PART 3: LONG QUESTION (50 points). **(A) Goods market equilibrium**

1 (2 points). The demand for domestic goods is equal to

$$ZZ^i = C + I + G + X - \varepsilon Q^i$$

where i is either A or B. The only difference between the economies is the expression for imports. Plugging in we find

$$ZZ^A = c_0 - c_1 T + d_0 - d_2 i + G + x_0 Y^* + x_1 \varepsilon + \beta \varepsilon^2 + (c_1 + d_1 - \varepsilon \alpha) Y$$

and

$$ZZ^B = c_0 - c_1 T + d_0 - d_2 i + G + x_0 Y^* + x_1 \varepsilon + \beta \varepsilon^2 - \varepsilon \phi c_0 + \varepsilon \phi c_1 T + (c_1 + d_1 - \varepsilon \phi c_1) Y$$

2 (10 points). The slope for ZZ^A is equal to $c_1 + d_1 - \varepsilon\alpha$, while for ZZ^B the slope is $c_1 + d_1 - \varepsilon\phi c_1$. Using the assumption that $\alpha > \phi c_1$ then demand in economy B is steeper. Regarding the intercept, the difference between the two lines is given by $\varepsilon\phi(c_1 T - c_0)$ which can be positive, negative, or zero. If $c_1 T = c_0$ then both lines have the same intercept. We will assume this is the case. If you made a different assumption you got full credit anyway, as long as you were consistent with what you assumed.

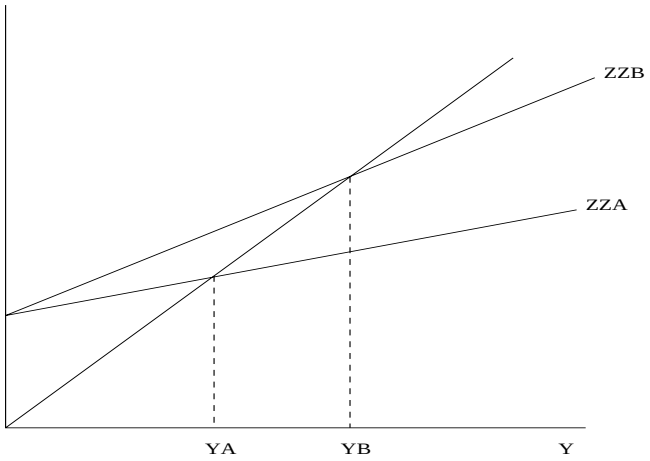
ZZ^B is steeper because the marginal propensity to import is larger in Economy A, which means that a larger share of any increase in autonomous spending will fall on goods produced abroad.

3 (2 points). Using the definition of net exports,

$$NX^A = x_0 Y^* + x_1 \varepsilon - \varepsilon \alpha Y + \beta \varepsilon^2$$

and

$$NX^B = x_0 Y^* + x_1 \varepsilon - \varepsilon \phi c_0 - \varepsilon \phi c_1 Y + \varepsilon \phi c_1 T + \beta \varepsilon^2$$



4 (10 points). In order to determine the trade balance we need line DD. If Economy A is in balanced trade at equilibrium, that means that lines DD and ZZ^A inersect at the 45 degrees line as the figure shows. Both economies share the DD line which means that the intersection of ZZ^B with DD happens at a higher level of income. This implies that the net export line for Economy B is flatter than the net exports line for economy A. The assumption about the intercepts of ZZ^A and ZZ^B is important to determine the sign of NX^B when country A has $NX^A = 0$. In the graph, B has a trade surplus, but if the intercept of ZZ^B is much lower than the intercept of ZZ^A, then ZZ^B will intersect DD at a lower Y than ZZ^A, therefore NX^B would be negative. However NX^B will still be flatter than ZZ^A (you can work out the different cases).

Note: You could also find the answer using algebra. Whatever assumption you made your graph for net exports should be consistent with your graph for ZZ and DD. (In many cases, it was not)

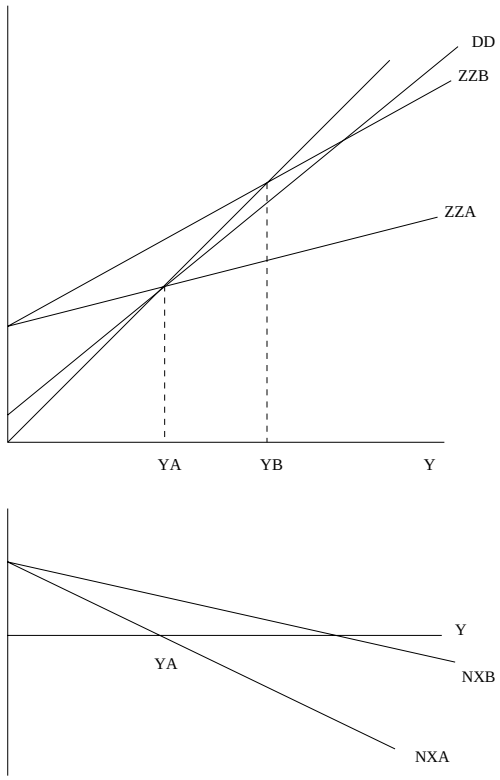
5 (2 points). In equilibrium output is equal to demand, so

$$Y^A = \frac{1}{c_1 + d_1 - \varepsilon\alpha} F$$

and

$$Y^B = \frac{1}{c_1 + d_1 - \varepsilon\phi c_1} H$$

where



$$F = c_0 - c_1 T + d_0 - d_2 i + G + x_0 Y^* + x_1 \varepsilon + \beta \varepsilon^2$$

and

$$H = c_0 - c_1 T + d_0 - d_2 i + G + x_0 Y^* + x_1 \varepsilon + \beta \varepsilon^2 - \varepsilon \phi c_0 + \varepsilon \phi c_1 T$$

6 (10 points). The first part is tricky. Given that a change in government spending affects the DD line, and this is the same for both economies, the vertical shift is identical for both economies. By looking at the expressions in part 5 we find out that Economy B has a larger multiplier, since $\alpha > \phi * c_1$. Any increase in autonomous spending will have a larger effect on output in Economy B, since a larger fraction of that increase will fall on domestic goods, rather than imports.

Finally, given that an increase in G increases output, and imports depend on negatively output (DIRECTLY in Economy A, INDIRECTLY in Economy B), net exports would decrease in both economies (Note that the question did not ask in which country was the decrease larger)"

(B) Financial markets

1. The three equations we need are the IS, the LM, and the interest parity condition:

$$IS: \; Y = C(Y - T) + I(i, Y) + G + X(Y^*, \varepsilon) - \varepsilon Q(Y, \varepsilon)$$

$$LM: \; \frac{M}{P} = YL(i)$$

$$IPC: \; i_t \simeq i_t^* + \frac{E_{t+1}^e - E_t}{E_t}$$

Note that demand for money depends on the nominal interest rate. If you assume that inflation expectations are zero, $i = r$, but not in general.

2. If Y^* increases, then net exports are going to increase too. This is equivalent to an expansionary policy in the domestic country. The IS curve shifts to the right, from IS to IS'. Output is higher, and interest rate increases too (from i_0 to i_1 in the figure). Now that the domestic interest rate is higher than the international, we need an appreciation of the Dollar to make investors indifferent between domestic and foreign bonds, and that is why the new exchange rate is E_1 instead of E_0. Domestic interest rate goes up, since demand for money increases with the increase in income, but money supply is given.