Problem Set No 2

Econ 14.05:
Intermediate Applied Macroeconomics

1. *Understanding the large country model:*

   Consider the simplified version of the large country model described by the following equations for the local economy:

$$m - p = y - hi, \tag{1}$$
$$y = -d(p - e - p^*) - bi, \tag{2}$$
$$p = \bar{p}, \tag{3}$$
$$i = i^*, \tag{4}$$
$$sdr + (1 - s)dr^* = 0, \tag{5}$$
$$e = g^* - g, \tag{6}$$
$$m = r - g - v, \tag{7}$$

   where the notation is the same as in Apendix A of Temin's book ("Lessons from the Great Depression"): $m, p, y,$ and i represent the money supply, price level, income, and interest rate respectively. The amount of gold reserves is given by r, g denotes the inverse of the price of gold, e is the nominal exchange rate, and v is the gold backing ratio (all the variables in logs). The variables with a * denote the analogous variable for the foreign country. h, d, and s are parameters, and $\bar{p}$ is a fixed number. A similar set of equations describes the behavior of the foreign country. The parameters are the same for both countries (interchanging the variables with and without the *).

   (a) Briefly describe the economic meaning of each equation.

   In the rest of the problem you are asked to work through the *algebra* of this simplified version of the Eichengreen and Sachs model. Observe that given that prices are fixed, the real exchange rate responds only to changes in the nominal exchange rate.

   (b) Plug equation (1) into equation (2) and show that the output levels that equilibrates the domestic goods and money markets are given by:

$$y = \frac{h}{h + b}\{d(g * -g + p^* - p) + \frac{b}{h}(m - p)\} \tag{8}$$

   Replace back into equation (1) to obtain that:

$$i = \frac{1}{(b + h)}\{d(g^* - g + p^* - p) - (m - p)\} \tag{9}$$

   Given the symmetry of the problem, you can safely assume that the same relations apply to the foreign country (interchanging the starred and unstarred variables).

   Using the equations derived in part b, and equations (4), (5), (6), and (7) analyze the effects on domestic and foreign income and interest rate of the following policies.

   (c) An unsterilized devaluation by the domestic country ($dg < 0$, $dv = 0$), assuming no reaction by the foreign economy ($dg^* = 0$, $dv^* = 0$).

(d) A simultaneous devaluation with unchanged monetary base ($dg = dg^* < 0$, $dm = dm^* = 0$).

You can guide your intuition using graphs, but in order to get *full credit* you are expected to *derive an expression* for the changes in income and interest rate.

(**Hints for parts (c) and (d)**):

(1) Use equations (5), (6), and (7) to determine the effect of the policies on the parameters of equations (8), and (9) for the domestic and foreign economy. The equality of interest rates in equilibrium will give you the additional relation you need.

(2) Think a little before starting with the algebra. When properly analyzed, the algebra should not take much more than ten steps in part (c) and much less than that in part (d).

2. *Application of large-country model. Write your answers in a few sentences.*

(a) Consider France in the 1920s. France adopted a low value of the franc, a low g in the model. (France's real exchange rate was not as low as its g because its domestic price level had risen. We ignore this complication, thinking of the "net" fall in g.) What was the effect of this policy decision in France and in other countries?

(b) Consider France in the 1930s. France continued to stay on gold after almost all other countries had devalued in 1933. What was the effect of this policy decision in France and in other countries?

(c) Explain how the same policy in France-holding on to the gold value of the franc-could have such different effects in two periods.

(d) Why was England condemned for its devaluation in 1931?

3. *Analysis of Labor Market Fluctuation with Friction.*

(a) Consider a world in which unions prevail, so that wages are set before market conditions are known. In other words, nominal wages are fixed. Demonstrate in a graph drawn in ($\frac{w}{p}$, L) space how this market could sustain involuntary unemployment. In this model, when there are fluctuations in the market for goods, does the labor market stay on the labor supply curve or the labor demand curve? Why?

(b) Now consider a world where unions play an insignificant role in the wage setting process. Suppose, in fact, that wages are perfectly flexible. Assume imperfect competition in the product market, so that $P = \bar{P}$ up to some y^{max}, at which point the producer will refuse to produce the product at $\bar{P}$. First, discuss what determines y^{max}. How does the producer decide it's value? Then show how this labor market looks in ($\frac{w}{p}$, L) space. In this model, do we stay on the labor supply curve or the labor demand curve? Explain.

(c) Which model best explains the rise in unemployment in the contraction that became the Great Depression? Based on this model, show the effect of a decrease in aggregate demand on the real wage, the amount of labor employed, and unemployment in each case. Use a graph/graphs and explain. How closely do the predictions of this model match what happened historically?

(d) How would you modify the model in (b) to explain continuing unemployment in the latter half of the 1930s?