



# Economic Growth and the Unemployment Rate

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## Summary

A persistently high unemployment rate is of concern to Congress for a variety of reasons, including its negative consequences for the economic well-being of individuals and its impact on the federal budget. The unemployment rate was 9.5% when the economy emerged from the 11<sup>th</sup> postwar recession in June 2009. It climbed further to peak at 10.0% in October 2009. The rate has slowly declined since then. Although it dropped below 8% in the fourth quarter of 2012, the unemployment rate remains high by historical standards.

After most postwar recessions, it took at least eight months for the unemployment rate to fall by one full percentage point. The slowest decline occurred following the 2001 recession's end, when the unemployment rate was a comparatively low 5.5%. About 3½ years elapsed before the rate fell just one-half of one percentage point. In contrast, the recovery from the severe 1981-1982 recession began with the highest unemployment rate of the postwar period (10.8%). In that instance, it took only eight months for the rate to fall over one percentage point. Some hoped the unemployment rate would fall as quickly after the 2007-2009 recession, but the speed of improvement has been more typical of the so-called jobless recoveries from the 2001 and 1990-1991 recessions.

What appears to matter for a reduction in the unemployment rate is the size of the output gap, that is, the rate of actual output (economic) growth compared with the rate of potential output growth. Potential output is a measure of the economy's capacity to produce goods and services when resources (e.g., labor) are fully utilized. The growth rate of potential output is a function of the growth rates of potential productivity and the labor supply when the economy is at full employment. If potential output growth is about 2.5% annually at full employment, then the growth rate in real gross domestic product (GDP) would have to be greater to yield a falling unemployment rate. How much greater will determine the speed of improvement in the unemployment rate, according to a rule of thumb known as Okun's law.

In its August 2012 economic forecast, the Congressional Budget Office (CBO) estimates that the annual average growth rate of real GDP will gradually approach the growth rate of potential output over the 2012-2022 projection period. As a result of this slow narrowing of the output gap, the unemployment rate is forecast to 5.9% by 2017.

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Despite the resumption of economic (output) growth in June 2009, the unemployment rate remains at an historically high level more than three years into the recovery from the 11<sup>th</sup> recession of the postwar period. Not until the fourth quarter of 2012 did the unemployment rate drop below 8%, its lowest level since January 2009.

The persistently high unemployment rate is a cause of concern to Congress for a variety of reasons. Among them are the high rate's deleterious impact on individuals' economic well-being and the budget deficit due to lower revenue and higher expenditures. The slow rebound of the labor market has renewed calls in some quarters for measures to stimulate the economy beyond those Congress has previously enacted.<sup>1</sup>

From a public policy perspective, the main driver of the unemployment rate is the pace of economic growth. This report first examines the long-run relationship between the two economic variables and then narrows its focus to the periods of recovery from the postwar recessions.

## The Relationship Between Growth and Unemployment

In the short run, the relationship between economic growth and the unemployment rate may be a loose one. It is not unusual for the unemployment rate to show sustained decline some time after other broad measures of economic activity have turned positive. Hence, it is commonly referred to as a lagging economic indicator. One reason that unemployment may not fall appreciably when economic growth first picks up after a recession's end is that some firms may have underutilized employees on their payrolls because laying off workers when product demand declines and rehiring them when product demand improves has costs. As a result, employers may initially be able to increase output to meet rising demand at the outset of a recovery without hiring additional workers by raising the productivity of their current employees. This temporarily boosts labor productivity growth above its trend (long-run) rate.

Once the labor on hand is fully utilized, output can grow no faster than the rate of productivity growth until firms begin adding workers. As an economic expansion progresses, output growth will be determined by the combined rates of growth in the labor supply and labor productivity. As long as growth in real gross domestic product (GDP) exceeds growth in labor productivity, employment will rise. If employment growth is more rapid than labor force growth, the unemployment rate will fall.

Over an extended period of time, there is a negative relationship between changes in the rates of real GDP growth and unemployment. This long-run relationship between the two economic variables was most famously pointed out in the early 1960s by economist Arthur Okun. "Okun's law" has been included in a list of "core ideas" that are widely accepted in the economics profession.<sup>2</sup> Okun's law, which economists have expanded upon since it was first articulated,

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<sup>1</sup> For additional information, see CRS Report R41578, *Unemployment: Issues in the 113<sup>th</sup> Congress*, by (name redacted), (name redacted), and (name redacted).

