a) $U(C,L) = B_0 \log(L-\gamma_L) + B_1 \log(C-\gamma_C)$

$B_0 + B_1 = 1, \quad C - \gamma_C > 0, \quad L - \gamma_L > 0, \quad B_0 = x'\breve{B}_0 + \varepsilon$

$$\max_{(C,L)} U(C,L)$$

$$\text{S.A.} \quad C + wL = R_0$$

$$R_0 = y + wT$$

$$\mathcal{L}(C,L,\lambda) = U(C,L) + \lambda(R_0 - C - wL)$$

$$\frac{\partial \mathcal{L}}{\partial L} = 0 \Rightarrow \frac{B_0}{L-\gamma_L} = \lambda w$$

$$\frac{\partial \mathcal{L}}{\partial C} = 0 \Rightarrow \frac{B_1}{C-\gamma_C} = \lambda$$

$$\Rightarrow \frac{B_0}{L-\gamma_L} = \frac{B_1}{C-\gamma_C} w \Rightarrow \frac{B_0}{B_1} \cdot \frac{C-\gamma_C}{L-\gamma_L} = w$$

$$\Rightarrow C = w(L-\gamma_L)\frac{B_1}{B_0} + \gamma_C.$$ SUBSTITUINDO NA R.O.

$$w(L-\gamma_L)\frac{B_1}{B_0} + \gamma_C + wL = R_0 \Rightarrow$$

$$Lw\left(\frac{B_1}{B_0} + \frac{B_0}{B_0}\right) = R_0 + \gamma_L \frac{B_1 w}{B_0} - \gamma_C$$

$$\Rightarrow wL = B_0(y + wT - \gamma_C) + \gamma_L B_1 w$$

$$= B_0(y + wT - \gamma_C - \gamma_L w) + \gamma_L w$$

$$C = wL\frac{B_1}{B_0} - w\gamma_L \frac{B_1}{B_0} + \gamma_C$$

$$= B_1(y + wT - \gamma_C - \gamma_L w) + \cancel{\gamma_L w \frac{B_1}{B_0}} - \cancel{w\gamma_L \frac{B_1}{B_0}} + \gamma_C$$

b) $wL - x'\breve{B}_0(y + wT - \gamma_C - \gamma_L w) - \gamma_L w = \varepsilon(y + wT - \gamma_C - \gamma_L w)$

$$E[\varepsilon \mid \underbrace{y, w, T, \gamma_C, \gamma_L, x}_{Z}] = 0$$

$$E[\varepsilon(y + wT - \gamma_C - \gamma_L w) \mid Z] = (y + wT - \gamma_C - \gamma_L w)E[\varepsilon \mid Z] = 0$$

$$\|$$

$$E[wL - x'\breve{B}_0(y + wT - \gamma_C - \gamma_L w) - \gamma_L w \mid Z]$$

Logo, $E[x'(wL - x'\breve{B}_0(y + wT - \gamma_C - \gamma_L w) - \gamma_L w]$

$$= E[E[x'(wL - x'\breve{B}_0(y + wT - \gamma_C - \gamma_L w) - \gamma_L w) \mid Z]]$$

$$= E[x' E[wL - x'\breve{B}_0(y + wT - \gamma_C - \gamma_L w) - \gamma_L w \mid Z]]$$

$$= E[x' \cdot 0] = 0$$

c) $B_1 = 1 - x'\breve{B}_0 - \varepsilon$. Logo,

$$C - x'\breve{B}_0(y + wT - \gamma_C - \gamma_L w) - (B_1(y + wT - \gamma_C - \gamma_L w) + \gamma_C)$$

$= -\varepsilon(y + wT - \gamma_C - \gamma_L w)$. A hipótese pode ser a mesma. Mas aí a condição de momento é

$$E\left[x'\left(C - (y + wT - \gamma_C - \gamma_L w)(x'\breve{B}_0 + B_1) - \gamma_C\right)\right] = 0$$

d) Temos $S_{00} = \left.\frac{\partial L^M(w, p, R_0(w,y))}{\partial w}\right|_U$. Logo,

$$S_{00} = \frac{\partial L^M(w, p, R_0(w,y))}{\partial w} - \frac{\partial L^M(w, p, R_0(w,y))}{\partial R_0}(T - L^M)$$

$$= -\frac{B_0}{w^2}(y + wT - \gamma_C - \gamma_L w) + \frac{B_0}{w}(T - \gamma_L) -$$

$$- \frac{B_0}{w}\left(T - \frac{B_0}{w}(y + wT - \gamma_C - \gamma_L w) - \gamma_L\right)$$

$$= -\frac{B_0}{w^2}(y + wT - \gamma_C - \gamma_L w)(1 - B_0) = \frac{-B_0}{w^2}(y - \gamma_C + \gamma_h w)(1 - B_0)$$

VAMOS ACHAR h:

$$wL = \gamma_L w + B_0(wT + y - \gamma_C - \gamma_L w)$$

$$\overset{T - \gamma_L = \gamma_h}{=} \gamma_L w + B_0(w\gamma_h + y - \gamma_C)$$

$$\overset{L = T - h}{\Rightarrow} -wh = -\gamma_h w + B_0(w\gamma_h + y - \gamma_C)$$

Logo, $-B_0(y - \gamma_C + w\gamma_h) = wh - \gamma_h w$. Logo,

$$S_{00} = \frac{(wh - \gamma_h w)}{w^2}(1 - B_0)$$