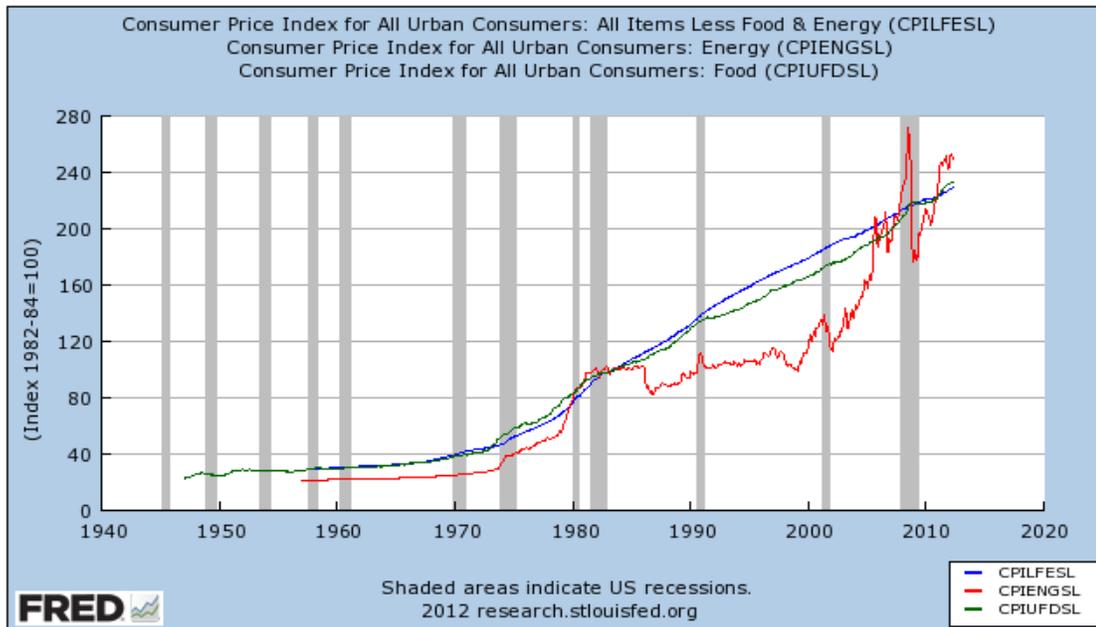
CPI-U: All Items Less Food & Energy is shown in blue

CPI-U: Energy is shown in red

CPI-U: Food is shown in green

FRED Graph

[Download Data in Graph](#) | [Print](#) | [PDF](#) | [Link](#) | [View Saved Graphs](#) | [Save Graph](#) | [Help](#)



14. Based on this graph, during the 1990s was the relative rise in the level of energy prices generally higher or lower than the overall price level?

15. Another measure of prices can be found in the data collected for calculating national income. The GDP deflator is the ratio of nominal GDP to real GDP. There are two ways to locate the GDP deflator.

Use the FRED search box and type in **GDP deflator**,

The screenshot shows the FRED Economic Research website. At the top right, there are links for 'MY ACCOUNT', 'REGISTER', and 'SIGN IN'. A search box contains the text 'gdp price deflato'. A dropdown menu is open, showing search results: 'Real Gross Domestic Product, 1 Decimal', 'Gross Domestic Product: Implicit Price Deflator' (highlighted with a blue bar and a red arrow), 'Real Potential Gross Domestic Product', 'Real Gross Domestic Product', 'Real Gross Domestic Product, 3 Decimal', 'Real GDP per Capita in the United States', and 'Real GDP in the United States'. Below the search box, the navigation bar includes 'TAGS', 'CATEGORIES' (circled in red), 'RELEASES', 'SOURCES', 'UPDATES', and 'RELEASE CALENDAR'. The main content area features the 'Federal Reserve Economic Data' logo and text: 'Download, graph, and track 45,000 economic time series from 40 sources.' Below this, it says 'View data by:' followed by the same navigation links.

or browse FRED's categories, choosing the **National Accounts** category, then **National Income & Product Accounts**,

The screenshot shows the 'Categories' page on the FRED website. The breadcrumb trail is 'Home > FRED® Economic Data'. The main heading is 'Categories'. Underneath, there are two main categories: 'Money, Banking, & Finance (3,794)' and 'National Accounts (704)'. The 'National Accounts' category is circled in red. Below it, there are sub-categories: 'Federal Government Debt (18)', 'Flow of Funds (194)', 'National Income & Product Accounts (241)' (circled in red), and 'U.S. Trade & International Transactions (251)'. There are also links for 'Banking (701)', 'Business Lending (1,910)', 'Exchange Rates (98)', 'Financial Indicators (96)', 'Foreign Exchange Intervention (21)', 'Interest Rates (552)', and 'Monetary Data (420)'.

and finally **Price Indexes & Deflators**.

