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1 CONSUMER

1.1 Optimisation problem

$$\max_{C_t, K_t, I_t, B_t, z_t} U_t = \beta \mathrm{E}_t \left[U_{t+1} \right] + \epsilon^{\mathrm{b}}_t \left(\left(1 - \sigma^{\mathrm{c}} \right)^{-1} \left(C_t - H_t \right)^{1 - \sigma^{\mathrm{c}}} - \omega \epsilon^{\mathrm{L}}_t \left(1 + \sigma^{\mathrm{l}} \right)^{-1} {L^{\mathrm{s}}_t}^{1 + \sigma^{\mathrm{l}}} \right) \tag{1.1}$$

s.t. :

$$C_t + I_t + B_t {R_t}^{-1} = Div_t - T_t + B_{t-1} {\pi_t}^{-1} + L_t W_t + K_{t-1} r^{\mathrm{k}}_t z_t - \psi^{-1} r^{\mathrm{k}}_{\mathrm{ss}} K_{t-1} \left(-1 + e^{\psi \left(-1 + z_t \right)} \right) \quad (\lambda_t) \tag{1.2}$$

$$K_t = K_{t-1} \left(1 - \tau \right) + I_t \left(1 - 0.5 \varphi \left(-1 + {I_{t-1}}^{-1} \epsilon^{\mathrm{I}}_t I_t \right)^2 \right) \quad (q_t) \tag{1.3}$$

1.2 Identities

$$H_t = h C_{t-1} \tag{1.4}$$

$$Q_t = {\lambda_t}^{-1} q_t \tag{1.5}$$

1.3 First order conditions

$$-\lambda_t + \epsilon^{\mathrm{b}}_t \left(C_t - H_t \right)^{-\sigma^{\mathrm{c}}} = 0 \quad (C_t) \tag{1.6}$$

$$-q_t + \beta \left(\left(1 - \tau \right) \mathrm{E}_t \left[q_{t+1} \right] + \mathrm{E}_t \left[\lambda_{t+1} \left(r^{\mathrm{k}}_{t+1} z_{t+1} - \psi^{-1} r^{\mathrm{k}}_{\mathrm{ss}} \left(-1 + e^{\psi \left(-1 + z_{t+1} \right)} \right) \right) \right] \right) = 0 \quad (K_t) \tag{1.7}$$

$$-\lambda_t + q_t \left(1 - 0.5 \varphi \left(-1 + {I_{t-1}}^{-1} \epsilon^{\mathrm{I}}_t I_t \right)^2 - \varphi {I_{t-1}}^{-1} \epsilon^{\mathrm{I}}_t I_t \left(-1 + {I_{t-1}}^{-1} \epsilon^{\mathrm{I}}_t I_t \right) \right) + \beta \varphi {I_t}^{-2} \mathrm{E}_t \left[\epsilon^{\mathrm{I}}_{t+1} q_{t+1} {I_{t+1}}^2 \left(-1 + {I_t}^{-1} \epsilon^{\mathrm{I}}_{t+1} I_{t+1} \right) \right] = 0 \quad (I_t) \tag{1.8}$$

$$\beta \mathrm{E}_t \left[\lambda_{t+1} {\pi_{t+1}}^{-1} \right] - \lambda_t {R_t}^{-1} = 0 \quad (B_t) \tag{1.9}$$

$$\lambda_t \left(K_{t-1} r^{\mathrm{k}}_t - r^{\mathrm{k}}_{\mathrm{ss}} K_{t-1} e^{\psi \left(-1 + z_t \right)} \right) = 0 \quad (z_t) \tag{1.10}$$

2 PREFERENCE SHOCKS

2.1 Identities

$$\log \epsilon_t^{\mathrm{b}} = \eta_t^{\mathrm{b}} + \rho^{\mathrm{b}} \log \epsilon_{t-1}^{\mathrm{b}} \tag{2.1}$$

$$\log \epsilon_t^{\mathrm{L}} = -\eta_t^{\mathrm{L}} + \rho^{\mathrm{L}} \log \epsilon_{t-1}^{\mathrm{L}} \tag{2.2}$$

3 INVESTMENT COST SHOCKS

3.1 Identities

$$\log \epsilon_t^{\mathrm{I}} = \eta_t^{\mathrm{I}} + \rho^{\mathrm{I}} \log \epsilon_{t-1}^{\mathrm{I}} \tag{3.1}$$

4 WAGE SETTING PROBLEM

4.1 Identities

$$f_t^1 = \beta \xi^{\mathrm{w}} \mathrm{E}_t \left[f_{t+1}^1 \left({w_t^\star}^{-1} w_{t+1}^\star \right)^{{\lambda^{\mathrm{w}}}^{-1}} \left({\pi_{t+1}}^{-1} {\pi_t}^{\gamma^{\mathrm{w}}} \right)^{-{\lambda^{\mathrm{w}}}^{-1}} \right] + \lambda_t w_t^\star L_t \left(1 + \lambda^{\mathrm{w}}\right)^{-1} {\pi_t^\star}^{{\mathrm{w}}^{-{\lambda^{\mathrm{w}}}^{-1}(1+\lambda^{\mathrm{w}})}} \tag{4.1}$$

$$f_t^2 = \beta \xi^{\mathrm{w}} \mathrm{E}_t \left[f_{t+1}^2 \left({w_t^\star}^{-1} w_{t+1}^\star \right)^{{\lambda^{\mathrm{w}}}^{-1}(1+\lambda^{\mathrm{w}})\left(1+\sigma^{\mathrm{l}}\right)} \left({\pi_{t+1}}^{-1} {\pi_t}^{\gamma^{\mathrm{w}}} \right)^{-{\lambda^{\mathrm{w}}}^{-1}(1+\lambda^{\mathrm{w}})\left(1+\sigma^{\mathrm{l}}\right)} \right] + \omega \epsilon_t^{\mathrm{b}} \epsilon_t^{\mathrm{L}} \left(L_t {\pi_t^\star}^{{\mathrm{w}}^{-{\lambda^{\mathrm{w}}}^{-1}(1+\lambda^{\mathrm{w}})}} \right)^{1+\sigma^{\mathrm{l}}} \tag{4.2}$$

$$f_t^1 = \eta_t^{\mathrm{w}} + f_t^2 \tag{4.3}$$

$${\pi_t^\star}^{\mathrm{w}} = w_t^\star {W_t}^{-1} \tag{4.4}$$

5 WAGE EVOLUTION

5.1 Identities

$$1 = \left(1 - \xi^{\mathrm{w}}\right) {\pi_t^\star}^{{\mathrm{w}}^{-{\lambda^{\mathrm{w}}}^{-1}}} + \xi^{\mathrm{w}} \left(W_{t-1} {W_t}^{-1} \right)^{-{\lambda^{\mathrm{w}}}^{-1}} \left({\pi_t}^{-1} {\pi_{t-1}}^{\gamma^{\mathrm{w}}} \right)^{-{\lambda^{\mathrm{w}}}^{-1}} \tag{5.1}$$

6 LABOUR AGGREGATION

6.1 Identities

$$\nu^{\mathrm{w}}_{t} = \left(1 - \xi^{\mathrm{w}}\right) {\pi^{\star}_{t}}^{\mathrm{w}-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)} + \xi^{\mathrm{w}} \nu^{\mathrm{w}}_{t-1} \Big(W_{t-1} {\pi_{t}}^{-1} {W_{t}}^{-1} {\pi_{t-1}}^{\gamma^{\mathrm{w}}}\Big)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)} \tag{6.1}$$

$$L_{t} = {\nu^{\mathrm{w}}_{t}}^{-1} L^{\mathrm{s}}_{t} \tag{6.2}$$

7 CONSUMER FLEXIBLE

7.1 Optimisation problem

$$\max_{C^{\mathrm{f}}_{t}, K^{\mathrm{f}}_{t}, I^{\mathrm{f}}_{t}, B^{\mathrm{f}}_{t}, z^{\mathrm{f}}_{t}, L^{\mathrm{sf}}_{t}} U^{\mathrm{f}}_{t} = \beta \mathrm{E}_{t}\left[U^{\mathrm{f}}_{t+1}\right] + \epsilon^{\mathrm{b}}_{t} \left(\left(1 - \sigma^{\mathrm{c}}\right)^{-1} \left(C^{\mathrm{f}}_{t} - H^{\mathrm{f}}_{t}\right)^{1-\sigma^{\mathrm{c}}} - \omega \epsilon^{\mathrm{L}}_{t} \left(1 + \sigma^{\mathrm{l}}\right)^{-1} {L^{\mathrm{sf}}_{t}}^{1+\sigma^{\mathrm{l}}}\right) \tag{7.1}$$

s.t. :

$$C^{\mathrm{f}}_{t} + I^{\mathrm{f}}_{t} + B^{\mathrm{f}}_{t} {R^{\mathrm{f}}_{t}}^{-1} = B^{\mathrm{f}}_{t-1} + Div^{\mathrm{f}}_{t} + \Pi^{\mathrm{wsf}}_{t} - T^{\mathrm{f}}_{t} + L^{\mathrm{sf}}_{t} W^{\mathrm{disutilf}}_{t} + K^{\mathrm{f}}_{t-1} r^{\mathrm{kf}}_{t} z^{\mathrm{f}}_{t} - \psi^{-1} r^{\mathrm{kf}}_{\mathrm{ss}} K^{\mathrm{f}}_{t-1} \left(-1 + e^{\psi\left(-1+z^{\mathrm{f}}_{t}\right)}\right) \quad \left(\lambda^{\mathrm{f}}_{t}\right) \tag{7.2}$$

$$K^{\mathrm{f}}_{t} = K^{\mathrm{f}}_{t-1} \left(1 - \tau\right) + I^{\mathrm{f}}_{t} \left(1 - 0.5\varphi \left(-1 + {I^{\mathrm{f}}_{t-1}}^{-1} \epsilon^{\mathrm{I}}_{t} I^{\mathrm{f}}_{t}\right)^{2}\right) \quad \left(q^{\mathrm{f}}_{t}\right) \tag{7.3}$$

