28 variables: g, r
$\tilde{c}_1, \tilde{c}_2, \tilde{d}_1, \tilde{d}_2, \tilde{\lambda}_{BC}, \tilde{\lambda}_{TFP}, \lambda_{ER}, L_a, L_{1,y}, L_{2,y}, \tilde{K}_1, \tilde{K}_2, \tilde{w}$
$\tilde{c}'_1, \tilde{c}'_2, \tilde{d}'_1, \tilde{d}'_2, \tilde{\lambda}'_{BC}, \tilde{\lambda}'_{TFP}, \lambda'_{ER}, L'_a, L'_{1,y}, L'_{2,y}, \tilde{K}'_1, \tilde{K}'_2, \tilde{w}'$

28 equations:

$$g_{t+1} = 1 + \mu(L^{\Omega}_{a,t} + L'^{\Omega}_{a,t})$$
$$r_t = \frac{\tilde{c}'_{1,t}}{\tilde{d}_{2,t}}$$

$$\tilde{c}_{1,t} + \tilde{c}_{2,t} + \frac{\tilde{d}_{1,t} + \tilde{d}_{2,t}}{r_t} + \tilde{K}_{1,t+1} + \tilde{K}_{2,t+1} + \pi'[\tilde{K}_{2,t+1}g_{t+1} - (1-\delta)\tilde{K}_{2,t})]^2 + \phi'\tilde{c}'_{1,t} + \tilde{w}'_t L'_{1,y,t} =$$
$$L^{\alpha}_{1,y,t}\tilde{K}^{1-\alpha}_{1,t} + L'^{\alpha}_{1,y,t}\tilde{K}^{1-\alpha}_{2,t} + (1-\delta)(\tilde{K}_{1,t} + \tilde{K}_{2,t}) + \phi\frac{\tilde{d}_{2,t}}{r_t} + \frac{\tilde{w}_t L_{2,y,t}}{r_t}$$
$$r_t(\tilde{c}'_{1,t} + \tilde{c}'_{2,t}) + \tilde{d}'_{1,t} + \tilde{d}'_{2,t} + \tilde{K}'_{1,t+1} + \tilde{K}'_{2,t+1} + \pi[\tilde{K}'_{1,t+1}g_{t+1} - (1-\delta)\tilde{K}'_{1,t})]^2 + \phi\tilde{d}_{2,t} + \tilde{w}_t L_{2,y,t} =$$
$$L^{\alpha}_{2,y,t}\tilde{K}'^{1-\alpha}_{1,t} + L'^{\alpha}_{2,y,t}\tilde{K}'^{1-\alpha}_{2,t} + (1-\delta)(\tilde{K}'_{1,t} + \tilde{K}'_{2,t}) + r_t\phi'\tilde{c}'_{1,t} + r_t\tilde{w}'_t L'_{1,y,t}$$