[Home](#) > [FRED® Economic Data](#) > [Categories](#) > [National Accounts](#)

National Income & Product Accounts

Categories

- [Domestic Capital Account \(Saving & Investment\)](#) (29)
- [Foreign Transactions](#) (22)
- [GDP/GNP](#) (24)
- [Gov't Receipts, Expenditures & Investment](#) (76)
- [Personal Income & Outlays](#) (66)
- [Price Indexes & Deflators](#) (9)
- [Private Enterprise Income](#) (15)

16. From this list, choose **Gross Domestic Product: Implicit Price Deflator**. (Note: Another frequently used measure of prices on the list is the Personal Consumption Expenditures: Chain-type Price Index.)

[Home](#) > [FRED® Economic Data](#) > [Categories](#) > [National Accounts](#) > [National Income & Product Accounts](#)

Price Indexes & Deflators

Series 1 - 9

Selected Series: [Add to Data List](#) [Add to New Graph](#) Sort by: [Popularity](#) ▾

Gross Domestic Product: Implicit Price Deflator ■■■■■■■■■■
GDPDEF, 1947:Q1 to 2012:Q1, Quarterly, Index 2005=100, Seasonally Adjusted (Apr 27)
[usa](#) [nation](#) [sa](#) [quarterly](#) [bea](#) [gdp](#) [implicit price deflator](#)

Personal Consumption Expenditures: Chain-type Price Index ■■■■■■■■■■
PCEPI, 1959-01 to 2012-03, Monthly, Index 2005=100, Seasonally Adjusted (Apr 30)
[usa](#) [nation](#) [monthly](#) [sa](#) [bea](#) [price index](#) [consumption expenditures](#) [pce](#) [chained](#)

Personal Consumption Expenditures: Chain-Type Price Index Less Food and Energy ■■■■■■■■■■
PCEPILFE, 1959-01 to 2012-03, Monthly, Index 2005=100, Seasonally Adjusted (Apr 30)
[usa](#) [nation](#) [monthly](#) [sa](#) [bea](#) [price index](#) [consumption expenditures](#) [pce](#) [chained](#) [core](#)

Personal Consumption Expenditures: Chain-type Price Index ■■■■■■■■■■
PCECTPI, 1947:Q1 to 2012:Q1, Quarterly, Index 2005=100, Seasonally Adjusted (Apr 27)
[usa](#) [nation](#) [sa](#) [quarterly](#) [bea](#) [price index](#) [consumption expenditures](#) [pce](#) [chained](#)

17. Now, to add some information to this choice, **change the units** to Percent Change from Year Ago (**% Chg. from Yr. Ago**)

Shaded areas indicate US recessions. 2012 research.stlouisfed.org

[Edit Graph](#)
[Print](#)
[PDF](#)
[Save](#)

Type: Line Size: Medium Range: Max Log Scale: Left Units: Levels
 Notes: Growth Rate Calculations | US recession dates

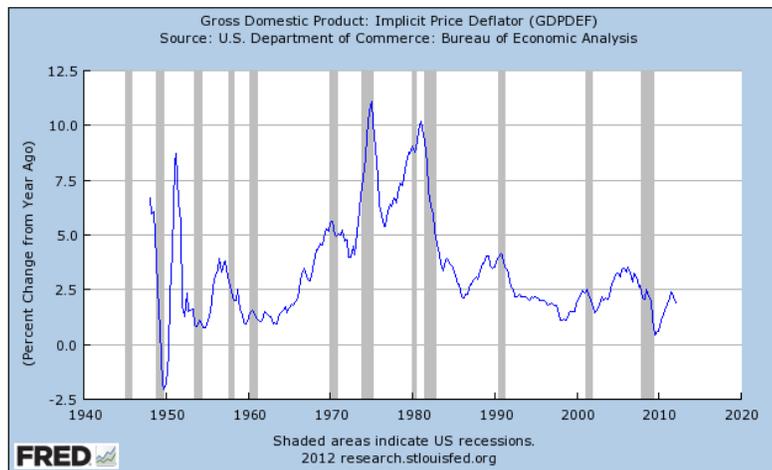
Source: U.S. Department of Commerce: Bureau of Economic Analysis

Release: Gross Domestic Product

Notes: The number of decimal places reported varies over time. A Guide to the National Income and Product Accounts of the United States (NIPA) - (<http://www.bea.gov/national/pdf/nipaguid.pdf>)

Change from Year Ago, Index 2005=100

18. Once you've done that, the options for editing the graph are available. Add the **CPI-U Less Food and Energy** (seasonally adjusted) series.