7.2 Identities

$$H^{\mathrm{f}}_{t} = h C^{\mathrm{f}}_{t-1} \tag{7.4}$$

$$Q^{\mathrm{f}}_{t} = {\lambda^{\mathrm{f}}_{t}}^{-1} q^{\mathrm{f}}_{t} \tag{7.5}$$

7.3 First order conditions

$$-\lambda^{\mathrm{f}}_{t} + \epsilon^{\mathrm{b}}_{t} \left(C^{\mathrm{f}}_{t} - H^{\mathrm{f}}_{t}\right)^{-\sigma^{\mathrm{c}}} = 0 \quad \left(C^{\mathrm{f}}_{t}\right) \tag{7.6}$$

$$-q^{\mathrm{f}}_{t} + \beta \left(\left(1 - \tau\right) \mathrm{E}_{t}\left[q^{\mathrm{f}}_{t+1}\right] + \mathrm{E}_{t}\left[\lambda^{\mathrm{f}}_{t+1} \left(r^{\mathrm{kf}}_{t+1} z^{\mathrm{f}}_{t+1} - \psi^{-1} r^{\mathrm{kf}}_{\mathrm{ss}} \left(-1 + e^{\psi\left(-1+z^{\mathrm{f}}_{t+1}\right)}\right)\right)\right]\right) = 0 \quad \left(K^{\mathrm{f}}_{t}\right) \tag{7.7}$$

$$-\lambda^{\mathrm{f}}_{t} + q^{\mathrm{f}}_{t} \left(1 - 0.5\varphi \left(-1 + {I^{\mathrm{f}}_{t-1}}^{-1} \epsilon^{\mathrm{I}}_{t} I^{\mathrm{f}}_{t}\right)^{2} - \varphi {I^{\mathrm{f}}_{t-1}}^{-1} \epsilon^{\mathrm{I}}_{t} I^{\mathrm{f}}_{t} \left(-1 + {I^{\mathrm{f}}_{t-1}}^{-1} \epsilon^{\mathrm{I}}_{t} I^{\mathrm{f}}_{t}\right)\right) + \beta \varphi {I^{\mathrm{f}}_{t}}^{-2} \mathrm{E}_{t}\left[\epsilon^{\mathrm{I}}_{t+1} q^{\mathrm{f}}_{t+1} {I^{\mathrm{f}}_{t+1}}^{2} \left(-1 + {I^{\mathrm{f}}_{t}}^{-1} \epsilon^{\mathrm{I}}_{t+1} I^{\mathrm{f}}_{t+1}\right)\right] = 0 \quad \left(I^{\mathrm{f}}_{t}\right) \tag{7.8}$$

$$\beta \mathrm{E}_{t}\left[\lambda^{\mathrm{f}}_{t+1}\right] - \lambda^{\mathrm{f}}_{t} {R^{\mathrm{f}}_{t}}^{-1} = 0 \quad \left(B^{\mathrm{f}}_{t}\right) \tag{7.9}$$

$$\lambda^{\mathrm{f}}_{t}\left(K^{\mathrm{f}}_{t-1} r^{\mathrm{k}^{\mathrm{f}}}_{t} - r^{\mathrm{k}^{\mathrm{f}}}_{\mathrm{ss}} K^{\mathrm{f}}_{t-1} e^{\psi\left(-1+z^{\mathrm{f}}_{t}\right)}\right) = 0 \quad \left(z^{\mathrm{f}}_{t}\right) \tag{7.10}$$

$$\lambda^{\mathrm{f}}_{t} W^{\mathrm{disutil}^{\mathrm{f}}}_{t} - \omega \epsilon^{\mathrm{b}}_{t} \epsilon^{\mathrm{L}}_{t} {L^{\mathrm{s}^{\mathrm{f}}}_{t}}^{\sigma^{\mathrm{l}}} = 0 \quad \left(L^{\mathrm{s}^{\mathrm{f}}}_{t}\right) \tag{7.11}$$

8 FLEXIBLE MONOPOLISTIC WORKER

8.1 Optimisation problem

$$\max_{W^{\mathrm{i}^{\mathrm{f}}}_{t}, L^{{\mathrm{i}^{\star}}^{\mathrm{f}}}_{t}} \Pi^{\mathrm{ws}^{\mathrm{f}}}_{t} = L^{{\mathrm{i}^{\star}}^{\mathrm{f}}}_{t}\left(-W^{\mathrm{disutil}^{\mathrm{f}}}_{t} + W^{\mathrm{i}^{\mathrm{f}}}_{t}\right) \tag{8.1}$$

s.t. :

$$L^{{\mathrm{i}^{\star}}^{\mathrm{f}}}_{t} = L^{\mathrm{f}}_{t}\left(W^{\mathrm{i}^{\mathrm{f}}}_{t} {W^{\mathrm{f}}_{t}}^{-1}\right)^{{\lambda^{\mathrm{w}}}^{-1}\left(-1-\lambda^{\mathrm{w}}\right)} \quad \left(\lambda^{\mathrm{FLEXIBLE}^{\mathrm{MONOPOLISTIC}^{\mathrm{WORKER}^{1}}}}_{t}\right) \tag{8.2}$$

8.2 Identities

$$L^{{\mathrm{i}^{\star}}^{\mathrm{f}}}_{t} = L^{\mathrm{i}^{\mathrm{f}}}_{t} \tag{8.3}$$

8.3 First order conditions

$$L^{{\mathrm{i}^{\star}}^{\mathrm{f}}}_{t} + {\lambda^{\mathrm{w}}}^{-1} \lambda^{\mathrm{FLEXIBLE}^{\mathrm{MONOPOLISTIC}^{\mathrm{WORKER}^{1}}}}_{t} L^{\mathrm{f}}_{t} {W^{\mathrm{f}}_{t}}^{-1}\left(-1-\lambda^{\mathrm{w}}\right)\left(W^{\mathrm{i}^{\mathrm{f}}}_{t} {W^{\mathrm{f}}_{t}}^{-1}\right)^{-1+{\lambda^{\mathrm{w}}}^{-1}\left(-1-\lambda^{\mathrm{w}}\right)} = 0 \quad \left(W^{\mathrm{i}^{\mathrm{f}}}_{t}\right) \tag{8.4}$$

$$-\lambda^{\mathrm{FLEXIBLE}^{\mathrm{MONOPOLISTIC}^{\mathrm{WORKER}^{1}}}}_{t} - W^{\mathrm{disutil}^{\mathrm{f}}}_{t} + W^{\mathrm{i}^{\mathrm{f}}}_{t} = 0 \quad \left(L^{{\mathrm{i}^{\star}}^{\mathrm{f}}}_{t}\right) \tag{8.5}$$

8.4 First order conditions after reduction

$$L^{{\mathrm{i}^{\star}}^{\mathrm{f}}}_{t} + {\lambda^{\mathrm{w}}}^{-1} L^{\mathrm{f}}_{t} {W^{\mathrm{f}}_{t}}^{-1}\left(-1-\lambda^{\mathrm{w}}\right)\left(-W^{\mathrm{disutil}^{\mathrm{f}}}_{t} + W^{\mathrm{i}^{\mathrm{f}}}_{t}\right)\left(W^{\mathrm{i}^{\mathrm{f}}}_{t} {W^{\mathrm{f}}_{t}}^{-1}\right)^{-1+{\lambda^{\mathrm{w}}}^{-1}\left(-1-\lambda^{\mathrm{w}}\right)} = 0 \quad \left(W^{\mathrm{i}^{\mathrm{f}}}_{t}\right) \tag{8.6}$$

9 LABOUR AGGREGATION FLEXIBLE

9.1 Identities

$$L^{\mathrm{s}^{\mathrm{f}}}_{t} = L^{\mathrm{i}^{\mathrm{f}}}_{t} \tag{9.1}$$

$$L^{\mathrm{f}}_{t} = L^{\mathrm{s}^{\mathrm{f}}}_{t} \tag{9.2}$$

10 FIRM

10.1 Optimisation problem

$$\max_{K_t^{\mathrm{j}^{\mathrm{d}}},L_t^{\mathrm{j}^{\mathrm{d}}}} tc_t^{\mathrm{j}} = -r_t^{\mathrm{k}} K_t^{\mathrm{j}^{\mathrm{d}}} - L_t^{\mathrm{j}^{\mathrm{d}}} W_t \tag{10.1}$$

s.t. :

$$Y_t^{\mathrm{j}} = -\Phi + \epsilon_t^{\mathrm{a}} {K_t^{\mathrm{j}^{\mathrm{d}}}}^{\alpha} {L_t^{\mathrm{j}^{\mathrm{d}}}}^{1-\alpha} \qquad (mc_t) \tag{10.2}$$

10.2 First order conditions

$$-r_t^{\mathrm{k}} + \alpha \epsilon_t^{\mathrm{a}} mc_t {K_t^{\mathrm{j}^{\mathrm{d}}}}^{-1+\alpha} {L_t^{\mathrm{j}^{\mathrm{d}}}}^{1-\alpha} = 0 \quad \left(K_t^{\mathrm{j}^{\mathrm{d}}}\right) \tag{10.3}$$

$$-W_t + \epsilon_t^{\mathrm{a}} mc_t \left(1-\alpha\right) {K_t^{\mathrm{j}^{\mathrm{d}}}}^{\alpha} {L_t^{\mathrm{j}^{\mathrm{d}}}}^{-\alpha} = 0 \quad \left(L_t^{\mathrm{j}^{\mathrm{d}}}\right) \tag{10.4}$$

