

Unemployment and Inflation: the Phillips Curve Relation¹ In-Class Problem²

Recall that the Phillips Curve relation suggests that as unemployment rises, inflation falls. The intuition behind this is that as unemployment rises workers buying power declines generally, leading to decreased aggregate demand. It may also suggest that as unemployment rises above a certain point, wages become less “sticky” and worker incomes may decline at an increasing rate; this is especially true if there are no automatic stabilizers (unemployment benefits, welfare). If automatic stabilizers do exist, then the curve may be declining at a decreasing rate, as in the example below.

Suppose that the Phillips Curve relation is parameterized by the following equation³:

$$\text{Inflation} = 16 - 6x \sqrt{\text{unemployment}} \quad (1)$$

- a) Provide a table showing the rate of inflation beginning with unemployment at 0% and continuing through unemployment at 20%**

% Unemployment	% Inflation
0	16.00
1	10.00
2	7.51
3	5.61
4	4.00
5	2.58
6	1.30
7	0.13
8	-0.97
9	-2.00
10	-2.97
11	-3.90
12	-4.78
13	-5.63
14	-6.45
15	-7.24
16	-8.00
17	-8.74
18	-9.46
19	-10.15
20	-10.83

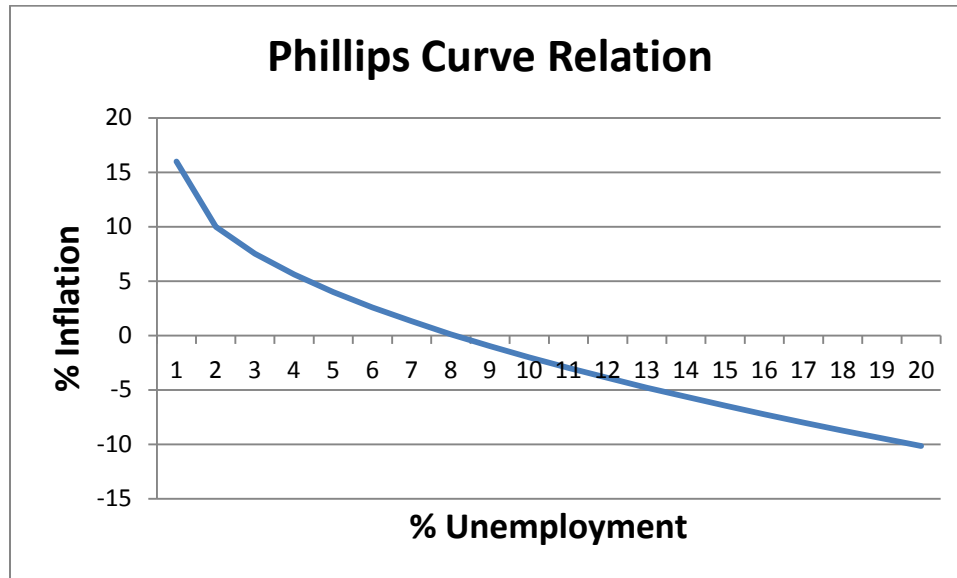
Notice that this does not yield a linear pattern due to the nature of the equation. The slope is declining at a decreasing rate, which might suggest that the automatic stabilizers in the economy minimize the effect on inflation (deflation) as unemployment rises above a given point. See the automatic stabilizer comments in the first paragraph above.

¹ This primer is intended to present an abbreviated discussion of the included economic concepts and is not intended to be a full or complete representation of them or the underlying economic foundations from which they are built.

² This problem set was developed by Rick Haskell (rick.haskell@utah.edu), Ph.D. Student, Department of Economics, College of Social and Behavioral Sciences, The University of Utah, Salt Lake City, Utah (2014).

³ This particular equation may not be indicative of an observed Phillips Curve for any particular economy, but is simply used for illustrative purposes.

b) Provide a Phillips Curve model of inflation and unemployment based on (1)



c) If this economy's Central Bank targets inflation at 2 ½%, what would be the accompanying rate of unemployment the bank may be trying to accommodate?

We can observe this from the table or calculate it with the equation:

$$\begin{aligned} \% \text{ Inflation} &= 16\% - 6 \times \sqrt{\text{unemployment rate}} \\ 2.5\% &= 16\% - 6 \times \sqrt{\text{unemployment rate}} \\ -13.5\% &= 6 \times \sqrt{\text{unemployment rate}} \\ -\frac{13.5\%}{6} &= \sqrt{\text{unemployment rate}} \\ 2.25\%^2 &= \text{unemployment rate} = 5.06\% \end{aligned}$$

Approximately 5%

d) What does this tell us about the NAIRU and the Natural Rate of Unemployment for this nation?

Recall that the NAIRU (non-accelerating inflation rate of unemployment) is the rate of unemployment that does not yield an increase in inflation, so it's the rate of unemployment where the change in prices is zero (0). We don't really see this in the Phillips Curve relation. Likewise, it's hard to see a "natural" unemployment rate in the Phillips Curve. What we can see, as noted in "c" above is the rate of unemployment at which inflation is at the targeted 2 ½%. Above that rate, inflation is higher than might be preferred and below that rate inflation is less than might be preferred, but this is very different from the NAIRU.