

AP Macroeconomics: Learning with Current Data— FRED® in the AP Macro Classroom

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Introduction

Each of these 17 activities shares a common structure and is designed to be distributed to students and completed in steps. Using FRED®—Federal Reserve Economic Data—students will create a visual display of data in graph form, constructing their own window of understanding by using the latest available macro data. Each activity stands on its own and is designed to be completed in one class period.

As they work through the activities, students will increase their data literacy while acquiring skills in finding, manipulating, and displaying quantitative data. Instructors may extend the activities by adding related data series or by supplying relevant writing or discussion prompts.

Activities conclude with an option to save the completed graph(s) to a FRED® dashboard. Students with FRED® accounts receive free unlimited cloud storage of their FRED® graphs and data collections: They can easily assemble a portfolio of graphs. Student-created dashboards may be accessed anytime from any location with internet access. Students can register for their own FRED® account at <https://fred.stlouisfed.org/>.

Concepts

The activities may be grouped under the following main topics:

GDP: 1-2

Inflation: 3-4, 11

Interest rates: 5-6

Federal budget: 7-8

Employment: 9a-e, 10

Money: 12

Phillips curve: 13

Activity 1: National Income: GDP

This activity focuses on the income component of the 2007-09 recession, and you will use FRED®—Federal Reserve Economic Data—to find relevant data. FRED® is a great and easy-to-master tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “nominal GDP.” One of the first few results should be **Gross Domestic Product, Billions of Dollars, Quarterly, Seasonally Adjusted Annual Rate**. Click on this.
3. Mouse over the graph line. You will see a pop-up displaying a value for GDP at each of the data points. By what frequency do the periods change?
4. Place the cursor on the most recent point to find a current value for GDP. What is the current level of GDP? What are the units?
5. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the EDIT LINE 1 tab is highlighted. Look below where there is an option that says **Units**. Click in the **Units** box and change the units to **Percent Change from Year Ago**. Look at the graph now. What is the current percent change in nominal GDP? Why might this value overstate actual GDP growth?
6. Place the cursor on the most recent point to find a current value for GDP, **Percent Change from Year Ago**. What is the current level of GDP? What are the units?
7. What is the highest rate of percent change in nominal GDP since the end of the Great Recession? In what year/quarter is this reported?

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8. The gray bars represent recessions. Take a closer look at the Great Recession (December 2007 to July 2009). Drag the left button of the slider bar below the x-axis to the right so that the date range in the display begins just before the most recent gray bar (use October 2007). Now, mouse over the starting point of the recession. What is the annual percent change in nominal GDP at the start of the recession?

9. What is the lowest annual percent change from a year ago in nominal GDP during the recession?

10. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

11. Dashboard option: Finish by adding the completed graph to a FRED® dashboard that you will now create. Begin by clicking the dropdown menu under MY ACCOUNT and select **Dashboards**. Click the **+Add New > Dashboard** buttons and give your dashboard a name. An appropriate name for these activities would be “AP Macro Dashboard_[First Name_Last Name Initial].” Click the **Create** button.

12. Next, click the **Graphs** tab on the left and find your recently saved graph. Click on it. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 1-National Income: GDP.” Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Click **Add to Dashboard**.

13. Once added to your dashboard, the graph may be resized or re-arranged, along with other graphs you add to the dashboard. To share the dashboard you must click **Actions > Make Public**. Then anyone with the URL can view a copy of your dashboard.

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Activity 2: National Income: Real GDP

This activity focuses on the real income component of the 2007-09 recession, and you will use FRED® to find relevant data. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “real GDP.” One of the first few results should be **Real Gross Domestic Product, Billions of Chained 2012 Dollars, Quarterly, Seasonally Adjusted Annual Rate**. Click on this. Real GDP is the most widely reported indicator for national income.
3. What is the source of this data?
4. Mouse over the graph line. You will see a pop-up displaying a value for real GDP at each of the data points. By what frequency do the periods change?
5. Place the cursor on the most recent point to find a current value for real GDP. What is the current level of GDP? What are the units? In what year/quarter is this reported?
6. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the EDIT LINE 1 tab is highlighted. Look below where there is an option that says **Units**. Click in the **Units** box and change the units to **Percent Change from Year Ago**. Look at the graph now. The (trend line of) percent change of real GDP is the most widely reported way to describe the economic growth rate. Current percent changes are a proxy for it. What is the current rate of economic growth?

