



Unemployment and Economic Recovery

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August 20, 2010

Congressional Research Service

7-5700

www.crs.gov

R40925

Summary

Although the economy has begun growing again, it may be a while before the unemployment rate shows steady improvement. The unemployment rate is considered a lagging indicator, meaning that its ups and downs happen some time after the ups and downs of other indicators of economic activity. For example, more than a year elapsed before the unemployment rate trended downward following the end of the 1990-1991 and 2001 recessions. This led the two to be labeled jobless recoveries. By contrast, after four earlier recessions the unemployment rate began a sustained decline within four to five months.

Unemployment often does not fall appreciably when economic growth first picks up because some firms may have underutilized labor that they kept on their payrolls during the recession to avoid incurring costs related to layoffs and rehiring. At the end of a recession as demand increases, some firms may initially be able to increase production without adding workers by raising the productivity of the labor on hand. But once the labor on hand has been fully utilized, output will grow at the growth rate of productivity until firms add workers. As an economic expansion progresses, output growth will be determined by the combined rates of productivity and labor force growth. If output growth exceeds the growth rate of productivity, then employment will rise. If employment growth exceeds the labor force growth rate, then the unemployment rate will fall.

Just as the time it takes for the unemployment rate to begin falling after a recession has varied, the speed at which it falls has varied. After nine of the past 10 contractions, it took at least eight months for the unemployment rate to fall by one full percentage point. Of the 10, the fastest decline occurred after the expansion that ended in October 1949 when the unemployment rate measured 7.9%. In one year's time, it dropped by 3.7 percentage points to 4.2%. The slowest decline occurred after the recession that ended in November 2001 when the unemployment rate was 5.5%, the lowest rate recorded at the start of any expansion. About 3½ years elapsed (June 2005) before the unemployment rate fell just one-half of a percentage point. In contrast, the expansion that followed the July 1981-November 1982 contraction began with the highest unemployment rate of the postwar period at 10.8%. In that case, it took only eight months for the unemployment rate to fall more than one percentage point.

From a policy perspective, what matters for a sustainable reduction in the unemployment rate is the growth rate of potential output. Potential output is a measure of the economy's capacity to produce goods and services when resources (e.g., labor) are fully utilized. The rate of growth of potential gross domestic product (GDP) is a function of the growth rate of potential productivity and the labor supply when the economy is at full employment. If, as recently estimated, the growth rate of potential output is as low as 2% to 2.4%, then real economic growth would not have to be much above that to yield a declining unemployment rate. How much it is above that range will determine the speed with which the unemployment rate declines during the recovery from the recession that began in December 2007.

This report examines the relationship between economic growth and the unemployment rate to anticipate possible future developments.

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Introduction

By many accounts, the economic contraction that began in December 2007 is already over.¹ The increase in real gross domestic product (GDP) in the third quarter of 2009, and GDP growth having remained positive thereafter, lends support to that view. Growth in GDP (i.e., the output of goods and services) is a key measure that the Business Cycle Dating Committee uses to officially designate the beginning and ends of recessions.

What may concern some policymakers as much or even more than whether the “Great Recession” has ended, however, is the outlook for the unemployment rate. Although the economy has been growing again, it may be a while before the unemployment rate begins to decline steadily. The rate may even continue rising for some time after the beginning of an expansion. The unemployment rate is considered a lagging indicator, meaning that its ups and downs happen some time after the ups and downs of other broad indicators of economic activity.²

Not only might the unemployment rate be slow to fall at the beginning of an economic expansion, its rate of decline, or whether it declines at all, is likely to depend on the rate of GDP growth. It is possible for there to be above-zero real economic growth that is insufficient to prevent continued increases in the unemployment rate. This report examines the relationship between economic growth and the unemployment rate to anticipate possible future developments.

