Pset note

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1 Summary

Our equilibrium consists of the following equations:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \tag{1}$$
$$Y_t = C_t + I_t + G_t \tag{2}$$
$$L_t^{\phi} C_t^{\sigma} = (1-\tau_{L,t}) A_t (1-\alpha) K_t^{\alpha} L_t^{-\alpha} \tag{3}$$
$$C_t^{-\sigma}(1+\tau_{I,t}) = \beta E_t[C_{t+1}^{-\sigma}[A_{t+1}\alpha K_{t+1}^{\alpha-1} L_{t+1}^{1-\alpha} + (1-\delta)(1+\tau_{I,t+1})]] \tag{4}$$

Log linearizing the labor supply equation we get the following:

$$\phi l_t + \sigma c_t = \frac{-\bar{\tau}_L}{1-\bar{\tau}_L}\hat{\tau}_{L,t} + \alpha k_t - \alpha l_t. \tag{5}$$

Log linearizing the EE this is what I got:

$$\sigma(E_t[c_{t+1}] - c_t) + \frac{\bar{\tau}_I}{1+\bar{\tau}_I}\hat{\tau}_{I,t} = \beta E_t\left[\frac{\alpha \bar{A}\bar{K}^{\alpha-1}\bar{L}^{1-\alpha}}{1+\bar{\tau}_I}(a_{t+1} + (1-\alpha)(-k_{t+1} + l_{t+1})) + (1-\delta)\frac{\bar{\tau}_I}{1+\bar{\tau}_I}\hat{\tau}_{I,t+1}\right] \tag{6}$$

Note that $\bar{\tau}_I$ being 0 makes the $\hat{\tau}_I$ term drop out, and a similar problem exists for the labor wedge. I had initially thought we could just define $\tilde{\tau}_{I,t} := \frac{\bar{\tau}_I}{1+\bar{\tau}_I}\hat{\tau}_{I,t}$ (and a similar $\tilde{\tau}_{L,t}$), but if $\bar{\tau}_I = 0$ then $\tilde{\tau}_{I,t} = 0$. So this is probematic I think.