

FRED in the Classroom: 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 **Prices** Category.

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3. On the next screen, choose **Consumer Price Indexes (CPI)**.

Prices

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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.

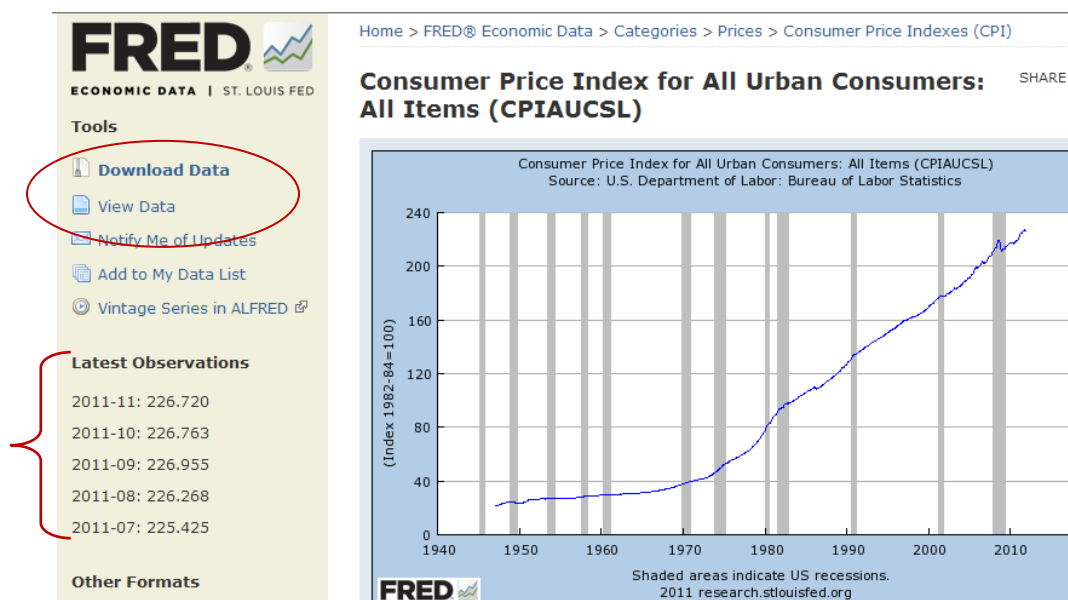
- Choose the **Consumer Price Index for All Urban Consumers: All Items**, Seasonally Adjusted (SA). It is the first item on the list. **Click the Series title** to see the graph.

Selected Series: Show All Filter

[Add to Data List](#) [Add to New Graph](#) Series 1 - 5 of 5

<input type="checkbox"/> Title	Series ID	Observation Range Start End	Freq	Units	Seas Adj	Popularity ▼
<input type="checkbox"/> Consumer Price Index for All Urban Consumers: All Items	CPIAUCSL	1947-01 2011-11	M	Index 1982-84=100	SA	<div></div>
<input type="checkbox"/> Consumer Price Index for All Urban Consumers: All Items	CPIAUCNS	1913-01 2011-11	M	Index 1982-84=100	NSA	<div></div>
<input type="checkbox"/> Chained Consumer Price Index for all Urban Consumers: All items	SUUR0000SA0	1999-12 2011-11	M	Index Dec 1999=100	NSA	<div></div>
<input type="checkbox"/> Consumer Price Index for Urban Wage Earners and Clerical Workers: All Items	CWUR0000SA0	1913-01 2011-11	M	Index 1982-84=100	NSA	<div></div>

- 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, see **Latest Observations** to the left of the graph.



6. Calculate the inflation rate from February 2010 to February 2011. Hints: You'll need to either **View Data** or **Download Data** to see the data for February 2010. The formula to use is:

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

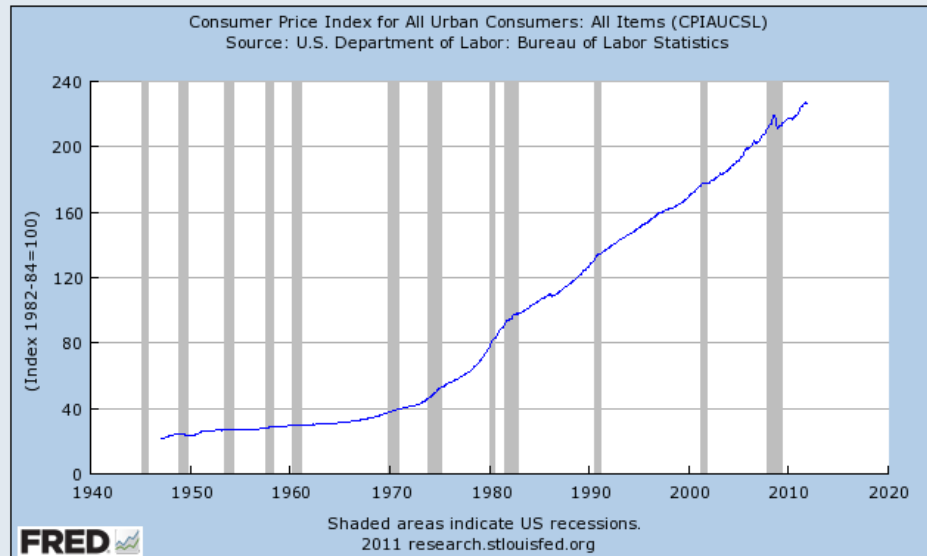
7. Next, edit the the CPI: All Items graph. After editing the graph, you will add the CPI for energy (CPI: Energy). CPI: Energy is a subset of the entire Consumer Price Index.

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

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

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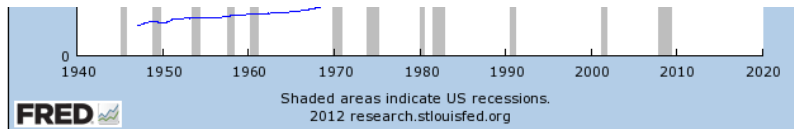
Type: Line Size: Medium Range: Max Log Scale: Left Units: Levels
Notes: [Growth Rate Calculations](#) | [US recession dates](#)

8. That will bring up a graph to which series can be added, units can be changed, and time 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 2011

Units:

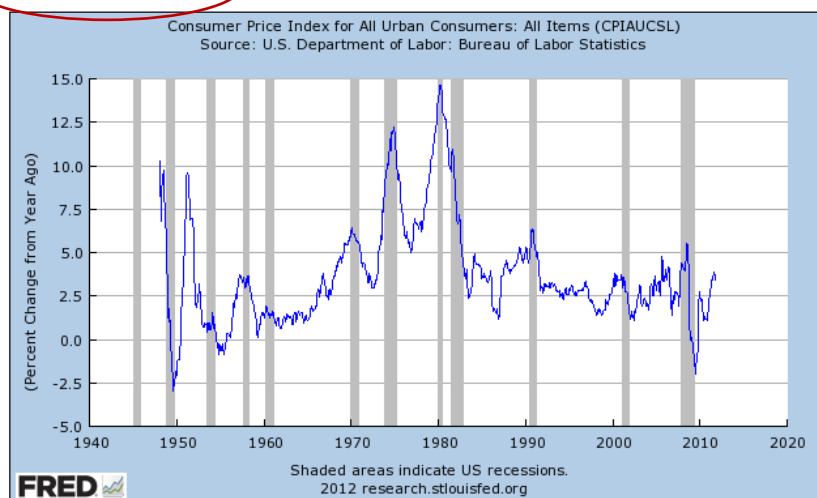
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► **Add Data Series**

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?

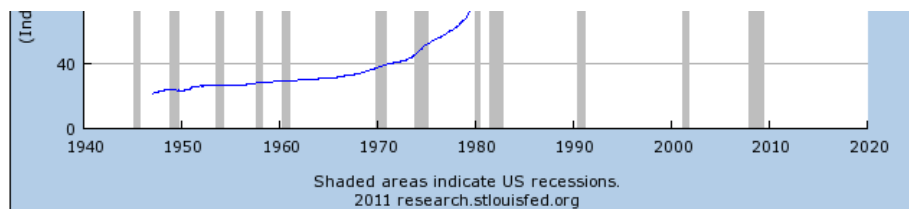
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- 11.
- Next, scroll down below the graph to the “**Add Data Series**” section.
 - Open it and type **CPI energy** in the search box. The search box automatically makes suggestions based on the words entered.
 - For the comparison, **choose Consumer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



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▶ **Graph**

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

▼ **Add Data Series**

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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

CPIENGNS, 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: 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