Economic Growth and the Unemployment Rate

In the short run, the relationship between economic growth and the unemployment rate may be a loose one. One reason that unemployment may not fall appreciably when economic growth first picks up is that some firms may have underutilized labor. Laying off workers when times are bad and rehiring them as conditions improve has costs. Therefore, up to a point, firms may be willing to pay for more workers than they need to satisfy the depressed demand for their goods and services. As a result, at the end of a recession as demand increases, some firms may, at first, be able to increase production without adding workers. In other words, firms may be able to increase their output by raising the productivity of the labor on hand, which yields a temporary boost in measured labor productivity above its longer-run trend rate of growth.

Once the labor on hand is fully utilized, output will grow no faster than the rate of growth of labor productivity until the firm begins to add workers. As the economic expansion progresses, output growth will be determined by the combined rates of growth of the labor supply and labor productivity. As long as growth in total output exceeds the rate of growth of labor productivity, then employment will rise. If employment growth is more rapid than growth in the labor force, then the unemployment rate will fall.

¹ For example, in October 2009, the National Association for Business Economics released the results of a survey of 44 professional forecasters, the “vast majority” of whom felt that the recession was already over. See <http://www.nabe.com/publib/macsum.html>.

² As discussed in CRS Report R40798, *Unemployment and Employment Trends Before and After the End of Recessions*, by Linda Levine, the unemployment rate did not peak until two to four months after the end of four post-war recessions and not until nine to 18 months after the end of three recessions.

Over the longer run, there tends to be a link between changes in the rates of real economic growth and unemployment. This stable long-run relationship between the two economic variables was most famously pointed out in the early 1960s by economist Arthur Okun, which is why it is commonly referred to as “Okun’s Law.”³ It has been included in a list of “core ideas” that are widely accepted in the economics profession.⁴

The key to the relationship between the rate of economic growth and the unemployment rate is the rate of growth of what economists refer to as “potential output.” In brief, potential output is an unobservable measure of the capacity of the economy to produce goods and services when the 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 of potential productivity and the labor supply when the economy is at full employment. When the unemployment rate is high, as it is now, then actual GDP falls short of potential GDP.

Labor’s contribution to output is determined by the hours worked by employed members of the labor force. This, in turn, depends on the size of the population, the share of the population that is in the labor force, and the share of the labor force that is actually employed.

In the absence of productivity growth, as long as each new addition to the labor force is employed, growth in total output will just equal the growth in the labor force. If the rate of output growth falls below the rate of growth of the labor force, then there will not be enough new jobs created to accommodate all of the new job seekers. The proportion of the labor force that is employed will fall, and the unemployment rate will rise. If growth in output exceeds the rate of growth in the labor force, some of the new jobs created by employers to satisfy the rising demand for goods and services will be filled by drawing down the pool of unemployed labor.⁵

As productivity increases over time it takes fewer and fewer workers to produce a given quantity of goods and services. If growth in output just equals the growth rate of the labor force in the presence of productivity growth, then more people will be entering the labor force than are needed to produce a given amount of output. The share of the labor force that is employed will fall, and the unemployment rate will rise. Only as long as the growth in output exceeds the combined growth rates of the labor force and productivity will the unemployment rate fall in the long run. Knowing what that rate is might be useful to policymakers.

³ Using real-time data from the late 1940s through early 1960s that would have been available to Okun, Knotek estimated that real output growth of 4% was consistent with a stable unemployment rate, which means that 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, available at <http://www.kansascityfed.org/PUBLICAT/ECONREV/PDF/4q07Knotek.pdf>.

⁴ Alan Blinder, “Is There A Core of Practical Macroeconomics That We Should All Believe?,” *American Economic Review*, vol. 87, no. 2, May 1997.

⁵ If there is considerable slack in the economy, as is now the case, this does not pose a problem, but once unemployment reaches relatively low levels then the increased demand for labor is more likely to be satisfied by rising wages than by higher levels of employment and there may be a risk of accelerating inflation. CBO estimated, in 2008, that the rate close to which that becomes a risk (which is referred to as the nonaccelerating inflation rate of unemployment or NAIRU) may have been as low as 5%. At current levels of unemployment, the risk of accelerating wages and inflation would seem low. See Robert Arnold, “Reestimating the Phillips Curve and the NAIRU,” Congressional Budget Office, Working Paper 2008-06, August 2008.

