Introductory Macroeconomics
Homework 6: The Phillips Curve and the AS-AD Model

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1. T/F. The original Phillips curve suggests a negative relationship between inflation and unemployment.
2. T/F. Rational expectations assume that people form expectations based on past inflation.
3. T/F. The long-run Phillips curve is vertical at the natural rate of unemployment.
4. T/F. When output is above its natural level, unemployment is below its natural rate.
5. T/F. Deviations from natural output are temporary because prices adjust and expectations are rational.
6. An imaginary economy has the following AD and (short run) AS curves.

$$\text{AD: } Y = 300 + 30\frac{M}{P}$$
$$\text{SRAS: } Y = \bar{Y} + 10(P - P^{\text{E}})$$

   Here the long run AS is $\bar{Y} = 500$ and money supply is $M = 400$.

   (a) What are the initial equilibrium values of the price level, P, the expected price level, P^{E} and output, Y?

   (b) An unanticipated increase raises the money supply to $M = 700$. Because the increase was unanticipated P^{E} remains at the same level of part (a). What are the equilibrium values of the price level, P, and output, Y?

   (c) The FED announces that the money supply will be increased to $M = 700$, which the public believes. Now what are the equilibrium values of the price level, P, the expected price level P^{E}, and output, Y?

   (d) Plot your answers with Y in the horizontal axis and P in the vertical axis.

7. Consider the following expression for the relationship between inflation and unemployment.

$$\pi_t = \pi_t^{\text{E}} + (m + z) - \alpha u_t$$

   Here assume $m = 0.15$, $z = 0$, and $\alpha = 1$.

   (a) Explain what each of π, π^{E}, m, z, α, and u represent.

   (b) What's the natural rate of unemployment?

   (c) If people always expect zero inflation, that is, $\pi_t^{\text{E}} = 0$, plot the Phillips curve with inflation in the vertical axis and unemployment in the horizontal axis.

   (d) Assume half the people can perfectly foresight inflation, while the other half still think it'll be zero. This means that on average, $\pi_t^{\text{E}} = \frac{1}{2}\pi_t$. Plot the resulting Phillips curve.

   (e) Now assume everyone can perfectly foresight what inflation will be so $\pi_t^{\text{E}} = \pi_t$. Plot the resulting curve. Hint: It'll be vertical.

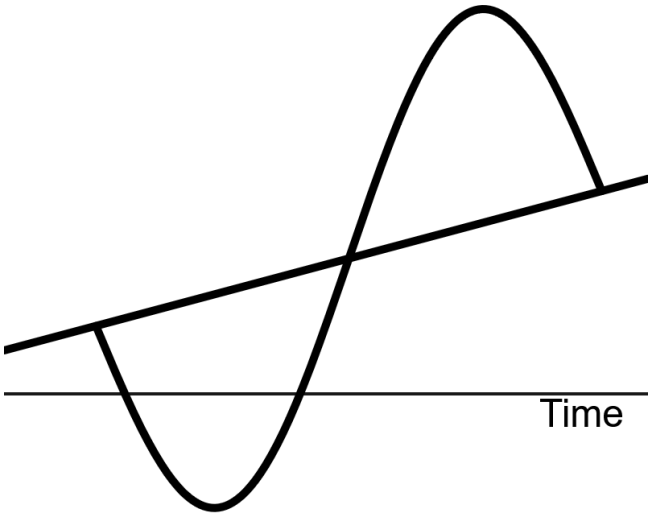
8. Consider the AS-AD model. Starting from the long run equilibrium, describe the transition to a new long run equilibrium when:

   (a) There's a positive demand shock.
   (b) There's a negative demand shock.
   (c) What could have generated these shocks? Give examples.

9. The central bank of a country announces a plan to reduce inflation. In your own words explain how the speed of this reduction (and the success of the plan) depends on:

   (a) The model of expectations: adaptive vs rational. Assuming the announcement is credible.
   (b) The credibility of the institution: credible vs non credible. Assuming expectations are rational.

10. Locate the peak, through, recession, recovery, and expansion phases of the business cycle in the figure.



11-15. Read this article about the Phillips curve and this article about consumer price indexes.

   (a) In your own words explain what the Phillips curve is.
   (b) In your own words explain what the personal consumption expenditure index is. How is this index different from the CPI?

   Download data on inflation and unemployment.

   (c) Make a scatterplot between inflation (on the vertical axis) and unemployment (on the horizontal axis) for data on the 1960s. Your plot should resemble Figure 2 of the first article.
   (d) Repeat the graph for the 1970's.
   (e) For each quarter, calculate the change of inflation from the previous quarter, this is, $\pi_t - \pi_{t-1}$. Repeat (d) but with the change of inflation in the vertical axis.

   Your final answer should include the short explanations about the Phillips curve and the price index, and 3 scatterplots in total. Please do not submit any intermediate step you took to create these graphs. To receive credit your scatterplots should be properly labeled and easy to understand.