11 TECHNOLOGY

11.1 Identities

$$\log \epsilon_t^{\mathrm{a}} = \eta_t^{\mathrm{a}} + \rho^{\mathrm{a}} \log \epsilon_{t-1}^{\mathrm{a}} \tag{11.1}$$

12 PRICE SETTING PROBLEM

12.1 Identities

$$g_t^1 = \eta_t^{\mathrm{p}} + g_t^2 \left(1 + \lambda^{\mathrm{p}}\right) \tag{12.1}$$

$$g_t^1 = \lambda_t \pi_t^{\star} Y_t + \beta \xi^{\mathrm{p}} \pi_t^{\star} \mathrm{E}_t \left[g_{t+1}^1 {\pi_{t+1}^{\star}}^{-1} \left({\pi_{t+1}}^{-1} {\pi_t}^{\gamma^{\mathrm{p}}} \right)^{-\lambda^{\mathrm{p}-1}} \right] \tag{12.2}$$

$$g_t^2 = \beta \xi^{\mathrm{p}} \mathrm{E}_t \left[g_{t+1}^2 \left({\pi_{t+1}}^{-1} {\pi_t}^{\gamma^{\mathrm{p}}} \right)^{-\lambda^{\mathrm{p}-1}\left(1+\lambda^{\mathrm{p}}\right)} \right] + \lambda_t mc_t Y_t \tag{12.3}$$

13 PRICE EVOLUTION

13.1 Identities

$$1 = \xi^{\mathrm{p}} \left({\pi_t}^{-1} {\pi_{t-1}}^{\gamma^{\mathrm{p}}} \right)^{-\lambda^{\mathrm{p}-1}} + \left(1 - \xi^{\mathrm{p}}\right) {\pi_t^{\star}}^{-\lambda^{\mathrm{p}-1}} \tag{13.1}$$

14 FACTOR DEMAND AGGREGATION

14.1 Identities

$$K_t^{\mathrm{d}} = K_t^{\mathrm{j}^{\mathrm{d}}} \tag{14.1}$$

$$L_t^{\mathrm{d}} = L_t^{\mathrm{j}^{\mathrm{d}}} \tag{14.2}$$

15 PRODUCT AGGREGATION

15.1 Identities

$$Y_t^{\mathrm{s}} = Y_t^{\mathrm{j}} \tag{15.1}$$

$$\nu_t^{\mathrm{p}} = \left(1 - \xi^{\mathrm{p}}\right) \pi_t^{\star\,-\lambda^{\mathrm{p}\,-1}\left(1+\lambda^{\mathrm{p}}\right)} + \xi^{\mathrm{p}} \nu_{t-1}^{\mathrm{p}} \left(\pi_t^{\,-1} \pi_{t-1}^{\;\gamma^{\mathrm{p}}}\right)^{-\lambda^{\mathrm{p}\,-1}\left(1+\lambda^{\mathrm{p}}\right)} \tag{15.2}$$

$$\nu_t^{\mathrm{p}} Y_t = Y_t^{\mathrm{s}} \tag{15.3}$$

16 FIRM FLEXIBLE

16.1 Optimisation problem

$$\max_{K_t^{\mathrm{j}^{\mathrm{df}}},\, L_t^{\mathrm{j}^{\mathrm{df}}}} tc_t^{\mathrm{j}^{\mathrm{f}}} = -r_t^{\mathrm{k}^{\mathrm{f}}} K_t^{\mathrm{j}^{\mathrm{df}}} - L_t^{\mathrm{j}^{\mathrm{df}}} W_t^{\mathrm{f}} \tag{16.1}$$

s.t. :

$$Y_t^{\mathrm{j}^{\mathrm{f}}} = -\Phi + \epsilon_t^{\mathrm{a}} K_t^{\mathrm{j}^{\mathrm{df}}\,\alpha} L_t^{\mathrm{j}^{\mathrm{df}}\,1-\alpha} \qquad \left(mc_t^{\mathrm{f}}\right) \tag{16.2}$$

16.2 First order conditions

$$-r_t^{\mathrm{k}^{\mathrm{f}}} + \alpha \epsilon_t^{\mathrm{a}} mc_t^{\mathrm{f}} K_t^{\mathrm{j}^{\mathrm{df}}\,-1+\alpha} L_t^{\mathrm{j}^{\mathrm{df}}\,1-\alpha} = 0 \qquad \left(K_t^{\mathrm{j}^{\mathrm{df}}}\right) \tag{16.3}$$

$$-W_t^{\mathrm{f}} + \epsilon_t^{\mathrm{a}} mc_t^{\mathrm{f}} \left(1 - \alpha\right) K_t^{\mathrm{j}^{\mathrm{df}}\,\alpha} L_t^{\mathrm{j}^{\mathrm{df}}\,-\alpha} = 0 \qquad \left(L_t^{\mathrm{j}^{\mathrm{df}}}\right) \tag{16.4}$$

17 PRICE SETTING PROBLEM FLEXIBLE

17.1 Optimisation problem

$$\max_{Y_t^{\mathrm{j}^{\mathrm{f}}},P_t^{\mathrm{j}^{\mathrm{f}}}} \Pi_t^{\mathrm{ps}^{\mathrm{f}}} = Y_t^{\mathrm{j}^{\mathrm{f}}} \left(-mc_t^{\mathrm{f}} + P_t^{\mathrm{j}^{\mathrm{f}}}\right) \tag{17.1}$$

s.t. :

$$Y_t^{\mathrm{j}^{\mathrm{f}}} = Y_t^{\mathrm{f}} \left(P_t^{\mathrm{f}^{-1}} P_t^{\mathrm{j}^{\mathrm{f}}}\right)^{-\lambda^{\mathrm{p}^{-1}}(1+\lambda^{\mathrm{p}})} \quad \left(\lambda_t^{\mathrm{PRICE}^{\mathrm{SETTING}^{\mathrm{PROBLEM}^{\mathrm{FLEXIBLE}^{1}}}}}\right) \tag{17.2}$$

17.2 First order conditions

$$-\lambda_t^{\mathrm{PRICE}^{\mathrm{SETTING}^{\mathrm{PROBLEM}^{\mathrm{FLEXIBLE}^{1}}}}} - mc_t^{\mathrm{f}} + P_t^{\mathrm{j}^{\mathrm{f}}} = 0 \quad \left(Y_t^{\mathrm{j}^{\mathrm{f}}}\right) \tag{17.3}$$

$$Y_t^{\mathrm{j}^{\mathrm{f}}} - \lambda^{\mathrm{p}^{-1}} \lambda_t^{\mathrm{PRICE}^{\mathrm{SETTING}^{\mathrm{PROBLEM}^{\mathrm{FLEXIBLE}^{1}}}}} P_t^{\mathrm{f}^{-1}} Y_t^{\mathrm{f}} \left(1+\lambda^{\mathrm{p}}\right) \left(P_t^{\mathrm{f}^{-1}} P_t^{\mathrm{j}^{\mathrm{f}}}\right)^{-1-\lambda^{\mathrm{p}^{-1}}(1+\lambda^{\mathrm{p}})} = 0 \quad \left(P_t^{\mathrm{j}^{\mathrm{f}}}\right) \tag{17.4}$$

17.3 First order conditions after reduction

$$Y_t^{\mathrm{j}^{\mathrm{f}}} - \lambda^{\mathrm{p}^{-1}} P_t^{\mathrm{f}^{-1}} Y_t^{\mathrm{f}} \left(1+\lambda^{\mathrm{p}}\right) \left(-mc_t^{\mathrm{f}} + P_t^{\mathrm{j}^{\mathrm{f}}}\right) \left(P_t^{\mathrm{f}^{-1}} P_t^{\mathrm{j}^{\mathrm{f}}}\right)^{-1-\lambda^{\mathrm{p}^{-1}}(1+\lambda^{\mathrm{p}})} = 0 \quad \left(P_t^{\mathrm{j}^{\mathrm{f}}}\right) \tag{17.5}$$

18 FACTOR DEMAND AGGREGATION FLEXIBLE

18.1 Identities

$$K_t^{\mathrm{d}^{\mathrm{f}}} = K_t^{\mathrm{j}^{\mathrm{d}^{\mathrm{f}}}} \tag{18.1}$$

$$L_t^{\mathrm{d}^{\mathrm{f}}} = L_t^{\mathrm{j}^{\mathrm{d}^{\mathrm{f}}}} \tag{18.2}$$

19 PRODUCT AGGREGATION FLEXIBLE

19.1 Identities

$$Y_t^{\mathrm{s}^{\mathrm{f}}} = Y_t^{\mathrm{j}^{\mathrm{f}}} \tag{19.1}$$

$$Y_t^{\mathrm{f}} = Y_t^{\mathrm{s}^{\mathrm{f}}} \tag{19.2}$$

20 PRICE EVOLUTION FLEXIBLE

20.1 Identities

$$P_t^{\mathrm{f}} = 1 \tag{20.1}$$

21 GOVERNMENT

21.1 Identities

$$G_t = G^{\mathrm{bar}} \epsilon_t^{\mathrm{G}} \tag{21.1}$$

$$G_t + B_{t-1} {\pi_t}^{-1} = T_t + B_t {R_t}^{-1} \tag{21.2}$$

22 GOVERNMENT SPENDING SHOCK

22.1 Identities

$$\log \epsilon_t^{\mathrm{G}} = \eta_t^{\mathrm{G}} + \rho^{\mathrm{G}} \log \epsilon_{t-1}^{\mathrm{G}} \tag{22.1}$$

