Attachment Macroeconomics: A European Perspective 2015-2016

Chapter 1:
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Chapter 2:
1. GDP growth rate: $(Y_t - Y_{t-1}) / Y_{t-1}$

2. Labour force (L) = Unemployment (U) + Employment (N)

3. $$P_t = \frac{\text{Nominal GDP}_t}{\text{Real GDP}_t} = \frac{€Y_t}{Y_t}$$

Chapter 3:
1. C = (Y-T) + Co

2. $C = C_o + C_1 (Y-T)$

3. Z= C + I + G

4. $Z = C_o + C_1(Y-T) + I_o + G_o = Y$ (equilibrium condition)

5.
$$Y = \frac{1}{1-C_1} \times (C_o + I_o + G_o - C_1T)$$

6. S = Y – C – T

7.
$(Y - C - T) + (T - G) = S_{total}$
Since Y: C + I + G, it is logic to say that Y-C-G = I. When you subtract taxes from both side you get:
Y -T -C -G = I -T → Y - T -C = I + G -T
Since Y-T-C = private saving and G-T = Public saving you can say that:
(Y -T -C) - (G - T) = I
So S = I in the equilibrium. This is called the **IS relation**.

Chapter 4 :
1. $M_d = €YL(i)$

2.

3. $M_s = M_d \rightarrow M = €YL(i)$

4.

- Demand for deposit accounts:
  $D^d = (1-c)M^d$
  c is the share of money held as a currency
- Demand for reserves by banks:
  $R^d = \theta(1-c)M^d$
- Demand for **central bank money**:
  $H^d = CU^d + R^d$ (with CU demand for currency)
- When we assume the equilibrium condition for central bank money, $H = H^d$, we can combine all equations to get:
  $H = (c + \theta(1-c))\, €YL(i)$

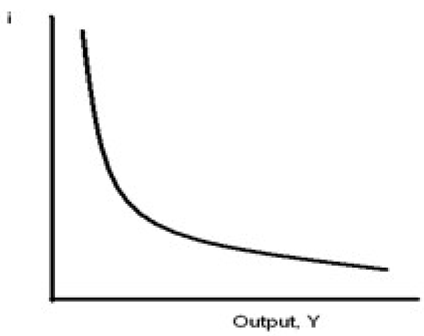
5. money multiplier= 1: $(c + \theta(1-c))$

Chapter 5 :

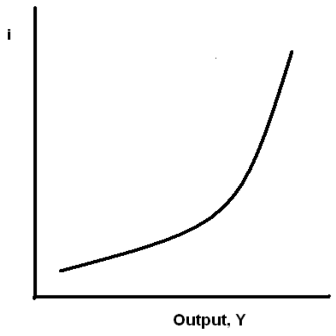
1. $I = I(Y,i)$
   (+,-)

Leading to:

$Y = C_o + C_1(Y-T) + I(Y,i) + G_o$



2. M/P = YL(i) (Note: (€Y/P) = Y)



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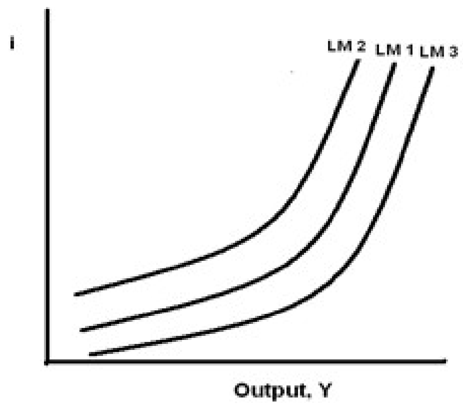

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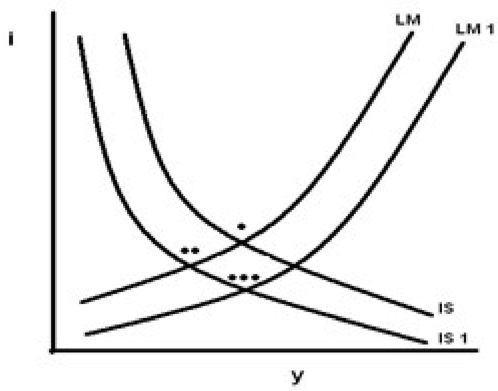


Chapter 6:

1. Real exchange rate: $\varepsilon = \frac{EP}{p*}$

2. $(1 + i_t) = (1 + i_t^*) \times (E_t / E^e_{t+1})$

3. $i_t = i_t^* - ((E^e_{t+1} - E_t) / E_t)$

4. $Z = C + I + G - (IM/\varepsilon) + X$

5. $C + I + G = C(Y - T) + I(Y, i) + G$

$\qquad\qquad\qquad\quad + \qquad\quad +, -$

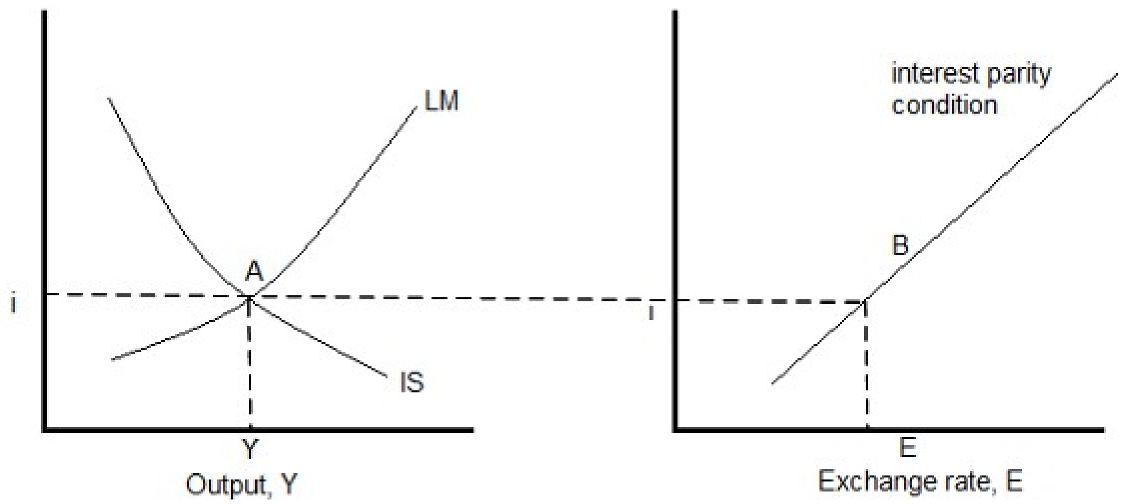
6. $Y = C(Y - T) + I(Y, i) + G + NX(Y, Y^*, \varepsilon)$ Where $NX = X(Y^*, \varepsilon) - IM(Y, \varepsilon) / \varepsilon$

$\qquad\quad + \qquad\quad +, - \qquad\qquad\quad -, \ +, \ -$

7. $E = \frac{1+i}{1+i*} \bar{E}^e$

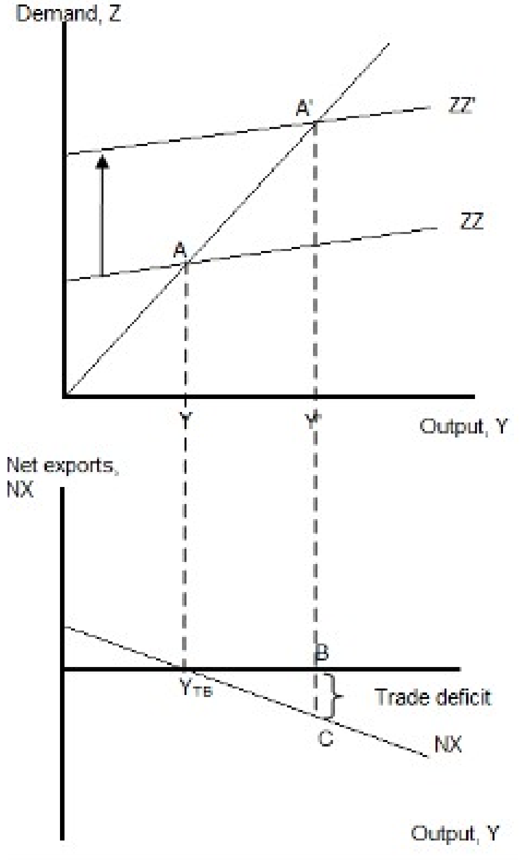
8. **IS:** $Y = C(Y - T) + I(Y, i) + G + NX(Y, Y^*, E)$

LM: $M/P = YL(i)$



Chapter 7:

1.



