Resit Fall 23/24

IIA $\quad U = C_1 C_2 \quad Q_1 = 192 \quad Q_2 = 32\sqrt{k_2} \quad \delta = 1$

a)

a1) $\delta = 1 \Rightarrow I_1 = k_2 \wedge I_2 = 0$

$Q_1 = C_1 + I_1 \Leftrightarrow I_1 = Q_1 - C_1. \qquad Q_2 = 32\sqrt{k_2} = 32\sqrt{I_1} = 32\sqrt{Q_1 - C_1}$

$Q_2 = C_2 + I_2 \Leftrightarrow Q_2 = C_2 \Rightarrow C_2 = 32\sqrt{Q_1 - C_1} = 32\sqrt{192 - C_1}$

a2) $\max_{\{C_1;C_2;k_2\}} U = C_1 C_2 \quad \text{s.t. } Q_2 = 32\sqrt{k_2} \quad \Leftrightarrow \quad \max_{\{C_1;C_2\}} U \quad \text{s.t. } C_2 = 32\sqrt{192-C_1} \quad \Leftrightarrow \quad \max_{\{C_1\}} U = C_1 32\sqrt{192-C_1} \quad \text{s.t. } C_2 = 32\sqrt{192-C_1}$

FOC: $\frac{\partial U}{\partial C_1} = 0 \Leftrightarrow 32\sqrt{192-C_1} - \frac{32 C_1}{2\sqrt{192-C_1}} = 0 \Leftrightarrow 32(192 - C_1) - 16 C_1 = 0$

$\Leftrightarrow 48 C_1 = 6144 \Leftrightarrow \begin{cases} C_1 = \frac{6144}{48} = 128 \\ C_2 = 32\sqrt{192-128} = 256 \end{cases}$

a3) $I_1 = Q_1 - C_1 = 192 - 128 = 64 = k_2$

a4) $1 + R^A = MPk = \frac{16}{\sqrt{k_2}} = \frac{16}{\sqrt{64}} = 2 \Rightarrow R^A = 1$

b) $R^* = 0$

b1) $\max_{\{k_2\}} V_1 \Rightarrow F'(k_2) = \frac{R^* + \delta}{2} \Leftrightarrow \frac{1}{2\sqrt{k_2}} = \frac{0+1}{32} \Leftrightarrow 2\sqrt{k_2} = 32$

$\Leftrightarrow \sqrt{k_2} = 16 \Rightarrow k_2 = 256 = I_1$

b2) $Q_2 = 32\sqrt{k_2} = 32\sqrt{256} = 512$

b3) $\Omega_1 = Q_1 - I_1 + \frac{Q_2 - I_2}{1+R^*} = (192 - 256) + \frac{512 - 0}{1+0} = 448$

b4) $\max_{\{C_1;C_2\}} U \quad \text{s.t. } C_1 + \frac{C_2}{1+R^*} = \Omega_1 \Rightarrow \begin{cases} C_1 = \frac{\Omega_1}{2} = 448/2 = 224 \\ C_2 = \frac{\Omega_1(1+R^*)}{2} = \frac{448}{2} = 224 \end{cases}$

b5) $\begin{cases} TB_1 = Q_1 - C_1 - I_1 = 192 - 224 - 256 = -288 \\ TB_2 = Q_2 - C_2 - I_2 = 512 - 224 - 0 = 228 \end{cases}$

b6) $R^* = 0 \Rightarrow NFIA = 0 \Rightarrow GNI = Q$

$\begin{cases} GNI_1 = Q_1 = 192 \\ GNI_2 = Q_2 = 512 \end{cases}$

b7) $U_{closed} = 128 \times 256 = 32768$

$U_{open} = 50176$

$U_{open} > U_{closed}$, we are better off.

c) $Q_1' = 384$

c1) The investment plan does not depend on Q_1, as it does not alter the NPV. Hence, $\bar{I}_1 = \bar{K}_2 = 256$.

c2) $\Omega_1' = Q_1' - \bar{I}_1 + \dfrac{\bar{Q}_2 - \bar{I}_2}{1+R^*} = 384 - 256 + \dfrac{512 - 0}{1+0} = 640$