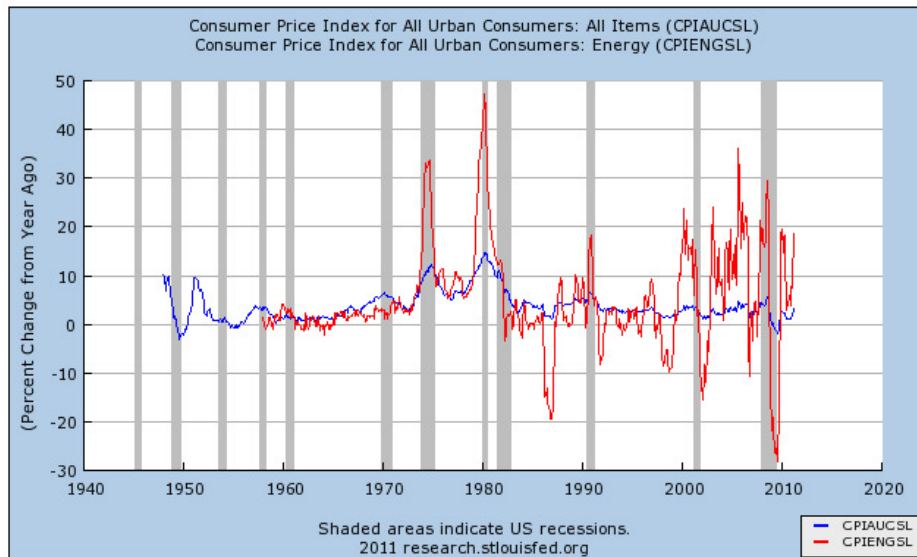
Consumer Price Index for All Urban Consumers: Energy services

CUSR0000SEHF, M, Index 1982-84=100, SA

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

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- ▶ 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 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**, and then add either CPI-U Food or the CPI-U Energy as a separate line on the graph. The steps are illustrated below.

Special Indexes

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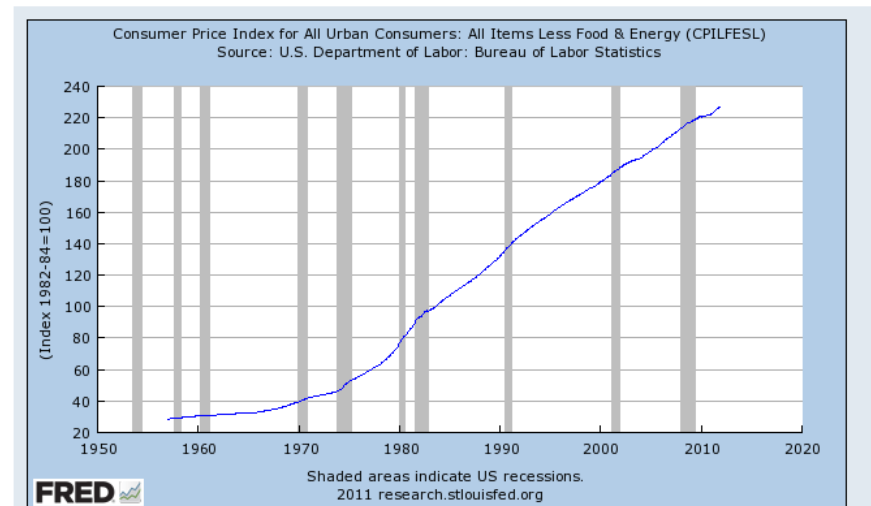
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Series 1 - 50 of 64 1 2 Next »

<input type="checkbox"/>	Title	Series ID	Observation Range		Freq	Units	Seas Adj	Popularity ▼
			Start	End				
<input type="checkbox"/>	Consumer Price Index for All Urban Consumers: All Items Less Food & Energy	CPILFESL	1957-01	2011-11	M	Index 1982-84=100	SA	
<input type="checkbox"/>	Consumer Price Index for All Urban Consumers: All Items Less Food & Energy	CPILFENS	1957-01	2011-11	M	Index 1982-84=100	NSA	
<input type="checkbox"/>	Consumer Price Index for All Urban Consumers: Energy	CPIENGSL	1957-01	2011-11	M	Index 1982-84=100	SA	

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

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Notes: Growth Rate Calculations | US recession dates

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► **Graph**

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

▼ **Add Data Series**

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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
CPIUFDSL, 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 ←

