Gross Domestic Product, the Business Cycle, and the Fed's goals for the Macroeconomy– SMART Lesson

Lesson by

Julie Kornegay, Senior Economic and Financial Education Specialist, Federal Reserve Bank of Atlanta, Birmingham Branch

Lesson description

In this lesson, students explore gross domestic product (GDP), the business cycle, and the Fed's goals for the macroeconomy. Students will use interactive visuals to learn the components of GDP. Using scenario cards, students will demonstrate the impact of changes to its components on GDP. Students will identify the components of GDP with a card sorting activity. Students will calculate real GDP. They will use the CIA's *World Factbook* to identify the GDP per capita of 10 nations. Finally, students will explore the business cycle. They will use four scenario cards to determine the phases of the business cycle being described.

Concepts

Economic growth
Price stability
Maximum employment
Gross domestic product
Components of GDP
Nominal vs. real GDP
GDP per capita
The business cycle
The stages of the business cycle: peak, recession, trough, and expansion

Objectives

Students will be able to:
- define the Fed's goals for the macroeconomy
- identify the components of GDP
- explore what is included in U.S. GDP
- calculate the difference between real and nominal GDP
- identify the GDP per capita from a global perspective
- define the business cycle
- identify the stages of the business cycle

Gross Domestic Product, the Business Cycle, and the Fed's goals for the Macroeconomy– SMART Lesson

Materials

- SMART Notebook File—"Gross Domestic Product, the Business Cycle, and the Fed's Goals for the Macroeconomy"
- Handout 1—one copy per student
- Handout 2—one copy per student
- Handout 1—Answer Key, one teacher copy
- Handout 2—Answer Key, one teacher copy

Preparation

Before the lesson, make one copy of Handouts 1 and 2 for each student.

Procedure – Instructions for the SMART Board have been put in italics. Content background is in regular type.

1. *Display slide 1—Start the SMART presentation.*
   Introduce the students to the objectives for this lesson.

2. *Display slide 2—This is for your general knowledge.*
   Introduce the students to the overview of this lesson.

3. *Display slide 3—Read the content to the students. Click the picture on the right and it will take you to a page on the Bureau of Economic Analysis website.*
   http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1

   Click on Section 1, "Domestic Product and Income" and then click Table 1.1.1., "Percent Change from Preceding Period in Real Gross Domestic Product." Click chart and then gross domestic product. Indicate that GDP can fluctuate. Move your finger along the points to reveal the level of GDP during the time period. Explain to the students that economic growth is an increase in the real value of the goods and services produced in the economy. It is measured by GDP, which is also a measure of a nation's income and spending.

4. *Display slide 4—Reinforce the points highlighted.*
   Stable prices can help people make good economic decisions. Price stability means people can plan more accurately for the future. This condition can be disrupted by inflation, a situation in which the economy's overall price level is rising. The inflation rate is the percentage change in the price level from the previous period. Inflation represents a decrease in the value of money or the purchasing power of money. The inflation rate is the percentage change in price levels.

5. *Display slide 5—Reinforce the points highlighted.*
   At maximum employment, the economy's labor resources are being used efficiently. There is still some unemployment in the economy, but it is often unemployment that cannot be avoided. It is either unemployment that arises from normal labor turnover;

people entering and leaving the labor force; and the ongoing creation and destruction of jobs or unemployment that arises when changes in technology or international competition change the skills needed to perform jobs or change the locations of jobs.

6.   *Display slide 6—Ask the students, "What is GDP?" Review the points with them, then ask whether the Camry is included in U.S. GDP. Touch the picture and a link will take you to an article with information on the top 10 cars sold in the United States and where they are made.*
http://www.cars.com/go/advice/Story.jsp?section=top&subject=ami&subject=amMade06 11

GDP is the market value of all final goods and services produced within a country in a given time period, usually a year. In other words, it is what residents produce in a country for end consumption, not as an input into another final good, also known as an intermediate good.

7.   *Display slide 7—Explain to students that there are four components of GDP. Touch the first blue square that says "Personal Consumption Expenditures." A picture will pop up that illustrates consumers at the grocery store. Touch the blank space under the circle with a C, text will appear that indicates "C represents expenditures under households on goods and services." Touch the green investment box. Indicate to the students that this picture illustrates a company's investment in equipment. Tap the blank space below the green circle with the letter I. The spending by firms includes final purchases of equipment and tools, additions to inventory, and all residential commercial construction. Tap on the orange square that represents government. This picture illustrates cars driving on a highway. Click the blank space under the orange circle G. This category represents purchases by all levels of government of goods and services from firms. Tap the yellow box "Net Exports." This picture illustrates a ship leaving the United States with goods. Tap the blank space under the yellow circle X-M, the value of exports of goods and services minus the value of imports of goods and services. It is the value by which foreign spending on U.S. goods and services exceeds U.S. spending on foreign goods and services.*

