

# PAGE ONE ECONOMICS NEWSLETTER

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## “The Output Gap: A ‘Potentially’ Unreliable Measure of Economic Health?”

November 2012

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*Prepared by Scott A. Wolla*

*Economic Education Group of the Federal Reserve Bank of St. Louis*



## The Output Gap: A “Potentially” Unreliable Measure of Economic Health?

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*“Is real output greater or less than potential?” and “Is real output growing more or less rapidly than potential?”  
The answers to these questions are central to policy decisions.”*

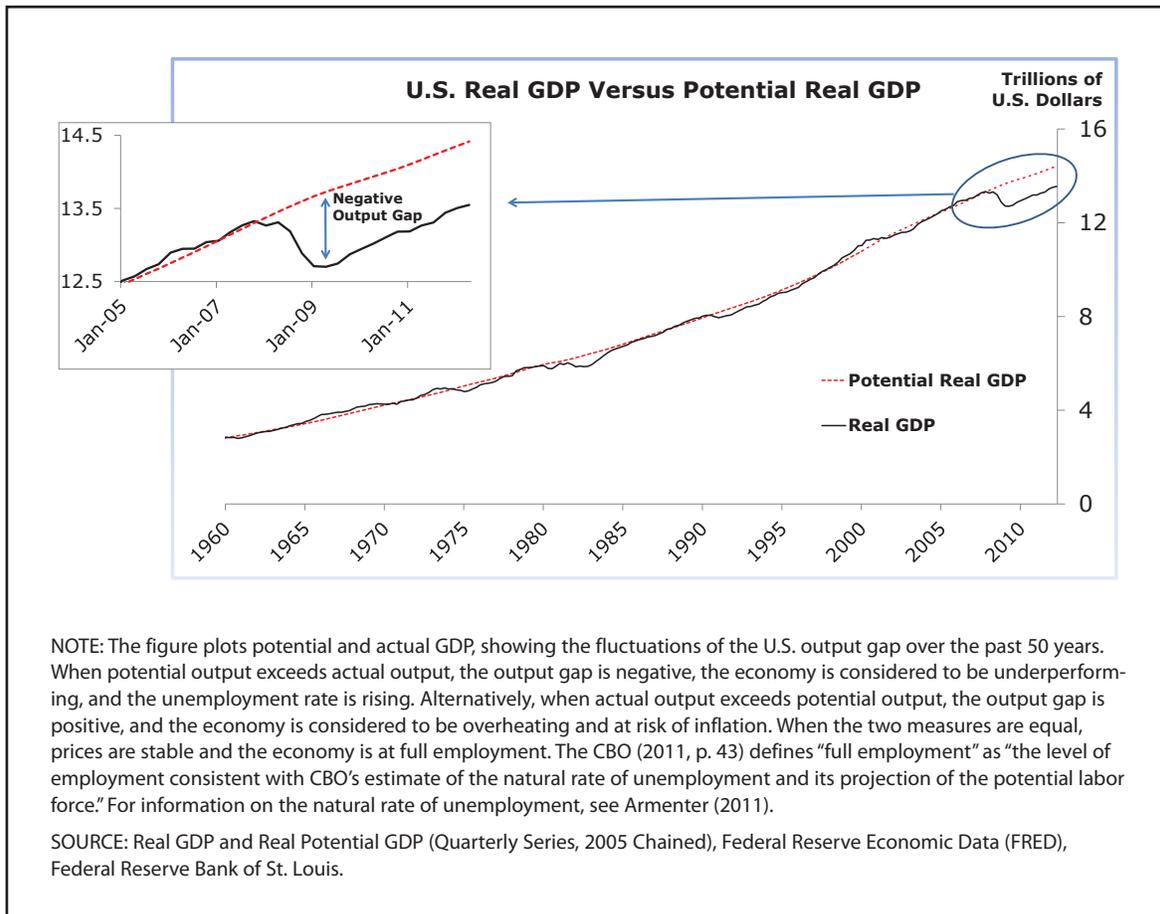
—Richard G. Anderson, Vice President and Economist, Federal Reserve Bank of St. Louis, 2009

