Economics 101b: Fall 2005: Problem Set 8

(Due in lecture on November 16, 2003)

1. **Foreign Exchange Crises: Flexible-Price Model**: Start out with our consensus flexible-price model in "difference" form, the relevant parts of which are:

$$\Delta Y = \Delta C + \Delta I + \Delta G + \Delta X - \Delta IM$$
$$\Delta C = C_y(1-t)\Delta Y$$
$$\Delta I = \Delta I_0 - I_r \Delta r$$
$$\Delta X = X_\varepsilon \Delta \varepsilon$$
$$\Delta \varepsilon = \Delta \varepsilon_0 - \varepsilon_r \Delta r$$

and let's consider the effect of a collapse of confidence in the currency—a large sudden rise in the $\Delta\varepsilon_0$ parameter that governs long-term expectations of the price of foreign currency. Suppose that there are no effects on the supply side—$\Delta Y=0$—no effects on investor confidence—$\Delta I_0=0$—no effects on imports—$\Delta IM=0$—and that government spending is unchanged as well—$\Delta G=0$.

a. In the flexible price model, solve for the equilibrium changes in the exchange rate ε, in the interest rate r, in investment I, and in exports X as a result of the rise in $\Delta\varepsilon_0$.
b. Suppose that the cause of the crisis is that government spending is rising rapidly and that investors have no confidence that the budget will ever be balanced, and thus that the government bonds they own will ever be repaid without inflation. Thus there is a relationship between government spending and the change in expectations of the exchange rate: $\Delta\varepsilon_0 = \theta\Delta G$ for some value of the parameter θ. Now solve for the equilibrium changes in the exchange rate ε, in the interest rate r, in investment I, and in exports X as a result of the rise government spending G.

2. **Foreign Exchange Crises: Sticky-Price Model:** Now let's turn to the consensus sticky-price model, the relevant parts of which are:

$$\Delta Y = \Delta C + \Delta I + \Delta G + \Delta X - \Delta IM$$
$$\Delta C = C_y(1-t)\Delta Y$$
$$\Delta I = \Delta I_0 - I_r \Delta r - I_\varepsilon (\Delta \varepsilon)^2$$
$$\Delta X = X_\varepsilon \Delta \varepsilon$$
$$\Delta IM = -IM_y \Delta Y$$
$$\Delta \varepsilon = \Delta \varepsilon_0 - \varepsilon_r \Delta r$$

and once again consider the effect of a collapse of confidence in the currency—a large sudden rise in the $\Delta\varepsilon_0$ parameter that governs long-term expectations of the price of foreign currency—this time in the short run in which full employment is not guaranteed, and in which the real interest rate r is chosen by the central bank. And not the extra term in the investment equation: a large shift in the exchange rate causes massive bankruptcies, destabilizes the financial system, and causes investment I to collapse and output Y to fall.

a. Solve for the change in the exchange rate as a function of the change in the interest rate r, and then turn that around: if the change in the exchange rate is going to take on a certain value $\Delta\varepsilon$, what must the change in the interest rate Δr be?
b. Now let's view the central bank as choosing not the interest rate but the exchange rate. In this model, solve for the change in output ΔY as a function of the change in the exchange rate $\Delta\varepsilon$ (taking account of the fact that the central bank must choose the change in the interest rate Δr to make the change in the exchange rate equal to the chosen value.
c. What is the best that the central bank can do in the short run. Where should it choose to set the exchange rate and the interest rate (bearing in mind that they are linked) to make the effects of the crisis as small as possible?
d. Suppose that the IMF is on hand to help, and to give the central bank extra foreign exchange R that it can then spend to affect the exchange rate: $\Delta\varepsilon = \Delta\varepsilon_0 - \varepsilon_r\Delta r - \varepsilon_r\Delta R$. Solve for how the best the central bank can do is affected by the addition of more help from the IMF.