
# Unemployment and Economic Recovery

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# Summary

Even though the economy seems to be growing again, it may be a while before the unemployment rate begins to decline, and it may even continue rising for some time after the resumption of sustained economic growth. The unemployment rate is generally a lagging indicator, meaning that its ups and downs happen some time after the ups and downs of other broad indicators of economic activity.

Unemployment may not fall appreciably when economic growth first picks up because some firms may have underutilized labor. At the end of a recession as demand increases, some firms may initially be able to increase production without adding workers. Firms may be able to increase their output by raising the productivity of the labor on hand.

Over the longer run, there tends to be a link between the rate of economic growth and changes in the unemployment rate. Estimates based on data since 1949 suggest that real economic growth of about 3.5% was associated with a stable unemployment rate. When economic growth was faster than 3.5%, the unemployment rate tended to fall, and when economic growth was below 3.5% the unemployment rate tended to rise.

In the long run, a one percentage point difference in the economic growth rate has historically led to a change in the unemployment rate of about 0.4 percentage points. In other words, although economic growth of 3.5% was sufficient to maintain a stable unemployment rate, an annual increase in real output of 4.5% would result in a decline in the unemployment rate of 0.4 percentage points.

Even if economic growth picks up and an expansion gets going, experience suggests it may be some time before there are significant declines in the unemployment rate. After the end of the two most recent contractions, it was well over a year before there was a clear downward trend in the unemployment rate. After nine of the past 10 contractions, it took at least eight months for the unemployment rate to fall by one full percentage point.

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, or is about to be, over.[1] The increase in real gross domestic product (GDP) in the third quarter of 2009 lends support to that view. What may concern policymakers as much or even more, however, is the outlook for the unemployment rate. Even though the economy seems to be growing again, it may be a while before the unemployment rate begins to decline, and it may even continue rising for some time after the beginning of any expansion. The unemployment rate is generally 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 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. Up to a point, firms may be willing to maintain more workers than they need to satisfy the depressed demand for their goods and services in order to avoid those costs. 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 at 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 labor and the productivity of labor. 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.

That there is a stable long-run relationship between the rate of economic growth and changes in the unemployment rate was most famously pointed out by economist Arthur Okun, which is why it is sometimes referred to as "Okun's Law." It has been included in a list of "core ideas" that are widely accepted in the economics profession.[3]

[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] See also CRS Report R40798, *Unemployment and Employment Trends Before and After the End of Recessions*, by Linda Levine.

[3] Alan Blinder, "Is There A Core of Practical Macroeconomics That We Should All Believe?," *American Economic*
(continued...)

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 a measure of the capacity of the economy to produce goods and services given the available resources, such as labor and capital. The rate of growth of potential output is a function of the rate of growth of productivity and the rate of increase of the contribution of the labor force in the production of goods and services. When the unemployment rate is high, as it is now, then actual output falls short of potential.

Labor's contribution to output is determined by the hours worked by those who are employed. Ultimately, labor input is measured in terms of hours. 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 growth in output 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 opening up to satisfy rising demand will be filled by drawing down the pool of unemployed labor.[4]

If productivity is rising, over time it will take 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, then more people will be entering the labor force than are needed to produce the higher levels 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.

Even when output 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.

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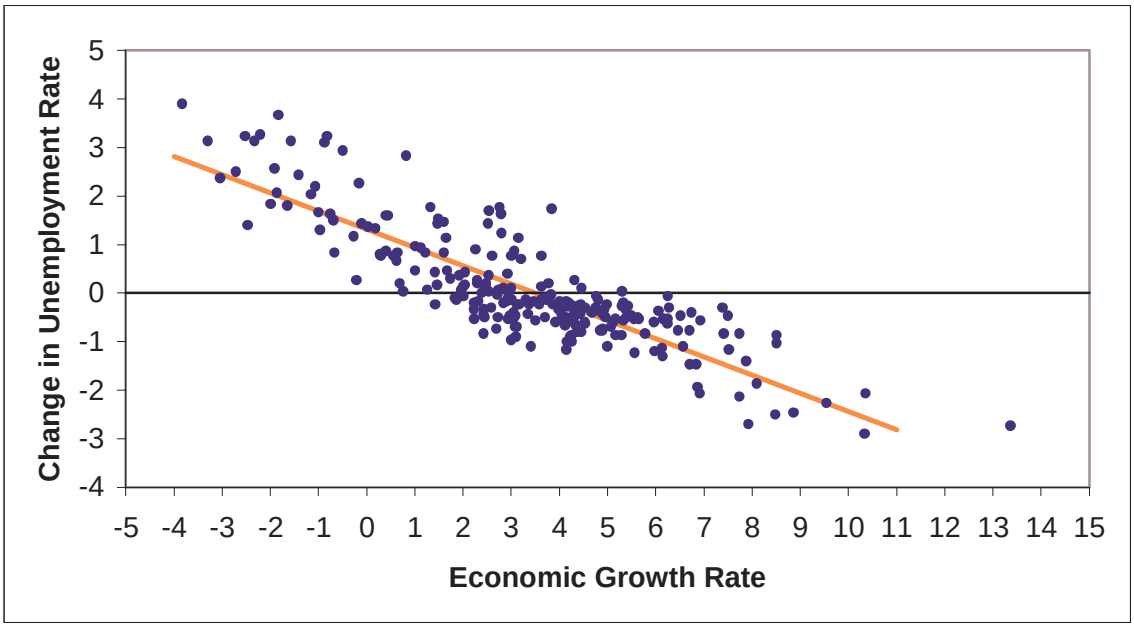
*Review*, vol. 87, no. 2, May 1997.