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23 GOVERNMENT FLEXIBLE

23.1 Identities

$$G_t^{\mathrm{f}} = G^{\mathrm{bar}} \epsilon_t^{\mathrm{G}} \tag{23.1}$$

$$B_{t-1}^{\mathrm{f}} + G_t^{\mathrm{f}} = T_t^{\mathrm{f}} + B_t^{\mathrm{f}} {R_t^{\mathrm{f}}}^{-1} \tag{23.2}$$

24 MONETARY POLICY AUTHORITY

24.1 Identities

$$calibr^{\pi} + \log\left({R_{\mathrm{ss}}}^{-1} R_t\right) = \eta_t^{\mathrm{R}} + r^{\Delta^{\pi}} \left(-\log\left({\pi_{\mathrm{ss}}}^{-1} \pi_{t-1}\right) + \log\left({\pi_{\mathrm{ss}}}^{-1} \pi_t\right)\right) + r^{\Delta^{\mathrm{y}}} \left(-\log\left({Y_{\mathrm{ss}}}^{-1} Y_{t-1}\right) + \log\left({Y_{\mathrm{ss}}}^{-1} Y_t\right) + \log\left({Y_{\mathrm{ss}}^{\mathrm{f}}}^{-1} Y_{t-1}^{\mathrm{f}}\right) - \log\left({Y_{\mathrm{ss}}^{\mathrm{f}}}^{-1} Y_t^{\mathrm{f}}\right)\right) + \rho \log\left({R_{\mathrm{ss}}}^{-1} R_{t-1}\right) + (1-\rho) \left(\log \tag{24.1}$$

$$\log \pi_t^{\mathrm{obj}} = \eta_t^{\pi} + \rho^{\pi^{\mathrm{bar}}} \log \pi_{t-1}^{\mathrm{obj}} + \log calibr^{\pi^{\mathrm{obj}}} \left(1 - \rho^{\pi^{\mathrm{bar}}}\right) \tag{24.2}$$

25 EQUILIBRIUM

25.1 Identities

$$K^{\mathrm{d}}_t = K_{t-1} z_t \tag{25.1}$$

$$L_t = L^{\mathrm{d}}_t \tag{25.2}$$

$$B_t = 0 \tag{25.3}$$

$$Dw_t = Y_t - L^{\mathrm{d}}_t W_t - r^{\mathrm{k}}_t K^{\mathrm{d}}_t \tag{25.4}$$

26 EQUILIBRIUM FLEXIBLE

26.1 Identities

$$K^{\mathrm{d}^{\mathrm{f}}}_t = K^{\mathrm{f}}_{t-1} z^{\mathrm{f}}_t \tag{26.1}$$

$$L^{\mathrm{f}}_t = L^{\mathrm{d}^{\mathrm{f}}}_t \tag{26.2}$$

$$B^{\mathrm{f}}_t = 0 \tag{26.3}$$

$$Dw^{\mathrm{f}}_t = Y^{\mathrm{f}}_t - L^{\mathrm{d}^{\mathrm{f}}}_t W^{\mathrm{f}}_t - r^{\mathrm{k}^{\mathrm{f}}}_t K^{\mathrm{d}^{\mathrm{f}}}_t \tag{26.4}$$

27 Equilibrium relationships (after reduction)

$$-q_t + \beta\left((1-\tau)\,\mathrm{E}_t\left[q_{t+1}\right] + \mathrm{E}_t\left[\epsilon^{\mathrm{b}}_{t+1}\left(r^{\mathrm{k}}_{t+1} z_{t+1} - \psi^{-1} r^{\mathrm{k}}_{\mathrm{ss}}\left(-1 + e^{\psi\left(-1+z_{t+1}\right)}\right)\right)\left(C_{t+1} - hC_t\right)^{-\sigma^{\mathrm{c}}}\right]\right) = 0 \tag{27.1}$$

$$-q^{\mathrm{f}}_t + \beta\left((1-\tau)\,\mathrm{E}_t\left[q^{\mathrm{f}}_{t+1}\right] + \mathrm{E}_t\left[\epsilon^{\mathrm{b}}_{t+1}\left(r^{\mathrm{k}^{\mathrm{f}}}_{t+1} z^{\mathrm{f}}_{t+1} - \psi^{-1} r^{\mathrm{k}^{\mathrm{f}}}_{\mathrm{ss}}\left(-1 + e^{\psi\left(-1+z^{\mathrm{f}}_{t+1}\right)}\right)\right)\left(C^{\mathrm{f}}_{t+1} - hC^{\mathrm{f}}_t\right)^{-\sigma^{\mathrm{c}}}\right]\right) = 0 \tag{27.2}$$

$$-r^{\mathrm{k}}_t + \alpha \epsilon^{\mathrm{a}}_t mc_t {L_t}^{1-\alpha} \left(K_{t-1} z_t\right)^{-1+\alpha} = 0 \tag{27.3}$$

$$-r^{\mathrm{k}^{\mathrm{f}}}_t + \alpha \epsilon^{\mathrm{a}}_t mc^{\mathrm{f}}_t {L^{\mathrm{f}}_t}^{1-\alpha} \left(K^{\mathrm{f}}_{t-1} z^{\mathrm{f}}_t\right)^{-1+\alpha} = 0 \tag{27.4}$$

$$-G_t + T_t = 0 \tag{27.5}$$

$$-G_t + G^{\mathrm{bar}} \epsilon_t^{\mathrm{G}} = 0 \tag{27.6}$$

$$-G_t^{\mathrm{f}} + T_t^{\mathrm{f}} = 0 \tag{27.7}$$

$$-G_t^{\mathrm{f}} + G^{\mathrm{bar}} \epsilon_t^{\mathrm{G}} = 0 \tag{27.8}$$

$$-L_t + {\nu_t^{\mathrm{w}}}^{-1} L_t^{\mathrm{s}} = 0 \tag{27.9}$$

$$-L_t^{\mathrm{s^f}} + L_t^{\mathrm{f}} \left(W_t^{\mathrm{i^f}} {W_t^{\mathrm{f}}}^{-1}\right)^{{\lambda^{\mathrm{w}}}^{-1} (-1-\lambda^{\mathrm{w}})} = 0 \tag{27.10}$$

$$L_t^{\mathrm{s^f}} - L_t^{\mathrm{f}} = 0 \tag{27.11}$$

$$L_t^{\mathrm{s^f}} + {\lambda^{\mathrm{w}}}^{-1} L_t^{\mathrm{f}} {W_t^{\mathrm{f}}}^{-1} \left(-1 - \lambda^{\mathrm{w}}\right) \left(-W_t^{\mathrm{disutil^f}} + W_t^{\mathrm{i^f}}\right) \left(W_t^{\mathrm{i^f}} {W_t^{\mathrm{f}}}^{-1}\right)^{-1 + {\lambda^{\mathrm{w}}}^{-1} (-1-\lambda^{\mathrm{w}})} = 0 \tag{27.12}$$

$$\Pi_t^{\mathrm{ws^f}} - L_t^{\mathrm{s^f}} \left(-W_t^{\mathrm{disutil^f}} + W_t^{\mathrm{i^f}}\right) = 0 \tag{27.13}$$

$$\Pi_t^{\mathrm{ps^f}} - Y_t^{\mathrm{f}} \left(-mc_t^{\mathrm{f}} + P_t^{\mathrm{j^f}}\right) {P_t^{\mathrm{j^f}}}^{-{\lambda^{\mathrm{p}}}^{-1} (1+\lambda^{\mathrm{p}})} = 0 \tag{27.14}$$

$$-Q_t + {\epsilon_t^{\mathrm{b}}}^{-1} q_t (C_t - hC_{t-1})^{\sigma^{\mathrm{c}}} = 0 \tag{27.15}$$

$$-Q_t^{\mathrm{f}} + {\epsilon_t^{\mathrm{b}}}^{-1} q_t^{\mathrm{f}} \left(C_t^{\mathrm{f}} - hC_{t-1}^{\mathrm{f}}\right)^{\sigma^{\mathrm{c}}} = 0 \tag{27.16}$$

$$-W_t + \epsilon_t^{\mathrm{a}} mc_t \left(1 - \alpha\right) {L_t}^{-\alpha} (K_{t-1} z_t)^{\alpha} = 0 \tag{27.17}$$

$$-W_t^{\mathrm{f}} + \epsilon_t^{\mathrm{a}} mc_t^{\mathrm{f}} \left(1 - \alpha\right) {L_t^{\mathrm{f}}}^{-\alpha} \left(K_{t-1}^{\mathrm{f}} z_t^{\mathrm{f}}\right)^{\alpha} = 0 \tag{27.18}$$

$$Y_t^{\mathrm{s}} - \nu_t^{\mathrm{p}} Y_t = 0 \tag{27.19}$$

$$-Y_t^{\mathrm{f}} + Y_t^{\mathrm{s^f}} = 0 \tag{27.20}$$

$$-Y_t^{\mathrm{s^f}} + Y_t^{\mathrm{f}} {P_t^{\mathrm{j^f}}}^{-{\lambda^{\mathrm{p}}}^{-1} (1+\lambda^{\mathrm{p}})} = 0 \tag{27.21}$$

$$\beta \mathrm{E}_t \left[\epsilon^{\mathrm{b}}_{t+1} \left(C^{\mathrm{f}}_{t+1} - h C^{\mathrm{f}}_t\right)^{-\sigma^{\mathrm{c}}}\right] - \epsilon^{\mathrm{b}}_t {R^{\mathrm{f}}_t}^{-1} \left(C^{\mathrm{f}}_t - h C^{\mathrm{f}}_{t-1}\right)^{-\sigma^{\mathrm{c}}} = 0 \tag{27.22}$$