$\begin{cases} C_1 = \Omega_1/2 = \dfrac{640}{2} = 320 \\ C_2 = \dfrac{(1+R^*)\Omega_1}{2} = \dfrac{640}{2} = 320 \end{cases}$

c3) $\begin{cases} TB_1 = Q_1 - C_1 - I_1 = 384 - 320 - 256 = -192 \\ TB_2 = Q_2 - C_2 - I_2 = 512 - 320 = 192 \end{cases}$

c4) $R^* = 0 \Rightarrow NFIA = 0$

$\begin{cases} CA_1 = TB_1 + NFIA_1 = -192 \\ CA_2 = TB_2 + NFIA_2 = 192 \end{cases}$

c5) Since in the closed economy we are constrained by the PPF, an ↑ in Q_1 will ↑ I_1. However, we would not be better off than in the case where the economy is open, as we would not be able to achieve the optimal K_2.

#B $\bar{e} = E^e = 1$ $m^D = Y/5i$ $Y_F = 100$ $eB_c^* = 75$ $i^* = 0{,}2$ $P = P^* = 1$ $Y = 4(\bar{A} + TB)$

$\bar{A} = 25$ $TB = 5\left(\frac{eP^*}{P} - 1\right)$

d)

d1) $Y = 4(\bar{A} + TB) = 4\left(25 + 5\left(\frac{e \times 1}{1} - 1\right)\right) = 80 + 20e$

With $e = 1$: $Y = 80 + 20 \times 1 = 100$

d2) We are in a fixed regime, so $i = i^*$.

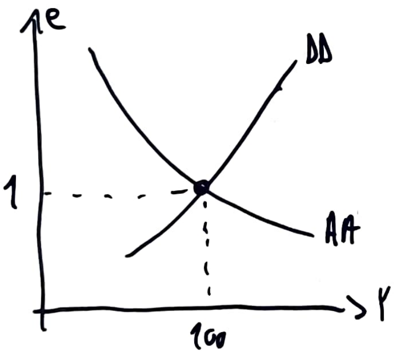
$m^D = \frac{Y}{5i} = \frac{100}{5 \times 0{,}2} = 100$ $M = m^D \times P = 100 \times 1 = 100$

$m^D = M/P \Leftrightarrow \frac{Y}{5i} = \frac{100}{1} \Leftrightarrow Y = 500i = 500\left(0{,}2 + \frac{1}{e} - 1\right) \Rightarrow Y = \frac{500}{e} - 400$

d3) $Y = Y_F = 100$ → Internal Balance

$TB = 5\left(\frac{eP^*}{P} - 1\right) = 5\left(\frac{1 \times 1}{1} - 1\right) = 0$ → External Balance.

d4)



e) $TB' = 5(\theta - 2)$

e1) $Y = 4(\bar{A} + TB') = 4\left(25 + 5\left(\frac{e \times 1}{1} - 2\right)\right) = 60 + 20e$

With $e = 1$: $Y' = 60 + 20 \times 1 = 80$

e2) $m^{D'} = \frac{Y'}{5i} = \frac{80}{5 \times 0{,}2} = 80$ $M' = m^{D'} \times \bar{P} = 80$

The CB sells foreign reserves.

CB

$B_c = 25$	$M = 100$
$eB_c^* = 75$	

→

CB

$B_c = 25$	$M = 80$
$eB_c^* = 55$	

e3) $m^D = M'/P \Leftrightarrow Y = 400i \Rightarrow Y = \frac{400}{e} - 320$

e4) Departing from the output market eq:

$$Y_F = 4(\bar{A} + TB') \Leftrightarrow 100 = 4\left(25 + 5\left(\frac{1\times 1}{P_{LR}} - 2\right)\right) \Rightarrow P_{LR} = 1/2$$

$$Y = 4(\bar{A} + TB') = 4\left(25 + 5\left(\frac{e\times 1}{1/2} - 2\right)\right) = 60 + 40e$$

