

Economics 170

**International Macroeconomics**

Homework 9

Due April 21, 2008

**Temporary Money-Based Inflation Stabilization**

Consider a small open economy with a single traded good and free capital mobility. Suppose that the government is running a permanent real secondary deficit of 10 units of goods per period (in terms of the notation developed in class,  $DEF = 10$ ). Because the government has defaulted on its debt in the past, it cannot borrow, that is, the stock of assets of the government,  $B_t^g$ , cannot be negative. In period 1, the government's initial asset holdings are positive and equal to 150 units of goods, that is,  $B_0^g = 150$ . Suppose in period 1, the government decides to follow a monetary policy of keeping the money supply constant over time that is,  $M_t = M_0$ , for any period  $t$  in which the constant money supply policy is in place. Households demand money for transactions purposes. Their liquidity preference function is given by

$$L(\bar{C}, i_t) = 0.2 \bar{C} \left( \frac{1 + i_t}{i_t} \right),$$

where  $\bar{C} = 100$  denotes consumption and  $i_t$  denotes the domestic nominal interest rate. Assume that PPP and uncovered interest rate parity hold, that the world interest rate  $r^*$  is 10% per period, and that the foreign currency price of the single traded good is constant and equal to 1 (i.e.,  $P_t^* = 1$  for all  $t$ ).

1. Explain in words why in this economy the policy of keeping the money supply constant is unsustainable in the long run.
2. Assume that once the government is forced to abandon the policy of holding the money supply constant, it will switch to a policy of constant money growth at the rate  $\mu > 0$  and finance the entire fiscal deficit through seignorage revenue. Let period  $T - 1$  is the last period in which the money supply is constant, that is,  $M_{T-1} = M_0$ , and  $M_t/M_{t-1} = 1 + \mu$  for all  $t \geq T$ . Find seignorage income for any period  $t \geq T$  as a function of  $\mu$ . Then determine at what rate  $\mu$  will the government have to expand the domestic money supply to be able to finance the deficit?
3. Find the rate of inflation, the rate of depreciation of the domestic currency, the domestic nominal interest rate, and the level of real balances after the collapse of the constant money policy, that is for any period  $t \geq T$ .
4. Find seignorage revenue and the change in government assets in any period  $t \leq T - 1$ . Will the country experience a balance of payment crisis, that is, will the country loose an unusually large amount of reserves in  $T - 1$ , the last period the money supply is held constant?
5. Determine  $T$ . To do this, assume that the government keeps the money supply constant until it lost all its reserves, that is, at the end of the last period in which the money supply is constant, period  $T - 1$ , reserves are zero, that is,  $B_{T-1}^g = 0$ .

6. Find the time path of inflation. Give an intuitive explanation for the behavior of prices during the time that the money supply is held constant. [Hint: Recall that above we determined inflation for any period  $t \geq T$ . So all you need to find now is  $P_t/P_{t-1}$  for any  $2 \leq t < T$ . First find inflation in period  $T - 1$ . Thereafter, inflation in period  $T - 2$ , and so on until period 2.]
7. Compare the dynamics of the temporary money-based inflation stabilization program developed in this problem set with the dynamics triggered by a temporary exchange rate peg like the one studied in class.