The Great Recession ended almost three years ago, but in many ways it seems like the economy is still in a rut. Amid financial instability in Europe and uncertainty about the future of the U.S. business climate, many firms seem reluctant to expand and invest. The numbers of mortgage delinquencies and foreclosures remain high despite recent improvements in housing starts and prices. And while monthly consumer spending indicators are improving steadily, many American families continue to struggle with the challenges of unemployment and underemployment. Given these realities, some economists and policymakers believe that the economy has not yet returned to a “normal” functioning level.

But what exactly is the economy’s “normal” functioning level? How many people could be working and how much could they be producing?<sup>1</sup> Economists use the notion of **potential output (potential real gross domestic product [GDP])** to represent a normal—or benchmark—level of output against which **actual output (real GDP)** can be compared at any given time. Potential output is the amount the economy would produce given the quantity and quality of the nation’s factors of production: capital (equipment and structures), technology, and worker knowledge. The economy’s “normal” functioning is characterized by this level of potential output and the corresponding level of employment. Depending on the state of the economy, actual output could be above, below, or equal<sup>2</sup> to potential output (see the chart, which plots U.S. potential output and actual output over the past 50 years). The difference between potential output and actual output—or, in other words, the difference between where the economy would be normally and where it is now—is known as the **output gap**.<sup>3</sup> The output gap is one of many economic measures that policymakers use to evaluate our economic performance.

Actual output, or real GDP, is a straightforward calculation because what the economy has produced is quantifiable. Calculating potential GDP, however, is not so straightforward; it is a modeling exercise, albeit one that uses actual data as inputs. In other words, potential GDP is a hypothetical number. For that reason, economists and policymakers must exercise caution when interpreting movements in the output gap—especially when potential GDP is estimated from the most recently available data.

Some economists question the reliability of potential output (and, therefore, output gap) measures. For instance, as James Bullard<sup>4</sup> noted in 2009, if calculations had considered the housing boom and bust, then potential GDP and output gap measurements would have been



smaller than they appeared.<sup>5</sup> His view suggests a problem with the inherent theoretical framework many economists use to measure output gaps. Another problem is that the estimates of potential and actual GDP are revised because (i) the underlying data are updated as more information becomes available and (ii) new methodologies are adopted to estimate potential output.

Given these concerns, how can economists accurately estimate what the economy should produce now and in the future? Herein lies the questionable nature of using measurements of the output gap in policy decisions: As more time allows for more accurate calculations, the estimates are revised—sometimes significantly. If initial estimates misrepresent the state of the economy, then important monetary and fiscal policy decisions based on these estimates could prove misguided.

For instance, economist Athanasios Orphanides (2002, 2003) suggests that using initial output gap estimates contributed importantly to the increased inflation of the 1970s.<sup>6</sup> He argues that the Federal Reserve, believing the output gap to be more negative than it really was, took overly stimulative actions that produced an overheated and inflation-ridden economy.<sup>7</sup>

What about the output gap today? Similar to Orphanides’ findings, Gavin (2012) shows that the output gap calculations for 2003-12 are reduced significantly when 2011 estimates of potential GDP are used in place of 2007 estimates.<sup>8</sup> If our economy is improving faster than current output gap measurements suggest, then monetary policy intended to boost the economy could produce too much stimulation, thereby fueling inflation once the economy begins to pick up steam. ■

## NOTES

<sup>1</sup> Our country's long-term growth is largely a function of the factors that influence how productive we are as a society.

<sup>2</sup> When real GDP is at potential (the output gap is zero), the unemployment rate equals its natural rate and prices are stable (see Kliesen, 1999, and Armenter, 2011). More information on unemployment can be found at the Federal Reserve Bank of St. Louis Economic Resources website ("[Unemployment—The Economic Lowdown Podcast Series](#)").