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7. What was the rate of economic growth at the worst point during the 2007-09 recession? (The gray bars represent recessions.) In what year/quarter was this reported?

8. What is the highest rate of economic growth since the 2007-09 recession (December 2007)? In what year/quarter is this reported?

9. What has the growth rate done since it reached this most recent high?

10. What is the highest rate of growth since 1950? What are the highest three peaks of growth and when did they occur? What was the historical context for each of these periods of growth?

11. How would you compare the changes since the last recession with those in prior decades?

12. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

13. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 2-National Income: Real GDP.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 3: Measures of Inflation

This activity focuses on the price level component of the 2007-09 recession, and you will use FRED® to find data that pertain to inflation. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “CPI.” One of the first few results should be **Consumer Price Index for All Urban Consumers: All Items, Index 1982-1984 = 100, Monthly, Seasonally Adjusted**. Click on this.
3. View the graph. What agency reports this data?
4. Drag the mouse along the line in the plot area. You will see a vertical line giving you a value for the CPI at each of the dates. By what frequency are the periods changing? In what units are the values? What are the base years?
5. Place the cursor on the most recent point to find a current value for the CPI. What is the current CPI? In what month/year is this reported? Is it simple to determine the rate of inflation from this measure alone?
6. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the EDIT LINE 1 tab is highlighted. Look below where there is an option that says **Units**. Click in the **Units** box and change the units to **Percent Change from Year Ago**. Look at the graph now. The percent change of any price level measure is an estimate for inflation. What is the current inflation rate (as measured by the CPI) and in what month/year is this reported?

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7. What is the highest rate of (CPI) inflation since December 2007? In what month/year is this reported?

8. What is the lowest rate of (CPI) inflation since December 2007? In what month/year is this reported?

9. Starting with 1948, how do the lowest rates of inflation during past recessions compare with that during the Great Recession? Cite some numbers to make your comparison. How does it make the Great Recession different from the others? What happens to inflation in or around recessions?

10. Starting with 1948, how do past peaks of inflation compare with the most recent peak of inflation? Cite data to make your comparison.

11. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

12. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 3-Measures of Inflation.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 4: More Measures of Inflation

This activity focuses on the price level component of the 2007-09 recession, and you will use FRED® to find data that pertain to inflation. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “CPI.” One of the first few results should be **Consumer Price Index for All Urban Consumers: All Items, Index 1982-1984 = 100, Monthly, Seasonally Adjusted**. Click on this.
3. Look at the graph. What is the source of the consumer price index? What are the units?
4. Now look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the EDIT LINE 1 tab is highlighted. Look below where there is an option that says **Units**. Click in the **Units** box and change the units to **Percent Change from Year Ago**. Look at the graph now. The percent change of any price level measure is an estimate of inflation.
5. Click the EDIT GRAPH button and make sure the ADD LINE tab is highlighted. In the search bar, type in “GDP deflator.” One of the first few options should be **Gross Domestic Product: Implicit Price Deflator, Quarterly, Index 2012 = 100, Seasonally Adjusted**. Click on this, and then click the **Add data series** button. (The series units should default to **Percent Change from Year Ago**). Look at the graph now.
6. What are the sources of the GDP deflator?
7. Make an observation about how these measures of inflation have changed since 1947.

