

Practice Questions

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1. Consider the continuous-time model of money demand that we have seen in class.

There are two countries, home and foreign.

The money demand function is

$$M^D = P \frac{Y}{i}$$

M^D is money demand, P is the price level, i is the nominal interest rate in domestic currency, pesos.

Output is constant and equal to

$$\bar{Y} = 1$$

(full employment level of output), the real interest rate is constant and equal to

$$\bar{r} = 5\%.$$

Suppose that money supply grows at a rate of 5% per year. Money supply in the foreign country is constant, so inflation in the foreign country is 0. The nominal interest rate in the foreign country is

$$i^* = 5\%.$$

(i) Write down the PPP equation (let E be the nominal exchange rate). Differentiate with respect to time and obtain a relation between the inflation in country home and the rate of depreciation. Argue that high inflation in country home has to be associated to a high rate of depreciation of the peso, why?

(ii) Write down the uncovered interest parity equation. Argue that a high interest rate $i > i^*$ has to be associated to a high rate of appreciation of the peso, why?

(iii) Suppose money supply is equal to $M_0 = 10$ at date 0. Show that in equilibrium the price level is $P_0 = 1$ at date 0 and then grows at the constant rate 5%.

(iv) Suppose that just an instant after date 0 the government announces that the growth rate of money supply will be 10% from then on. Show that the

equilibrium price level jumps from $P_0 = 1$ to $P = 2$. Why? What happens to the nominal interest rate? What happens to the nominal exchange rate?

(v) Supposed you borrowed 100 dollars at the interest rate i^* , one instant before date 0 how many pesos do you need to repay your debt one instant after date 0?

2. Consider the model of borrowing and lending that we have seen in class. There is a country with income (y_1, y_2) who can borrow at the given world interest rate $r = 10\%$.

Suppose the preferences of the consumers of the country are given by

$$\log c_1 + \beta \log c_2$$

where

$$\beta = \frac{1}{1 + 10\%}.$$

Suppose country 1 has an initial debt with the rest of the world, i.e.

$$b_0 = -100$$

this debt is due at the beginning of date 1 and the contractual interest rate is $r_0 = 10\%$.

The budget constraint for the country is

$$\begin{aligned} b + c_1 &= y_1 + (1 + r_0) b_0, \\ c_2 &= y_2 + (1 + r) b. \end{aligned}$$

Suppose:

$$y_1 = 110, y_2 = 210.$$

(i) Derive the optimal consumption at date 1.

(ii) Define the trade balance and the current account balance. Show that the country is running a trade surplus and the current account is zero.

(iii) Suppose the IMF is considering a debt-relief program. The program involves reducing the value of the initial debt, so that

$$b_0 = -90.$$

What are the effects of this policy on the trade balance and on the current account balance of the country? Show that the country now will run a current account *deficit*. Explain.

(iv) Argue, informally, that in a setting with multiple goods, the debt relief program will lead to a real *appreciation* of the domestic currency. Why?