8.   *Display slide 8—On this slide, students select a scenario card. They will read the card and identify the component of GDP represented by moving the corresponding circle up or down, thus indicating whether expenditures increased or decreased. The student will then move the GDP circle up or down to keep the equation in balance. This demonstrates the change in GDP that occurs when expenditures in the aggregate economy change. For example, if you buy a fresh loaf of bread from a local bakery, slide the circles for both C and GDP up.* **Reset the equation before the next scenario is read.**
   - John Deere Co. sells 100 new tractors to the Chinese government.—X-M and GDP increase (exports increase relative to imports)
   - A cookie maker located in Germany buys wheat from a farmer in Iowa.—X-M and GDP increase. (exports increase relative to imports)
   - The U.S. Navy cancels an order for 10 new fighter jets.—G and GDP decrease

- Your parents cancel the family vacation to Disney World.—C and GDP decrease
- Your cousin buys a new Sony PlayStation made in Japan.—X-M and GDP decrease
- You get a haircut at the local barbershop.—C and GDP increase
- U.S. small businesses buy 50 percent fewer U.S. manufactured copier machines this year.—I and GDP decrease
- U.S. consumers purchase more Italian-made leather purses as part of the latest fad.—X-M and GDP decrease (imports increase relative to exports)
- You and your friends go out for burgers and fries at a local fast-food restaurant.—C and GDP increase
- Your family builds a brand-new home on land your father inherited.—I and GDP increase
- The state of California repairs sections of Highway 1.—G and GDP increase
- An insurance company replaces all of its computers.—I and GDP increase
- Hyundai expands its plant in Montgomery, Alabama.—I and GDP increase
- Your city builds a new elementary school.—I and GDP increase
- The U.S. Army buys a new tank.—G and GDP increase
- Two movie theaters in your city shut down because attendance decreased this year.—C and GDP decrease
- You buy tickets for a Major League baseball game.—C and GDP increase
- The state of Pennsylvania postpones a road construction project indefinitely.—G and GDP decrease
- Your parents buy you a new American-made laptop for your birthday.—C and GDP increase

9. *Display slide 9—Explain to students that GDP is the total output of the country; therefore, it is a measure of economic growth when compared over periods of time. Real GDP is a more helpful measure than nominal GDP because real GDP is adjusted for inflation. Ask the students what GDP stands for? Touch the blue question for it to appear. A green box will flash, indicating the correct answer of gross domestic product. Ask the students, what is the difference between real and nominal GDP? Click the blue line, and the correct answer appears, "Real GDP is adjusted for inflation, nominal GDP is not."*

10. *Display slide 10—In this slide, students will sort the components of GDP. Have students slide the card into the correct category.*
    - New York City hires 1,000 new police officers— G
    - Movie and dinner with friends—C
    - A business purchases manufacturing equipment—I
    - A school library purchases books—C
    - A business purchases a computer—I
    - A mechanic fixes a car transmission—C
    - A family pays a contractor to build a new house—I
    - The government increases its defense expenditures—G

- You buy a new Toyota that was made in Japan—X - M
- Ford Motor Company buys new automaking robots—I
- You buy premium coffee from Colombia—X - M

Click the yellow star with a blue check in the top right corner to see the correct answers.

11. *Display slide 11—Reveal correct answers to the students. Use the blue arrow at the bottom of the page to go back to the previous slide.*

12. *Display slide 12—Pull the tab at the left side of the slide and remind students that nominal GDP is the measure of GDP in current dollars. Pull the right tab and remind students that real GDP is adjusted for inflation.*
Economist more commonly use real GDP that is adjusted for inflation. For example, when real GDP grows by 3 percent, we know that 3 percent more goods and services have been produced, not that a 3 percent price increase occurred.

    Click on the box and watch GDP grow. Click on the box again and watch GDP shrink. Pull down the top tab and ask students, why do people seem to care about GDP; remind students it is the one primary indicator used to gauge the health of the nation's economy. It represents the total dollar value of all goods and services produced over a specific time period.