<sup>3</sup> The concepts of potential output and the output gap described in this essay fall largely within a New Keynesian macroeconomic framework, which many economists and Federal Open Market Committee policymakers use to analyze the economy and determine the appropriate stance of monetary policy. Others in the economics profession would describe potential output and the output gap in a different way. More information on different economic schools of thought can be found in the November 2009 [Liber8 Economic Information Newsletter](#).

<sup>4</sup> James Bullard is the president and CEO of the Federal Reserve Bank of St. Louis.

<sup>5</sup> For further discussion of how the real estate bubble biased the output gap, see Banerghansa and Peralta-Alva (2009).

<sup>6</sup> For more information on the Great Inflation of the 1970s and early 1980s, see the October 2012 [Page One Economics Newsletter](#).

<sup>7</sup> See Lubik and Slivinski (2010).

<sup>8</sup> Gavin shows that Congressional Budget Office (CBO) estimates of the output gap based on 2007-vintage potential GDP are much larger than estimates using 2011-vintage potential GDP. For instance, based on 2007-vintage data, the output gap for the first quarter of 2009 was -9.9 percent, compared with -7.1 percent, which results when 2011-vintage data (based on revised data) for potential GDP are used.

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## GLOSSARY

**Output gap:** The difference between potential output and actual output.

**Potential output:** The real output (GDP) an economy can produce when it fully employs its available resources.

**Actual output (real GDP):** The amount that an economy actually produces, as measured by real GDP.

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Federal Reserve Bank of St. Louis *Page One Economics Newsletter*:  
"The Output Gap: A 'Potentially' Unreliable Measure of Economic Health?"

After reading the article, answer the following questions.

1. What is potential output?
2. What is the output gap?
3. What data are used to represent actual output?
4. Which is more difficult to calculate, potential output or actual output? Explain.
5. Explain how incorrect estimates in the output gap during the 1970s led to inappropriate policy.
6. Why is this knowledge important when considering current policy?

## Teacher's Guide

### Federal Reserve Bank of St. Louis *Page One Economics Newsletter*: "The Output Gap: A 'Potentially' Unreliable Measure of Economic Health?"

After reading the article, answer the following questions.

#### 1. What is potential output?

Potential output is the amount the economy would produce given the quantity and quality of the nation's factors of production: capital (equipment and structures), technology, and worker knowledge. The economy's "normal" functioning is characterized by this level of potential output and the corresponding level of employment.

#### 2. What is the output gap?

The output gap is the difference between potential output and actual output—or, the difference between where the economy would be normally and where it is now. The output gap is one of many economic measures that policymakers use to evaluate our economic performance.

#### 3. What data are used to represent actual output?

Real GDP

#### 4. Which is more difficult to calculate, potential output or actual output? Explain.

Real GDP is a straightforward calculation because what the economy has produced is quantifiable. Calculating potential GDP, however, is not so straightforward; it is a modeling exercise, albeit one that uses actual data as inputs. In other words, potential GDP is a hypothetical number.

#### 5. Explain how incorrect estimates in the output gap during the 1970s led to inappropriate policy.

Economist Athanasios Orphanides argues that the Federal Reserve, believing the output gap to be more negative than it really was, took overly stimulative actions that produced an overheated and inflation-ridden economy.

#### 6. Why is this knowledge important when considering current policy?

If our economy is improving faster than current output gap measurements suggest, then monetary policy intended to boost the economy could produce too much stimulation, thereby fueling inflation once the economy begins to pick up steam.

## For Further Discussion

**Read the following or distribute the handout to your students; then use the visuals to lead a classroom discussion on the relationship between actual and potential output—the output gap.**

Imagine you are on a road trip, driving your car on an unfamiliar highway. There are two speeds that you are concerned with: your current speed and the speed limit. We will call the speed limit “potential speed”—but notice that potential speed is not the maximum speed at which the car can travel, say 120 mph. Instead, it is the normal speed at which the car will safely travel if other factors (traffic, weather, and so on) are cooperating. In this case, it is the speed that has been stated as the maximum legal speed—65 mph. This is considered a safe speed for you and other drivers, taking into consideration how cars are designed and the highway is constructed. In this example, imagine the car’s current speed is 45 mph and the potential (normal) speed is 65 mph—let’s call the difference the “speed gap.”