$$\beta \mathrm{E}_t \left[\epsilon^{\mathrm{b}}_{t+1} {\pi_{t+1}}^{-1} (C_{t+1} - h C_t)^{-\sigma^{\mathrm{c}}}\right] - \epsilon^{\mathrm{b}}_t {R_t}^{-1} (C_t - h C_{t-1})^{-\sigma^{\mathrm{c}}} = 0 \tag{27.23}$$

$$Y^{\mathrm{f}}_t {P^{\mathrm{j^f}}_t}^{-{\lambda^{\mathrm{p}}}^{-1}(1+\lambda^{\mathrm{p}})} - {\lambda^{\mathrm{p}}}^{-1} Y^{\mathrm{f}}_t \left(1 + \lambda^{\mathrm{p}}\right) \left(-mc^{\mathrm{f}}_t + P^{\mathrm{j^f}}_t\right) {P^{\mathrm{j^f}}_t}^{-1-{\lambda^{\mathrm{p}}}^{-1}(1+\lambda^{\mathrm{p}})} = 0 \tag{27.24}$$

$$\epsilon^{\mathrm{b}}_t W^{\mathrm{disutil^f}}_t \left(C^{\mathrm{f}}_t - h C^{\mathrm{f}}_{t-1}\right)^{-\sigma^{\mathrm{c}}} - \omega \epsilon^{\mathrm{b}}_t \epsilon^{\mathrm{L}}_t {L^{\mathrm{s^f}}_t}^{\sigma^{\mathrm{l}}} = 0 \tag{27.25}$$

$$-1 + \xi^{\mathrm{p}} \left({\pi_t}^{-1} {\pi_{t-1}}^{\gamma^{\mathrm{p}}}\right)^{-{\lambda^{\mathrm{p}}}^{-1}} + \left(1 - \xi^{\mathrm{p}}\right) {\pi^\star_t}^{-{\lambda^{\mathrm{p}}}^{-1}} = 0 \tag{27.26}$$

$$-1 + \left(1 - \xi^{\mathrm{w}}\right) \left(w^\star_t {W_t}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}} + \xi^{\mathrm{w}} \left(W_{t-1} {W_t}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}} \left({\pi_t}^{-1} {\pi_{t-1}}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}} = 0 \tag{27.27}$$

$$-\Phi - Y^{\mathrm{s}}_t + \epsilon^{\mathrm{a}}_t {L_t}^{1-\alpha} (K_{t-1} z_t)^{\alpha} = 0 \tag{27.28}$$

$$-\Phi - Y^{\mathrm{f}}_t {P^{\mathrm{j^f}}_t}^{-{\lambda^{\mathrm{p}}}^{-1}(1+\lambda^{\mathrm{p}})} + \epsilon^{\mathrm{a}}_t {L^{\mathrm{f}}_t}^{1-\alpha} \left(K^{\mathrm{f}}_{t-1} z^{\mathrm{f}}_t\right)^{\alpha} = 0 \tag{27.29}$$

$$\eta^{\mathrm{b}}_t - \log \epsilon^{\mathrm{b}}_t + \rho^{\mathrm{b}} \log \epsilon^{\mathrm{b}}_{t-1} = 0 \tag{27.30}$$

$$-\eta^{\mathrm{L}}_t - \log \epsilon^{\mathrm{L}}_t + \rho^{\mathrm{L}} \log \epsilon^{\mathrm{L}}_{t-1} = 0 \tag{27.31}$$

$$\eta^{\mathrm{I}}_t - \log \epsilon^{\mathrm{I}}_t + \rho^{\mathrm{I}} \log \epsilon^{\mathrm{I}}_{t-1} = 0 \tag{27.32}$$

$$\eta^{\mathrm{w}}_t - f^1_t + f^2_t = 0 \tag{27.33}$$

$$\eta^{\mathrm{a}}_t - \log \epsilon^{\mathrm{a}}_t + \rho^{\mathrm{a}} \log \epsilon^{\mathrm{a}}_{t-1} = 0 \tag{27.34}$$

$$\eta^{\mathrm{p}}_t - g^1_t + g^2_t \left(1 + \lambda^{\mathrm{p}}\right) = 0 \tag{27.35}$$

$$\eta^{\mathrm{G}}_t - \log \epsilon^{\mathrm{G}}_t + \rho^{\mathrm{G}} \log \epsilon^{\mathrm{G}}_{t-1} = 0 \tag{27.36}$$

$$-f_t^1+\beta\xi^{\mathrm{w}}\mathrm{E}_t\left[f_{t+1}^1\left({w_t^{\star}}^{-1}w_{t+1}^{\star}\right)^{{\lambda^{\mathrm{w}}}^{-1}}\left({\pi_{t+1}}^{-1}{\pi_t}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}}\right]+\epsilon_t^{\mathrm{b}}w_t^{\star}L_t\left(1+\lambda^{\mathrm{w}}\right)^{-1}\left(C_t-hC_{t-1}\right)^{-\sigma^{\mathrm{c}}}\left(w_t^{\star}{W_t}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}=0 \tag{27.37}$$

$$-f_t^2+\beta\xi^{\mathrm{w}}\mathrm{E}_t\left[f_{t+1}^2\left({w_t^{\star}}^{-1}w_{t+1}^{\star}\right)^{{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)\left(1+\sigma^{\mathrm{l}}\right)}\left({\pi_{t+1}}^{-1}{\pi_t}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)\left(1+\sigma^{\mathrm{l}}\right)}\right]+\omega\epsilon_t^{\mathrm{b}}\epsilon_t^{\mathrm{L}}\left(L_t\left(w_t^{\star}{W_t}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}\right)^{1+\sigma^{\mathrm{l}}}=0 \tag{27.38}$$

$$-g_t^1+\beta\xi^{\mathrm{p}}\pi_t^{\star}\mathrm{E}_t\left[g_{t+1}^1{\pi_{t+1}^{\star}}^{-1}\left({\pi_{t+1}}^{-1}{\pi_t}^{\gamma^{\mathrm{p}}}\right)^{-{\lambda^{\mathrm{p}}}^{-1}}\right]+\epsilon_t^{\mathrm{b}}\pi_t^{\star}Y_t(C_t-hC_{t-1})^{-\sigma^{\mathrm{c}}}=0 \tag{27.39}$$

$$-g_t^2+\beta\xi^{\mathrm{p}}\mathrm{E}_t\left[g_{t+1}^2\left({\pi_{t+1}}^{-1}{\pi_t}^{\gamma^{\mathrm{p}}}\right)^{-{\lambda^{\mathrm{p}}}^{-1}\left(1+\lambda^{\mathrm{p}}\right)}\right]+\epsilon_t^{\mathrm{b}}mc_tY_t(C_t-hC_{t-1})^{-\sigma^{\mathrm{c}}}=0 \tag{27.40}$$

$$-\nu_t^{\mathrm{w}}+\left(1-\xi^{\mathrm{w}}\right)\left(w_t^{\star}{W_t}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}+\xi^{\mathrm{w}}\nu_{t-1}^{\mathrm{w}}\left(W_{t-1}{\pi_t}^{-1}{W_t}^{-1}{\pi_{t-1}}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}=0 \tag{27.41}$$

$$-\nu_t^{\mathrm{p}}+\left(1-\xi^{\mathrm{p}}\right){\pi_t^{\star}}^{-{\lambda^{\mathrm{p}}}^{-1}\left(1+\lambda^{\mathrm{p}}\right)}+\xi^{\mathrm{p}}\nu_{t-1}^{\mathrm{p}}\left({\pi_t}^{-1}{\pi_{t-1}}^{\gamma^{\mathrm{p}}}\right)^{-{\lambda^{\mathrm{p}}}^{-1}\left(1+\lambda^{\mathrm{p}}\right)}=0 \tag{27.42}$$

$$-K_t+K_{t-1}\left(1-\tau\right)+I_t\left(1-0.5\varphi\left(-1+{I_{t-1}}^{-1}\epsilon_t^{\mathrm{I}}I_t\right)^2\right)=0 \tag{27.43}$$

$$-K_t^{\mathrm{f}}+K_{t-1}^{\mathrm{f}}\left(1-\tau\right)+I_t^{\mathrm{f}}\left(1-0.5\varphi\left(-1+{I_{t-1}^{\mathrm{f}}}^{-1}\epsilon_t^{\mathrm{I}}I_t^{\mathrm{f}}\right)^2\right)=0 \tag{27.44}$$

$$U_t-\beta\mathrm{E}_t\left[U_{t+1}\right]-\epsilon_t^{\mathrm{b}}\left(\left(1-\sigma^{\mathrm{c}}\right)^{-1}\left(C_t-hC_{t-1}\right)^{1-\sigma^{\mathrm{c}}}-\omega\epsilon_t^{\mathrm{L}}\left(1+\sigma^{\mathrm{l}}\right)^{-1}{L_t^{\mathrm{s}}}^{1+\sigma^{\mathrm{l}}}\right)=0 \tag{27.45}$$

$$U_t^{\mathrm{f}}-\beta\mathrm{E}_t\left[U_{t+1}^{\mathrm{f}}\right]-\epsilon_t^{\mathrm{b}}\left(\left(1-\sigma^{\mathrm{c}}\right)^{-1}\left(C_t^{\mathrm{f}}-hC_{t-1}^{\mathrm{f}}\right)^{1-\sigma^{\mathrm{c}}}-\omega\epsilon_t^{\mathrm{L}}\left(1+\sigma^{\mathrm{l}}\right)^{-1}{L_t^{\mathrm{s}^{\mathrm{f}}}}^{1+\sigma^{\mathrm{l}}}\right)=0 \tag{27.46}$$

