61046 40856

1.) $E_0\left[m_{02} f_2\right] = E_0\left[m_{02}(S_2 - F_{02})\right]$

$= E\left[m_{02}S_2\right] - E\left[m_0 F_{02}\right]$

$= S_0 - D_0 - \frac{1}{R_f^2} F_0 = 0$ due to $\frac{F_{02}}{R_f^2} = S_0 - D_0$

2) $U(C_t, t) = -\delta^t e^{-aC_t}$

$U(C_t, t) = a\delta^t e^{-aC_t}$

$P_0 = E_0\left[\sum_{t=1}^{\infty} \frac{u_c(C_t,t)}{u_c(C_0,0)} d_t\right] = E_0\left[\sum_{t=1}^{\infty} \delta^t e^{-a(d_t - d_0)} d_t\right]$

3.) $\frac{P_t}{d_t} = E_t\left[\sum_{t=1}^{\infty} \delta^j \left(\frac{C_{t+j}}{C_j}\right)^{\gamma-1}\left(\frac{d_{t+j}}{d_t}\right)\right] = E_t\left[\sum_{t=1}^{\infty} \delta^j e^{(\gamma-1)\ln(C_{t+j}/C_t) + \ln(d_{t+j}/d_t)}\right]$

$\frac{P_t}{d_t} = E_t\left[\sum_{j=1}^{\infty} \delta^j e^{(\gamma-1)(j\mu_c + 6_c \sum_{i=1}^{j} n_{t+j}) + j\mu_d + 6_d \sum_{i=1}^{\infty} \Sigma_{t+j}}\right]$

$= \sum_{j=1}^{\infty} e^{j(\ln\delta - (1-\gamma)\mu_c + \mu_d + \frac{1}{2}(1-\gamma)^2 6_c^2 + 6_d^2) - (1-\gamma)6_c 6_d p}]$

$= \frac{1}{1 - \delta e^{-(1-\gamma)\mu_c + \mu_d + \frac{1}{2}(1-\gamma)^2 6_c^2 + 6_d^2 - (1-\gamma)6_c 6_d p}} - 1$

Then $P_t = d_t \frac{\delta e^a}{1-\delta e^a}$; $a = \mu_d - (1-\gamma)\mu_c + \frac{1}{2}\left[(1-\gamma)^2 6_c^2 + 6_d^2\right] - (1-\gamma)p 6_c 6_d$

4.) a.) $E_t(b_{t+1}) = \frac{R_f}{q_t} b_t q_t + E_t[e_{t+1}] q_t + (1-q_t) E_t[z_{t+1}] = R_f b_t$

b.) $E_t[b_{t+1}] = R_f b_t$, $\lim_{i \to \infty} E_t[b_{t+i}] = \begin{cases} +\infty & \text{if } b_t > 0 \\ -\infty & \text{if } b_t < 0 \end{cases}$

P_i is a limited then $b_t > 0$, Rational speculate buble not exist

since P_t cannont exeed P_{sales} and b_t cannot exeed $P_{sales} - P_t^*$

c) rationalo buble can't be existed, since bond price must be $P_t = d_t$

at maturity and equal to 0 when $P_t = P_t^*$ (rational price)

6.) Due to $P_t = f_t + b_t$; $b_t \neq 0$ → impossible.

$P_t = f_t = d_t$ at date T