Even when GDP is growing rapidly enough to create jobs fast enough to push the unemployment rate down, it may still take time to match jobs and job seekers. If the new jobs being created require substantially different skills from those jobs that have disappeared, then it may be difficult for displaced workers to get rehired. Some of those job seekers may have skills that are easily transferred from one job to another and thus may not experience long-term unemployment. Those with skills that have become outmoded or are less applicable in those industries that are expanding may have more difficulty finding new work. The more of a mismatch in skills there is between new jobs and job seekers, the longer it will take for displaced workers to find new jobs.⁶

Limits to geographical mobility may also account for some of the mismatches in the labor market. There are costs, both monetary and emotional, associated with pulling up stakes and moving to another part of the country to get a new job. It may also be the case that the further removed a job prospect is, geographically, the less likely it is that a job seeker will even hear about it. This may be especially relevant in areas where job losses are permanent, such as seems to be happening in segments of the motor vehicle industry and other industries that are in decline due in part to heightened foreign competition.

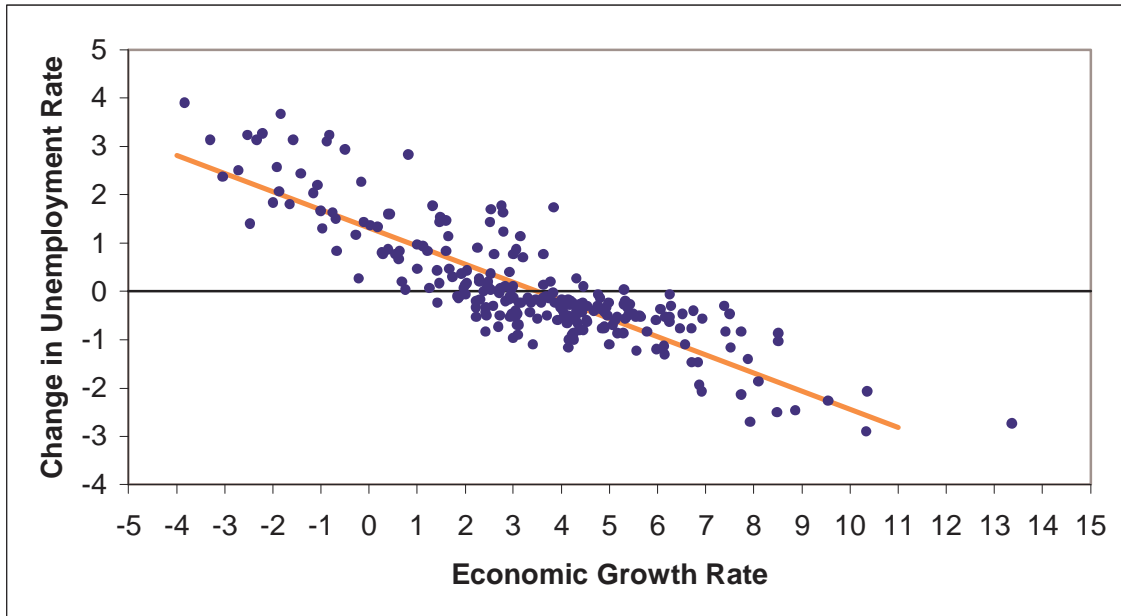
Figure 1 shows the long-run relationship between real economic growth and changes in the unemployment rate. Each point in the graph refers to a calendar quarter and indicates a pair of observations. The first observation of each pair is the percentage change in real GDP over the previous four quarters (shown on the horizontal scale). The second observation of each pair is the percentage point change in the civilian unemployment rate over the same period (shown on the vertical scale). The downward sloping line indicates the estimated statistical relationship between the two series over the interval shown.⁷ Where it crosses the zero line indicates, approximately, the rate of real economic growth necessary to keep the unemployment rate from either rising or falling. Above that growth rate, the unemployment rate tended to fall, and below that growth rate, the unemployment rate tended to rise.

