Part A: Answer one (1) question from this part.

1. Friedman argued a surprise inflation would create a temporary economic expansion if workers know their nominal wage but are slow to perceive changes in general prices. Explain why in this situation 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.

2. Suppose inflation is given by

\[ \pi_t = \beta E_t \pi_{t+1} + \kappa x_t + \epsilon_t. \]

Under discretionary policy, the central bank takes \( E_t \pi_{t+1} \) as given; under a credible commitment policy, the central bank can influence \( E_t \pi_{t+1} \). Explain (no math required) why policy under commitment is able to achieve less inflation volatility and less output gap volatility in the face of inflation shocks than policy under discretion can achieve.

Part B: Answer one (1) question from this part.

1. Consider the following simple model. The private sector forms their expectations of inflation. Taking expectations as given, 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

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

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

(a) Show that the equilibrium rate of inflation is \( \pi^* + a\lambda > \pi^* \), and the equilibrium unemployment rate is \( u^n + v \). What is the value of \( W \) in this equilibrium?
(b) Explain why the central bank will have an incentive to increase inflation (relative to expectations) if the public expects any rate of inflation that is less than \( \pi^* + a\lambda \). Explain why the central bank will have an incentive to reduce inflation (relative to expectations) if the public expects any rate of inflation that is greater than \( \pi^* + a\lambda \).

(c) Explain why the inflation bias \( a\lambda \) depends on \( a \) and \( \lambda \).

(d) The inflation bias can be eliminated by appointing an extreme Rogoff conservative, one who puts no weight on unemployment \( (\lambda = 0) \). Would this be optimal in this model? Explain.

2. Consider the following simple new Keynesian model in which the demand and inflation shocks are assumed to be serially uncorrelated so that the expected future output gap is zero and expected future inflation is equal to the central bank’s inflation target of inflation \( \pi^T \):

\[
x_t = -\sigma \left( i_t - \pi^T - r^n_t \right) \tag{2}
\]

\[
\pi_t - \pi^T = \kappa x_t + e_t \tag{3}
\]

\[
i_t = \pi^T + \phi \left( \pi_t - \pi^T \right) \tag{4}
\]

where \( x_t \) is the output gap, \( \pi_t \) is inflation, \( i_t \) is the nominal interest rate, \( r^n_t \) and \( e_t \) are stochastic demand and inflation shocks respectively, \( \pi^T \) is the central bank’s inflation target and \( \sigma, \kappa, \phi \) are constants.

(a) What is the equation for the aggregate demand – monetary policy relationship? 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 why the slope is negative and explain how the slope depends on \( \phi \). Draw the case of a large \( \phi \) and a small \( \phi \).

(b) What is the equation for the Phillips curve? Add this relationship to your graph. What is it’s slope? If \( \kappa \) increases, how is the slope of the Phillips Curve affected?

(c) Using your graph, illustrate the effects of a negative inflation shock \( (e < 0) \). Explain why \( x \) and \( \pi \) move in the way shown in your graph. Explain how the effects on \( x \) and \( \pi \) differ if \( \phi \) is large or small.