<sup>2</sup> Alan Blinder, "Is There A Core of Practical Macroeconomics That We Should All Believe?," *American Economic Review*, vol. 87, no. 2, May 1997.

states that real GDP growth about equal to the rate of potential output growth usually is required to maintain a stable unemployment rate.<sup>3</sup>

Thus, the key to the long-run relationship between changes in the rates of GDP growth and unemployment is the rate of growth in potential output. Potential output is an unobservable measure of the capacity of the economy to produce goods and services when available resources, such as labor and capital, are fully utilized. The rate of growth of potential output is a function of the rate of growth in potential productivity and the labor supply when the economy is at full employment.<sup>4</sup> When the unemployment rate is high, as it is now, then actual GDP falls short of potential GDP. This is referred to as the output gap.

In the absence of productivity growth, as long as each new addition to the labor force is employed, growth in output will equal growth in the labor supply. If the rate of GDP growth falls below the rate of labor force growth, there will not be enough new jobs created to accommodate all new job seekers. As a result, the proportion of the labor force that is employed will fall. Put differently, the unemployment rate will rise. If the rate of output growth exceeds the rate of labor force growth, some of the new jobs created by employers to satisfy the rising demand for their goods and services will be filled by drawing from the pool of unemployed workers. In other words, the unemployment rate will fall.<sup>5</sup>

If GDP growth equals labor force growth in the presence of productivity growth, more people will be entering the labor force than are needed to produce a given amount of goods and services. The share of the labor force that is employed will fall. Expressed differently, the unemployment rate will rise. Only as long as GDP growth exceeds the combined growth rates of the labor force and productivity (potential output) will the unemployment rate fall in the long run.

Knowing what that rate of GDP growth is might be useful to policymakers interested in undertaking stimulus policies to bring down the unemployment rate. But as just stated, the rate of output growth necessary to lower the unemployment rate requires knowledge of the rates of labor force and productivity growth. Both have changed over time.

Between 1950 and 2000, the civilian labor force grew at an average annual rate of 1.6%.<sup>6</sup> The growth rate has slowed since then and is expected to continue doing so partly as a result of the

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<sup>3</sup> Knotek updated Okun's analysis, which covered the 1948-1960 period, to 2007 and came to much the same conclusion. Specifically, real output growth of about 4.0% is consistent with a stable unemployment rate. This means that in the long run faster output growth usually coincided with a decreasing unemployment rate, whereas output growth below 4% usually coincided with an increasing unemployment rate. See Edward S. Knotek, "How Useful is Okun's Law?," Federal Reserve Bank of Kansas City, *Economic Review*, fourth quarter 2007. (Hereinafter referred to as Knotek, *How Useful is Okun's Law*.)

<sup>4</sup> Full employment is said to be achieved when the unemployment rate is at a level consistent with a stable (non-accelerating) inflation rate.

<sup>5</sup> Once unemployment reaches relatively low levels, the increased demand for labor is more likely to be satisfied by rising wages than by higher levels of employment. There may be a risk of accelerating inflation as a result. The Congressional Budget Office estimated that the rate close to which that becomes a risk (which is referred to as the nonaccelerating inflation rate of unemployment or NAIRU) may be about 5%. (See Robert Arnold, *Reestimating the Phillips Curve and the NAIRU*, CBO, Working Paper 2008-06, August 2008.) At the current level of the unemployment rate, the risk of accelerating wages and inflation seems low. It also seems low at even higher estimates of NAIRU, which ranged from 6.2% to 8.2% for the first quarter of 2011 according to estimates by Weidner and Williams (*Update of "How Big is the Output Gap?"*, Federal Reserve Bank of San Francisco, July 7, 2011).

