

“What is the relationship between price inflation and the unemployment rate?”

by Sarah Rummery, Ph.D.

Let's begin by defining both the unemployment rate and price inflation, and then move on to examine possible theoretical explanations for a relationship between these two economic indicators.

First, the unemployment rate; to be counted as unemployed in the United States you must have been actively involved in job search in the previous four weeks. This would include sending out resumes, going to job interviews and registering with an employment agency. You would also count as unemployed if you had been laid off temporarily, and were awaiting recall.

You would not be counted as unemployed if you had become discouraged in your search for a job, and had therefore stopped looking, or if you were not available to work, perhaps for medical reasons, should a job be offered to you.

The unemployment figures also do not account for under-employment - that is, when people are working part time but would prefer full time, or would simply prefer to be employed for more hours.

The unemployment rate is calculated monthly by the Bureau of Labor Statistics (hereafter BLS). It is the number of people unemployed, divided by the number of people in the labor force. For example, in October 2002, the BLS estimated that there were 8,209,000 Americans unemployed and 134,914,000 Americans employed. This makes the October 2002 labor force (the number of people working or actively looking for work) equal to 143,123,000 and the unemployment rate equal to: $\frac{8,209,000}{143,123,000} = 5.73\%$.

Economists consider there to be three major categories of unemployment; frictional, structural and cyclical. Regardless of the state of the economy there will always be frictional and structural unemployment. Frictional unemployment includes people who have been fired from their job, quit their job voluntarily, have graduated from high school or college and are looking for a job, or someone returning to the labor force and looking for a job. Structural unemployment is caused by "structural" changes, such as the loss of manufacturing companies to overseas locations, which leaves many domestic workers unemployed, and perhaps with skills that are no longer in demand. These two types of unemployment together make up the "natural rate of unemployment", that is, the unemployment that would be expected even in a full employment economy.

Deviations from this rate are attributed to cyclical variations (or business cycle factors). For example, if the economy moves into recession, aggregate demand for business output falls, and as a consequence the demand for labor falls creating an excess supply of labor and cyclical unemployment. This would cause the unemployment rate to exceed the natural rate. On the other hand if the economy experiences an economic expansion, aggregate

demand for business output increases, as does the demand for labor, creating an excess demand or shortage of labor, and an unemployment rate below the natural rate. Unemployment in the labor market clearly depends on demand in the product markets.

Now let's define price inflation so that we can consider possible connections between the rate of unemployment and price inflation.

The general consensus amongst economists is that price inflation is triggered as the economy moves towards or possibly exceeds the "full employment" level of production, which causes the unemployment rate to fall below the natural rate. Why? As the economy approaches full employment output, businesses are operating at close to full capacity, the labor market is tight meaning there is very little, if any excess supply of labor, and this starts to put upward pressure on resource prices (such as wages) which businesses may pass on to consumers in the form of higher prices. This explanation of inflation ties it directly to the labor market. Inflation therefore measures the rate of increase in the general price level. How is the general price level defined? The BLS enlists up to 30,000 American households to participate in the tracking and recording of consumer prices for a range of some eighty thousand goods and services. A certain number of these households keep detailed diaries of all their expenditures so that the BLS can construct a "market basket" of typical household purchases. BLS employees then track the prices of these typical goods every month and the rate of change in these price levels is used to calculate a weighted average rate of inflation. This means that not all price changes are of equal weight in the inflation calculation. Those goods on which typical households spend more income, count more than those goods on which the typical household spends less.

For example, in the six months ending September 2002, the BLS reported that the price of tobacco and smoking products increased 25.6%, the price of tuition, school fees and childcare increased by 7.4%, the price of personal computers decreased 16.6%, the price of fuel oil increased 17.7%, the price of meat, poultry fish and eggs decreased 2.1%, the price of household furnishings decreased 1.2%, the price of new vehicles decreased 0.3%, the price of sugar and sweets increased 3.5%, the price of take-out food increased 2.4% and prices of piped gas increased 2.6%. These are just a few examples of the many categories of goods whose prices are tracked on a monthly basis. The weighted average inflation rate for the six months ending September 2002 was 2.5%.

