

Problem Set 6 – Fixed Exchange Rates in the Long Run

Questions

6.1 Consider the central bank balance sheet for the country of Patria. Patria currently has 2,500 million euros in its money supply, 1,800 million of which is backed by domestic government bonds. Assume that Patria maintains a fixed exchange rate and the foreign interest rate remains unchanged.

- (a) Assuming that there are no private banks:
 - (a1) Show Patria's central bank balance sheet.
 - (a2) Calculate the backing ratio.
- (b) Suppose now that the central bank sells 300 million euros in government bonds.
 - (b1) How would this transaction affect the central bank balance sheet?
 - (b2) Calculate the new backing ratio.
 - (b3) Does this change affect Patria's money supply? Explain why or why not.
- (c) Now suppose that there is an economic recession in Patria.
 - (c1) Explain theoretically what would happen to Patria's money demand and central bank balance sheet.
 - (c2) Assuming that real money balances change by 200 million euros, what would happen to domestic credit and to the foreign exchange reserves?
 - (c3) Departing from (c2), is the peg at stake? Calculate the new backing ratio.

6.2 Suppose a country has \$2,000 million in money supply and \$1,200 million in reserves.

- (a) Illustrate the central bank balance sheet diagram. Calculate the backing ratio.
- (b) Because of a recent banking crisis, the central bank extends \$800 billion in credit to deal with liquidity problems in the banking system. Illustrate this situation a new central bank balance sheet diagram. Is the country still able to maintain a fixed exchange rate? Explain how you know.
- (c) Suppose that rather than the previous scenario described, the central bank extends \$800 billion in credit to prevent bank insolvency. Illustrate this situation on your graph. Is the country able to maintain a fixed exchange rate?
- (d) In practice, widespread bank insolvency indicates longer-term problems in the banking sector. Suppose the central bank repeats the operation conducted in (c) for another year. Will the central bank be able to defend the exchange rate peg in this case? Explain why or why not.

6.3 Consider an oil exporter economy, where the domestic currency (peso) is initially pegged to the dollar. Assume that: the PPP and the Fisher effect hold instantaneously; the foreign price level is constant at $P^* = 1$; the money demand is given by $m^D = Y/4i$; the real interest rate is 5% and the central bank balance sheet is initially as follows: $M = eB_C^* + B_C = 20 + 60$ pesos.

- (a) Initially, oil prices are peaking up in international markets, and full employment output stands at $Y = 160$.
 - (a1) Compute the money demand and the price level.
 - (a2) Represent the money market equilibrium.
 - (a3) What will be the value of the peg?
- (b) Assume now that oil prices increased, driving full employment output in this economy to a record high of $Y = 200$. Surfing on prosperity, the government in this economy decided to borrow 20 pesos from the central bank to finance a development plan. Would this operation threat the fixed exchange rate and price stability? Explain why.
- (c) Examine the policy options for the central bank if oil prices suddenly declined, driving full employment GDP to $Y = 130$. Would the fixed exchange rate regime be at stake?

6.4 Consider an economy where the currency (peso) is initially pegged to the dollar at $e=1$. Assume that the foreign price level is constant ($P^* = 1$), PPP holds, prices are fully flexible and full employment is always met ($Y_f = 432$). The real interest rate is the same at home and abroad and equals 5%. In this economy the money demand is given by $m^D = Y/20i$.

- (a) Assume first that agents expect the money supply to remain constant at $M=432$. Describe the money market equilibrium, assuming that the peg is credible.
- (b) Consider now the case where, unexpectedly, the central bank abandons the fixed exchange rate regime, and the nominal money supply starts increasing at 20% per year. What would happen to the interest rate, real money demand and the price level at the time of the surprise?
- (c) Instead of assuming that agents are taken by surprise, consider a case where agents have rational expectations and perfect foresight. At moment zero, the central bank balance sheet is as follows: $M = eB_C^* + B_C = 382 + 50$. In the years that follow, the domestic credit component expands 20% each year. Assuming that the domestic credit expansion is fully sterilized by a foreign market intervention:
 - (c1) Describe the central bank balance sheet at $t=2$ and compute the backing ratio.
 - (c2) Would it make sense for economic agents to launch a speculative attack at $t=2$?
 - (c3) Assuming that there was no attack at $t=2$, describe the central bank balance sheet at $t=3$.
 - (c4) Would it make sense for economic agents to launch a speculative attack at $t=3$?
 - (c5) Assuming that there was no attack at $t=3$, describe the central bank balance sheet at $t=4$.
 - (c6) Would it make sense for economic agents to launch a speculative attack at $t=4$?

6.5 Consider an economy with flexible prices, with a real money demand given by $m^D = \frac{Y}{4i}$, and where i is the nominal interest rate. The foreign price level is $P^* = 1$, the real interest rate is 5%, both the Fisher principle and PPP hold in each moment in time, and the economy is always at full employment, with $Y^f = 225$. Initially, the money supply is growing at $\mu = 20\%$ and the exchange rate is floating.

- (a) Find out the money market equilibrium, quantifying:
 - (a1) the nominal interest rate
 - (a2) the real money demand
 - (a3) the exchange rate depreciation rate
 - (a4) the velocity of money
 - (a5) describe the money market equilibrium in a graph.
- (b) Now, assume that once the money supply reaches $M = 450$, with $B_{CB} = 312.5$, the central bank decides to **unexpectedly** fix the exchange rate at: $e = 2$.
 - (b1) Find the new interest rate.
 - (b2) Quantify the new real money demand and describe graphically the adjustment in the money market.
 - (b3) Draw the new central bank balance sheet. Explain the mechanism.
- (c) Departing from b), suppose that the central bank starts expanding the domestic credit (B_{CB}) at a rate of 20% per year to finance reoccurring government deficits, while keeping the peg at $e = 2$. Assume that agents are rational and have perfect foresight.
 - (c1) Will the fix exchange rate be sustainable? Find the future real money demand.
 - (c2) Describe what happens to the central bank's balance sheet in $t=1$. How do you label this policy?
 - (c3) What will happen to the central bank's balance sheet at $t=2$? Explain.

6.6 The assets of a central bank in a given economy with flexible prices have been constant over time and equal to: $eB_C^* = 1340$ and $B_C = 160$ pesos. Further assume that the money multiplier is equal to one and that the real money demand is given by $m^D = Y/10i$, where $Y=150$ is output (constant) and i is the nominal interest rate. The real interest rate is 5%. In this economy, PPP and the Fisher principle hold each moment in time, and the foreign price level is $P^* = 1$.

- (a) Describe in a graph the money market equilibrium. Find out the equilibrium level of prices and of the exchange rate.
- (b) Suppose that there was a fall in output to $Y=125$.
 - (b1) Find the price level.
 - (b2) If the central bank wanted to keep prices unchanged, what should it do?
 - (b3) Departing from (b2), explain why many central banks in the world have been building up large stocks of foreign reserves.
- (c) Returning to the initial scenario, suppose now that the central was forced to expand domestic credit by 25% each year, maintaining at the same time a fixed exchange rate. Find out the timing of the speculative attack, and the amount of foreign reserves lost in that attack.