<sup>6</sup> Mitra Toossi, "A Century of Change: the U.S. Labor Force, 1950-2050," *Monthly Labor Review*, May 2002.

aging of the baby-boom generation. Between 2000 and 2010, the annual rate of labor force growth fell to 0.8%. It is projected to fall further, to 0.7% per year on average, between 2010 and 2020.<sup>7</sup>

Predicting productivity growth is more difficult than predicting labor force growth. Economists had, until recently, identified three time periods that correspond with three different trend rates of growth in productivity.<sup>8</sup> Between 1947 and 1973, output per hour of labor in the private nonfarm business sector grew at an annual rate of 2.8%. Between 1973 and 1995, productivity slowed to an annual average rate of 1.4%. Between 1995 and 2005, it accelerated to 2.9% per year. Since then (2005-2011), the rate of productivity growth has slowed to 1.6% annually.<sup>9</sup>

If recent trends in labor force and productivity growth continue, real GDP growth above about 2.5% will be needed to push down the unemployment rate from its currently elevated level. “More specifically, according to currently accepted versions of Okun’s law, to achieve a 1 percentage point decline in the unemployment rate in the course of a year, real GDP must grow approximately 2 percentage points faster than the rate of growth of potential GDP over that period.”<sup>10</sup>

## The Unemployment Rate During Postwar Recoveries

As previously discussed, it is not unusual for some time to elapse between the start of an economic recovery and the start of a declining unemployment rate. Suppose that two successive monthly declines are taken as the beginning of a meaningful downward trend in the unemployment rate. **Table 1** shows how long it has taken following the end of each of the 11 economic contractions for that trend to begin. At one extreme, it was well over a year following the start of the economy’s rebound from the 1990-1991 and 2001 recessions before the unemployment rate began to steadily decline. This contributed to the two periods being labeled jobless recoveries. At the other extreme, the unemployment rate began trending downward at five or fewer months after the end of five earlier recessions. The current recovery lies within but closer to the high-end of this range. As the unemployment rate experienced two successive monthly declines 12 months after the start of the recovery from the 2007-2009 recession, it too was dubbed a jobless recovery.

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<sup>7</sup> Mitra Toossi, “Labor Force Projections to 2020: A More Slowly Growing Workforce,” January 2012.

<sup>8</sup> See for example Michael Chernousov, Susan E. Fleck, and John Glaser, “Productivity Trends in Business Cycles,” *Monthly Labor Review*, June 2009; and J. Bradford DeLong, “Productivity Growth in the 2000s,” National Bureau of Economic Research, *Macroeconomics Annual*, vol. 17 (2000).

<sup>9</sup> Calculated by CRS from BLS productivity data, available at <http://www.bls.gov>.

<sup>10</sup> Chairman Ben S. Bernanke at the National Association for Business Economics annual conference, Washington, DC, March 26, 2012, available at <http://www.federalreserve.gov/newsevents/speech/bernanke20120326a.htm>. (Hereinafter referred to as Bernanke, NABE conference address.)

**Table 1. Months Between the Start of a Recovery and Two Successive Declines in the Unemployment Rate**

<b>Date of Start of Recovery</b>	<b>Months After Recovery's Start and Two Successive Declines in Unemployment Rate</b>
October 1949	4
May 1954	6
April 1958	5
February 1961	9
November 1970	11
March 1975	4
July 1980	2
November 1982	5
March 1991	17
November 2001	21
June 2009	12

**Source:** Calculated by CRS based on business cycle troughs from the National Bureau of Economic Research and unemployment rates from the U.S. Bureau of Labor Statistics.

Not only has the length of time for the unemployment rate to begin falling varied by recovery, but its pace of decline also has varied. After eight of the eleven postwar recessions, it took at least eight months for the unemployment rate to fall by one full percentage point.<sup>11</sup> The slowest decline occurred after the recession that ended in November 2001 when the unemployment rate stood at 5.5%, the lowest unemployment rate recorded at the start of an expansion. About 3½ years elapsed before the unemployment rate fell one-half of a percentage point. In contrast, the expansion that followed the July 1981-November 1982 downturn began with the highest unemployment rate of the postwar period (10.8%). In that case, it took only eight months for the unemployment rate to fall more than one percentage point (to a still high 9.4%).