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8. We are going to add one more data series and then change the units for all three series. Click the orange button that says EDIT GRAPH. Make sure the ADD LINE tab is highlighted. In the search bar, type in “core CPI.” One of the first few options should be **Consumer Price Index for All Urban Consumers: All Items Less Food and Energy, Monthly, Index 1982-1984 = 100, Seasonally Adjusted**. Click on this, and then click the **Add data series** button.
9. Now make sure the **Units** box shows **Index (Scale value to 100 for chosen date)**, and then, in the **U.S. recession box**, select **2009-06-01 End**. Click the **Copy to all** button. Adjust the graph’s date range to begin on 2009-06-01.
10. Which measure of inflation has been the most volatile since the end of the 2007-09 recession? Why might that be? Which series is reported quarterly? How might that affect volatility?
11. If you could control the rate of inflation, what would you want it to be? Why? Which series would you use as a measure? Why?
12. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.
13. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 4-More Measures of Inflation.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 5: Interest Rates

This activity focuses on interest rates, and you will use FRED® to find data that pertain to them. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “30 year mortgage.” One of the first few results should be **30-Year Fixed Rate Mortgage Average in the United States, Percent, Weekly, Not Seasonally Adjusted**. Click on this. This is the typical fixed rate a homeowner would pay for a house loan with a 30-year term. What is the current reported rate and date? What are the units?
3. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the ADD LINE tab is highlighted. In the search bar, type in “10 year.” One of the first few options should be **10-Year Treasury Constant Maturity Rate, Weekly, Percent, Not Seasonally Adjusted**. This is the rate at which the U.S. government borrows on a 10-year term. Click on that, and then click the **Add data series** button. Look at the graph now.
4. What are the sources of this new data?
5. Make an observation about how these two measures of interest rates have changed.
6. Which rate is consistently higher? Why do you think that is?
7. We are going to add one more data series. Click the orange button that says EDIT GRAPH. Make sure the ADD LINE tab is highlighted. In the search bar, type in “federal funds.” One of the first few options should be **Effective Federal Funds Rate, Weekly, Percent, Not Seasonally Adjusted**. Click on this, and then click the **Add data series** button. The federal funds rate is the interest rate at which banks borrow from other banks for overnight loans. Look at the graph and make an observation about the graph. What classes of borrowers are included in your graph? How might differences among these borrowers affect the rates displayed?

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8. Change the date range so that you only graph the time period since the end of the Great Recession (2009-07-01 onward). Now make a few observations about what you see.

9. Look back at other times of recessions. What do the interest rates tend to do then?

10. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

11. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 5-Interest Rates.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

Activity 6: Real Interest Rates

This activity focuses on real interest rates, and you will use FRED® to find data that pertain to them. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “30 year mortgage.” One of the first results should be **30-Year Fixed Rate Mortgage Average in the United States, Percent, Weekly, Not Seasonally Adjusted**. Click on this.
3. What is the source of this data? What are the units?
4. View the graph. This is the fixed rate that a typical homeowner would pay for a house loan on a 30-year term. What is the current reported rate and date?
5. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the ADD LINE tab is highlighted. In the search bar, type in “30 year mortgage.” (Yes, the same series as above.) One of the first few options should be **30-Year Fixed Rate Mortgage Average in the United States**. Click on this, and then click the **Add data series** button. The second series will display in red and, for the moment, will be graphed on top of the blue line.
6. You are going to add one more data series in a new way. Look at the upper right of the screen for the orange button that says EDIT GRAPH. Click it and make sure the EDIT LINES tab is highlighted and select EDIT LINE 2. Halfway down the editing panel, there is a **Customize data** section. Below this is a box for adding a series to combine with your existing series. In the search bar, type in “CPI.” One of the first few options should be **Consumer Price Index for All Urban Consumers: All Items, Monthly, Index 1982-1984 = 100, Seasonally Adjusted**. Click on this, and then click the **Add** button (on the right).
7. Notice that LINE 2 now has an **(a)** series and a **(b)** series. For the **(b)** series, change the units from **Index 1982-1984 = 100** to **Percent Change from Year Ago**. Changing the units turns CPI from a level into an inflation rate estimate.
8. FRED® lets users input a formula to combine two data series into a single line. In this step of the activity, you will type in a formula for calculating the real interest rate (nominal interest rate – inflation rate). In the **Formula** box type “a-b.” Click **Apply**.