[4] 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 CBO refers 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 and the NAIRU," Congressional Budget Office, Working Paper 2008-06, August 2008.

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 the automotive industry as well as those industries that are in decline because of foreign competition.

**Figure 1** shows the relationship between economic growth and changes in the unemployment rate since 1949. 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.[5] Where it crosses the zero line indicates, approximately, the rate of 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.

**Figure 1. 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

This analysis of the 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, there is evidently a strong link between the

[5] Using ordinary least squares.

rate of economic growth and changes in the unemployment rate. Based on this estimate of the relationship between the two variables over the entire period, real economic growth of about 3.5% was associated with a stable unemployment rate. When economic growth was faster than 3.5%, the unemployment rate tended to fall, and when economic growth was below 3.5% the unemployment rate tended to rise.

There are times, however, when the relationship temporarily breaks down. Changes in productivity growth, for example, tend not to be correlated with changes in unemployment. In the short run, a change in the rate of growth of productivity can cause the economic growth rate and the unemployment rate to change in the same direction. For example, in 1993, 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.[6] There may also be small variations in average hours worked that may cause changes in the growth rate that are independent of changes in unemployment.

In the long run, based on the relationship estimated in **Figure 1**, a one percentage point difference in the economic growth rate has historically led to a change in the unemployment rate of about 0.4 percentage points. In other words, although economic growth of 3.5% was sufficient to maintain a stable unemployment rate, an annual increase in real output of 4.5% would result in a decline in the unemployment rate of 0.4 percentage points.

Depending on possible changes in productivity, economic growth might not have to be as rapid as 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, however, that growth rate has slowed. Between 2000 and 2008, the annual rate of growth of the labor force was 1.0% and its growth is expected to continue to slow down. The Bureau of Labor Statistics projects that the labor force will grow at a 0.7% rate between 2009 and 2016.[7]

Although the near-term growth rate of the labor force may be known with some degree of confidence, predicting productivity growth presents substantial difficulties. In the short run, over the course of the business cycle, productivity growth tends to vary in predictable ways.[8] In the long run, projecting productivity growth is difficult. Economists have identified three time periods that correspond with three different trend rates of growth in productivity.[9] Between 1949 and 1973, output per hour of labor grew by 2.8% at an annual rate. Between 1973 and 1995, labor productivity grew at a 1.4% rate. Between 1995 and 2008, labor productivity grew at a 2.6% annual rate.[10]

Since 2000, the labor force has grown at an annual rate of 1%. To get the unemployment rate to fall, economic growth will likely have to exceed the sum of the 1% rate of growth of the labor force and the recent 2.6% rate of growth of labor productivity. This would seem to indicate that,

[6] 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.

[7] Data available at ftp://ftp.bls.gov/pub/special.requests/ep/labor.force/clfa0616.txt.

[8] For example, in the very early stages of an economic expansion, productivity growth tends to be relatively rapid, as the most productive of the idle labor force are put back to work first.

[9] See CRS Report RL34677, *Productivity Growth: Trends and Prospects*, by Brian W. Cashell.

[10] As measured by changes in output per hour of the nonfarm private business sector. Data published by the Department of Labor, Bureau of Labor Statistics.

if recent trends continue, sustained economic growth above 3.5% may be necessary to push down the unemployment rate.

Even if economic growth picks up and an expansion gets going, experience suggests it may be some time before there are significant declines in the unemployment rate. Suppose that two successive monthly declines is taken as the beginning of a meaningful downward trend in the unemployment rate.[11] **Table 1** shows how long it has taken following the end of each of the past 10 economic contractions for that trend to begin. For example, following the end of the contraction in October 1949 that downward trend did not start until January 1950. After the two most recent contractions, well over a year had passed before there was a clear downward trend in the unemployment rate.