Settings [Restore Defaults](#) | [Save Settings](#) | [Apply Saved Settings](#)

Graph

Line 1: Gross Domestic Product: Implicit Price Deflator (GDPDEF)

Add Data Series

Search: [Browse](#)

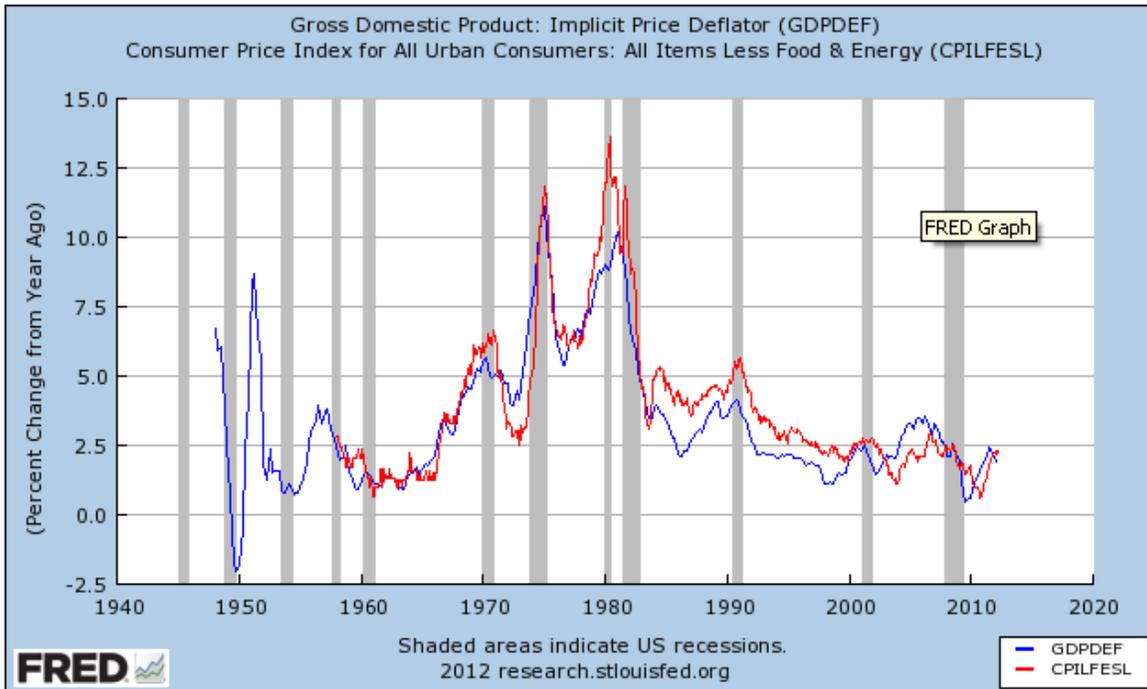
Consumer Price Index for All Urban Consumers: All Items Less Food & Energy
 CPIUFESL, M, Index 1982-84=100, SA

Notes on arc
 Consumer Price Index for All Urban Consumers: All Items Less Food & Energy
 CPIUFENS, M, Index 1982-84=100, NSA

19. The GDP deflator (blue line in the graph below) reflects the prices of all goods and services produced domestically, while the CPI (red line below) reflects prices of all goods and services bought by consumers.

FRED Graph

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▶ **Graph**

▶ **Line 1: Gross Domestic Product: Implicit Price Deflator (GDPDEF)**

▼ **Line 2: Consumer Price Index for All Urban Consumers: All Items Less Food & Energy (CPILFESL)**

Measuring inflation is crucial to the FOMC's mandate for price stability. And, understanding inflation and how it is measured is key to being an informed citizen. We hope that you have found FRED to be a useful tool in your understanding of inflation and price stability.