$$(\tilde{c}^{\nu}_{1,t} + \tilde{c}^{\nu}_{2,t} + \tilde{d}^{\nu}_{1,t} + \tilde{d}^{\nu}_{2,t})^{-1}\tilde{c}^{\nu-1}_{1,t} = \tilde{\lambda}_{BC,t}$$
$$(\tilde{c}^{\nu}_{1,t} + \tilde{c}^{\nu}_{2,t} + \tilde{d}^{\nu}_{1,t} + \tilde{d}^{\nu}_{2,t})^{-1}\tilde{c}^{\nu-1}_{2,t} = \tilde{\lambda}_{BC,t}$$
$$(\tilde{c}^{\nu}_{1,t} + \tilde{c}^{\nu}_{2,t} + \tilde{d}^{\nu}_{1,t} + \tilde{d}^{\nu}_{2,t})^{-1}\tilde{d}^{\nu-1}_{1,t} = \frac{\tilde{\lambda}_{BC,t}}{r_t}$$
$$(\tilde{c}^{\nu}_{1,t} + \tilde{c}^{\nu}_{2,t} + \tilde{d}^{\nu}_{1,t} + \tilde{d}^{\nu}_{2,t})^{-1}\tilde{d}^{\nu-1}_{2,t} + \frac{\tilde{\lambda}_{BC,t}\phi}{r_t} = \frac{\tilde{\lambda}_{BC,t}}{r_t} + \frac{r_t\lambda_{ER,t}}{\tilde{d}_{2,t}}$$
$$\chi[L^{\epsilon}_{a,t} + (L_{1,y,t} + L_{2,y,t})^{\epsilon}]^{\frac{\eta}{\epsilon}-1}L^{\epsilon-1}_{a,t} = \tilde{\lambda}_{TFP,t}\mu\Omega L^{\Omega-1}_{a,t}$$
$$\chi[L^{\epsilon}_{a,t} + (L_{1,y,t} + L_{2,y,t})^{\epsilon}]^{\frac{\eta}{\epsilon}-1}(L_{1,y,t} + L_{2,y,t})^{\epsilon-1} = \tilde{\lambda}_{BC,t}\alpha L^{\alpha-1}_{1,y,t}\tilde{K}^{1-\alpha}_{1,t}$$
$$\chi[L^{\epsilon}_{a,t} + (L_{1,y,t} + L_{2,y,t})^{\epsilon}]^{\frac{\eta}{\epsilon}-1}(L_{1,y,t} + L_{2,y,t})^{\epsilon-1} = \frac{\tilde{\lambda}_{BC,t}\tilde{w}_t}{r_t}$$
$$\tilde{w}'_t = \alpha L'^{\alpha-1}_{1,y,t}\tilde{K}^{1-\alpha}_{2,t}$$
$$\frac{\tilde{\lambda}_{BC,t+1}}{g_{t+1}}[(1-\alpha)L^{\alpha}_{1,y,t+1}\tilde{K}^{-\alpha}_{1,t+1} + 1 - \delta] = \tilde{\lambda}_{BC,t}$$
$$\frac{\tilde{\lambda}_{BC,t+1}}{g_{t+1}}\left((1-\alpha)L'^{\alpha}_{1,y,t+1}\tilde{K}^{-\alpha}_{2,t+1} + 1 - \delta + 2(1-\delta)\pi'[\tilde{K}_{2,t+2}g_{t+2} - (1-\delta)\tilde{K}_{2,t+1}]\right) =$$
$$\tilde{\lambda}_{BC,t}\left(1 + 2\pi'[\tilde{K}_{2,t+1}g_{t+1} - (1-\delta)\tilde{K}_{2,t}]\right)$$
$$\frac{\tilde{\lambda}_{BC,t+1}}{g_{t+1}}\left(\alpha L^{\alpha}_{1,y,t+1}\tilde{K}^{1-\alpha}_{1,t+1} + \alpha L'^{\alpha}_{1,y,t+1}\tilde{K}^{1-\alpha}_{2,t+1} + \pi'[\tilde{K}_{2,t+2}g_{t+2} - (1-\delta)\tilde{K}_{2,t+1}]^2\right) = \tilde{\lambda}_{TFP,t}$$

$$\tilde{\lambda}_{BC,t}\left(\frac{\tilde{d}_{1,t}+\tilde{d}_{2,t}-\phi\tilde{d}_{2,t}-\tilde{w}_t L_{2,y,t}}{r_t^2}\right)=\lambda_{ER,t}$$

$$(\tilde{c}'^{\nu}_{1,t}+\tilde{c}'^{\nu}_{2,t}+\tilde{d}'^{\nu}_{1,t}+\tilde{d}'^{\nu}_{2,t})^{-1}\tilde{c}'^{\nu-1}_{1,t}+\tilde{\lambda}'_{BC,t}r_t\phi'=r_t\tilde{\lambda}'_{BC,t}-\frac{r_t\lambda'_{ER,t}}{\tilde{c}'_{1,t}}$$