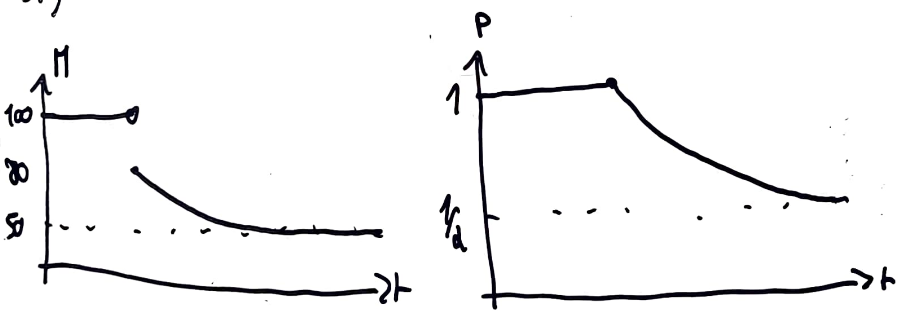
e5) $m^D = Y/S_i = \frac{100}{5\times 0{,}2} = 100$ $\quad M_{LR} = m^D \times P_{LR} = 100 \times 1/2 = 50$

$$m^D = M_{LR}/P_{LR} \Leftrightarrow \frac{Y}{S_i} = \frac{50}{1/2} \Leftrightarrow Y = 500i \Rightarrow Y = \frac{500}{e} - 400$$

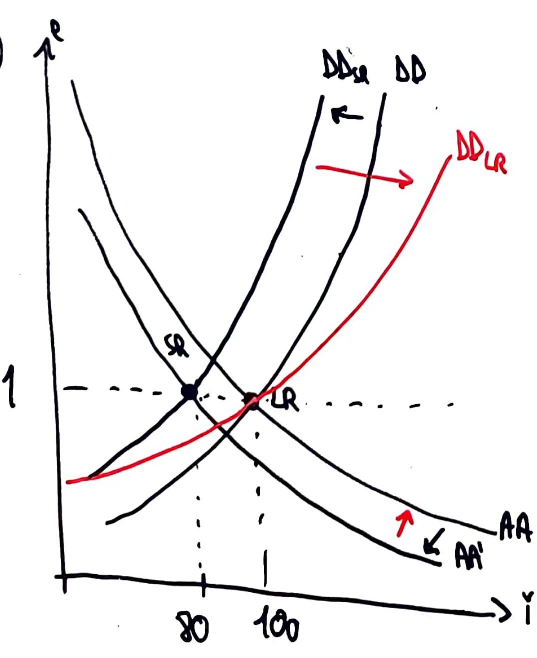
e6) $TB_{SR} = 5\left(\frac{eP^*}{P} - 2\right) = 5\left(\frac{1\times 1}{1} - 2\right) = -5$ → External Imbalance

$TB_{LR} = 5\left(\frac{eP^*}{P_{LR}} - 2\right) = 5\left(\frac{1\times 1}{1/2} - 2\right) = 0$ → External Balance

e7)



e8)



In the SR, the TB shock shifts DD to the left. To defend the peg, the CB ↓ M, and thus AA also shifts.
In the LR, the P ↓ and shifts DD. Again, to the defend the peg, the CB further ↓ M, and AA returns to its original position.

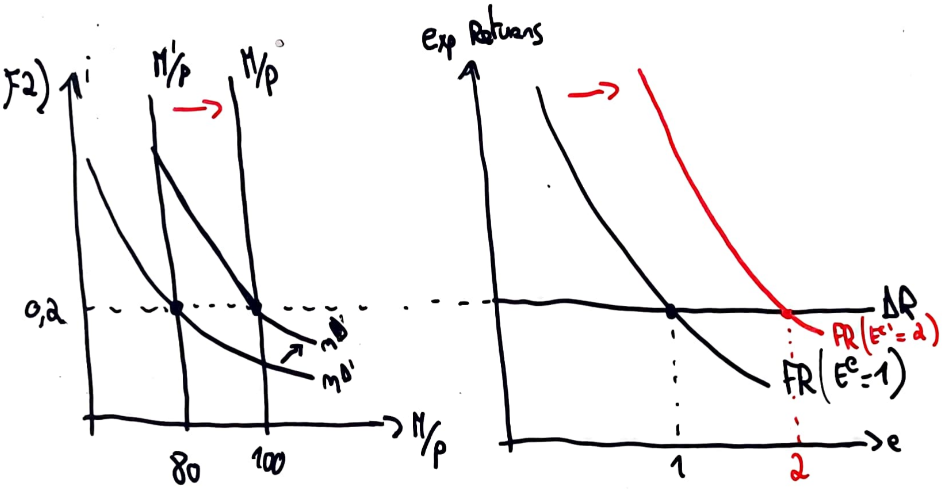
f)

