

PROBLEM SET FIVE

DUE 23 APRIL

You will legibly write both your full name and section on your completed assignment.

Problem 1

Consider an imaginary country where agents form expectations about the future when making their economic decisions. To simplify we will assume that there are only two periods, today and the tomorrow. Assuming that the economy is closed and that there is no inflation, current or expected, the behavioral equations for this economy are given by:

$$\text{Consumption: } C = C_0 + \frac{1}{2}(Y - T) + \frac{1}{12} \frac{Y' - T'}{r'}$$

$$\text{Investment: } I = I_0 + \frac{1}{10} \frac{Y}{r} + \frac{1}{40} \frac{Y'}{r'}$$

$$\text{Government Expenditure: } G = 50, G' = 80$$

$$\text{Taxes: } T = T' = 80$$

$$\text{Real Money Demand: } \frac{1}{10} \frac{Y}{r}$$

$$\text{Autonomous Private Spending: } C_0 + I_0 = 20$$

Where r is the real interest rate, that is equal to the nominal rate i under our assumption of no inflation. Variables without primes refer to current values, and variables with primes refer to next period values. Note that since there are only two periods, when making decisions tomorrow there will be only current variables (since from the point of view of tomorrow there is no “next period”).

a) Assuming the price level is 1 (i.e. $P = P' = 1$), and $M = M' = 40$ determine the equilibrium of this economy, i.e. Y , r , Y' , and r' (Hint: you need to solve recursively, first for tomorrow, and then for today).

b) Due to the presence of a budget surplus, Congress is considering a reduction of taxes to $T = T' = 40$. How would this affect the equilibrium outcome if the Central Bank remains passive and does not change the money supply?

c) More realistically, let's imagine that the Central Bank is concerned that the economy is working at full capacity (i.e. unemployment is at the natural level) and it will respond to the tax reduction with a contractionary monetary policy that will leave equilibrium output for both periods at their original levels (those found in point a), thus preventing any inflationary pressures (and making our assumption of no inflation more palatable). What is the equilibrium in this case?

d) How do you think the stock market will react to the announcement of a tax reduction in both cases b) and c). How would you relate the issues raised by this problem to the present situation of the US economy?

Problem 2

Let's imagine a country M (which can be Mexico) that has as currency the peso which initially is floating. A three year bond that pays only at maturity in M pays a nominal interest rate of 7%, while a similar bond in the US pays a nominal interest rate of 5%. Inflation in the US is expected to average 3% over the next three years, while in M it is expected to be 10% this year, and to fall to 5% for the following two years.

a) If the nominal exchange rate is initially at a level of 10 pesos for each dollar, what is going to be the nominal exchange rate three years from now (Hint: assume that interest parity holds).

b) What is the expected appreciation/depreciation of the real exchange rate for M (you can take the real exchange rate to be initially 1)? Comparing with the result of a) what can you say about a country's trade balance evolution by looking at its nominal exchange rate?

c) Suppose now that M fixes its exchange rate with the US dollar at a rate of 10 pesos for each dollar. If the price of the Mexican bond was initially 100\$, what will be the new price after the announcement of the pegging of the exchange rate if it is believed that the government will be able to sustain it for the next three years? (Hint: you must use the interest parity relation again)

d) Suppose now that financial markets suddenly believe that the peso could be devalued by 20% in the next year, and that this will happen with a 50% probability (i.e. with a 50% probability there will be no devaluation). By how much must the Central Bank of M increase the interest rate to defend the peso?