A debate recently broke out over the applicability of Okun's law to changes in economic growth and the unemployment rate.<sup>12</sup> Following a period of growth rates early in the recovery high enough (above 3.5%) to have produced a downward trend in the unemployment rate, the unemployment rate stalled at about 9.0% in the first three quarters of 2011. This resulted from slow annual growth in real GDP of 0.1% in the first quarter, 2.5% in the second quarter, and 1.3% in the third quarter of 2011.<sup>13</sup> Output growth accelerated at an annual rate of 4.1% in the fourth quarter of 2011, and the unemployment rate resumed its downward trend—dropping to 8.5% in December 2011.

<sup>11</sup> They are the recoveries from the 1960-1961, 1969-1970, 1973-1975, 1980, 1981-1982, 1990-1991, 2001, and 2007-2009 recessions.

<sup>12</sup> See for example Nin-Hai Tseng, "Jobless Numbers Defy Economic Theory," *CNNMoney*, March 15, 2012, available at <http://finance.fortune.cnn.com/2012/03/16/okuns-law/>.

<sup>13</sup> U.S. Bureau of Economic Analysis, National Income and Product Accounts data, available at <http://www.bea.gov>.

But as noted by the chairman of the Federal Reserve Board at a March 2012 conference of economists,

the decline in the unemployment rate over the course of 2011 was greater than would seem consistent with GDP growth over that period. Indeed, with last year's real GDP growth below 2 percent, less than what most economists would estimate to be the U.S. economy's potential rate of growth, one might have expected little change in the unemployment rate last year or even a slight increase.<sup>14</sup>

Bernanke suggested that this temporary disconnect may have compensated for an earlier deviation from Okun's law. In 2009, workers were laid off and the unemployment rate rose beyond the level commensurate with the contraction in economic growth.

When McCarthy, Potter, and Ng at the New York Federal Reserve Bank examined long recovery periods after the trough of the three recessions before the 2007-2009 recession,<sup>15</sup> they estimated that Okun's law underpredicted the actual decline in the unemployment rate.<sup>16</sup> Others similarly estimated periods of instability in the relationship between the rates of economic growth and unemployment.<sup>17</sup> Some of the variation may be due to the stage of the business cycle, with the rule of thumb perhaps holding up better during recessions than recoveries.<sup>18</sup> Based on their analysis, Owyang and Sekhposyan suggest "that back-of-the-envelope calculations used to relate changes in the unemployment rate to changes in output growth or the output gap should not be taken too seriously but rather as an approximation to be taken with a grain of salt."<sup>19</sup>

In contrast, Ball et al estimated that, as posited by Okun, increases and decreases in output have the same effect on unemployment. In other words, the rule-of-thumb applies equally well to recoveries and recessions. They also demonstrated that Okun's law did not break down during the recent jobless recoveries. Between 2009 and 2011, for example, Ball et al estimated that the relationship between output and unemployment gaps approximated the relationship predicted by Okun. The difference between the recoveries from the 1990-1991, 2001, and 2007-2009 recessions and recoveries from earlier recessions appears to be that large output gaps (i.e., slow economic growth relative to trend) persisted well into the three jobless (high-unemployment) recoveries. The researchers conclude by stating that "it is rare to call a macroeconomic relationship a 'law.' Yet we believe that Okun's Law has earned its name. It is not as universal as the law of gravity ... , but it is strong and stable by the standards of macroeconomics. Reports of deviations from the Law are often exaggerated."<sup>20</sup>

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<sup>14</sup> Bernanke, NABE conference address.

<sup>15</sup> Years two through five from the end of the 1981-1982, 1990-1991, and 2001 recessions.

<sup>16</sup> Jonathan McCarthy, Simon Potter, and Ging Cee Ng, "Okun's Law and Long Expansions," Federal Reserve Bank of New York, March 27, 2012.

<sup>17</sup> See for example Brent Meyer and Murat Tasci, "An Unstable Okun's Law, Not the Best Rule of Thumb," Federal Reserve Bank of Cleveland, *Economic Trends*, June 7, 2012.

<sup>18</sup> Knotek, *How Useful Is Okun's Law* and Emily Burgen, Brent Meyer and Murat Tasci, "An Elusive Relation Between Unemployment and GDP Growth: Okun's Law," Federal Reserve Bank of Cleveland, *Economic Trends*, April 5, 2012.