CPIUFDSL, M, Index 1982-84=100, SA

Consumer Price Index for All Urban Consumers: Food away from home
CUUR0000SEFV, 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
SUUR0000SA0L1E, M, Index Dec 1999=100, NSA

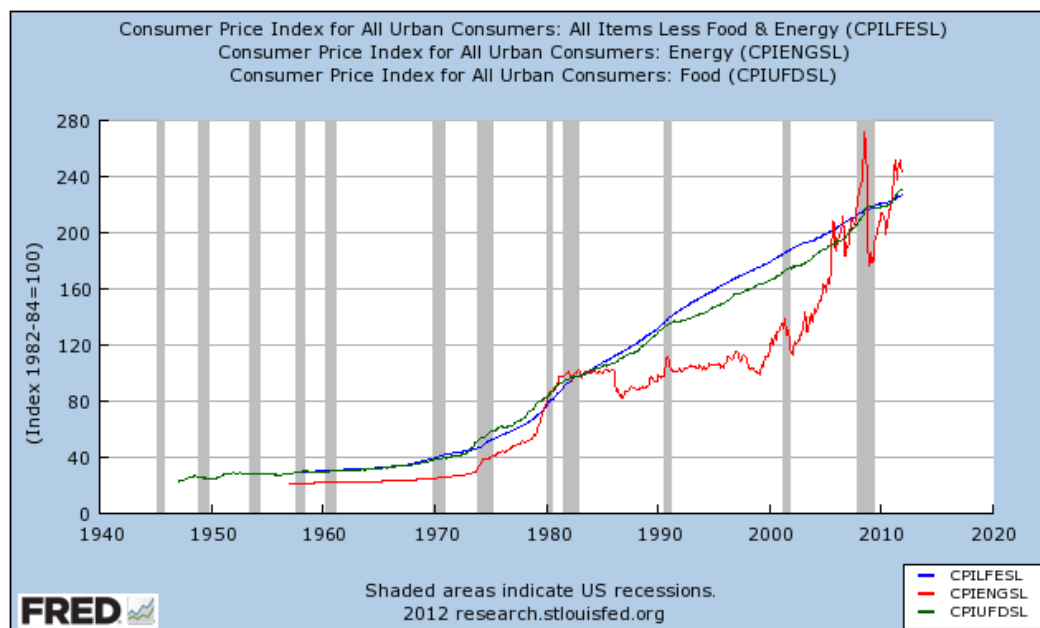
CPI-U: All Items Less Food & Energy is shown in blue

CPI-U: Energy is shown in red

CPI-U: Food is shown in green

FRED Graph

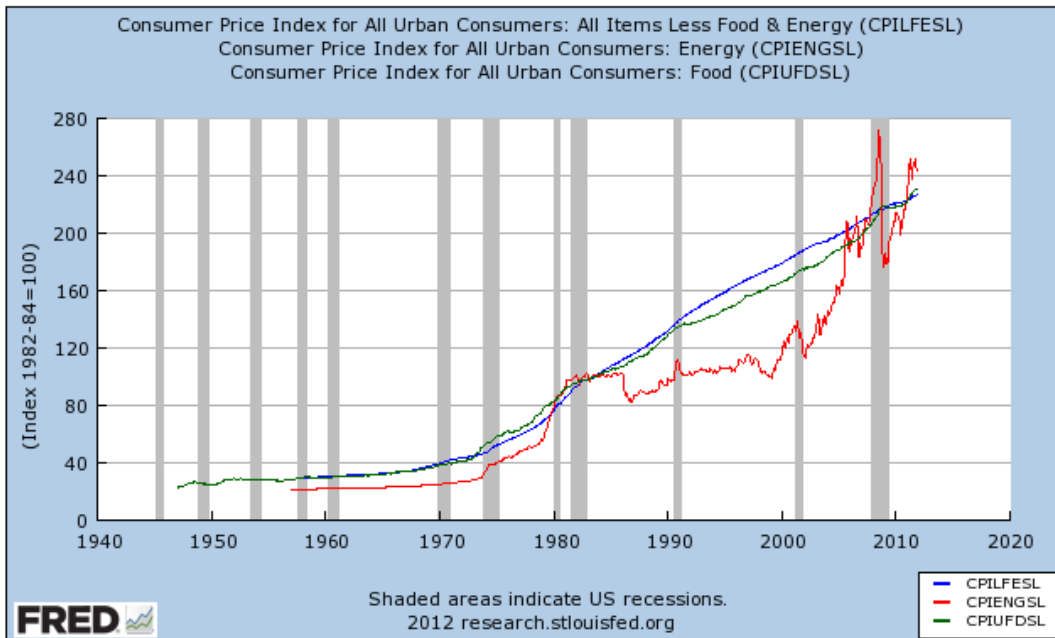
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14. Based on this graph, from the mid-1980s to the early 2000s was the relative rise in the level of energy prices generally higher or lower than the overall price level?