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9. Make an observation about how these two measures of interest rates (your nominal rate and real rate) have moved. Look at the period from February-October 2009. What must have occurred for the real interest rate to rise above the nominal 30-year fixed mortgage?

10. What other observations can you make?

11. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

12. Dashboard option: Add the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 6-Real Interest Rates—30 Year.” Select an **Observation Range**. Click **Add to Dashboard**.

13. Repeat steps 1-6 above, making sure to type “fedfunds” in the search bar instead of “30 year mortgage.” (You are substituting series ID: FEDFUNDS for the 30-Year Fixed Mortgage Rate.)

14. Make an observation about how these two measures of interest rates (your nominal rate and real rate) have moved. Look at the period from March-October 2009. What must have occurred for the real interest rate to rise above the nominal 30-year fixed mortgage?

15. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

16. Dashboard option: Add the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 6-Real Interest Rates—Fed Funds.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 7: Budget Surplus and Budget Deficit

This activity focuses on the U.S. government's budget, and you will use FRED® to find data that pertain to it. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in "surplus deficit." One of the first few results should be **Federal government budget surplus or deficit**. Click on this. This is calculated by subtracting the federal government's fiscal year expenditures from its receipts. What is the current reported amount and date?
3. During periods of recession, what typically happens to this indicator? What happened during the 2007-09 recession?
4. Let's put the government deficit into context. Click the orange EDIT GRAPH button and select the ADD LINE tab. In the search box, type in "surplus deficit." One of the first few options should be **Federal Surplus or Deficit as Percent of Gross Domestic Product**. This is the ratio arrived at using the following formula: $\text{Total federal government receipts} - \text{Total federal government expenditures} / \text{GDP}$. Click on that, and then click the **Add data series** button. Next, click the FORMAT tab and for LINE 2, under **Y-Axis position**, select **Right**. Finally, edit the date range to begin on 1952-01-01.
5. Describe any pattern you observe. What is the historical norm for how big the deficit has been compared to GDP?
6. What happened to the federal budget deficit during the 2007-09 recession? Why do you think that is?

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7. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.
8. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 7-Budget Surplus and Budget Deficit.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

Activity 8: Federal Government Debt

This activity focuses on the national debt, and you will use FRED® to find data that pertain to it. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “federal debt total public debt.” One of the first few results should be **Federal Debt: Total Public Debt, Millions of Dollars, Quarterly, Not Seasonally Adjusted**. Click on this. This is the total amount the U.S. government owes to all its bondholders. What is the current reported amount and in what time period is it reported? (Note that this data series may not be as up to date as what you see on the National Debt Clock.)
3. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the ADD LINE tab is highlighted. In the search bar, type in “federal debt held.” One of the first few options should be **Federal Debt Held by the Public**. This is the amount the U.S. government owes to all bondholders that are not part of the U.S. government. Click on that, and then click the **Add data series** button. Look at the graph now. What is the current reported amount and in what time period is it reported?
4. It will be helpful to put these debt numbers into context. Let’s refresh and start again on your graph. Open a new browser tab and start your FRED® page again. In the search bar, type in “federal debt total public debt.” One of the first few results should be **Federal Debt: Total Public Debt as Percent of Gross Domestic Product, Percent of GDP, Quarterly, Seasonally Adjusted**. This is the total amount the U.S. government owes to all its bondholders expressed as a percentage of the nation’s annual income. What is the most recent reported level?

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5. Click the orange EDIT GRAPH button and make sure the ADD LINE tab is highlighted. In the search bar, type in “federal debt held by the public.” One of the first several options should be **Federal Debt Held by the Public as Percent of Gross Domestic Product, Quarterly, Percent of GDP, Seasonally Adjusted**. This is the amount the U.S. government owes to all bondholders that are not part of the U.S. government, stated as a percent of GDP. Click on that, and then click the **Add data series** button. Finally, shorten the date range to begin in 1970. Look at the graph now. What is the current reported percentage, and in what time period?