**Given that the actual speed is 45 mph and the potential speed is 65 mph, what is the speed gap?**

20 mph

**How could the speed gap be closed?**

The speed gap could be closed by pressing on the accelerator to increase the speed of the car.

Now, imagine that you are not really sure that the potential speed—or speed limit—is 65 mph. Instead, you have predicted that the speed limit (normal or potential speed) is 65 mph based on the fact that you are traveling on an interstate highway and some of the other cars are traveling at about that rate. But, what if the actual potential speed—or speed limit—turns out to be 55 mph?

**If the speed limit is indeed 55 mph, and you are in the process of accelerating the car from its current speed of 45 mph to your predicted speed of 65 mph, what could happen?**

You will accelerate beyond the actual potential speed—the speed limit. This could result in a speeding ticket or a traffic accident.

This analogy helps describe the difficulty of designing effective monetary policy. When it comes to policy, the actual speed of the car is similar to actual output—the amount of goods and services that the economy is actually producing in a given year. In terms of data, this is real GDP. The potential (normal) speed of the car is similar to potential output—the economy’s normal production level. And the speed gap—the difference between actual speed and potential speed—is similar to the output gap, the difference between where the economy would be normally and where it is now. This scenario also helps describe the danger associated with estimating the potential output, and therefore the output gap, incorrectly. As policymakers design policy, if they estimate the potential as too high, and therefore the output gap too large, the result will be policies that are too aggressive. In terms of monetary policy, this means interest rates that are too low and the danger that the inflation rate might rise too high in the future.

Another great resource for students on the difference between real and potential GDP is a short video from the Federal Reserve Bank of Atlanta Economic Education Department. See “The Fed Explains Real Versus Potential GDP” ([www.frbatlanta.org/news/multimedia/12fedExplained\\_gdp.cfm](http://www.frbatlanta.org/news/multimedia/12fedExplained_gdp.cfm)).

Display Visual 1. This is the same graph featured in the article.

**1. How does the current real GDP relate to current potential GDP?**

The current real GDP is below the current potential real GDP on the graph.

**2. Read the notes beneath the graph. What does it mean to say that the output gap is “positive” or “negative?”**

When potential output exceeds actual output, the output gap is negative. This means that the economy is producing fewer goods and services than is normal. Alternatively, when actual output exceeds potential output, the output gap is positive. This means that the economy is producing more goods and services than is normal.

**3. Is the current output gap positive or negative?**

Currently the potential real GDP is higher than real GDP, so there is a negative output gap.

**4. Again referring to the notes, how is the unemployment rate related to the output gap?**

When potential output exceeds actual output, the output gap is negative, and the unemployment rate is rising.