<sup>19</sup> Michael T. Owyang and Tatevik Sekhposyan, "Okun's Law over the Business Cycle: Was the Great Recession All That Different?," *Federal Reserve Bank of St. Louis REVIEW*, September/October 2012, p.417.

<sup>20</sup> Laurence Ball, Daniel Leigh, and Prakash Loungani, *Okun's Law: Fit at 50?*, paper presented at the 13<sup>th</sup> Jacques Polak Annual Research Conference hosted by the International Monetary Fund, Washington, DC, November 8-9, 2012, p. 22.

## The Outlook for the Unemployment Rate in the Next Few Years

According to estimates by economist Robert J. Gordon, potential output has grown at an average annual rate of 3.4% since 1875.<sup>21</sup> Gordon doubts, however, that growth in potential GDP will be that rapid over the next 20 years as gains from information technology investments have been diminishing. His assumption of slower productivity growth along with the previously discussed expected declines in labor force growth led him to project a 2.4% rate of growth in potential output over the next 20 years. If that view is correct, then real economic growth in excess of 2.4% would be likely to yield a declining rate of unemployment.

Economists Susanto Basu and John G. Fernald also examined the current outlook for growth in potential output.<sup>22</sup> They point out that household net worth declined significantly during the 2007-2009 recession. That drop in wealth, they argue, will make it more difficult for workers to afford leisure time (e.g., retirement). Consequently, the supply of labor may be larger in the near term than it might otherwise have been. This would tend to temporarily raise growth in potential output. At the same time, Basu and Fernald expect that disruptions in financial markets will tend to constrain growth in potential output over the near term because of higher risks associated with investment spending. These offsetting factors mainly serve to emphasize how uncertain estimates of growth in potential output can be.

Weidner and Williams examined the relationship between real economic growth and the strength of past recoveries. The economists estimate that potential output growth was comparatively rapid during the initial expansions of the 1960s through 1980s (at 3.6%). In contrast, potential output was much more moderate (2.5%) during the first two years of recovery from the 1990-1991 and 2001 recessions. They estimate potential GDP growth at the outset of the recovery from the Great Recession<sup>23</sup> was a more sluggish 2.1% due to the slow rate of labor force growth.<sup>24</sup> If they are correct, real economic growth greater than 2.1% would likely produce a falling unemployment rate.

The Congressional Budget Office (CBO) regularly publishes projections of growth in potential output. In its August 2012 economic outlook, CBO forecast that potential output of the overall economy will grow at an average annual rate of 2.2% between 2012 and 2022.<sup>25</sup> In contrast, the agency estimated a considerably higher average annual growth rate of potential GDP between 1950 and 2011 (3.3%). The lower projection of potential output growth going forward chiefly reflects CBO's projection of greatly reduced potential labor force growth (from 1.5% between

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<sup>21</sup> Robert J. Gordon, "The Slowest Potential Output Growth in U.S. History: Measurement and Interpretation," presented at the Center for the Study of Innovation and Productivity at the Federal Reserve Bank of San Francisco, November 2008.

<sup>22</sup> Susanto Basu and John G. Fernald, *What Do We Know and Not Know About Potential Output?*, Federal Reserve Bank of San Francisco, Working Paper, March 2009.

<sup>23</sup> The 2007-2009 recession is commonly referred to as the Great Recession.

<sup>24</sup> Justin Weidner and John C. Williams, "The Shape of Things to Come," Federal Reserve Bank of San Francisco, Economic Letter, May 17, 2010.

<sup>25</sup> Congressional Budget Office, *An Update of the Budget and Economic Outlook: Fiscal Years 2012 to 2022*, August 2012.

1950 and 2011 to 0.5% between 2012 and 2022) mostly due to increasing retirements among workers of the baby-boom generation.

CBO also projected in August 2012 that the annual average growth rate of real GDP will stay below the growth rate of potential output until 2018. The annual average rate of unemployment is therefore estimated to remain above 8.0% through 2014, and then fall to 5.9% by 2017 as the output gap progressively narrows.

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## **Acknowledgments**

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