6. Make an observation about how these two measures of debt as percentages of GDP have moved. What is similar and what is different about them?

7. What trend do you see from the Great Recession compared with that of past recessions?

8. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

9. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 8-Federal Government Debt.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 9a: Unemployment

This activity focuses on the labor market component of the Great Recession, and you will use FRED® to find data that pertain to the employment and unemployment picture. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “civilian unemployment rate.” One of the first few results should be **Civilian Unemployment Rate**. Click on this. The civilian unemployment rate (U3; FRED® Series ID: UNRATE) is the most widely reported indicator for unemployment.
3. Mouse over the graph line. You will see a pop-up displaying a value for the unemployment rate at each of the data points. By what frequency are the periods changing?
4. Place the cursor on the most recent point to find a current value for the unemployment rate. What is the current unemployment rate? In what month/year is this reported?
5. What is the highest rate of unemployment since December 2007? In what month/year is this reported?
6. How has the unemployment rate changed since it reached this most recent peak?

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7. What is the highest rate of unemployment since 1950? In what month/year is this reported?

8. The gray bars represent recessions. Take a closer look at the Great Recession. Drag the left button of the slider bar below the x-axis to the right so that the date range in the display begins just before the most recent gray bar (late 2007). Next, mouse over the starting point of the recession. What was the beginning month/year of the recession? What was the unemployment rate then?

9. Now mouse over the endpoint of the recession. What was the final month/year of the Great Recession? What was the unemployment rate then?

10. Did the unemployment rate reach its highest level during the recession?

11. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

12. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type "Activity 9a-Unemployment." Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 9b: Duration of Unemployment

This activity focuses on the labor market component of the Great Recession, and you will use FRED® to find data that pertain to the employment and unemployment picture. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “duration of unemployment.” One of the first few results should be **Average (Mean) Duration of Unemployment**. Click on this.
3. Mouse over the graph. You will see a pop-up displaying a value for the average duration of unemployment at each of the data points. By what frequency are the periods changing? In what units are the values?
4. Mouse over the most recent point to find a current value for the average duration of unemployment. What is the current mean length of unemployment? In what month/year is this reported?
5. What is the maximum mean duration of unemployment since December 2007? In what month/year is this reported?
6. How does this most recent maximum mean duration of unemployment compare with that of the recessions since 1950? Cite some numbers to make your comparison. How does the 2007-09 recession differ from the others?

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7. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the ADD LINE tab is highlighted. In the search bar, type in “median duration of unemployment.” One of the first few options should be **Median Duration of Unemployment, Monthly, Weeks, Seasonally Adjusted**. Click on this, and then click the **Add data series** button. Look at the graph now. What is the frequency of the new line? What are the units?

8. How does the median duration of unemployment compare with the mean duration of unemployment? What does this suggest about some of those who are/have been counted as unemployed?

9. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

10. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 9b-Duration of Unemployment.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 9c: Jobs Created and Lost

This activity focuses on the labor market component of the Great Recession, and you will find data that pertain to the employment and unemployment picture. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “total nonfarm payrolls.” One of the first few results should be **All Employees: Total Nonfarm Payrolls, Thousands of Persons, Monthly, Seasonally Adjusted**. Click on this. What is the frequency? What are the units?
3. Drag the left button of the slider bar below the x-axis to the right so that the date range in the display begins just before the most recent gray bar (use December 2007). Now, mouse over the starting point of the recession. What was the level of total nonfarm payrolls then and what was the month/year? (Pay attention to the units so that you report the correct amount.)
4. Place the cursor over the endpoint of the 2007-09 recession. What was the level of total nonfarm payrolls then and what was the month/year?
5. Subtract your #4 answer from your #3 answer to find how many jobs were created or lost during the recession, according to the nonfarm payroll measurement.

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6. Place the cursor at the end of the graph to find the most recent measurement. What is the current level of total nonfarm payrolls and what is the month/year of your reading? Subtract your most recent answer from your #4 answer to find how many jobs have been created or lost since the recession, according to the total nonfarm payroll measurement.

7. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the EDIT LINE 1 tab is highlighted. Look below where there is an option that says **Units**. Click in the **Units** box and change the units to **Change, Thousands of Persons**. Look at the graph now. Nonfarm payrolls are often used to show how many jobs were created during the most recent month. How many jobs were created in the most recent month?

8. What is the trend for jobs created each month since the end of the 2007-09 recession? Click the **Max** tab above the graph to view a longer time horizon, going back to the 1930s. How does the current trend compare with the longer historical average?

9. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

10. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type "Activity 9c-Jobs Created and Lost." Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 9d: Unemployment—A Geographical Look

This activity uses a different data tool—GeoFRED®—to visualize the labor market component of the Great Recession, and you will find data that pertain to the employment and unemployment picture. GeoFRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to GeoFRED® <https://geofred.stlouisfed.org/>.
2. Click on **Build New Map** in the green box in the upper right of the screen.
3. Near the upper left of the screen, click on the **Tools** menu. Under the menu item **Region Type**, change the setting to **State**.
4. Next, click in the **Data** box, and in the search bar, type in “unemployment rate” and click the selection. You now have a choropleth map of the United States showing the unemployment rate in each state.
5. What is the most recent date displayed on the map? What are the units? Click your home state and on the pop-up that appears, click **Details and Data**. What is the source of the data? What is the last reported value?
6. Which states currently have the highest rates of unemployment? (If some of the states are grayed out, scroll through the **Date** field in the legend and select the prior month.)
7. Mouse over or click on each of these high-unemployment states and the rate will appear. If the rates are not visible, zoom in until they display. Which state has the highest unemployment rate? What is that rate?

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8. Next, go back to the **Tools** menu and you'll see that further below the **Data** box is a **Date** box. The default date setting shows the most recent data. Change the date to the month/year of the highest level of unemployment from the 2007-09 recession. Which states had the highest rates of unemployment then?

9. Mouse over or click on each of these high-unemployment states and the monthly rate will appear. Which state had the highest unemployment rate? What was that rate? What may have been happening in that state's economy?

10. Save your GeoFRED® map by clicking **Save & Share** in the **Tools** menu. Click **Save Map**. Type a name for your map in the space provided. You may add it to a **Category** you create. Click **Save Map**.

11. Dashboard option: Open the dashboard in which you want to save the map. Click **Add Widget** and select **GeoFRED® Map**. Find your map on the list that appears. Click it and then click **Add Widget to Dashboard**.

12. Return to GeoFRED®. Next, change the date to the most recent month with complete data and repeat the steps to save the map.

13. Open your downloaded maps or dashboard and compare the maps side by side. What other general observations can you make by comparing and contrasting these two maps, especially regarding the improvement in the unemployment picture?

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Activity 9e: Unemployment and Labor Force Participation

This activity focuses on the labor market component of the Great Recession, and you will use FRED® to find data that pertain to the employment and unemployment picture. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “unemployment rate.” One of the first few results should be **Civilian Unemployment Rate, Percent, Monthly Seasonally Adjusted**. Click on this. The civilian unemployment rate (U3; FRED® Series ID: UNRATE) is the most widely reported indicator for unemployment.
3. Review the formula for calculating the unemployment rate that you learned in class. Write it down here.
4. Mouse over the most recent month to display the current unemployment rate. What is the current unemployment rate? In what month/year is this reported? What is the source of this data?
5. Look at the upper right of the screen for an orange EDIT GRAPH button. Click it and make sure the ADD LINE tab is highlighted. In the search bar, type in “civilian labor force participation.” One of the first few options should be **Civilian Labor Force Participation Rate, Monthly, Percent, Seasonally Adjusted**. Click on this, and then click the **Add data series** button. Next, click the FORMAT tab and for LINE 2, under **Y-Axis position**, select **Right**.
6. How has the civilian unemployment rate changed since it reached its most recent peak level?