$$-\epsilon_t^{\mathrm{b}}(C_t-hC_{t-1})^{-\sigma^{\mathrm{c}}}+q_t\left(1-0.5\varphi\left(-1+{I_{t-1}}^{-1}\epsilon_t^{\mathrm{I}}I_t\right)^2-\varphi{I_{t-1}}^{-1}\epsilon_t^{\mathrm{I}}I_t\left(-1+{I_{t-1}}^{-1}\epsilon_t^{\mathrm{I}}I_t\right)\right)+\beta\varphi{I_t}^{-2}\mathrm{E}_t\left[\epsilon_{t+1}^{\mathrm{I}}q_{t+1}{I_{t+1}}^2\left(-1+{I_t}^{-1}\epsilon_{t+1}^{\mathrm{I}}I_{t+1}\right)\right]=0 \tag{27.47}$$

$$-\epsilon_t^{\mathrm{b}}\left(C_t^{\mathrm{f}}-hC_{t-1}^{\mathrm{f}}\right)^{-\sigma^{\mathrm{c}}}+q_t^{\mathrm{f}}\left(1-0.5\varphi\left(-1+{I_{t-1}^{\mathrm{f}}}^{-1}\epsilon_t^{\mathrm{I}}I_t^{\mathrm{f}}\right)^2-\varphi{I_{t-1}^{\mathrm{f}}}^{-1}\epsilon_t^{\mathrm{I}}I_t^{\mathrm{f}}\left(-1+{I_{t-1}^{\mathrm{f}}}^{-1}\epsilon_t^{\mathrm{I}}I_t^{\mathrm{f}}\right)\right)+\beta\varphi{I_t^{\mathrm{f}}}^{-2}\mathrm{E}_t\left[\epsilon_{t+1}^{\mathrm{I}}q_{t+1}^{\mathrm{f}}{I_{t+1}^{\mathrm{f}}}^2\left(-1+{I_t^{\mathrm{f}}}^{-1}\epsilon_{t+1}^{\mathrm{I}}I_{t+1}^{\mathrm{f}}\right)\right]=0 \tag{27.48}$$

$$\eta_t^{\pi}-\log\pi_t^{\mathrm{obj}}+\rho^{\pi^{\mathrm{bar}}}\log\pi_{t-1}^{\mathrm{obj}}+\log calibr^{\pi^{\mathrm{obj}}}\left(1-\rho^{\pi^{\mathrm{bar}}}\right)=0 \tag{27.49}$$

$$-C_t-I_t-T_t+Y_t-\psi^{-1}r_{\mathrm{ss}}^{\mathrm{k}}K_{t-1}\left(-1+e^{\psi\left(-1+z_t\right)}\right)=0 \tag{27.50}$$

$$-calibr^{\pi}+\eta_t^{\mathrm{R}}-\log\left(R_{\mathrm{ss}}{}^{-1}R_t\right)+r^{\Delta^{\pi}}\left(-\log\left(\pi_{\mathrm{ss}}{}^{-1}\pi_{t-1}\right)+\log\left(\pi_{\mathrm{ss}}{}^{-1}\pi_t\right)\right)+r^{\Delta^{\mathrm{y}}}\left(-\log\left(Y_{\mathrm{ss}}{}^{-1}Y_{t-1}\right)+\log\left(Y_{\mathrm{ss}}{}^{-1}Y_t\right)+\log\left(Y_{\mathrm{ss}}^{\mathrm{f}}{}^{-1}Y_{t-1}^{\mathrm{f}}\right)-\log\left(Y_{\mathrm{ss}}^{\mathrm{f}}{}^{-1}Y_t^{\mathrm{f}}\right)\right)+\rho\log\left(R_{\mathrm{ss}}{}^{-1}R_{t-1}\right)+(1-\rho)\left(\log \tag{27.51}$$

$$-C_t^{\mathrm{f}}-I_t^{\mathrm{f}}+\Pi_t^{\mathrm{ws^f}}-T_t^{\mathrm{f}}+Y_t^{\mathrm{f}}+L_t^{\mathrm{s^f}}W_t^{\mathrm{disutil^f}}-L_t^{\mathrm{f}}W_t^{\mathrm{f}}-\psi^{-1}r_{\mathrm{ss}}^{\mathrm{k^f}}K_{t-1}^{\mathrm{f}}\left(-1+e^{\psi\left(-1+z_t^{\mathrm{f}}\right)}\right)=0 \tag{27.52}$$

$$\epsilon_t^{\mathrm{b}}\left(K_{t-1}r_t^{\mathrm{k}}-r_{\mathrm{ss}}^{\mathrm{k}}K_{t-1}e^{\psi(-1+z_t)}\right)\left(C_t-hC_{t-1}\right)^{-\sigma^{\mathrm{c}}}=0 \tag{27.53}$$

$$\epsilon_t^{\mathrm{b}}\left(K_{t-1}^{\mathrm{f}}r_t^{\mathrm{k^f}}-r_{\mathrm{ss}}^{\mathrm{k^f}}K_{t-1}^{\mathrm{f}}e^{\psi\left(-1+z_t^{\mathrm{f}}\right)}\right)\left(C_t^{\mathrm{f}}-hC_{t-1}^{\mathrm{f}}\right)^{-\sigma^{\mathrm{c}}}=0 \tag{27.54}$$

28 Steady state relationships (after reduction)

$$-q_{\mathrm{ss}}+\beta\left(q_{\mathrm{ss}}\left(1-\tau\right)+\epsilon_{\mathrm{ss}}^{\mathrm{b}}\left(r_{\mathrm{ss}}^{\mathrm{k}}z_{\mathrm{ss}}-\psi^{-1}r_{\mathrm{ss}}^{\mathrm{k}}\left(-1+e^{\psi(-1+z_{\mathrm{ss}})}\right)\right)\left(C_{\mathrm{ss}}-hC_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}}\right)=0 \tag{28.1}$$

$$-q_{\mathrm{ss}}^{\mathrm{f}}+\beta\left(q_{\mathrm{ss}}^{\mathrm{f}}\left(1-\tau\right)+\epsilon_{\mathrm{ss}}^{\mathrm{b}}\left(r_{\mathrm{ss}}^{\mathrm{k^f}}z_{\mathrm{ss}}^{\mathrm{f}}-\psi^{-1}r_{\mathrm{ss}}^{\mathrm{k^f}}\left(-1+e^{\psi\left(-1+z_{\mathrm{ss}}^{\mathrm{f}}\right)}\right)\right)\left(C_{\mathrm{ss}}^{\mathrm{f}}-hC_{\mathrm{ss}}^{\mathrm{f}}\right)^{-\sigma^{\mathrm{c}}}\right)=0 \tag{28.2}$$

$$-r_{\mathrm{ss}}^{\mathrm{k}}+\alpha\epsilon_{\mathrm{ss}}^{\mathrm{a}}mc_{\mathrm{ss}}L_{\mathrm{ss}}{}^{1-\alpha}\left(z_{\mathrm{ss}}K_{\mathrm{ss}}\right)^{-1+\alpha}=0 \tag{28.3}$$

$$-r_{\mathrm{ss}}^{\mathrm{k^f}}+\alpha\epsilon_{\mathrm{ss}}^{\mathrm{a}}mc_{\mathrm{ss}}^{\mathrm{f}}L_{\mathrm{ss}}^{\mathrm{f}}{}^{1-\alpha}\left(z_{\mathrm{ss}}^{\mathrm{f}}K_{\mathrm{ss}}^{\mathrm{f}}\right)^{-1+\alpha}=0 \tag{28.4}$$

$$-G_{\mathrm{ss}}+T_{\mathrm{ss}}=0 \tag{28.5}$$

$$-G_{\mathrm{ss}}+G^{\mathrm{bar}}\epsilon_{\mathrm{ss}}^{\mathrm{G}}=0 \tag{28.6}$$

$$-G_{\mathrm{ss}}^{\mathrm{f}}+T_{\mathrm{ss}}^{\mathrm{f}}=0 \tag{28.7}$$

$$-G_{\mathrm{ss}}^{\mathrm{f}}+G^{\mathrm{bar}}\epsilon_{\mathrm{ss}}^{\mathrm{G}}=0 \tag{28.8}$$

$$-L_{\mathrm{ss}}+\nu_{\mathrm{ss}}^{\mathrm{w}}{}^{-1}L_{\mathrm{ss}}^{\mathrm{s}}=0 \tag{28.9}$$

$$-L_{\mathrm{ss}}^{\mathrm{s^f}}+L_{\mathrm{ss}}^{\mathrm{f}}\left(W_{\mathrm{ss}}^{\mathrm{i^f}}W_{\mathrm{ss}}^{\mathrm{f}}{}^{-1}\right)^{\lambda^{\mathrm{w}}{}^{-1}\left(-1-\lambda^{\mathrm{w}}\right)}=0 \tag{28.10}$$

$$L_{ss}^{s^{f}} - L_{ss}^{f} = 0 \tag{28.11}$$

$$L_{ss}^{s^{f}} + {\lambda^{w}}^{-1} L_{ss}^{f} {W_{ss}^{f}}^{-1} \left(-1 - \lambda^{w}\right) \left(-W_{ss}^{disutil^{f}} + W_{ss}^{i^{f}}\right) \left(W_{ss}^{i^{f}} {W_{ss}^{f}}^{-1}\right)^{-1+{\lambda^{w}}^{-1}\left(-1-\lambda^{w}\right)} = 0 \tag{28.12}$$

$$\Pi_{ss}^{ws^{f}} - L_{ss}^{s^{f}} \left(-W_{ss}^{disutil^{f}} + W_{ss}^{i^{f}}\right) = 0 \tag{28.13}$$