Conventional economic wisdom hypothesizes a connection between what is happening in product markets and therefore price levels and what is happening in labor markets and therefore unemployment. These two markets, product and labor, are interdependent. To put it in very simple terms, low unemployment, below the natural rate, is an indicator of a strong economy experiencing significant rates of economic growth. Consumer

demand for all types of products and services is high and this translates to a high demand for labor (which is derived from the demand for goods and services which it is used to produce). In this type of economy where businesses are competing for workers, wages of the scarcest and most sought after workers will start to rise causing prices to rise in these same industries. If this happens in many industries and occupations across the economic landscape, then an increase in the general price level will most likely follow. In economic theory this is known as a wage-price spiral. It indicates that labor market pressures can lead to inflationary pressures in product markets.

Naturally the reverse scenario applies equally well. Unemployment that is above the natural rate is a symptom of a weaker economy, an economy experiencing lower than average or lower than expected rates of economic growth. Consumer confidence and demand for all types of goods and services begins to decline, and with it the demand for labor. In this type of environment there is much less pressure to increase wages, and less pressure on price levels.

It seems therefore, that there may be reason to think that the unemployment rate in the labor market should be negatively or inversely correlated with the level of price inflation in product markets.

A New Zealand Economist by the name of A.W. Phillips actually verified this relationship (or something close to it) in 1958.¹ Using data from the United Kingdom covering the time period 1861-1957 he found a statistically significant inverse correlation between the unemployment rate and the rate of wage inflation. His research became known as the Phillips Curve. Wage inflation is strongly correlated with price inflation so the Phillips Curve analysis was easily extended to the relationship between unemployment and price inflation. As such, Central banks and Politicians could use this tradeoff when designing Monetary and Fiscal policy. If, for example, the goal of public policy were to reduce price inflation by a certain number of percentage points, the known tradeoff would be a certain increase in the unemployment rate, and vice versa.

The Phillips Curve relationship appeared quite robust until the 1970's when the U.S. experienced stagflation, which is a combination of high unemployment and high inflation. This was due to the 1973 Arab oil embargo against the U.S., which led to a dramatic and sudden increase in the cost of oil. This had many consequences, not the least of which was a big spike in the inflation rate. Oil is a necessary input for many businesses such as electricity generation, oil and gas refining and production and transportation and delivery of all kinds. Operating costs increased very substantially for many U.S. businesses. Prices of many goods and services increased at a rapid rate. The Federal Reserve Bank acted to counter the rising rate of inflation by implementing a tight monetary policy that saw interest rates rise. At the same time

there was a lot of uncertainty and consumer and business confidence plummeted. Consumer demand fell, business investment fell and quite naturally demand for labor fell, so unemployment increased. The U.S. economy moved into a severe recession. This was compounded by further oil shocks in 1979 with the Iranian Revolution and 1980 with the Iran-Iraq war.

In 1980 the price of a barrel of crude oil was \$67 (in today's prices) and a gallon of gas cost \$2.57 (in today's prices).²

So was the Phillips Curve analysis redundant? Did the 1970's experience with stagflation contradict the Phillips Curve, or did it suggest that the economy was now operating on a new Phillips Curve, above and to the right of the old, comprised of higher inflation and unemployment combinations?

The Phillips Curve also does not explain the eight years of economic expansion during the 1990's, when the U.S. economy experienced historically low unemployment and low price inflation, simultaneously! Is this another contradiction of the Phillips Curve, or does it suggest the Phillips Curve has shifted yet again, this time to the left, and now comprised of lower inflation and unemployment combinations?

Many economists now believe that the Phillips Curve characterization of the relationship between unemployment and price inflation is too simplistic to explain what is evidently a more complex interdependence. The Phillips Curve may still be useful in a short run context, but is not sufficient to explain the long run dynamics of the relationship, and shifts in the entire function over time. Much work has been done since 1958 to extend the analysis of A.W. Phillips to take account of such factors.^{3,4}

Despite the shortcomings of the original Phillips Curve, it is still considered a seminal work in Economics and a major contribution to our understanding of the relationship between unemployment and price inflation.

¹ A.W. Phillips, "The Relationship Between Unemployment and the Rate of Change of Money Wages in the United Kingdom, 1861-1957," *Economica* 25 (November 1958):283-299.

² J.W. Anderson, "The Surge in Oil Prices – Anatomy of a Non-Crisis" Resources for the Future, Spring 2000.

³ Milton Friedman, "The Role of Monetary Policy," *American Economic Review* 58 (March 1968):1-17.

⁴ Edmund S. Phelps, "Money Wage Dynamics and Labor Market Equilibrium," *Journal of Political Economy*, July-August 1967, pp678-711.

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