13. *Display slide 13—Explain to students that you are an economist who has been asked to calculate your nation's GDP, which produced only three goods/services. Calculate nominal GDP for Year 1 and Year 2.* ***Multiply the price of each item by the quantity of each item, then add the dollar amount to arrive at the GDP total***. *Students may use calculators to determine the answers.*
    - Oil Changes: $15 x   5 = $75
    - Hamburgers: $2 x 20 = $40
    - MP3 Players: $150 x   3 = $450
    - Total: $75 + $40 + $450   = $565   **Year 1 GDP = $565**

    In Year 2 we see an increase in price and quantity.
    - Oil Changes: $18 x   6 = $108
    - Hamburgers: $ 3 x 25 = $75
    - MP3 Players: $175 x   5 = $875
    - Total: $108 + $75 +$875   = $1,058   **Year 2 GDP = $1,058**

    How much did nominal GDP increase from Year 1 to Year 2? Answer: $493

14. *Display slide 14—Inform the students that you are an economist who has been asked to calculate your nation's real GDP, which is adjusted for inflation. Calculate real GDP for Year 2 using Year 1 prices and Year 2 quantities.*
    - Oil Changes: $15 x   6 = $90
    - Hamburgers: $ 2 x 25 = $50
    - MP3 Players $125 x   5 = $625

- Total: $90 + $50 + $625 $=$ $765   **Year 2 GDP** $=$ **$765**

By how many dollars was nominal GDP overstating GDP in Year 2?
Answer: $1,058 – $765 $=$ $293

How much has real GDP increased from Year 1 to Year 2?
Answer: $765 – $565 $=$ $200

15. *Display slide 15—Read the slide and explain GDP per capita. Click the picture of very different housing choices and it will take you to the CIA's* World Factbook *website. Have students answer the questions on **Handout 1**. Once completed, go over the answers and discuss.*
https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html

GDP per capita is average real output per person in a nation. A country's real GDP per capita is used as a measure to compare economic conditions between nations such as the labor productivity of countries; however, it is not used to measure social well-being. It correlates to a nation's standard of living but does not measure standard of living.

16. *Display slide 16—Using information from the CIA* World Factbook*, https://www.cia.gov/library/publications/the-world-factbook/index.html, students will fill in the table on **Handout 2** with the information on GDP. To access this information quickly, students have instructions on their handouts to go to the website's Country Comparisons page. Once on the website, they will click on "Guide to Country Comparisons" under the "References" tab, then click on "Economy" and the "GDP – (purchasing power parity)" link. Students can then rank countries in order of GDP from 1 to 10, with 1 being the country with the highest GDP. To fill in the second set of numbers, they will click the back arrow and select GDP – per capita (PPP).* This is a good time to reinforce the meaning of GDP, and to ask students why they think the United States, China, and India have high GDPs, while countries like Luxembourg and Bermuda have smaller GDPs. Students will then use the *Factbook* to fill in the information on GDP per capita. They can then rank the countries from 1 to 10, using the GDP per capita information. Ask students why the rankings have changed. Population is part of the reason: countries like China and India both have populations of over 1 billion, while countries like Liechtenstein have small populations (36,713). While this explains the math, there are many factors that influence a country's GDP. Key to determining a country's output of goods and services is productivity. Productivity is influenced by a country's supply of the factors of production (land, labor capital), but there are a number of other factors that are also important. These factors include levels of investment (domestic and foreign), education, health, population growth rate, policies toward foreign trade, and the stability of a country's government, business environment, and level of

economic freedom. GDP per capita, while not an actual measure of a country's standard of living, is highly correlated to other measures of well-being such as life expectancy, literacy rates, infant mortality, and the Human Development Index.

Students may want to research the idea further by looking up some of these factors. Statistics on literacy rate, average years of schooling, life expectancy, infant mortality, and population growth rate can be found in the "People and Society" section of the *World Factbook* for each country. The Human Development Index can be found here: http://hdr.undp.org/en/statistics/hdi/.

Another very interesting chart is the Coke Index. Students may not understand why Coca-Cola consumption is also related to factors that measure well-being, but in most parts of the world, soft drinks are luxuries that are out of reach for the average citizen. http://www.economist.com/node/456039?story_id=456039

Another statistic that is often helpful to share with students during the discussion is that of the world's 6 billion people; more than 1.2 billion live on less than $1 a day, according to the World Bank.

17. *Display slide 17—This slide will reveal the answers to the exercise on slide 16.*

18. *Display slide 18—Read the slide to students explaining why we use GDP.*

19. *Display slide 19—Ask students, what is a business cycle?*
Business cycles explain economic fluctuations: the rising and falling of output in relation to potential output.

20. *Display slide 20—Ask students, what do we mean by potential outputs?*
Potential output is the level of output that the economy can sustain given capital, technology, and full employment. As you view the graph, think of potential as the blue dashed trend line.
Pull the blue tab to the right and inform students that deviations from the trend or potential output represent problems: unemployment and inflation.

21. *Display slide 21—Pulls the tabs counterclockwise, starting with the peak.*
Let students know there are four phases of the business cycle: peak, recession, trough, and expansion. Peak is the point at which output starts to decline, also called the beginning of a recession. Recession is roughly defined as two consecutive quarters of negative growth in real GDP. Trough is the point at which output starts to increase, also called the end of the recession. Expansion is the period between trough and the next peak, also called the recovery period.