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7. Given how you answered #6 (and using the formula from #3), what accounts for the change in the civilian unemployment rate?

8. How does the change in the civilian unemployment rate compare with changes in the civilian labor force participation rate over the same period of time? What is one possible explanation for the change in the labor force participation rate?

9. What does this information about the civilian labor force participation rate add to your understanding of what has been happening to the general employment picture?

10. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

11. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 9e-Unemployment and Labor Force Participation.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 10: Motivating Aggregate Supply and Aggregate Demand— The Relationship Between Real GDP and Unemployment

This activity focuses on economic growth and the unemployment rate, and you will use FRED® to find data that pertain to them. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. On the FRED® landing page, under the AT A GLANCE tab on the left, find the link to **Real Gross Domestic Product**. Click on this. The gray bars in the graph represent recessions. How many recessions have there been since 1950? What happened to real GDP during each of these recessions?
3. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the ADD LINE tab is highlighted. In the search bar, type in “civilian unemployment rate.” One of the first few options should be **Civilian Unemployment Rate, Monthly, Percent, Seasonally Adjusted**. Click on this, and then click the **Add data series** button. Click in the **Units** box and change the units to **Percent**. Click in the **Modify frequency** box and change the frequency to **Quarterly**. What happened to the unemployment rate during each of the past recessions?
4. Looking at the recessions, describe the relationship between the percent change in real GDP and the unemployment rate. Do you see any patterns?

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5. Looking at the time periods right after the recessions, describe what tends to happen to the unemployment rate and the percent change in real GDP. Do you see any patterns? Are these patterns as clear as those during the Great Recession?

6. Looking at the time periods between recessions, describe what tends to happen to the unemployment rate and the percent change in real GDP. Do you see any patterns?

7. What other observations can you make about these two graphs?

8. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

9. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 10-Real GDP and Unemployment.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 11: Motivating Aggregate Supply and Aggregate Demand— The Relationship Between Real GDP and Inflation

This activity focuses on economic growth and inflation, and you will use FRED® to find data that pertain to them. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. On the FRED® landing page, under the AT A GLANCE tab on the left, find the link to **Real Gross Domestic Product**. Click on this. The gray bars in the graph represent recessions. How many recessions have there been since 1950? What happened to the percent change of real GDP during each of these recessions?
3. Look at the upper right of the screen for an orange button that says EDIT GRAPH. Click it and make sure the ADD LINE tab is highlighted. In the search bar, type in “CPI.” One of the first few options should be **Consumer Price Index for All Urban Consumers: All Items, Monthly, Index 1982-1984 = 100, Seasonally Adjusted**. Click on this, and then click the **Add data series** button. Click in the **Units** box and change the units to **Percent Change from Year Ago**. Click in the **Modify frequency** box and change the frequency to Quarterly. What happened to the percent change of CPI (an estimate of inflation) during each of the past recessions?
4. Looking at the recessions, describe the relationship between the percent change in real GDP and the inflation rate. Do you see any patterns?

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5. Looking at the time periods right after the recessions, describe what tends to happen to the inflation rate and the percent change in real GDP. Do you see any patterns?

6. Looking at the time periods between recessions, describe what tends to happen to the inflation rate and the percent change in real GDP. Do you see any patterns?

7. What other observations can you make about these two data series?

8. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

9. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 11-GDP and CPI.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