$$\Pi_{ss}^{ps^{f}} - Y_{ss}^{f} \left(-mc_{ss}^{f} + P_{ss}^{j^{f}}\right) {P_{ss}^{j^{f}}}^{-{\lambda^{p}}^{-1}\left(1+\lambda^{p}\right)} = 0 \tag{28.14}$$

$$-Q_{ss} + {\epsilon_{ss}^{b}}^{-1} q_{ss} \left(C_{ss} - hC_{ss}\right)^{\sigma^{c}} = 0 \tag{28.15}$$

$$-Q_{ss}^{f} + {\epsilon_{ss}^{b}}^{-1} q_{ss}^{f} \left(C_{ss}^{f} - hC_{ss}^{f}\right)^{\sigma^{c}} = 0 \tag{28.16}$$

$$-W_{ss} + \epsilon_{ss}^{a} mc_{ss} \left(1-\alpha\right) L_{ss}^{-\alpha} \left(z_{ss} K_{ss}\right)^{\alpha} = 0 \tag{28.17}$$

$$-W_{ss}^{f} + \epsilon_{ss}^{a} mc_{ss}^{f} \left(1-\alpha\right) {L_{ss}^{f}}^{-\alpha} \left(z_{ss}^{f} K_{ss}^{f}\right)^{\alpha} = 0 \tag{28.18}$$

$$Y_{ss}^{s} - \nu_{ss}^{p} Y_{ss} = 0 \tag{28.19}$$

$$-Y_{ss}^{f} + Y_{ss}^{s^{f}} = 0 \tag{28.20}$$

$$-Y_{ss}^{s^{f}} + Y_{ss}^{f} {P_{ss}^{j^{f}}}^{-{\lambda^{p}}^{-1}\left(1+\lambda^{p}\right)} = 0 \tag{28.21}$$

$$\beta \epsilon_{ss}^{b} \left(C_{ss}^{f} - hC_{ss}^{f}\right)^{-\sigma^{c}} - \epsilon_{ss}^{b} {R_{ss}^{f}}^{-1} \left(C_{ss}^{f} - hC_{ss}^{f}\right)^{-\sigma^{c}} = 0 \tag{28.22}$$

$$-\epsilon_{ss}^{b} R_{ss}^{-1} \left(C_{ss} - hC_{ss}\right)^{-\sigma^{c}} + \beta \epsilon_{ss}^{b} \pi_{ss}^{-1} \left(C_{ss} - hC_{ss}\right)^{-\sigma^{c}} = 0 \tag{28.23}$$

$$Y_{ss}^{f} {P_{ss}^{j^{f}}}^{-{\lambda^{p}}^{-1}\left(1+\lambda^{p}\right)} - {\lambda^{p}}^{-1} Y_{ss}^{f} \left(1+\lambda^{p}\right) \left(-mc_{ss}^{f} + P_{ss}^{j^{f}}\right) {P_{ss}^{j^{f}}}^{-1-{\lambda^{p}}^{-1}\left(1+\lambda^{p}\right)} = 0 \tag{28.24}$$

$$\epsilon_{ss}^{b} W_{ss}^{disutil^{f}} \left(C_{ss}^{f} - hC_{ss}^{f}\right)^{-\sigma^{c}} - \omega \epsilon_{ss}^{b} \epsilon_{ss}^{L} {L_{ss}^{s^{f}}}^{\sigma^{l}} = 0 \tag{28.25}$$

$$-1 + \xi^{p} \left(\pi_{ss}^{-1} {\pi_{ss}}^{\gamma^{p}}\right)^{-{\lambda^{p}}^{-1}} + \left(1 - \xi^{p}\right) {\pi_{ss}^{\star}}^{-{\lambda^{p}}^{-1}} = 0 \tag{28.26}$$

$$-1+\left(1-\xi^{\mathrm{w}}\right)\left(w^{\star}_{\mathrm{ss}}{W_{\mathrm{ss}}}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}}+\xi^{\mathrm{w}}1^{-{\lambda^{\mathrm{w}}}^{-1}}\left({\pi_{\mathrm{ss}}}^{-1}{\pi_{\mathrm{ss}}}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}}=0 \tag{28.27}$$

$$-\Phi-Y^{\mathrm{s}}_{\mathrm{ss}}+\epsilon^{\mathrm{a}}_{\mathrm{ss}}{L_{\mathrm{ss}}}^{1-\alpha}\left(z_{\mathrm{ss}}K_{\mathrm{ss}}\right)^{\alpha}=0 \tag{28.28}$$

$$-\Phi-Y^{\mathrm{f}}_{\mathrm{ss}}{P^{\mathrm{j}^{\mathrm{f}}}_{\mathrm{ss}}}^{-{\lambda^{\mathrm{p}}}^{-1}\left(1+\lambda^{\mathrm{p}}\right)}+\epsilon^{\mathrm{a}}_{\mathrm{ss}}{L^{\mathrm{f}}_{\mathrm{ss}}}^{1-\alpha}\left(z^{\mathrm{f}}_{\mathrm{ss}}K^{\mathrm{f}}_{\mathrm{ss}}\right)^{\alpha}=0 \tag{28.29}$$

$$-\log\epsilon^{\mathrm{b}}_{\mathrm{ss}}+\rho^{\mathrm{b}}\log\epsilon^{\mathrm{b}}_{\mathrm{ss}}=0 \tag{28.30}$$

$$-\log\epsilon^{\mathrm{L}}_{\mathrm{ss}}+\rho^{\mathrm{L}}\log\epsilon^{\mathrm{L}}_{\mathrm{ss}}=0 \tag{28.31}$$

$$-\log\epsilon^{\mathrm{I}}_{\mathrm{ss}}+\rho^{\mathrm{I}}\log\epsilon^{\mathrm{I}}_{\mathrm{ss}}=0 \tag{28.32}$$

$$-f^{1}_{\mathrm{ss}}+f^{2}_{\mathrm{ss}}=0 \tag{28.33}$$

$$-\log\epsilon^{\mathrm{a}}_{\mathrm{ss}}+\rho^{\mathrm{a}}\log\epsilon^{\mathrm{a}}_{\mathrm{ss}}=0 \tag{28.34}$$

$$-g^{1}_{\mathrm{ss}}+g^{2}_{\mathrm{ss}}\left(1+\lambda^{\mathrm{p}}\right)=0 \tag{28.35}$$

$$-\log\epsilon^{\mathrm{G}}_{\mathrm{ss}}+\rho^{\mathrm{G}}\log\epsilon^{\mathrm{G}}_{\mathrm{ss}}=0 \tag{28.36}$$

$$-f^{1}_{\mathrm{ss}}+\beta\xi^{\mathrm{w}}f^{1}_{\mathrm{ss}}1^{{\lambda^{\mathrm{w}}}^{-1}}\left({\pi_{\mathrm{ss}}}^{-1}{\pi_{\mathrm{ss}}}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}}+\epsilon^{\mathrm{b}}_{\mathrm{ss}}w^{\star}_{\mathrm{ss}}L_{\mathrm{ss}}\left(1+\lambda^{\mathrm{w}}\right)^{-1}\left(C_{\mathrm{ss}}-hC_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}}\left(w^{\star}_{\mathrm{ss}}{W_{\mathrm{ss}}}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}=0 \tag{28.37}$$

$$-f^{2}_{\mathrm{ss}}+\omega\epsilon^{\mathrm{b}}_{\mathrm{ss}}\epsilon^{\mathrm{L}}_{\mathrm{ss}}\left(L_{\mathrm{ss}}\left(w^{\star}_{\mathrm{ss}}{W_{\mathrm{ss}}}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}\right)^{1+\sigma^{\mathrm{l}}}+\beta\xi^{\mathrm{w}}f^{2}_{\mathrm{ss}}1^{{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)\left(1+\sigma^{\mathrm{l}}\right)}\left({\pi_{\mathrm{ss}}}^{-1}{\pi_{\mathrm{ss}}}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)\left(1+\sigma^{\mathrm{l}}\right)}=0 \tag{28.38}$$

$$-g^{1}_{\mathrm{ss}}+\beta\xi^{\mathrm{p}}g^{1}_{\mathrm{ss}}\left({\pi_{\mathrm{ss}}}^{-1}{\pi_{\mathrm{ss}}}^{\gamma^{\mathrm{p}}}\right)^{-{\lambda^{\mathrm{p}}}^{-1}}+\epsilon^{\mathrm{b}}_{\mathrm{ss}}\pi^{\star}_{\mathrm{ss}}Y_{\mathrm{ss}}\left(C_{\mathrm{ss}}-hC_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}}=0 \tag{28.39}$$

$$-g^{2}_{\mathrm{ss}}+\beta\xi^{\mathrm{p}}g^{2}_{\mathrm{ss}}\left({\pi_{\mathrm{ss}}}^{-1}{\pi_{\mathrm{ss}}}^{\gamma^{\mathrm{p}}}\right)^{-{\lambda^{\mathrm{p}}}^{-1}\left(1+\lambda^{\mathrm{p}}\right)}+\epsilon^{\mathrm{b}}_{\mathrm{ss}}mc_{\mathrm{ss}}Y_{\mathrm{ss}}\left(C_{\mathrm{ss}}-hC_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}}=0 \tag{28.40}$$

$$-\nu^{\mathrm{w}}_{\mathrm{ss}}+\left(1-\xi^{\mathrm{w}}\right)\left(w^{\star}_{\mathrm{ss}}{W_{\mathrm{ss}}}^{-1}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}+\xi^{\mathrm{w}}\nu^{\mathrm{w}}_{\mathrm{ss}}\left({\pi_{\mathrm{ss}}}^{-1}{\pi_{\mathrm{ss}}}^{\gamma^{\mathrm{w}}}\right)^{-{\lambda^{\mathrm{w}}}^{-1}\left(1+\lambda^{\mathrm{w}}\right)}=0 \tag{28.41}$$