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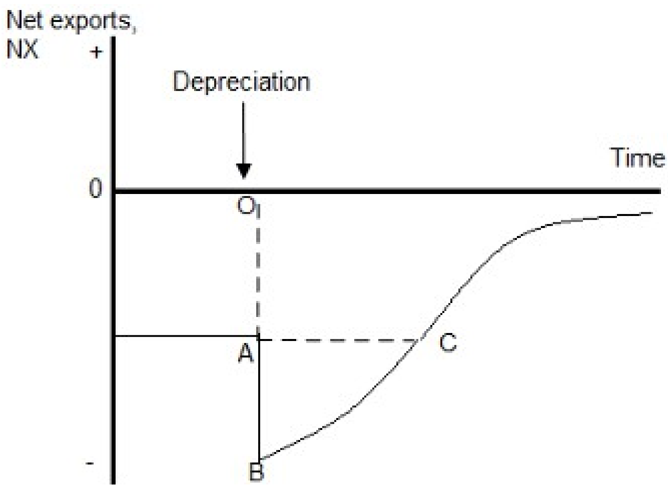


3. $NX = S + (T - G) - I$

Chapter 8:

1. $W = P^e F(u,z)$
$(-, +)$

2. Total output = Labour productivity x workers → Y = A x N

3. P= (1+μ) W

4. W/P = F (u,z)

5. W/P = 1/ (1+μ)

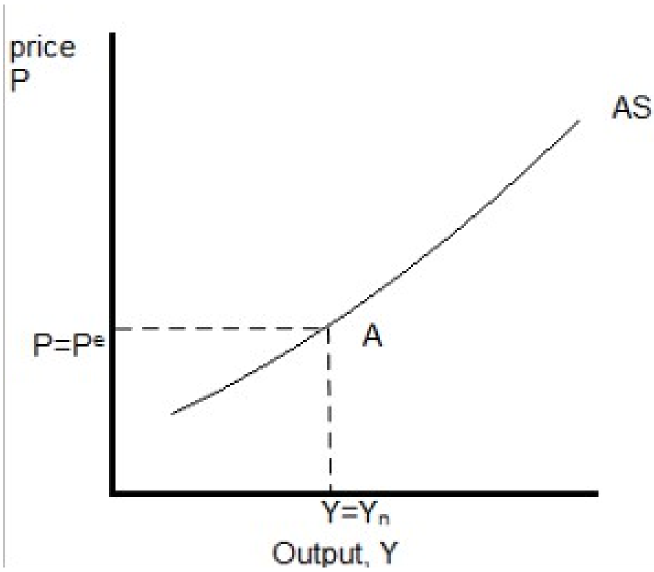
6. N= L(1-u)

7. u= 1- (Y/L) And F (1-(Y/L),z) = 1/ (1+μ)

Chapter 9

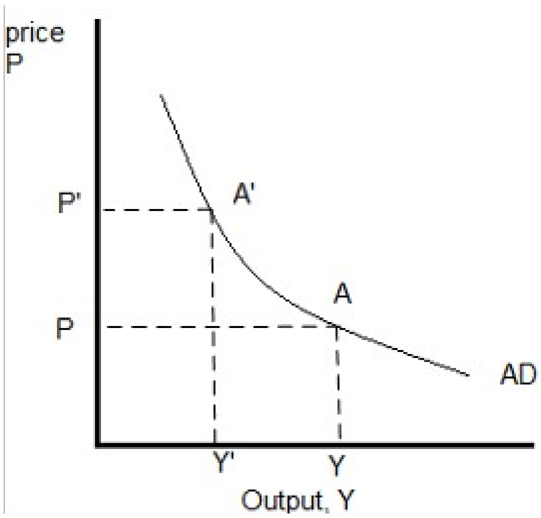
1. *AS relation*: $P = P^e (1 + \mu) F(1 – Y/AL , z)$

2.



3. *AD relation:* Y = Y (M/P, G, T)
+, +, -

4.



Chapter 10

1. $F(u, z) = e^{-\alpha u+z}$.

