Solutions to Problem Set #7

November 22,1995

I. Goods market equilibrium in an open economy

(a) The demand for domestic goods in each economy is given by:

ZZ^A = C(Y-T) + I(Y, r) + G + X(Y*,) - Q(Y, $\in$)
ZZ^B = C(Y-T) + I(Y, r) + G + X(Y*,) - Q(C(Y-T), $\in$)

See graph 1 for equilibrium. The demand for domestic goods in economy B is steeper because for a given change in income imports increase by less than in economy A (remember, the marginal propensity to consume is less than 1).

(b) See graph 2 for this part. Economy B has a steeper NX schedule for the same reason as before (i.e. NX decline by more in economy A when income increases). Since domestic demand (DD) and exports are identical in both economies, at the level of income where NX are zero for Economy A then NX are positive for Economy B (again, imports are lower in this economy for any level of income).

(c) Using the fact that DD is identical for both economies, we know that the vertical shifts are also identical. Nevertheless, since demand is flatter in Economy B output will increase by more. This implicitly means that the multiplier is larger in Economy B (see below). Fiscal policy decreases net exports in both economies.

$$\text{multiplier}^A = \frac{1}{1-C_1-I_1+Q_1} < \frac{1}{1-C_1-I_1+Q_1C_1} = \text{multiplier}^B$$

where C_1, I_1 and Q_1 are the marginal propensities to consume, invest and import out of income respectively.

(d) See graph 3. Due to the increase in consumer confidence, the upward shift in the DD curve is higher than the upward shift of the ZZ curve. The reason is that the marginal propensity to consume and to import are both lower than 1 so that the increase in demand following the increase in consumer confidence is partially offset by an increase in imports (this is also the reason why the effect

on output is smaller in this open economy than in a closed economy). Finally, since exports remain constant (Y* and $\in$ did not change in this exercise) and imports go up, we know that NX goes down (i.e. the increase in consumer confidence translates into a higher trade deficit).

II. The Mundell-Fleming Model

(a) We have a system of three equations with three unknowns (Y, i and E). Remember that our simplifying assumptions imply that the real interest and exchange rates are equal to their respective nominal rates:

IS: Y = C(Y-T) + I(Y,i) + G + X(Y*,E) -EQ(Y,E)

LM: M/P = Y L(i)

interest parity: $i = i^* + \frac{\overline{E}^e - E}{E}$

See graph 4 for the equilibrium.

(b) As graph 5 shows, if i* increases and Y* remains unchanged, the IS curve shifts to the left, decreasing both, domestic output and the domestic interest rate.

(c) See graph 6. The E curve shifts in and the additional impact of this foreign policy mix will be to appreciate the exchange rate (i.e. E goes down).

(d) See graph 7. If the domestic interest rate goes down but domestic output remains constant then: (i) Investment increases; (ii) Consumption remains constant; (iii) Government spending remains constant (is exogenous). Since domestic output did not change we need NX to go down in order to compensate for the increase in investment. Using the fact that foreign output did not change either, we know that the exchange rate must go down (i.e. appreciate) in order to increase imports and/or decrease exports (so that NX decreases). In summary, we can conclude that the exchange rate at this new equilibrium is smaller, meaning that the domestic interest rate decreases by less than the foreign interest rate (see the interest rate parity condition to verify this result).

(e) The Fed needs to increase the money supply, shifting the LM to the right (see graph 8). The effect is exactly the same as in part (d): lower domestic interest rate -lower than in (c)-, exchange rate appreciation, and domestic output constant.

(f) If the Fed wishes to maintain the exchange rate level, then it needs to decrease the interest rate by exactly the same amount as the decrease in the foreign interest rate. To achieve this, it increases the supply of money more than in part (d). See graph 9. Note also that domestic output increases (this will induce higher imports that will **partially** offset the increase in investment caused by lower i).