$$-\nu^{\mathrm{p}}_{\mathrm{ss}} + \left(1-\xi^{\mathrm{p}}\right)\pi^{\star}_{\mathrm{ss}}{}^{-\lambda^{\mathrm{p}}{}^{-1}\left(1+\lambda^{\mathrm{p}}\right)} + \xi^{\mathrm{p}}\nu^{\mathrm{p}}_{\mathrm{ss}}\left(\pi_{\mathrm{ss}}{}^{-1}\pi_{\mathrm{ss}}{}^{\gamma^{\mathrm{p}}}\right)^{-\lambda^{\mathrm{p}}{}^{-1}\left(1+\lambda^{\mathrm{p}}\right)} = 0 \tag{28.42}$$

$$-K_{\mathrm{ss}} + I_{\mathrm{ss}}\left(1-0.5\varphi\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right)^{2}\right) + K_{\mathrm{ss}}\left(1-\tau\right) = 0 \tag{28.43}$$

$$-K^{\mathrm{f}}_{\mathrm{ss}} + I^{\mathrm{f}}_{\mathrm{ss}}\left(1-0.5\varphi\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right)^{2}\right) + K^{\mathrm{f}}_{\mathrm{ss}}\left(1-\tau\right) = 0 \tag{28.44}$$

$$U_{\mathrm{ss}} - \beta U_{\mathrm{ss}} - \epsilon^{\mathrm{b}}_{\mathrm{ss}}\left(\left(1-\sigma^{\mathrm{c}}\right)^{-1}\left(C_{\mathrm{ss}}-hC_{\mathrm{ss}}\right)^{1-\sigma^{\mathrm{c}}} - \omega\epsilon^{\mathrm{L}}_{\mathrm{ss}}\left(1+\sigma^{\mathrm{l}}\right)^{-1}L^{\mathrm{s}}_{\mathrm{ss}}{}^{1+\sigma^{\mathrm{l}}}\right) = 0 \tag{28.45}$$

$$U^{\mathrm{f}}_{\mathrm{ss}} - \beta U^{\mathrm{f}}_{\mathrm{ss}} - \epsilon^{\mathrm{b}}_{\mathrm{ss}}\left(\left(1-\sigma^{\mathrm{c}}\right)^{-1}\left(C^{\mathrm{f}}_{\mathrm{ss}}-hC^{\mathrm{f}}_{\mathrm{ss}}\right)^{1-\sigma^{\mathrm{c}}} - \omega\epsilon^{\mathrm{L}}_{\mathrm{ss}}\left(1+\sigma^{\mathrm{l}}\right)^{-1}L^{\mathrm{s^f}}_{\mathrm{ss}}{}^{1+\sigma^{\mathrm{l}}}\right) = 0 \tag{28.46}$$

$$-\epsilon^{\mathrm{b}}_{\mathrm{ss}}\left(C_{\mathrm{ss}}-hC_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}} + q_{\mathrm{ss}}\left(1-0.5\varphi\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right)^{2} - \varphi\epsilon^{\mathrm{I}}_{\mathrm{ss}}\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right)\right) + \beta\varphi\epsilon^{\mathrm{I}}_{\mathrm{ss}}q_{\mathrm{ss}}\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right) = 0 \tag{28.47}$$

$$-\epsilon^{\mathrm{b}}_{\mathrm{ss}}\left(C^{\mathrm{f}}_{\mathrm{ss}}-hC^{\mathrm{f}}_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}} + q^{\mathrm{f}}_{\mathrm{ss}}\left(1-0.5\varphi\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right)^{2} - \varphi\epsilon^{\mathrm{I}}_{\mathrm{ss}}\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right)\right) + \beta\varphi\epsilon^{\mathrm{I}}_{\mathrm{ss}}q^{\mathrm{f}}_{\mathrm{ss}}\left(-1+\epsilon^{\mathrm{I}}_{\mathrm{ss}}\right) = 0 \tag{28.48}$$

$$-\log\pi^{\mathrm{obj}}_{\mathrm{ss}} + \rho^{\pi^{\mathrm{bar}}}\log\pi^{\mathrm{obj}}_{\mathrm{ss}} + \log \mathit{calibr}^{\pi^{\mathrm{obj}}}\left(1-\rho^{\pi^{\mathrm{bar}}}\right) = 0 \tag{28.49}$$

$$-C_{\mathrm{ss}} - I_{\mathrm{ss}} - T_{\mathrm{ss}} + Y_{\mathrm{ss}} - \psi^{-1}r^{\mathrm{k}}_{\mathrm{ss}}K_{\mathrm{ss}}\left(-1+e^{\psi\left(-1+z_{\mathrm{ss}}\right)}\right) = 0 \tag{28.50}$$

$$-\mathit{calibr}^{\pi} + \left(1-\rho\right)\left(\log\pi^{\mathrm{obj}}_{\mathrm{ss}} - r^{\pi}\log\pi^{\mathrm{obj}}_{\mathrm{ss}}\right) = 0 \tag{28.51}$$

$$-C^{\mathrm{f}}_{\mathrm{ss}} - I^{\mathrm{f}}_{\mathrm{ss}} + \Pi^{\mathrm{ws^f}}_{\mathrm{ss}} - T^{\mathrm{f}}_{\mathrm{ss}} + Y^{\mathrm{f}}_{\mathrm{ss}} + L^{\mathrm{s^f}}_{\mathrm{ss}}W^{\mathrm{disutil^f}}_{\mathrm{ss}} - L^{\mathrm{f}}_{\mathrm{ss}}W^{\mathrm{f}}_{\mathrm{ss}} - \psi^{-1}r^{\mathrm{k^f}}_{\mathrm{ss}}K^{\mathrm{f}}_{\mathrm{ss}}\left(-1+e^{\psi\left(-1+z^{\mathrm{f}}_{\mathrm{ss}}\right)}\right) = 0 \tag{28.52}$$

$$\epsilon^{\mathrm{b}}_{\mathrm{ss}}\left(r^{\mathrm{k}}_{\mathrm{ss}}K_{\mathrm{ss}} - r^{\mathrm{k}}_{\mathrm{ss}}K_{\mathrm{ss}}e^{\psi\left(-1+z_{\mathrm{ss}}\right)}\right)\left(C_{\mathrm{ss}}-hC_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}} = 0 \tag{28.53}$$

$$\epsilon^{\mathrm{b}}_{\mathrm{ss}}\left(r^{\mathrm{k^f}}_{\mathrm{ss}}K^{\mathrm{f}}_{\mathrm{ss}} - r^{\mathrm{k^f}}_{\mathrm{ss}}K^{\mathrm{f}}_{\mathrm{ss}}e^{\psi\left(-1+z^{\mathrm{f}}_{\mathrm{ss}}\right)}\right)\left(C^{\mathrm{f}}_{\mathrm{ss}}-hC^{\mathrm{f}}_{\mathrm{ss}}\right)^{-\sigma^{\mathrm{c}}} = 0 \tag{28.54}$$

29 Calibrating equations

$$-1.408 + {Y^{\mathrm{s}}_{\mathrm{ss}}}^{-1} \left(\Phi + Y^{\mathrm{s}}_{\mathrm{ss}}\right) = 0 \tag{29.1}$$

$$-1 + \pi^{\mathrm{obj}}_{\mathrm{ss}} = 0 \tag{29.2}$$

$$-0.6 + C^{\mathrm{f}}_{\mathrm{ss}} {Y^{\mathrm{f}}_{\mathrm{ss}}}^{-1} = 0 \tag{29.3}$$

$$-0.18 + G_{\mathrm{ss}} {Y_{\mathrm{ss}}}^{-1} = 0 \tag{29.4}$$

$$\pi_{\mathrm{ss}} - \pi^{\mathrm{obj}}_{\mathrm{ss}} = 0 \tag{29.5}$$

30 Parameter settings

$$\alpha = 0.3 \tag{30.1}$$

$$\beta = 0.99 \tag{30.2}$$

$$\gamma^{\mathrm{w}} = 0.763 \tag{30.3}$$

$$\gamma^{\mathrm{p}} = 0.469 \tag{30.4}$$

$$h = 0.573 \tag{30.5}$$

$$\lambda^{\mathrm{w}} = 0.5 \tag{30.6}$$

$$\omega = 1 \tag{30.7}$$

$$\psi = 0.169 \tag{30.8}$$

$$r^{\pi} = 1.684 \tag{30.9}$$

$$r^{\mathrm{Y}} = 0.099 \tag{30.10}$$

$$r^{\Delta^{\pi}} = 0.14 \tag{30.11}$$

$$r^{\Delta^{\mathrm{y}}} = 0.159 \tag{30.12}$$

$$\rho^{\mathrm{b}} = 0.855 \tag{30.13}$$

$$\rho^{\mathrm{L}} = 0.889 \tag{30.14}$$

$$\rho^{\mathrm{I}} = 0.927 \tag{30.15}$$

$$\rho^{\mathrm{a}} = 0.823 \tag{30.16}$$

$$\rho^{\mathrm{G}} = 0.949 \tag{30.17}$$

$$\rho = 0.961 \tag{30.18}$$

$$\rho^{\pi^{\mathrm{bar}}} = 0.924 \tag{30.19}$$

$$\sigma^{\mathrm{c}} = 1.353 \tag{30.20}$$

$$\sigma^{\mathrm{l}} = 2.4 \tag{30.21}$$

$$\tau = 0.025 \tag{30.22}$$

$$\varphi = 6.771 \tag{30.23}$$

$$\xi^{\mathrm{w}} = 0.737 \tag{30.24}$$

$$\xi^{\mathrm{p}} = 0.908 \tag{30.25}$$