2. $\pi_t = \pi^e_t + (\mu + z) - \alpha u_t$

3. $\pi_t = (\mu + z) - \alpha u_t$

4. $\pi_t = \theta\pi_{t-1} + (\mu + z) - \alpha u_t$

5. $\pi - \pi_{t-1} = (\mu + z) - \alpha u_t$

6. $\pi - \pi_{t-1} = - \alpha (u_t - u_n)$

7. $\pi_t = (\lambda\pi_t + (1-\lambda)\pi_t^e) - \alpha(u_t - u_n)$

Chapter 11

1. $u_t - u_{t-1} = -g_{yt}$

2. $u_t - u_{t-1} = -\beta (g_{yt} - \bar{g}_y)$

3. $g_{yt} = g_{mt} - \pi_t$

4. $r_t = i_t - \pi^e_{t+1}$

5. $i = r_n + g_m$

6. Sacrifice ratio = $\frac{Point-years\ of\ excess\ unemployment}{Decrease\ in\ inflation}$

Chapter 12

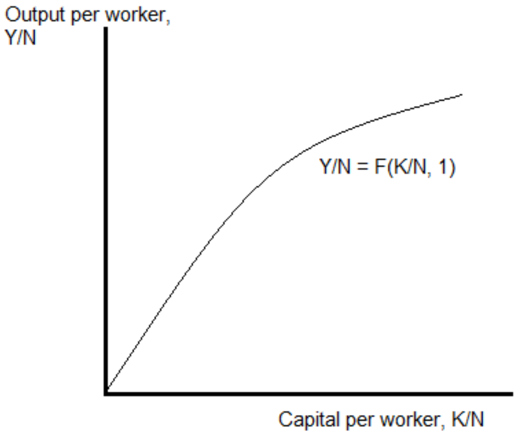
1. $Y = Y(\bar{E}P/P^*, G, T)$

2. $E_{t+1} = (1 + i_{t+1} / 1+ i^*_{t+1})\ E_{t+2}^e$

3. $E_t = \frac{(1+i_t)(1+i^e_{t+1})...(1+i^e_{t+n})}{(1+i^*_t)(1+i^{*e}_{t+1})...(1+i^{*e}_{t+n})}\ E^e_{t+n+1}$

Chapter 13:
1. $Y = F(K,N)$

2. Output per worker = Y/N → Y/N= F (K/N, N/N) = F(K/N,1)



Chapter 14:

1. S=sY

2. $I_t = sY_t$

3.

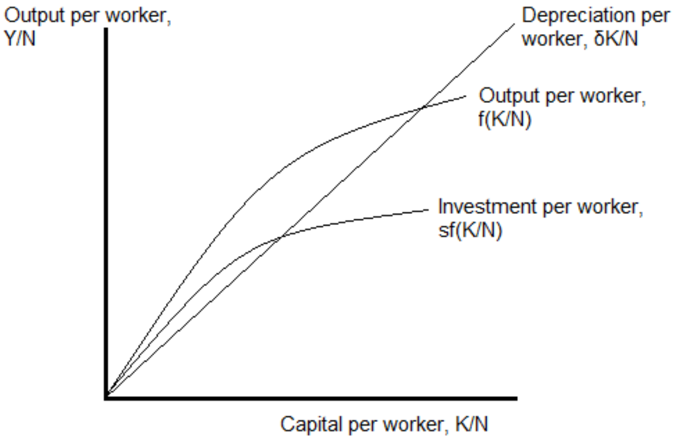
$K_{t+1} = (1-\delta) K_t + I_t$

→ $K_{t+1}/N = ((1-\delta)(K_t/N)) + (s \times Y_t/N)$

→ $(K_{t+1}/N) – (K_t/N) = s(Y_t/N) – \delta(K_t/N)$

4. $(K_{t+1}/N) – (K_t/N) = sf(Kt/N) – \delta(K_t/N)$

5.

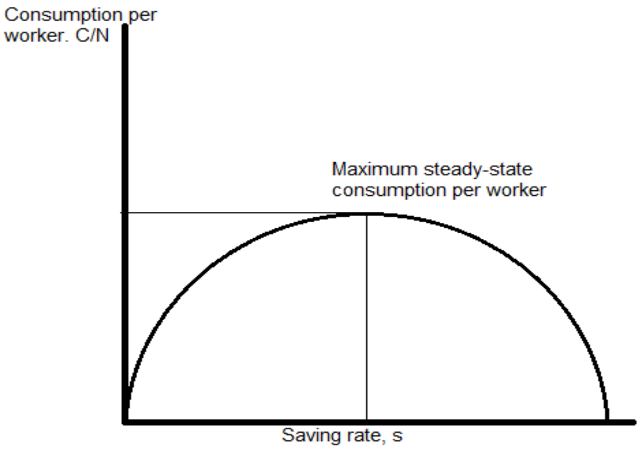


6. capital per worker is given by: $sf(K^*/N) = \delta(K^*/N)$

The steady-state output per worker is:

$Y^*/N = f(K^*/N)$

7.



8.
$Y=\sqrt{K}\sqrt{N}$.
When you divide both sides by N, as usual the equation looks like this:
$Y/N=\sqrt{(K/N)}$.
$\rightarrow (K_{t+1}/N) - (K_t/N) = s(\sqrt{(K_t/N)}) - \delta(K_t/N)$

9. $C/N=Y/N - \delta (K/N)$

10. $C/N = (s (1-s)) / \delta$

11. $Y/N = f (K/N, H/N)$
(+ , +)

Chapter 15:
1. $Y=F(K, N, A)$ → $Y = F(K, AN)$
(+, +, +)