**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.

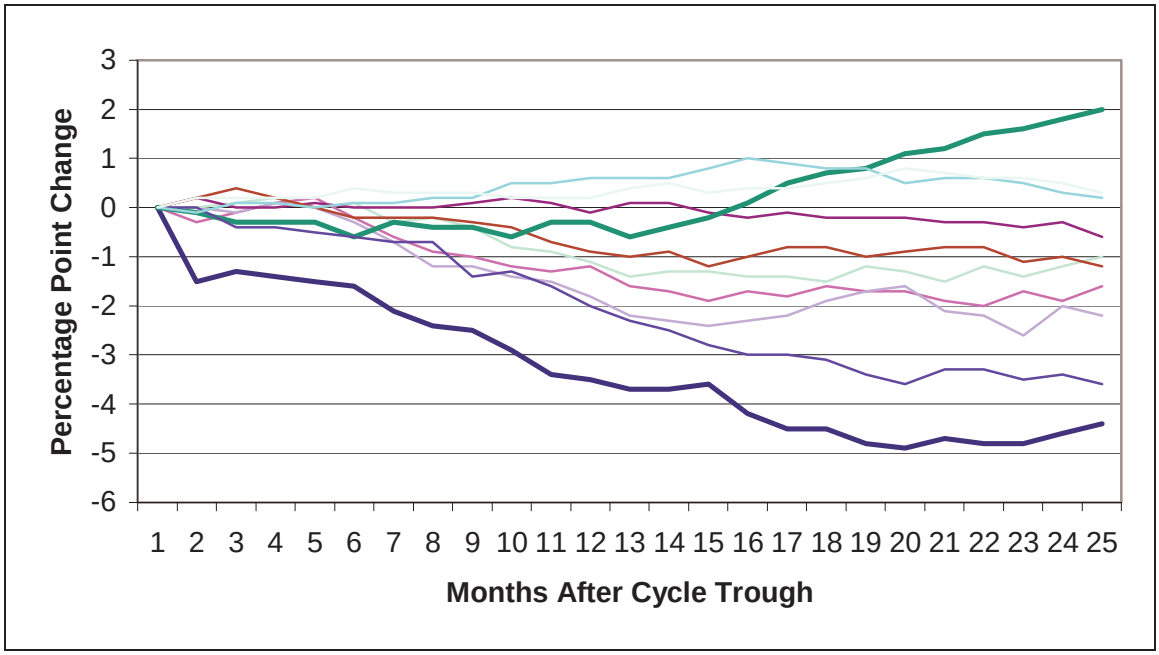
Just as the time it takes for the unemployment rate to begin coming down has varied, the rate at which it falls has varied as well. Each of the lines in **Figure 2** shows the percentage point change in the unemployment rate following the end of each of the past 10 economic contractions. In nine of those 10 instances, it took at least eight months for the unemployment rate to fall by one full percentage point. The line showing the steepest decline was the expansion that began in October 1949 when the unemployment rate was 7.9%. Of those 10, the expansion that began with the highest unemployment rate was the one that began in November 1982 when the unemployment rate was 10.8%. In that case, it took eight months for the unemployment rate to fall below 10%.

The two thickest lines in **Figure 2** show a wide range of possible outcomes. The top line represents the two years following the July 1980 business cycle trough, which ended with the unemployment rate two percentage points *higher* than it was at the trough. In that case, the

[11] 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 significantly after the end of an economic contraction.

expansion only lasted a year and the another contraction began in July 1981. 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.[12] Gordon doubts, however, that growth in potential output 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 lead 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.

[12] 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.

Economics Susanto Basu and John G. Fernald also examined the current outlook for growth in potential output.[13] 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 temporarily to 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.

The Congressional Budget Office (CBO) publishes projections of growth in potential output. In its August 2009 economic outlook, CBO projected that potential output will grow at an average annual rate of 2.0% between 2009 and 2013, rising to a 2.4% rate of increase between 2014 and 2019.[14] CBO expects the unemployment rate to average 10.2% in 2010 and 9.1% in 2011. The Organisation for Economic Co-operation and Development (OECD) projects that the U.S. unemployment rate will remain above 10% through the end of 2010.[15]

In conclusion, if the current rate of growth in potential output is as low as 2%, then real economic growth would not have to be much above that to eventually end the rise in the unemployment rate. Nonetheless, history suggests that even after the contraction is over, the unemployment rate may continue to rise or at least remain steady at relatively high rates for some time.

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[13] 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.

[14] Congressional Budget Office, *The Budget and Economic Outlook: An Update*, August 2009, available at http://www.cbo.gov/ftpdocs/105xx/doc10521/08-25-BudgetUpdate.pdf.

[15] Organisation for Economic Co-operation and Development, "OECD Employment Outlook: Tackling the Jobs Crisis," 2009.