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Unemployment and Economic Growth

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Abstract. Economic growth and the unemployment rate are very closely related. The connection is such a stable one that it is often referred to as "Okun's law," after an economist who pointed it out. In the long run, economic growth is a function of increases in labor and in productivity. For economic growth to accommodate growth in the labor force without leading to a rise in the unemployment rate, it must at least equal the combined growth rates of labor and productivity. Over the last 50 years, the rate of economic growth required to keep the unemployment rate from rising has been, on average, close to 3.5 percent. Over relatively shorter periods of time, the rate may have fluctuated due to shifts in either labor force or productivity growth. Although labor force growth has slowed over time, the trend rate of productivity growth may have accelerated in the second half of the 1990s. Recent estimates put the combined rate of growth of labor and productivity at about 3.5 percent. If that is true, that is the rate that would be consistent with a stable unemployment rate. Economic growth below that rate would lead to a rising unemployment rate, and economic growth above that rate would likely lead to a falling rate of unemployment.

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Unemployment and Economic Growth

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Summary

Economic growth and the unemployment rate are very closely related. The connection is such a stable one that it is often referred to as “Okun’s law,” after an economist who pointed it out. In the long run, economic growth is a function of increases in labor and in productivity. For economic growth to accommodate growth in the labor force without leading to a rise in the unemployment rate, it must at least equal the combined growth rates of labor and productivity. Over the last 50 years, the rate of economic growth required to keep the unemployment rate from rising has been, on average, close to 3.5%. Over relatively shorter periods of time, the rate may have fluctuated due to shifts in either labor force or productivity growth. Although labor force growth has slowed over time, the trend rate of productivity growth may have accelerated in the second half of the 1990s. Recent estimates put the combined rate of growth of labor and productivity at about 3.5%. If that is true, that is the rate that would be consistent with a stable unemployment rate. Economic growth below that rate would lead to a rising unemployment rate, and economic growth above that rate would likely lead to a falling rate of unemployment. In the very short run, there may be variations in the unemployment rate due to factors other than the rate of economic growth. Over longer periods of time, however, it may take economic growth in excess of 3.5% to achieve substantial reductions in the unemployment rate. This report will not be updated.

In the long run, real economic growth is the means by which the nation achieves improving living standards. Over the long run, the faster the economy grows, the better off we are materially. In the short run, however, the rate of growth has consequences for a number of other economic variables. If economic growth persists at too rapid a rate, there is a risk that inflation may accelerate.¹ If economic growth is too slow, then there is a risk of rising unemployment. Although rising unemployment is typically associated with economic contractions, or recessions, it is entirely possible for the economy to be growing yet not rapidly enough to prevent the unemployment rate from rising. This has

¹ See: CRS Report RL30391, *Inflation and Unemployment: What is the Connection?*, by Brian W. Cashell.

been referred to as a “growth recession.” Knowing what the rate of economic growth is that is necessary to reduce the unemployment rate, or at least to keep it from rising, would be of considerable use to policymakers.

What Is the Connection?

That there is a stable 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 now referred to as “Okun’s Law.” More recently, it was included in a list of “core ideas” that are widely accepted in the economics profession.²

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.

Labor’s contribution to output is, in turn, determined by the size of the population, the share of the population that is in the labor force, the share of the labor force which is actually employed, and the hours worked by those who are employed. Ultimately, labor input is measured in terms of hours.

If, for the sake of simplicity, it can be assumed that the hours worked by those who are employed remain constant, then the contribution of labor to total output depends on the size of the labor force, and the proportion of it that is employed.

The labor force consists of those who are either working or who are looking for work. 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 to accommodate additions to the labor force. 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 will only be filled by drawing down the pool of unemployed labor. If there is considerable slack in the economy this does not pose a problem, but if unemployment is already at 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.