2. K_t/A_tN_t

3. $sf(K/ AN) = (\delta + g_a + g_n) \times (K/AN)$

4. $I = (\delta + g_a + g_n) K$

Chapter 16

1. $€V_t = €z_t + \frac{1}{1+i_t}€z_{t+1} + \frac{1}{(1+i_t)(1+i_{t+1})} €z_{t+2} + \dots\dots$

2. $€V_t = €z \frac{1-[1/(1+i)^n]}{1-\left[\frac{1}{1+i}\right]}$

3. $€V_t / P_t = V_t$

4. One year bond price: $€P_{1t} = €100 / (1+i_{1t})$

Two year bond price: $€P_{2t} = €100 / (1+i_{1t})(1+i^e_{1t+1})$

5. Expected return one year bond: $(1+i_{1t})$
Expected return two year bond: P^e_{1t+1} / P_{2t}

6. $€P_{2t} = €P^e_{1t+1} / 1+i_{1t}$

7. $€P_{2t} = €100 / (1+i_{2t})^2$

8. $i^e_{1t+1} = 2i_{2t} - i_{1t}$

9. Nominal price of stock: $€Q_t = \frac{€D^e_{t+1}}{1+i_{1t}} + \frac{€D^e_{t+2}}{(1+i_{1t})(1+i^e_{1t+1})} + \ldots$

10. Real stock price: $Q_t = \frac{D^e_{t+1}}{1+r_{1t}} + \frac{€D^e_{t+2}}{(1+r_{1t})(1+r^e_{1t+1})} + \ldots$

Chapter 17

1. Human wealth: $V(Y^e_{LT} - T^e_t)$

2. $p_1c_1 + p_2c_2 = p_1y_1 + p_2y_2$

3. $c_1 + (p_2/p_1)c_2 = y_1 + (p_2/p_1)y_2$

4. $c_1 + (1/1+r)c_2 = y_1 + (1/1+r)y^e_2 = V(y^e_t)$ with t = 1,2

5. $U(c_1, c_2) = u(c_1) + (1 / 1+\rho)u(c_2)$

6. $MRS = \frac{\partial U(c_1,c_2)/\partial c_1}{\partial U(c_1,c_2)} = \frac{\partial U/\partial c_1}{\frac{1}{1+\rho}\partial U/\partial U c_2} = 1 + r$

7.
$\frac{\partial U/\partial c_1}{\partial U/\partial c_2} = \frac{1+r}{1+\rho}$

8. $C_t = C(W_t, Y_{Lt} - T_t)$
$\quad (+, \quad +)$
Where;
$W_t = W_t^F + W_tH + \sum_{i=0}^{t} \frac{Y^e_{t+i} - T^e_{t+i}}{(1+r)^i}$

9. $V(\pi^e_t) = \frac{1}{(1+r_t)} \pi^e_{t+1} + \frac{1}{(1+r_t)(1+r^e_t)}(1 - \delta)\pi^e_{t+2} + \ldots$

10. $I_t = I[V(\pi^e_t)]$
$\quad (+)$

11. $I_t = I\left(\frac{\pi_t}{r_t+\delta}\right)$

12. Rental cost $= (r_t + \delta)$

13. $I_t = I[V(\pi_t^e), \pi_t]$

14. $\pi_t = \pi(\frac{Y_t}{K_t})$
(+)

Chapter 18

1. A (Y, T, r) = C (Y – T) + I (Y,r)
So that the IS relation becomes:
Y = A (Y, T, r) + G
(+, -, -)

2. LM: M/P = YL(r)

Chapter 19

1. $i_t = a_0 + a_1(\pi^e_{t+1} - \pi^*) + a_2 (\frac{Y_t - Y_*}{Y_*})$

Chapter 20

1. Capital ratio is the ratio of capital to assets.
Leverage ratio = assets / capital

Chapter 21

1. $Deficit_t = rB_{t-1} + G_t - T_t$

2. $B_t - B_{t-1} = deficit_t$

3. $B_t = (1 + r) B_{t-1} + (G_t - T_t)$

4. $B_t / Y_t = (1 + r)(B_{t-1}/Y_t) + (G_t - T_t)/Y_t$

5.
$\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}} = (r - g) \frac{B_{t-1}}{Y_{t-1}} + \frac{(G_t - T_t)}{Y_t}$

6. $y_t = \beta y_{t-1} + A$

7. $\dot{b} = \frac{(G_t - T_t)/Y_t}{g - r}$

Chapter 22

1. $\pi = -\alpha (u - u_n)$

Chapter 23

1. $\pi^* = \pi^* - \alpha\,(u_t - u_n)$

2. $i_t = i^* + a(\pi_t - \pi^*) - b(u_t - u_n)$