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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**, or choose the National Accounts Category, then National Income & Product Accounts, and finally Price Indexes & Deflators.



16. If you browse through the Categories, go to **Price Indexes & Deflators**.
17. 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.)

Price Indexes & Deflators

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Selected Series:

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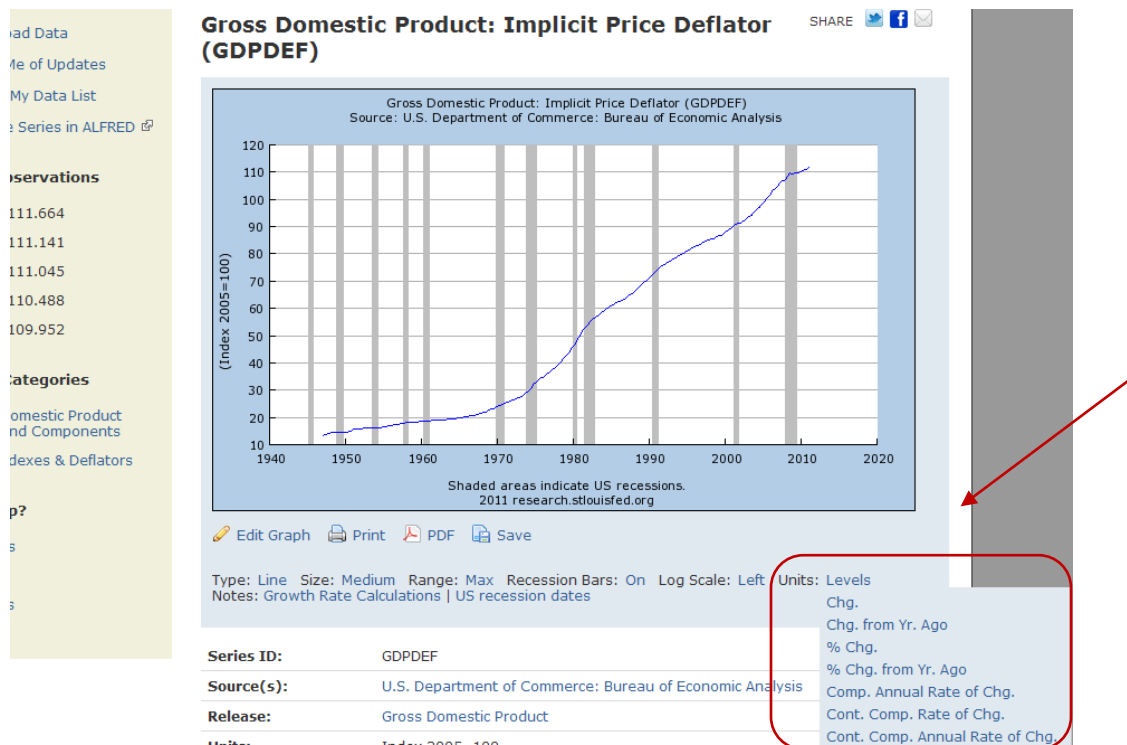
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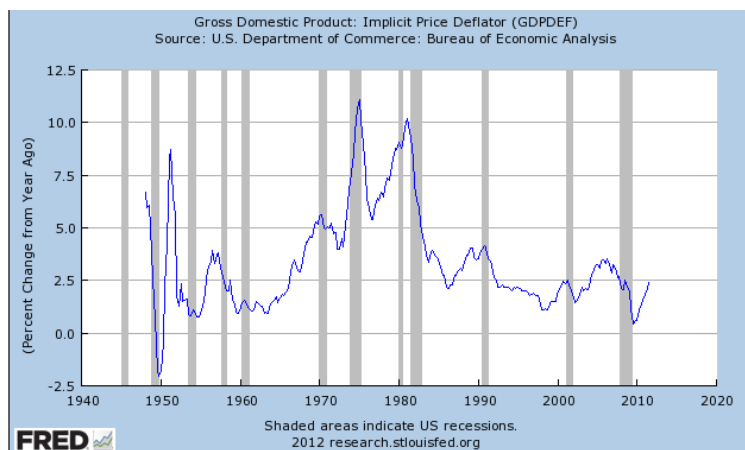
Series 1 - 9 of 9