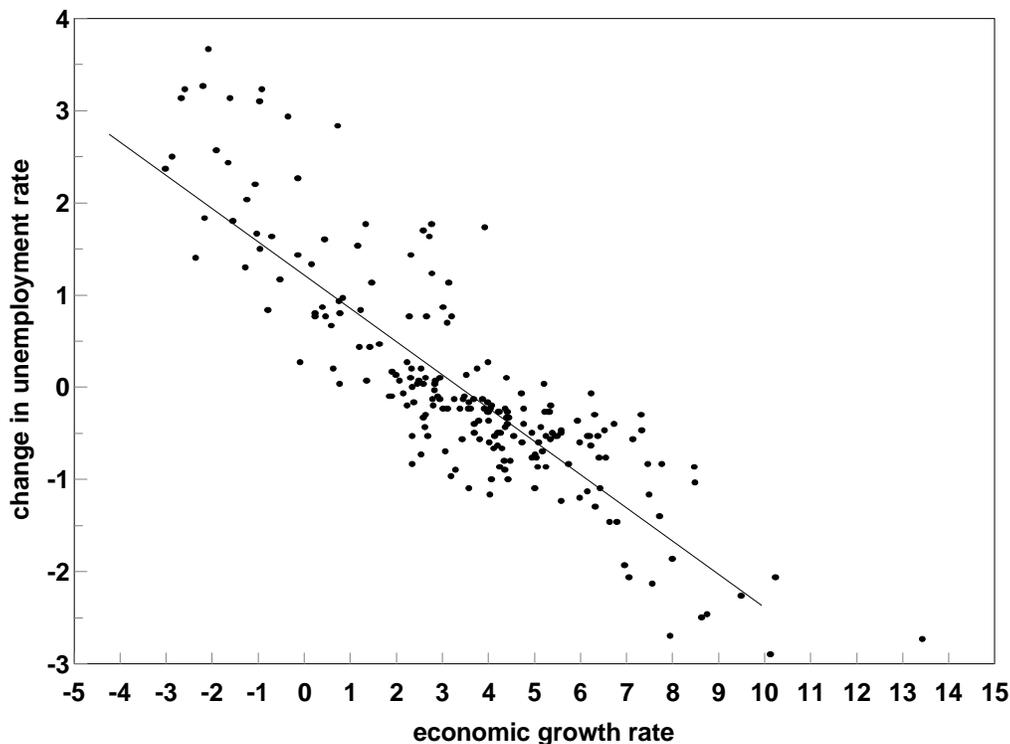
If productivity is rising, over time it will take fewer and fewer workers to produce a given quantity of goods and services. If growth in output only matches the growth rate

² Blinder, Alan. “Is There A Core of Practical Macroeconomics That We Should All Believe,” *American Economic Review*, volume 87, number 2, May 1997, pp. 240-243.

of the labor force, then growth in the labor force will exceed what is necessary to produce the higher levels of output. The share of the labor force employed will fall, and the unemployment rate will rise. Only as long as the growth in output equals the combined growth rates of the labor force and productivity will the unemployment rate remain constant. Knowing what that rate is would be useful to policymakers. Depending on the economic situation it might be desirable to strive for actual economic growth at, above, or even below that rate of growth.

Figure 1 shows the relationship between economic growth and changes in the unemployment rate graphically. Each point in the graph refers to a particular quarter of a year and indicates a pair of observations. The first observation of each pair is the 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 data reflect the U.S. experience since 1949.

Figure 1. Real Economic Growth and the Unemployment Rate



The solid line in the graph indicates the estimated statistical relationship between economic growth and changes in the unemployment rate based on the actual data plotted. Clearly, there is a strong link between the rate of economic growth and changes in the unemployment rate. Based on the estimated 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 that rate the unemployment rate tended to rise.