This analysis of the long-run relationship between economic growth and changes in the unemployment rate is relatively simple. There are certainly other economic factors to take into account, in addition to more sophisticated statistical techniques. Nonetheless, over an extended period of time, there is evidently a strong link between the real GDP growth rate and changes in the unemployment rate. Based on the estimate of the relationship between the two variables over the entire period shown in **Figure 1**, real economic growth of about 3.5% was associated with a stable unemployment rate. Thus, in the long run, a one percentage point difference in the real GDP growth rate has historically led to a 0.4 percentage point change in the unemployment rate. In other words, an annual increase in real output of 4.5% is expected to result in a decline in the unemployment rate of 0.4 percentage points.

⁶ For more information see CRS Report R41179, *Long-Term Unemployment and Recessions*, by Gerald Mayer and Linda Levine.

⁷ Using ordinary least squares.

Figure 1. Real Economic Growth Rate (%) and Percentage Point Changes in the Unemployment Rate, 1949 – 2009



Source: Department of Commerce, Bureau of Economic Analysis; Department of Labor, Bureau of Labor Statistics.

There are times, however, when the long-run relationship temporarily breaks down or weakens. A change in the rate of growth of productivity in the short run can cause the economic growth rate and the unemployment rate to change in the same direction. In 1993, for example, the economic growth rate fell to 2.7% from 3% in 1992 and the unemployment rate fell to 6.9% from 7.5%. The reason was a decline in productivity growth in 1993 after a brief surge in the previous year.⁸ Another surge in the rate of productivity growth occurred in 2009, which explains the unemployment rate's increasing to a much greater extent than would have been expected by Okun's law.⁹ Instead of the small anticipated increase, the unemployment rate rose by almost four percentage points from 5.8% in 2008 to 9.3% in 2009.

Depending on possible changes in the productivity growth rate, GDP growth might not have to be above 3.5% now to push down the unemployment rate. Between 1949 and 2000, the civilian labor force grew at an average annual rate of 1.6%. More recently, that growth rate has slowed and is projected to continue to do so as a result of the aging of the baby-boom generation.¹⁰ Between 2000 and 2009, the annual rate of growth of the labor force was 0.9%.¹¹

⁸ David Altig, Terry Fitzgerald, and Peter Rupert, "Okun's Law Revisited: Should We Worry about Low Unemployment?," Federal Reserve Bank of Cleveland, *Economic Commentary*, May 15, 1997, available at <http://www.clevelandfed.org/research/commentary/1997/0515.htm>.

⁹ Mary Daly and Bart Hobijn, "Okun's Law and the Unemployment Surprise of 2009," Federal Reserve Bank of San Francisco, *Economic Letter*, March 8, 2010, available at <http://www.frbsf.org/publications/economics/letter/2010/el2010-07.html>.

¹⁰ Mitra Toossi, "Labor Force Projections to 2018: Older Workers Staying More Active," *Monthly Labor Review*, November 2009.

¹¹ Calculated by CRS from data published by the Bureau of Labor Statistics.

Although the near-term growth rate of the labor force may be known with some degree of confidence, predicting productivity growth is difficult. Economists have identified three time periods that correspond with three different trend rates of growth in productivity.¹² Between 1947 and 1973, output per hour of labor grew at an annual rate of 2.8%. Between 1973 and 1995, labor productivity grew at a 1.4% rate. Between 1995 and 2009, labor productivity grew at a 2.6% annual rate.¹³

To get the unemployment rate to fall, economic growth will likely have to exceed the sum of the recent rates of labor force and productivity growth. This would seem to indicate that, if recent trends continue, sustained economic growth above 3.5% may be necessary to push down the unemployment rate.

