

## **Problem Set #8: Output and the Exchange Rate**

### **1. The consumption function**

Consider a closed economy. In the economy investment,  $I$ , and government spending,  $G$ , are exogenous and do not change with output. Consumption is given by:

$$C = C_0 + MP_C(Y - T)$$

Where  $C_0 > 0$  and  $0 < MP_C < 1$ .

- (a) Derive the aggregate demand function, write down the equilibrium condition in the goods market, and solve for the equilibrium level of output.
- (b) The government decides to increase its spending by  $\Delta G$  ( $\Delta G > 0$ ). What is the effect of this policy on output? Does output increase by more, less, or by the same amount as the increase in  $G$ ? Explain your result.
- (c) The Treasury Secretary expressed his concern from such a policy as it is going to result in a deficit in the government budget. He suggested to increase taxes,  $T$ , by exactly the same amount as  $G$  in order to finance the additional spending (that is  $\Delta G = \Delta T$ ). What is the effect of this balanced policy on output? Does output increase by more, less, or by the same amount as the increase in  $G$ ? Explain your result.

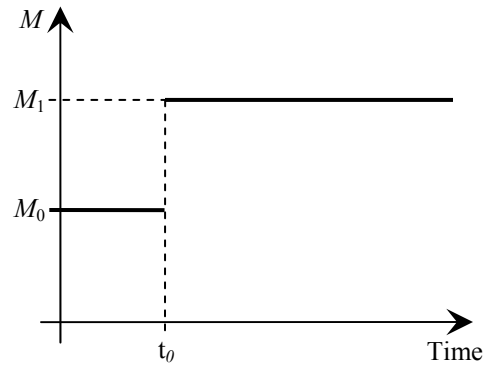
### **2. Permanent monetary policy and exchange rate overshooting**

This exercise is similar to question 4 in problem set 5; the difference is that now output is endogenous. You may turn to your answer to that question for help

Assume that initially the home and foreign economies are in their long run equilibrium with  $R = R^*$ . Suppose that unexpectedly the home money supply increases and is expected to remain at its higher level forever. Note that money does not constantly

grow over time ( $\mu = 0$ ), only its level changes permanently as depicted in the figure below.

### Time Path of Money Supply



- Analyze the new long run equilibrium. Specifically, what happens in the long run to  $P$ ,  $E$ ,  $E^e$ ,  $M/P$ ,  $q$ ,  $Y$ , and  $R$ ? In a diagram for the asset markets (i.e. the money market and the interest parity condition) and a diagram for the goods market (the Keynesian cross), identify the long run interest rate, exchange rate, real money balances, and output.
- Using the money market and the interest parity diagrams and taking output as given, analyze the on-impact effects to  $M/P$ ,  $R$ , and  $E$ . Show how these changes are reflected in the  $AA-DD$  diagram.
- Given your answer to (b), what happens to the real exchange rate,  $q$ , on impact? Use the Keynesian cross to analyze the effect on  $Y$ . Show how these changes are reflected in the  $AA-DD$  diagram.
- Given your answer to (c), that is after allowing movement in  $Y$ , go back to the asset market and show that on impact the exchange rate does not *necessarily* overshoot its long run level. Specifically show that if money demand does not react much to output, then the overshooting result remains<sup>1</sup>. Can the interest rate increase on impact?
- Complete the analysis for the transition period assuming the exchange rate overshoots. Draw the time path of  $P$ ,  $M/P$ ,  $R$ ,  $Y$ ,  $E$ , and  $q$ .

<sup>1</sup> Given this result, overshooting becomes an empirical question: is money demand responsive enough (to output) that overshooting does not take place. Empirically, researchers have found that money demand does not react much to fluctuations in output, which makes exchange rate overshooting more than just a theoretical possibility.