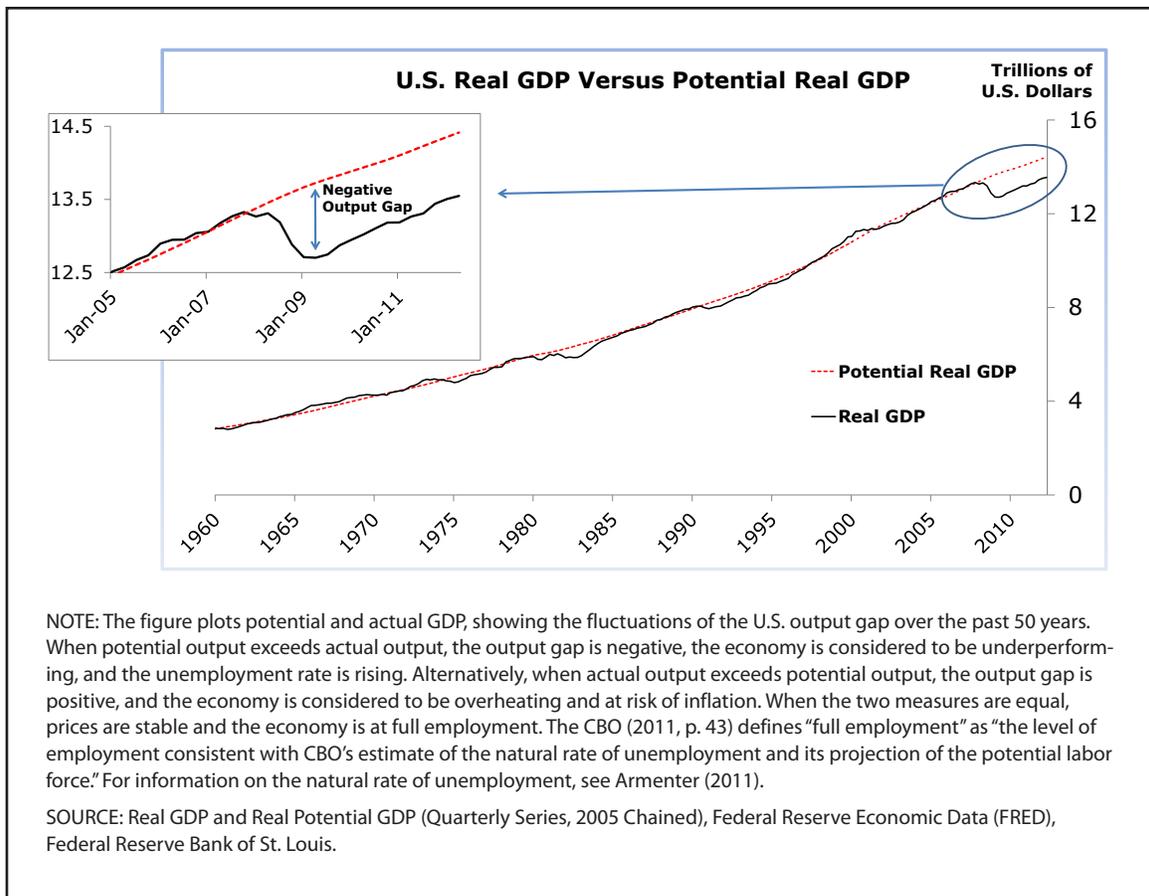
**5. Does this correspond to your understanding of the current economy? (Use Visual 2 to obtain the current unemployment rate.)**

Yes—the unemployment rate has recently been very high by historical standards; this corresponds to a negative output gap.

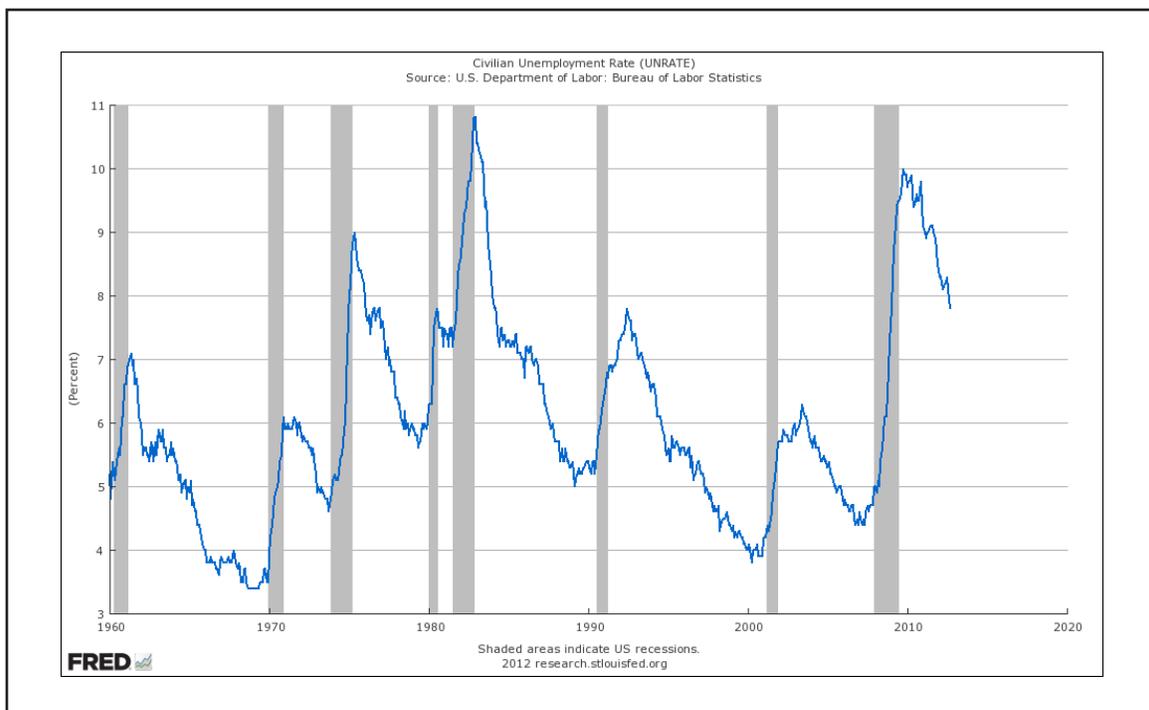
**6. Compare Visuals 1 and 2. Both graphs give information about the economy from 1960 to the present. Examine the early to mid-1980s and mid- to late 1990s and discuss the relationship between the unemployment rate and the output gap.**