Even after GDP growth picks up, however, experience suggests it may be some time before the unemployment rate steadily declines. Suppose that two successive monthly declines is taken as the beginning of a meaningful downward trend in the unemployment rate.¹⁴ **Table 1** shows how long it has taken following the end of each of the past 10 economic contractions for that trend to begin. After the end of the 1990-1991 and 2001 contractions, for example, it was well over a year before there was a clear downward trend in the unemployment rate. This led the two to be labeled jobless recoveries. By contrast, after the end of four earlier recessions the unemployment rate began a steadily decline within four to five months.

Table 1. Time in Months Between the End of Economic Contractions and Two Successive Monthly Declines in the Unemployment Rate

Date of End of Contraction	Months Following End of Contraction Until There Were Two Successive Declines
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

Source: National Bureau of Economic Research; Department of Labor, Bureau of Labor Statistics.

¹² For example, see J. Bradford DeLong, Productivity Growth in the 2000s, National Bureau of Economic Research Macroeconomics Annual, vol. 17 (2000), and CRS Report RL34677, *Productivity Growth: Trends and Prospects*, by Brian W. Cashell.

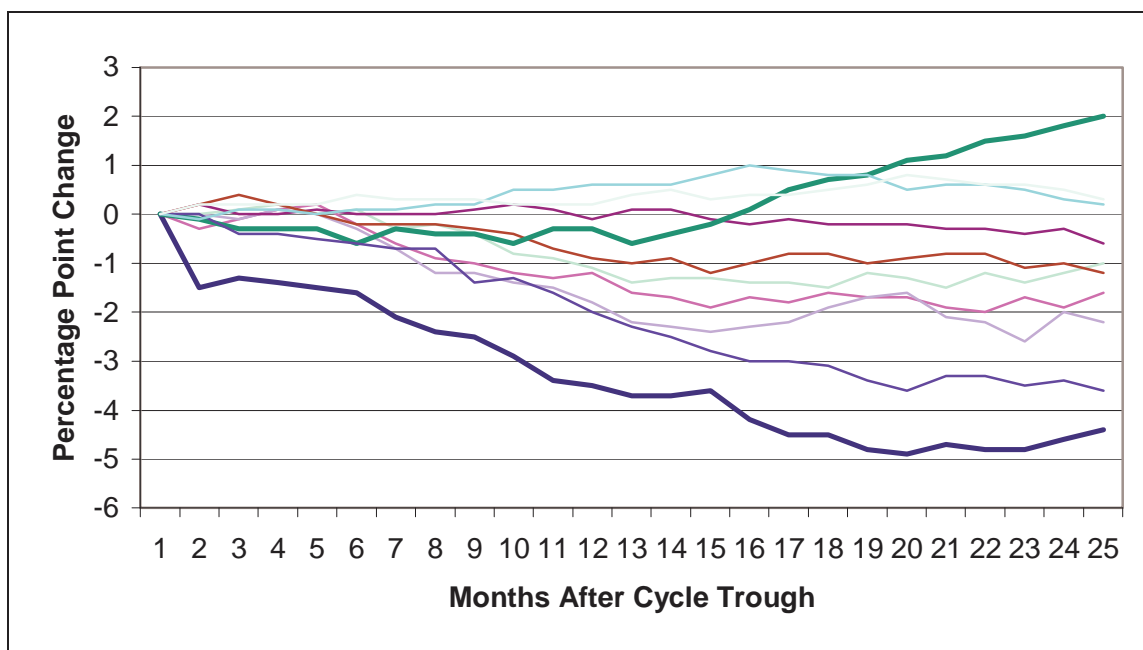
¹³ As measured by changes in output per hour of the nonfarm private business sector. Calculated by CRS from data published by the Bureau of Labor Statistics.

¹⁴ This may not be a rigorous definition, other standards could be used. See **Figure 2** to appreciate the time it takes for the unemployment rate to decline substantially after the end of an economic contraction.

Just as the time it takes for the unemployment rate to begin coming down has varied, the rate at which it falls has varied as well. Each of the lines in **Figure 2** shows the percentage point change in the unemployment rate following the end of each of the past 10 economic contractions. In nine of those 10 instances, it took at least eight months for the unemployment rate to fall by one full percentage point. 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 (June 2005) 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 9.4%).

