The Phillips Curve, the natural rate of unemployment and inflation

1. Discuss the following statements
   a) The Phillips curve implies that when unemployment is high, inflation is low, and vice versa. Therefore, we may experience either high inflation or high unemployment, but we will never experience both together.
   b) As long as we do not mind having high inflation, we can achieve as low a level of unemployment as we want. All we have to do is increase short-term interest rates, such as restrictionary monetary policy.
   c) In periods of deflation, workers resist reductions in their nominal wages even though prices are falling.

2. The natural rate of unemployment
   a) The Phillips curve is:

$$\boldsymbol{\pi_t = \pi_t^e + (m + z) - \alpha u_t}$$

   Rewrite this relation as a relation between the deviation of the unemployment rate from the natural rate, inflation and expected inflation.

   b) In the past, we derived the natural rate of unemployment. What condition on the price level and the expected price level was imposed in that derivation? How does it relate to the condition imposed in part (a)?
   c) How does the natural rate of unemployment vary with the mark-up?
   d) How does the natural unemployment rate vary with the catch-all term z?
   e) Identify two important sources of variation in the natural unemployment rate across countries and time.

3. Suppose that the Phillips curve is given by:

$$\boldsymbol{\pi_t = \pi_t^e + 0.1 - 2u_t}$$

   and expected inflation is given by:

$$\boldsymbol{\pi_t^e = (1 - \theta)\bar{\pi} + \theta\pi_t - 1}$$

   And suppose that θ is initially equal to zero, and $\bar{\pi}$ is given and does not change. It could be zero or any positive value. Suppose that the rate of unemployment is initially equal to the natural rate. In year t, the authorities decide to bring the unemployment rate down to 3% and hold it there forever.

   a) Determine the rate of inflation in periods t + 1, t + 2, t + 3, t + 4, t + 5. How does π compare with π_t^e?
   b) Do you believe the answer given in (a)? Why or why not? (Hint: Think about how people are more likely to form inflation expectations.)

   Now suppose that in year t + 6, u increases from 0 to 1. Suppose that the government is still determined to keep u at 3% for ever.

   c) Why might u increase in this way?
   d) What will the inflation rate be in years t + 6, t + 7 and t + 8?

e) What happens to inflation when θ = 1 and unemployment is kept below the natural unemployment rate?
f) What happens to inflation when θ = 1 and unemployment is kept at the natural unemployment rate?

4. Suppose that the Phillips curve is given by:

$$\pi_t - \pi_t^e = 0.1 - 2u_t$$

where:

$$\pi_t^e = \pi_t - 1$$

Suppose that inflation in year t - 1 is zero. In year t, the central bank decides to keep the unemployment rate at 4% forever

a) Compute the rate of inflation for years t, t + 1, t + 2 and t + 3.

Now suppose that half the workers have indexed labour contracts.

b) What is the new equation for the Phillips curve?
c) Based on your answer to part (b), recompute your answer to part (a).
d) What is the effect of wage indexation on the relation between p and u?

ADDITIONAL QUESTIONS:

Label each of the following statements is true, false or uncertain. Explain briefly.

False. The participation rate has increased over time.

1. The original Phillips curve is the antagonistic relation between unemployment and inflation first observed in the United Kingdom.
2. The original Phillips curve relation has proven to be very stable across countries and over time.
3. For some periods of history, inflation has been very persistent between adjacent years. In other periods of history, this year's inflation has been a poor predictor of next year's inflation.
4. Policymakersers can exploit the inflation–unemployment trade-off only temporarily.
5. Expected inflation always equals actual inflation.
6. In the late 1960s, economists Milton Friedman and Edmund Phelps said that policymakers could achieve as low an unemployment rate as they wanted.
7. If people assume that inflation will be the same as last year's inflation, the Phillips curve relation will be a relation between the change in the inflation rate and the unemployment rate.
8. The natural unemployment rate is constant over time within a country.
9. The natural rate of unemployment is the same in all countries.
10. Deflation means that the rate of inflation is negative.