22. *Display slide 22—Students will test their knowledge.*
Ask students, at what stage in the business cycle would you see the highest level of unemployment? C: "Trough" is the correct answer. Refer to slide 21 for definitions of these concepts.

23. *Display slide 23—Students will test their knowledge.*
Ask students, at what point on the business cycle would you see the highest levels of inflation? A: "Peak" is the correct answer. Refer to slide 21 for definitions of these concepts.

24. *Display slide 24—Ask for four volunteers. Inform students that they are going to read the scenario cards and determine where they should be placed on the chart. They may receive help from the class. They will use their fingers to drag the cards to the correct point.*

- Point A: Place the card at the peak position
- Point B: Place the card under the recession point
- Point C: Place the card at the trough point
- Point D: Place the card at the expansion point

Use the green check button in the lower right to check the students' work.

Gross Domestic Product, the Business Cycle, and the Fed's goals for the Macroeconomy– SMART Lesson

Handout 1

GDP per capita: A country's total GDP divided by the population of the country.

- *A rise in per capita GDP generally translates to growth in the economy*
- *Real GDP correlates to a nation's standard of living but does not measure standard of living*

Students should answer the questions below using the information on the CIA World Factbook website. Once on the website, click on "Guide to Country Comparisons" under the "References" tab. Click on "Economy" and then the "GDP –per capita (PPP)" link. This will give you the information on GDP per capita. For questions 5–10 on the handout, students will need to refer to the "Economy" section on the individual country pages for the United States and Liechtenstein. These pages can be accessed directly from the country comparison pages by clicking on the country names.

https://www.cia.gov/library/publications/the-world-factbook/

1. What country has the highest GDP per capita? _____

2. What is the United States' GDP per capita? _____

3. What country has the lowest GDP per capita? _____

4. The 10 countries with the lowest per capita GDP are all located on which continent? _____

5. What sector of the labor force contributes most to Liechtenstein's high GDP? _____

6. What is the United States' unemployment rate? _____

7. What are the United States' revenues? _____

8. What are the United States' expenditures? _____

9. What is the United States' external debt? _____

10. What percent of the United States' population lives below the poverty line? _____

Handout 1 - Answers: (**Answers will vary as data is updated**.)

1. What country has the highest GDP per capita?   <u>Liechtenstein</u>

2. What is the United States' GDP per capita? <u>$48,100</u>

3. What country has the lowest GDP per capita? <u>Democratic Republic of the Congo</u>

4. The 10 countries with the lowest per capita GDP are all located on which continent? <u>Africa</u>

5. What sector of the labor force contributes most to Liechtenstein's high GDP? <u>Services sector</u>

6. What is the United States' unemployment rate? <u>9.1 percent</u>

7. What are the United States' revenues? <u>$2.264 trillion</u>

8. What are the United States' expenditures? <u>$3.604 trillion</u>

9. What is the United States' external debt? <u>$4.051 trillion</u>

10. What percent of the United States' population lives below the poverty line? <u>15.1%</u>

Handout 2 – GDP per capita- Fill in the table.

GDP per capita: A country's total GDP divided by the population of the country.

Fill in the table below using the information on the CIA World Factbook *website. Once on the website, click on "Guide to Country Comparisons" under the "References" tab. Click on "Economy" and then the "GDP –(purchasing power parity)" link. Fill in the second column with the information on GDP. In column 3, rank countries in order of GDP from 1–10, with 1 being the country with the highest GDP. Click the back arrow, select GDP – per capita (PPP). Fill in the fourth column with information on GDP per capita. In the fifth column, rank the countries from 1 to 10, using the GDP per capita information.*

Why has the ranking changed?

Country	GDP	Rank	GDP per capita	Rank
United States				
China				
India				
Russia				
Brazil				
Liechtenstein				
Qatar				
Luxembourg				
Bermuda				
Norway				

Handout 2 – GDP per capita- Answers to Handout 2.

Country	GDP	Rank	GDP per capita	Rank
United States	15.04 trillion	1	$48,100	6
China	11.29 trillion	2	$8,400	9
India	4.46 trillion	3	$3,700	10
Russia	2.38 trillion	4	$16,700	7
Brazil	2.28 trillion	5	$11,600	8
Liechtenstein	5.03 billion	9	$141,100	1
Qatar	181.7 billion	7	$102,700	2
Luxembourg	43.55 billion	8	$84,700	3
Bermuda	4.50 billion	10	$69,900	4
Norway	264.5 billion	6	$53,300	5