Review questions for the midterm

1. Briefly summarize what you feel were the major points Milton Friedman made in his 1968 American Economic Association Presidential Address?

2. If workers know their nominal wage but are slow to perceive changes in general prices, explain how a surprise inflation would create an economic expansion. What happens to employment and the real wage? What happens as workers come to perceive that prices have risen? Use a simple labor demand, labor supply graph to illustrate your answers.

3. Kydland and Prescott demonstrated the importance of credibility and commitment in setting in which optimal policies are time inconsistent. Explain what is meant by saying an optimal policy is time inconsistent. Provide an example in which the best policy is time inconsistent.

4. Consider the following simple model. At the start of each period, the central bank announces its target for the inflation rate. The private sector then sets nominal wages based on their expectations of inflation. Finally, the central bank implements actual policy which determines actual inflation. Unemployment in this economy is given by

\[ u = u^n - a(\pi - \pi^e) + v, \]

where \( u \) is the unemployment rate, \( u^n \) is the natural rate of unemployment, \( \pi \) is inflation, \( \pi^e \) is expected inflation, and \( v \) is a random error term that captures any other factors affecting unemployment. Assume \( v \) has an expected value of zero. When it implements policy (i.e., picks \( \pi \)), the central bank tries to maximize an objective function given by

\[ L = \lambda u + \frac{1}{2} (\pi - \pi^*)^2, \]

where \( \lambda \) is a positive constant and \( \pi^* \) is the policy maker’s desired inflation rate.

(a) Given \( \pi^e \), what value of \( \pi \) minimizes the central bank’s loss function \( L \)?

(b) If private agents understand the decisions of the central bank, what inflation rate will they expect?

(c) What is the equilibrium rate of inflation? What is the equilibrium rate of unemployment? What is the value of \( L \) in this equilibrium?

(d) If the inflation rate you found in part (c) is not equal to \( \pi^* \), explain why? What factors cause \( \pi \) to differ from \( \pi^* \)?
5. Consider the same setup as in the previous question, but now suppose the central bank will also deliver the inflation rate it announced at the start of the period. What inflation rate should it announce? Is there a gain (measured by achieving a lower value of $L$) if the central bank can commit? (I.e., compare the value for $L$ obtained in part (d) of the previous question to the value of $L$ in the equilibrium when the central bank commits to its announced inflation rate.)

6. Consider the same model as question 3 so

$$u = u^n - a (\pi - \pi^e) + v,$$

but now the central bank wants to minimize

$$L = \frac{1}{2} \lambda (u - u^n + k)^2 + \frac{1}{2} (\pi - \pi^*)^2,$$

where $k > 0$ and so $u^n - k$ is the central bank’s goal for unemployment. Assume the central bank sets inflation after observing the shock $v$ but private agents form expectations before observing $v$ (assume their best guess is that it will be zero).

(a) Given $\pi^e$, what value of $\pi$ minimizes the central bank’s loss function $L$?

(b) If private agents understand the decisions of the central bank, what inflation rate will they expect?

(c) What is the equilibrium rate of inflation? What is the equilibrium rate of unemployment? What is the value of $L$ in this equilibrium?

(d) If the inflation rate you found in part (c) is not equal to $\pi^*$, explain why? What factors cause $\pi$ to differ from $\pi^*$?

7. How did Ken Rogoff propose solving the inflation bias that can arise under discretionary monetary policy? What trade off between costs and benefits would determine how conservative the central banker should be? Use your results from question 6 to answer this question.

8. Discuss three possible solutions to the inflation bias you found in question 6.

9. Do Blinder and Rudd in their 2012 paper agree that the high inflation of the 1970s was the result of the times of time inconsistency and credibility issues highlighted by Bernanke in his 2005 paper? If they disagree, what do Blinder and Rudd point to as the source(s) of the high inflation?

10. Consider the following simple new Keynesian model:

$$x_t = E_t x_{t+1} - \sigma (i_t - E_t \pi_{t+1} - r^n_t)$$

$$\pi_t = \beta E_t \pi_{t+1} + \kappa x_t + e_t$$
\[ i_t = \phi \pi_t \] (3)

where \( x \) is the output gap, \( \pi \) is inflation, \( i \) is the nominal interest rate, \( r^n \) and \( e \) are stochastic shocks, and \( \sigma, \beta, \kappa, \) and \( \phi \) are constants. Assume \( r^n \) and \( e \) are mean zero, serially uncorrelated random shocks so that there future expected values are zero. In this case, \( E_t x_{t+1} = E_t \pi_{t+1} = 0 \) as well.

(a) Use equations (1) and (3) (together with \( E_t x_{t+1} = E_t \pi_{t+1} = 0 \)) to obtain an aggregate demand relationship between the output gap and inflation. Draw a graph with \( x \) on the horizontal axis and \( \pi \) in the vertical axis and illustrate this aggregate demand relationship. What is its slope? Explain how the slope depends on \( \phi \). Draw the case of a large \( \phi \) and a small \( \phi \).

(b) Use equation (2) together with \( E_t x_{t+1} = E_t \pi_{t+1} = 0 \) to obtain a Phillips curve relating \( x \) and \( \pi \). Add this relationship to your graph. What is its slope? Suppose \( \kappa \) is larger in an economy with more flexible prices. How is the slope of the Phillips Curve affected?

(c) Using your graph, illustrate (i) the effects of a positive demand shock \( (r^n > 0) \) and (ii) the effects of a negative inflation shock \( (e < 0) \). For each shock, explain how the effects on \( x \) and \( \pi \) differ if \( \phi \) is large or small and if \( \kappa \) is large or small. (So for each shock, discuss four cases: \( \phi \) large, \( \kappa \) large; \( \phi \) large, \( \kappa \) small; \( \phi \) small \( \kappa \) large; \( \phi \) small \( \kappa \) small.)