In the early 1980s, the output gap was negative and the unemployment rate was rising. During the mid- to late 1990s, the output gap transitioned from mildly negative to mildly positive, and the unemployment rate was falling. There is an inverse (opposite) relationship between the output gap and the unemployment rate—a negative output gap is related to a rising unemployment rate. An output gap that is closing or is positive is related to a decreasing unemployment rate.

## Visual 1



## Visual 2



## Handout

Name \_\_\_\_\_ Period \_\_\_\_\_

Imagine you are on a road trip, driving your car on an unfamiliar highway. There are two speeds that you are concerned with: your current speed and the speed limit. We will call the speed limit “potential speed”—but notice that potential speed is not the maximum speed at which the car can travel, say 120 mph. Instead, it is the normal speed at which the car will safely travel if other factors (traffic, weather, and so on.) are cooperating. In this case, it is the speed that has been stated as the maximum legal speed—65 mph. This is considered a safe speed for you and other drivers, taking into consideration how cars are designed and the highway is constructed. In this example, imagine the car’s current speed is 45 mph and the potential (normal) speed is 65 mph—let’s call the difference the “speed gap.”

**Given that the actual speed is 45 mph and the potential speed is 65 mph, what is the speed gap?**

**How could the speed gap be closed?**

Now, imagine that you are not really sure that the potential speed—or speed limit—is 65 mph. Instead, you have predicted that the speed limit (normal or potential speed) is 65 mph based on the fact that you are traveling on an interstate highway and some of the other cars are traveling at about that rate. But, what if the actual potential speed—or speed limit—turns out to be 55 mph?

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## Handout (continued)

Use Visual 1 to answer the following questions. This is the same graph featured in the article.

1. How does the current real GDP relate to current potential GDP?
2. Read the notes beneath the graph. What does it mean to say that the output gap is “positive” or “negative?”
3. Is the current output gap positive or negative?
4. Again referring to the notes, how is the unemployment rate related to the output gap?
5. Does this correspond to your understanding of the current economy? (Use Visual 2 to obtain the current unemployment rate.)
6. Compare Visuals 1 and 2. Both graphs give information about the economy from 1960 to the present. Examine the early to mid-1980s and mid- to late 1990s and discuss the relationship between the unemployment rate and the output gap.

## **Common Core State Standards**

### **Grades 6-12 Literacy in History/Social Studies and Technical Subjects**

- **Key Ideas and Details**

RH.11-12.1: Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.

RH.11-12.2: Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.

- **Craft and Structure**

RH.11-12.4: Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).