Activity 12: Money

This activity focuses on the money supply and interest rates, and you will use FRED® to find data that pertain to them. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “M1.” One of the first few results should be **M1 Money Stock, Billions of Dollars, Monthly, Seasonally Adjusted**. Click on this. This is our basic money supply, which equals currency (outside banks) plus demand deposits. Next, click the orange EDIT GRAPH button on the upper right of the screen and make sure the EDIT LINE 1 tab is highlighted. In the **Modify frequency** box change the frequency to **Quarterly**. What are the units? What is the current level of the M1 money stock?
3. What was the level of M1 at the start of the 2007-09 recession? How has the level changed since then? How would you describe the trend? What kinds of actions do you think the Federal Reserve took to create this path?
4. Click on the orange EDIT GRAPH button and make sure the ADD LINE tab is highlighted. In the search bar, type in “monetary base.” One of the first few options should be **St. Louis Adjusted Monetary Base, Monthly, Billions of Dollars, Seasonally Adjusted**. Click on this, and then click the **Add data series** button. In the **Modify frequency** box change the frequency to **Quarterly**. This data series is sometimes referred to as M0 and equals currency in circulation plus bank reserves. What do you notice about the graph now? What happened to the monetary base since the 2007-09 recession?
5. Click on the orange EDIT GRAPH button and make sure the ADD LINE tab is highlighted. In the search bar, type in “money multiplier.” One of the first few options should be **M1 Money Multiplier, Biweekly, Ratio, Seasonally Adjusted**. Click on this, and then click the **Add data series** button. This is the (effective) money multiplier using the (effective) reserve ratio. Under the EDIT LINES tab, make sure EDIT LINE 3 is selected. Change the frequency to **Quarterly**. To view this series, you must click the FORMAT tab and for LINE 3, under **Y-Axis position**, select **Right**. What is the current value of the money multiplier?

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6. How did the money multiplier change following the 2007-09 recession? How does this compare with what happened to M1 and the monetary base? What is a possible explanation?

7. Change the date range to begin in January 2000. Compare the changes in the lines during the 2001 recession to the changes during the Great Recession. Propose an explanation for the differences.

8. The federal funds rate was near zero for several years during and following the Great Recession. What policy do you think the FOMC was trying to implement?

9. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

10. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 12-Money.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.

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Activity 13: The Phillips Curve

This activity focuses on inflation and unemployment, and you will use FRED® to find data that pertain to them. FRED® is a great and simple tool for finding, viewing, and manipulating official data.

1. Go to <https://fred.stlouisfed.org/> and sign in to your personal FRED® account.
2. In the search bar, type in “CPI.” One of the first few results should be **Consumer Price Index for All Urban Consumers: All Items, Index 1982-1984 = 100, Monthly, Seasonally Adjusted**. Click on this.
3. Look at the upper right of the screen for the orange EDIT GRAPH button. Click it and make sure the EDIT LINE 1 tab is highlighted. In the **Units** box, change the units to **Percent Change from Year Ago**.
4. In the EDIT GRAPH panel, make sure the ADD LINE tab is highlighted. In the search bar, type in “civilian unemployment rate.” One of the first few options should be **Civilian Unemployment Rate, Monthly, Percent, Seasonally Adjusted**. Click on this, and then click the Add data series button. Now click the EDIT LINES tab and change the units to **Percent** (not Percent Change from Year Ago).
5. Now, adjust the left button of the slider bar below the x-axis so that you can see the two most recent recessions (i.e., set the plot area so that you can view from about 2001 to the present). Next, click inside the gray slider area (between the two buttons) and move the viewer back and forth across the dates, paying attention for any patterns between the inflation rate and unemployment. Do you observe any patterns?
6. Moving the same size viewing window across the dates again, pay attention to the inflation rate and unemployment during the recessions (the gray bars). What pattern do you notice?

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7. How pronounced is this pattern?

8. Does the pattern hold in every recession?

9. Does this pattern ever reverse itself?

10. Save the graph to your FRED® account: Find the **Account Tools** button under the graph and click it. Select **Save Graph**. Select an **Observation Range**. The middle choice—**Always chart from YYYY-00-00 to the last value available**—will ensure that your graph updates whenever new data are added to the series. Type in a title and click **Save Graph**. You may create a **Category** folder first, if you wish, and save the graph in the folder.

11. Dashboard option: Finish by adding the completed graph to your FRED® dashboard. Click the **Account Tools** button under the graph and select **Add to Dashboard**. Select your dashboard and in the **Graph Name** box, type “Activity 13-Phillips Curve.” Select an **Observation Range**. Click **Add to Dashboard**. For additional instructions, see Activity 1.