International Macroeconomics

Miguel Lebre de Freitas Pedro Sousa Coelho Tomás Falua Duarte

Problem Set 2 – Two-Period Model Without Investment Questions

- 2.1 Consider a two-period endowment economy, where the preferences of the representative consumer are given by $U = \ln C_1 + 0.8 \ln C_2$. In this economy, current and future GDP are $Q_1 = 1125$ and $Q_2 = 1350$.
 - (a) Assuming that the economy is closed to capital flows:
 - (a1) Find the optimal consumption path.
 - (a2) Find out the equilibrium interest rate.
 - (a3) Comparing r with the rate of time preference, is this an expected result?
 - (b) Suppose that the economy opens to international flows of capital and that the world interest rate is $r^* = 25\%$.
 - (b1) Find out the optimal consumption path.
 - (b2) Find the trade balance for periods 1 and 2.
 - (b3) Find the net international investment position for periods 1 and 2.
 - (b4) Find the GNI and the current account for periods 1 and 2.
 - (b5) Departing from a), describe the adjustment in a graph.
 - (c) Departing from b), suppose that the interest rate falls to $r^* = 0\%$.
 - (c1) Find the new optimal consumption path.
 - (c2) Find the new values for the TB, NIIP and CA.
 - (c3) In which of the three cases (a, b and c) is the economy better off?
- 2.2 Consider a two-period small economy open to international capital flows, where the expected production pattern is $Q_1 = 110$ and $Q_2 = 110$. Also assume that the lifetime

utility function of the representative consumer is $U = \ln C_1 + \frac{\ln C_2}{11}$.

- (a) Considering that $r^* = 10\%$, find:
 - (a1) The optimal consumption pattern.
 - (a2) The trade balance and the current account for periods 1 and 2.
 - (a3) Does the openness to trade make a difference? Why?
- (b) For each of the following scenarios, assuming the same world interest rate, compute the optimal consumption pattern, trade balance and current account:

(b1) $Q_1 = 68 \mid Q_2 = 110$ (b2) $Q_1 = 110 \mid Q_2 = 68$

- (b3) $Q_1 = 68 \mid Q_2 = 68$

- **2.3** Consider a world with only two economies: a large economy (L) and the rest of the world (ROW). The endowments of the representative agents in L and ROW are the following: $Q_1^L = 400$; $Q_1^{ROW} = 800$; $Q_2^L = 350$ and $Q_2^{ROW} = 930$. Furthermore, consider that the preferences of the representative consumer are given by $U = \ln C_1 + \frac{1}{1+0.5} \ln C_2$.
 - (a) Derive the current account functions for both L and ROW.
 - (b) Find the world interest rate.
 - (c) Compute the current account for both L and ROW in the first period.
 - (d) Without calculations: what would be the implication of an anticipated output expansion in the large economy?
- **2.4** Consider an infinite horizon small open economy, where output is constant and equal to Q = 100. The instantaneous utility function of the representative consumer is equal to $u_t = \ln C_t$. Further assume that there are no initial external assets or liabilities, and that the world interest rate is equal to the rate of time preference, $r^* = \rho = 5\%$.
 - (a) Assuming that there are no shocks:
 - (a1) Find out the lifetime wealth.
 - (a2) What is the optimal consumption in each period?
 - (b) Suppose now that $Q_1 = 79$, with all other output values remaining equal:
 - (b1) What is the impact on the optimal consumption path?
 - (b2) Are there any changes in the trade balance?
 - (b3) Compute the values for the NIIP, NFIA and CA.
- **2.5** Consider a small economy, where the preferences are given by $U = \ln C_1 + 0.8 \ln C_2$. In this economy, the expected production pattern is $Q_1 = 150$ and $Q_2 = 150$.
 - (a) Assuming that the economy is closed to capital flows:
 - (a1) Find the optimal consumption path.
 - (a2) Find out the equilibrium interest rate.
 - (b) Suppose that the economy opens to international flows of capital and that the world interest rate is $r^* = 25\%$.
 - (b1) Find the optimal consumption pattern.
 - (b2) Find the trade balance for periods 1 and 2.
 - (b3) Find the current account for periods 1 and 2.
 - (c) Departing from (b), suppose that current output falls to $Q_1=60$.
 - (c1) Find the new optimal consumption pattern.
 - (c2) Find the private savings for both periods.
 - (c3) Find the trade balance, current account and GNI for both periods.
 - (c4) Represent graphically, departing from (b).
 - (c5) What would be the impact of this shock if the economy was closed?

- **2.6** Consider a one-good economy where NIIP is initially zero. The representative consumer has a lifetime utility function given by: $U = Ln(C_1) + \frac{Ln(C_2)}{1+0.5}$. In both periods there is a pre-determined amount of output, $Q_1 = 200$ and $Q_2 = 180$.
 - (a) Assuming that this economy is closed to capital flows:
 - (a1) Compute the optimal consumption path.
 - (a2) Compute the autarky interest rate.
 - (a3) Represent graphically.
 - (b) Suppose now that the economy opens to international flows of capital and that the world interest rate is $r^* = 20\%$. Find out:
 - (b1) The lifetime wealth.
 - (b2) The optimal consumption path.
 - (b3) the trade balance (for periods 1 and 2).
 - (b4) The current account (for periods 1 and 2).
 - (b5) The gross national income (for periods 1 and 2).
 - (b6) Will the economy be better off than when it was closed?
 - (b7) Represent graphically the adjustment, departing from (a).
 - (c) Assume now that the world is composed by two economies: the Home Economy, which was analysed in questions a) and b), and the Foreign Economy, which has the following endowments: $Q_1^F = 150$; $Q_2^F = 100$. Representative agents in both economies have the same preferences. Find, for period 1:
 - (c1) The current account functions for both economies.
 - (c2) The world interest rate.
 - (c3) The current account for both economies.