Solution to the last part of seminar 1

ECON 4330

6

We assume zero depreciation. Home country's investment demand is derived from the demand for date 2 capital K_2. The optimal capital is pinned down by the equalization of return on domestic real capital and the golbal interest rate:

$$F_K(N, K_2) = r$$

and investment demand is (assuming zero depreciation):

$$I_1 = K_2 - K_1$$

Define domestic savings as:

$$S_1 = Y_1 - c_1$$

The current account is now given by $CA_1 = S_1 - I_1$

Effect of r on I_1: If the interest rate increases, investment demand goes down. Marginal productivity of capital is now initialy lower than the world interest rate. The country will therefore save less in domestic capital and more in the international financial market, until equalization of rate of return is restored.

Effect of r on S_1: This is the same as the effect on the current account in the endowment economy.

7

The capital stock in period 2 will be the same in both countries because they both face the same production technology and the same interest rate. The second order conditions for optimal choice of the two countries will yield:

$$F'_K(N, K_2) = r = F'_K(N, K_2^*)$$

which implies equal capital stocks, $K_2 = K_2^*$.

Suppose, first, that $K_1 = K_1^*$. This means that the two countries are equal, and the only equilibrium is that $CA_1 = CA_1^* = 0$. So what happens when $K_1 > K_1^*$? An increase in K_1 will increase the RHS of the budget constraint of the home country:

$$C_1 + \frac{C_2}{1+r} = K_1 + Y_1 + \frac{Y_2 - rK_2}{1+r}$$

because $Y_1 + K_1 = F(K_1) + K_1$ goes up. The consumer is richer and will therefore increase consumption in both periods.

The current account is given by

$$
\begin{aligned}
CA_1 &= S_1 - I_1 \\
&= Y_1 - C_1 + K_1 - K_2 \\
&= Y_1 + K_1 - C_1 - K_2
\end{aligned}
$$

since K_2 is unchanged and C_1 increases less than the increase in $Y_1 + K_1$ the current account improves. Hence the CA schedule shifts to the right, and we can use the graph to determine the equilibrium. Home (Foreign) country will run a current account surplus (deficit) in period 1 and vice versa in period 2.

[(3)] Note that this implies that the world market interest rate is higher than the Home autarky interest rate.

$$
\begin{aligned}
CA_1(r_A) &= 0 \\
S_1(r_A) &= I(r_A)
\end{aligned}
$$

In the graph we find r_A as the intersection between the current account schedule and the vertical axis. Since marginal product of capital is always equal to the interest rate, the period 2 capital stock in the Home country will be higher in autarky than in an open economy.

8

Marginal productivity of labor (wages) are increasing in the capital stock. Nothing happens to wages in period 1, since the initial capital stock is determined from the past. But period 2 wages in the home country will be lower than under autarky, since some of the savings that in autarky went to capital investment are now invested in the international financial market.

Part 2: Discussion

This is supposed to be a discussion part, so there is not much I can do in terms of giving a solution, but I'll point to some of the things I had in mind and you can discuss among yourselves.

- It's important here to separate what we can discuss within our model and what our model is useless for. Many of the arguments in the article are outside out model like the terms of trade and the oil price. Perhaps we can say more about them later in the course.

- What out model can explain is why India had a deficit in the first place and to some degree why it is turning into a surplus. India has been growing very fast for many years. In our model this has two effects. First, from the pure endowment example we saw that when a country is growing fast (Y_2 high) they would like to borrow now, which implies a current account deficit. The other reason is that the capital stock in India has been low. This, in addition to the high growth rate, means that investing in India has been very profitable. As the example where $K_1^* < K_1$, interpreting India as the country with low capital stock, investing there is very profitable and capital will flow to India.

- The recent move towards a surplus could has something to do with the relative slowdown of growth in recent years. India had 10.3% growth in 2010 according to the World Bank, and the following 4 years it was between 5% and 7%.