f1) $Y_F = 60 + 20e' \Leftrightarrow 100 = 60 + 20e' \Rightarrow e' = 2$

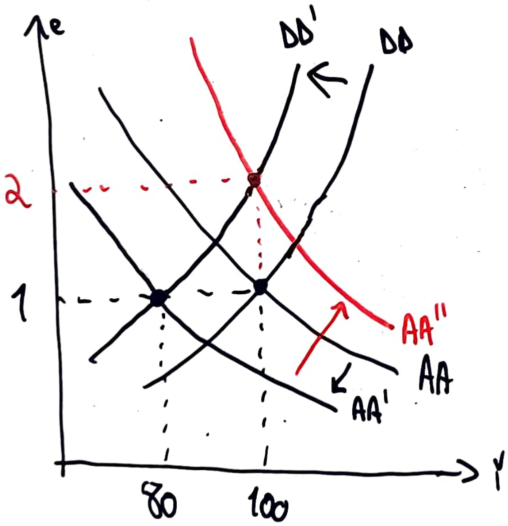
$m^D = \frac{Y}{5i} = 100 \qquad m^D = M/P \Leftrightarrow Y = 500i = 500\left(0{,}2 + \frac{2}{e} - 1\right) \Rightarrow Y = \frac{1\,000}{e} - 400$

$M = m^D \times P = 100$

f2)



f3)



The devaluation is achieved with an ↑ in M that shifts AA up, and we move along DD' to the new eq.

g)

g1) $Y_F = 4(\bar{A}' + TB') \Leftrightarrow 100 = 4\left(\bar{A}' + 5\left(\frac{1\times1}{1} - 2\right)\right) \Rightarrow \bar{A}' = 30$

$Y = 4(\bar{A}' + TB') = 4\left(30 + 5\left(\frac{e\times1}{1} - 2\right)\right) = 80 + 20e$

g3) Monetary Policy

$Y = Y_F = 100$ → Internal Balance

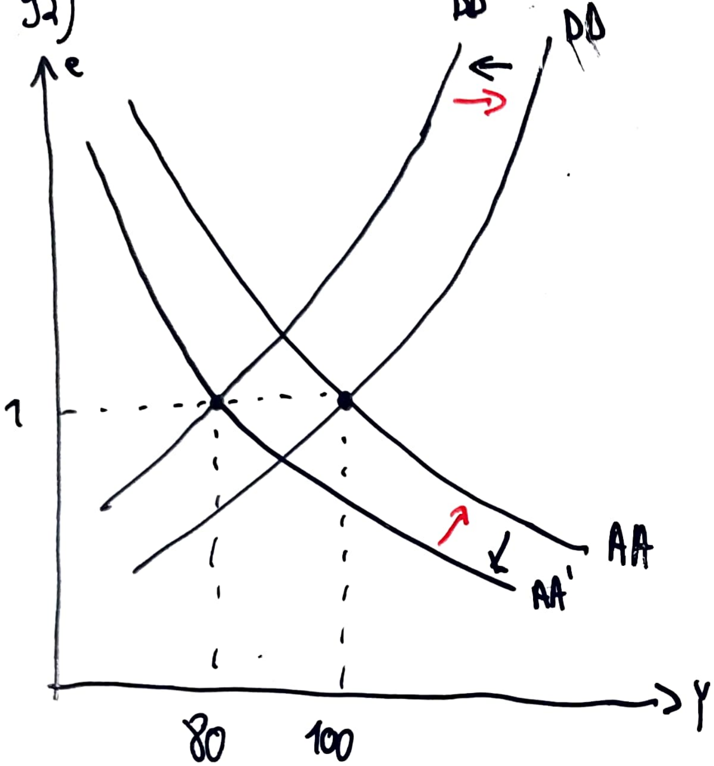
$TB = 5\left(\frac{2\times1}{1} - 2\right) = 0$ → External Balance

Fiscal Policy

$Y = Y_F = 100$ → Internal Balance

$TB = 5\left(\frac{1\times1}{1} - 2\right) = -5$ → External Imbalance

92)



The fiscal expansion shifts DD back to its original position.

To defend the peg, the CB ↑ M, which makes AA return to its original position.