There are times, however, when the relationship breaks down. Changes in productivity growth tend not to be correlated with changes in unemployment. In the short run, a rise in productivity can produce an increase in the economic growth rate without necessarily pushing down the unemployment rate. For example, in 1993 the unemployment rate fell to 6.9% from 7.5% in 1992. But at the same time economic growth in 1993 fell to 2.7% from 3% in 1992. The reason was a brief surge in productivity growth in 1992.³

In the long run, labor market conditions are important determinants of the unemployment rate. Changes in the labor market may also cause the relationship between economic growth and the unemployment rate to break down.⁴

Over the course of a year, a one percentage point difference in the economic growth rate led to a change in the unemployment rate of about 0.4 percentage points. In other words, while economic growth of 3.5% was sufficient to maintain a stable unemployment rate, an annual increase in real output of 4.5% was associated with a one-year decline in the unemployment rate of 0.4 percentage points. Similarly, an annual increase in real output of 2.5% was associated with a one-year increase in the unemployment rate of 0.4 percentage points.

Looking Ahead

Knowing what rate of growth is needed to reduce the unemployment rate, or at least keep it from rising would clearly be useful. That rate, however, tends to vary over time. There are a number of reasons for that. First of all, growth in the labor force varies due to changes in population growth, and changing labor force participation rates. Between 1949, and 2000, for example, the civilian labor force grew at an average annual rate of 1.6%. More recently, however that rate has been slightly less. Between 1990 and 2000, the annual rate of growth of the labor force was 1.1%. That, by itself, would suggest that growth might not have to be as fast as 3.5% now to accommodate growth in the labor force.

Even though the growth rate of the labor force can be known with a certain degree of confidence, predicting productivity growth presents substantial difficulties. Productivity growth is most often studied in the context of longer run trends, but in the short run there can be considerable variation in its rate of change. Between 1949 and 2000, output per hour of labor grew by 2.5% at an annual rate. More recently, this measure grew at an annual rate of 2.1% between 1990 and 2000, but at a 2.7% rate between 1995 and 2000. In the second half of the 1990s, productivity growth accelerated.

³ David Altig, Terry Fitzgerald, and Peter Rupert, "Okun's Law Revisited: Should We Worry about Low Unemployment?," Federal Reserve Bank of Cleveland *Economic Commentary*, November 27, 2001. Available on the internet at:[www.clev.frb.org/Research/com97/0515.htm].

⁴ See: CRS Report RL30738, *Why has the unemployment rate fallen when inflation is stable?*, by Marc Labonte.

From a policy perspective, what matters is what the growth rate of productivity will be in the future. Productivity growth is driven by two factors. One is the rate of increase in the amount of capital available to each worker, which is in turn a function of the rate of investment. The other is the rate of technological progress. Technological progress is a variable that is not easily forecast, not to mention that it is difficult even to measure. Who can say when the next technical breakthrough that will lead to improving living standards will happen? Not only that, but even when there is such an innovation who can say what effect it may have down the road? Even now, the effect of the introduction of personal computers on the economy is subject to considerable uncertainty.

Past variations in productivity growth are poorly understood. Because of that, there is little basis on which to make projections of productivity growth short of extrapolating current trends. But, there is some uncertainty about what the trend rate of productivity is. Productivity growth accelerated in the second half of the 1990s. That was unusual in that it happened, not in the initial stages of an economic upswing as might typically have been the case, but in a mature economic expansion, and led more than a few economists to suggest that it might be indicative of a durable increase, rather than a short-term cyclical phenomenon.

As the increased rate of growth in productivity persisted through the end of the most recent expansion forecasters gradually began to raise their long-term projections of economic growth. Over the last few years, estimates of the long-term growth rate of productivity have risen from about 1.5% to about 2.5%. Combined with labor force growth of about 1%, that yields an economic growth rate of about 3.5% that would be required to accommodate growth in the labor force and hold the unemployment rate steady. In the very short run, there may be variations in the unemployment rate due to factors other than the rate of economic growth. Over longer periods of time, however, it may take economic growth in excess of 3.5% to achieve substantial reductions in the unemployment rate.