<input type="checkbox"/> Title	Series ID	Observation Range		Freq	Units	Seas	Adj	Popularity ▼
		Start	End					
<input type="checkbox"/> Gross Domestic Product: Implicit Price Deflator	GDPDEF	1947:Q1	2011:Q3	Q	Index 2005=100	SA		
<input type="checkbox"/> Personal Consumption Expenditures: Chain-type Price Index	PCEPI	1959-01	2011-11	M	Index 2005=100	SA		
<input type="checkbox"/> Personal Consumption Expenditures: Chain-type Price Index	PCECTPI	1947:Q1	2011:Q3	Q	Index 2005=100	SA		
<input type="checkbox"/> Gross Domestic Product: Chain-type Price Index	GDPCTPI	1947:Q1	2011:Q3	Q	Index 2005=100	SA		
<input type="checkbox"/> Personal Consumption Expenditures: Chain-Type Price Index Less Food and Energy	PCEPILFE	1959-01	2011-11	M	Index 2005=100	SA		
<input type="checkbox"/> Gross National Product: Implicit Price Deflator	GNPDEF	1947:Q1	2011:Q3	Q	Index 2005=100	SA		
<input type="checkbox"/> Personal Consumption Expenditures: Chain-type Price Index Less Food and Energy	JCXFE	1959:Q1	2011:Q3	Q	Index 2005=100	SA		

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



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



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Graph

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

Add Data Series

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

Search: [Browse](#)

Consumer Price Index for All Urban Consumers: All Items Less Food & Energy

Notes on this series: CPIUFESL, M, Index 1982-84=100, SA

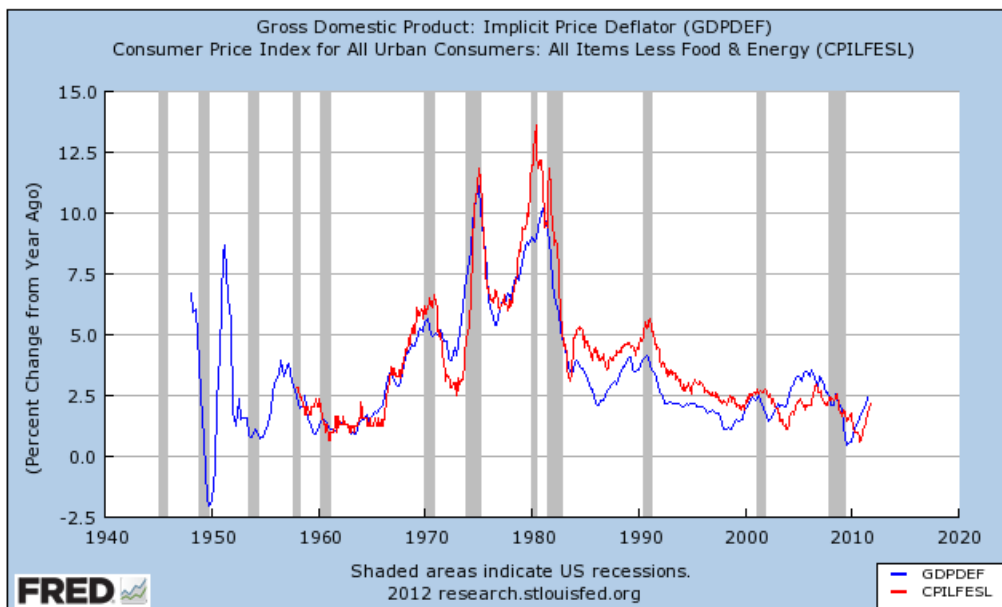
Consumer Price Index for All Urban Consumers: All Items Less Food & Energy

20. 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 (less food and energy).

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.

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- ▶ Line 1: Gross Domestic Product: Implicit Price Deflator (GDPDEF)
- ▶ Line 2: Consumer Price Index for All Urban Consumers: All Items Less Food & Energy (CPILFESL)
- ▶ Add Data Series