$$(\tilde{c}'^{\nu}_{1,t}+\tilde{c}'^{\nu}_{2,t}+\tilde{d}'^{\nu}_{1,t}+\tilde{d}'^{\nu}_{2,t})^{-1}\tilde{c}'^{\nu-1}_{2,t}=r_t\tilde{\lambda}'_{BC,t}$$

$$(\tilde{c}'^{\nu}_{1,t}+\tilde{c}'^{\nu}_{2,t}+\tilde{d}'^{\nu}_{1,t}+\tilde{d}'^{\nu}_{2,t})^{-1}\tilde{d}'^{\nu-1}_{1,t}=\tilde{\lambda}'_{BC,t}$$

$$(\tilde{c}'^{\nu}_{1,t}+\tilde{c}'^{\nu}_{2,t}+\tilde{d}'^{\nu}_{1,t}+\tilde{d}'^{\nu}_{2,t})^{-1}\tilde{d}'^{\nu-1}_{2,t}=\tilde{\lambda}'_{BC,t}$$

$$\chi[L'^{\epsilon}_{a,t}+(L'_{1,y,t}+L'_{2,y,t})^{\epsilon}]^{\frac{\eta}{\epsilon}-1}L'^{\epsilon-1}_{a,t}=\tilde{\lambda}'_{TFP,t}\mu\Omega L'^{\Omega-1}_{a,t}$$

$$\chi[L'^{\epsilon}_{a,t}+(L'_{1,y,t}+L'_{2,y,t})^{\epsilon}]^{\frac{\eta}{\epsilon}-1}(L'_{1,y,t}+L'_{2,y,t})^{\epsilon-1}=\tilde{\lambda}'_{BC,t}\tilde{w}'_t r_t$$

$$\chi[L'^{\epsilon}_{a,t}+(L'_{1,y,t}+L'_{2,y,t})^{\epsilon}]^{\frac{\eta}{\epsilon}-1}(L'_{1,y,t}+L'_{2,y,t})^{\epsilon-1}=\tilde{\lambda}'_{BC,t}\alpha L'^{\alpha-1}_{2,y,t}\tilde{K}'^{1-\alpha}_{2,t}$$

$$\tilde{w}_t=\alpha L^{\alpha-1}_{2,y,t}\tilde{K}'^{1-\alpha}_{1,t}$$

$$\frac{\tilde{\lambda}'_{BC,t+1}}{g_{t+1}}\left((1-\alpha)L^{\alpha}_{2,y,t+1}\tilde{K}'^{-\alpha}_{1,t+1}+1-\delta+2(1-\delta)\pi[\tilde{K}'_{1,t+2}g_{t+2}-(1-\delta)\tilde{K}'_{1,t+1}]\right)=$$

$$\tilde{\lambda}'_{BC,t}\left(1+2\pi[\tilde{K}'_{1,t+1}g_{t+1}-(1-\delta)\tilde{K}'_{1,t}]\right)$$

$$\frac{\tilde{\lambda}'_{BC,t+1}}{g_{t+1}}[(1-\alpha)L'^{\alpha}_{2,y,t+1}\tilde{K}'^{-\alpha}_{2,t+1}+1-\delta]=\tilde{\lambda}'_{BC,t}$$

$$\frac{\tilde{\lambda}'_{BC,t+1}}{g_{t+1}}\left(\alpha L^{\alpha}_{2,y,t+1}\tilde{K}'^{1-\alpha}_{1,t+1}+\alpha L'^{\alpha}_{2,y,t+1}\tilde{K}'^{1-\alpha}_{2,t+1}+\pi[\tilde{K}'_{1,t+2}g_{t+2}-(1-\delta)\tilde{K}'_{1,t+1}]^2\right)=\tilde{\lambda}'_{TFP,t}$$

$$\tilde{\lambda}'_{BC,t}(\phi'\tilde{c}'_{1,t}+\tilde{w}'_t L'_{1,y,t}-\tilde{c}'_{1,t}-\tilde{c}'_{2,t})=\lambda'_{ER,t}$$