Economics 202b Mock Exam Fall 2000

1. **Monetary Policy: Reputation:** Consider a policy maker in office forever, whose objective function is to maximize:

$$\sum_{t=0}^{\infty} \beta^t \left(y_t - a\frac{\pi_t^2}{2} \right)$$

where the parameter a is greater than zero and the discount factor β is between zero and one. Output y_t is determined by:

$$y_t = y^* + b(\pi_t - \pi_t^e)$$

with the Phillips curve parameter b greater than zero. Expected inflation is determined by the following rule:

- If in the past inflation π has always equaled the parameter π*, then $\pi_t^e = \pi^*$.
- Otherwise $\pi_t^e = b/a$.

The policy maker chooses the inflation rate this year, and will continue to choose the inflation rate each year in the future.

a. What is the model's equilibrium if at some time in the past π was not equal to π*?
b. Suppose that in the past π has always been equal to π*. If the monetary authority chooses to pick a level of inflation this year not equal to π*, what level does it choose? What will the value of its lifetime objective function be?
c. Suppose that in the past π has always been equal to π*, and the monetary policy authority continues forever to choose π=π*. What will the value of its lifetime objective function be?
d. Which is bigger? For what values of π* does the monetary authority choose to keep π=π*?

2. **Monetary Policy: Targeting:** Suppose that the economy has (log) linear IS and LM curves that are subject to disturbances:

IS: $y = c - ai + \varepsilon_{IS}$
LM: $m - p = hy - ki + \varepsilon_{LM}$

Where c, a, h, and k are fixed and positive coefficients. Suppose that prices are fixed and that policy makers wish to stabilize output, but that they cannot observe the disturbances to the IS or the LM curves.

a. Suppose that policy makers can and do control and fix the interest rate i. What is the variance of output y as a function of the parameters of the model and the variances of the shocks to the IS curve and the LM curve ε_{LM}?
b. Suppose that policy makers can and do control and fix the money stock m. What is the variance of output y as a function of the parameters of the model and the variances of the shocks to the IS and LM curves?
c. In the 1980s the LM curve became much more unstable—the variance of the shock to the LM curve became larger. Would this make it more likely that good stabilization policy would be based on control of interest rates, or that it would be based on control of the money stock?
d. Suppose that you aren't limited to a policy that fixes the money stock or the interest rate, but can adopt some intermediate policy. What policy does the best at minimizing the variance of output?

3. **Fiscal Policy: Sustainability of the Deficit:**

a. Suppose that the government runs a cash-flow deficit—spending (including debt service) minus taxes—that is equal to a constant share δ of national income Y. Suppose further that real national income Y grows at a rate of n+g. What can you say about the long-run evolution of the debt to national income ratio D/Y?
b. Suppose that the government runs a *primary* deficit (or surplus)—spending excluding debt service minus taxes—that is equal to a constant share α of national income Y(in the case of a surplus, α would be negative). The cash-flow deficit as a share of national income is then equal to α + r (D/Y), where r is the (constant) real interest rate. Suppose that real national income Y grows at a rate of n+g. What can you say now about the long-run evolution of the debt to national income ratio D/Y.

4. **Fiscal Policy: Tax Smoothing:**

Suppose that real national income is constant at a level Y, and the real interest rate is constant at a rate r. With probability 1-p in every year, government spending G = 0. With probability p in every year, government spending G = W because there is a war. The government starts out with debt equal to D_0.

a. Suppose that Barro's tax smoothing model holds—that the government sets the tax rate τ this year so that the expected change in the tax rate is zero. What do you expect the tax rate to be in year one?
b. Suppose that Barro's tax smoothing model holds, and as year one begins a war begins as well. What will the government set the year one tax rate to be?

c. Suppose that Barro's tax smoothing model holds, and as year one begins it is clear that peace will prevail. What will the government set the year one tax rate to be?

5. **International Financial Crises:**

Suppose that the government controlling the exchange rate wishes to maximize its objective function:

$$y - \frac{b\left(\varepsilon^2\right)}{2} - D(\varepsilon)$$

The objective function is thus increasing in output and decreasing in the square of the exchange rate change ε, and where $D(\varepsilon) = 0$ if the exchange rate change is zero and is equal to D* if the exchange rate change is not zero. Suppose output is given by:

$$y = y^* + \beta(\varepsilon - \varepsilon^e)$$

where ε^e is the market's expectation of the change in the exchange rate.

a. Suppose that $\varepsilon^e = 0$, and suppose that D* is zero. What value of the change in the exchange rate does the government choose in order to maximize its objective function? What then is the value of the objective function?

b. Suppose that $\varepsilon^e = 0$. How large does D* have to be before the best policy for the government is to keep the exchange rate fixed?

c. Would your answer as to the value of D* needed to make the government keep the exchange rate fixed be any different if market expectations of the exchange rate change were not $\varepsilon^e = 0$? Why or why not?