Similarly, the two thickest lines in **Figure 2** show the wide range of possible outcomes. The top line represents the two years following the July 1980 business cycle trough, which ended with an unemployment rate of 9.8%—two percentage points *higher* than it was at the trough. In that case, the expansion only lasted a year and another contraction began in July 1981. (It is for that reason that the two recessions of the early 1980s are sometimes referred to as a double-dip recession.) The bottom line shows the two years following the October 1949 business cycle trough, which ended with the unemployment rate 4.4 percentage points *lower* than it had been at the trough.

Figure 2. Percentage Point Change in the Unemployment Rate in the First Two Years of Each of the Past 10 Economic Recoveries



Source: National Bureau of Economic Research; Department of Labor, Bureau of Labor Statistics.

The Outlook

From a policy perspective, what matters for the sustainable reduction of the unemployment rate is what the growth rate of potential output will be in the future. According to estimates by economist Robert J. Gordon, potential output has grown at an average annual rate of 3.4% since

1875.¹⁵ Gordon doubts, however, that growth in potential GDP will be that rapid over the next 20 years. He argues that the acceleration in productivity growth of the late 1990s was temporary. He examines economy-wide productivity rather than just that for the private business sector and finds that productivity growth slowed between 2004 and 2008 because the gains from information technology investments were beginning to diminish. His assumption of slower productivity growth along with expected declines in the growth rate of the labor force led him to project a 2.4% rate of growth in potential output over the next 20 years. If that view is correct, then over the long run, 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.¹⁶ They point out that there has been a significant decline in household net worth during the most recent contraction. That drop in wealth will likely make it more difficult to afford leisure time or to make down payments on purchases of durable goods like automobiles. Consequently, the supply of labor may be larger in the near term than it might otherwise have been, and that would tend to temporarily raise growth in the labor force and potential output. At the same time, they 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. Those factors tend to offset and 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. They 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. The economists estimate potential GDP growth at the outset of the recovery from what is commonly being referred to as the “Great Recession” will be a more sluggish 2.1%, “likely reflecting the low prevailing rate of labor force growth.”¹⁷ If they are correct, real economic growth greater than 2.1% would likely produce a falling unemployment rate.

The Congressional Budget Office (CBO) publishes projections of growth in potential output. In its August 2010 economic outlook, CBO projects that potential output of the overall economy will grow at an average annual rate of 2.1% between 2010 and 2014, rising to a 2.4% rate of increase between 2015 and 2020.¹⁸ CBO’s projected average annual growth rate of potential GDP was a higher 2.7% over the 2002-2009 period. The different estimates for the three periods chiefly reflects CBO’s diminishing projection over time of potential growth of the labor force. In terms of the unemployment rate in the near term, CBO expects it will average 9.5% in 2010 and 9.0% in 2011. The unemployment rate is projected to gradually fall thereafter to 8.1% in 2012, 6.6% in 2013, and 5.3% in 2014.

¹⁵ 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, available at http://www.frbsf.org/csip/research/200811_Gordon.pdf.

¹⁶ 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, available at <http://www.frbsf.org/publications/economics/papers/2009/wp09-05bk.pdf>.

¹⁷ Justin Weidner and John C. Williams, “The Shape of Things to Come,” Federal Reserve Bank of San Francisco, Economic Letter, May 17, 2010, available at <http://www.frbsf.org/publications/economics/letter/2010/el2010-15.html>.

¹⁸ Congressional Budget Office, *The Budget and Economic Outlook: An Update*, August 2010, available at <http://www.cbo.gov/ftpdocs/117xx/doc11705/08-18-Update.pdf>.

In conclusion, if the current rate of growth in potential output is as low as 2% to 2.4%, then real economic growth would not have to be much above that to yield a declining unemployment rate. How much it is above that range will determine the speed with which the unemployment rate declines during the recovery from the recession that began in December 2007.

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Acknowledgments

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