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1 CONSUMER

1.1 Optimisation problem

$$\max_{C_t, K_t^{\mathrm{s}}, I_t, B_t, L_t^{\mathrm{s}}} U_t = \beta \mathrm{E}_t\left[U_{t+1}\right] + (1-\eta)^{-1}\left(C_t{}^{\mu}(1-L_t^{\mathrm{s}})^{1-\mu}\right)^{1-\eta} \tag{1.1}$$

s.t. :

$$C_t + I_t + B_t R_t{}^{-1} = Dw_t - T_t + B_{t-1}\pi_t{}^{-1} + K_{t-1}^{\mathrm{s}} r_t + L_t^{\mathrm{s}} W_t \quad (\lambda_t) \tag{1.2}$$

$$K_t^{\mathrm{s}} = I_t + K_{t-1}^{\mathrm{s}}(1-\delta) \quad (q_t) \tag{1.3}$$

1.2 Identities

$$Q_t = \lambda_t{}^{-1} q_t \tag{1.4}$$

1.3 First order conditions

$$-\lambda_t + \mu C_t{}^{-1+\mu}(1-L_t^{\mathrm{s}})^{1-\mu}\left(C_t{}^{\mu}(1-L_t^{\mathrm{s}})^{1-\mu}\right)^{-\eta} = 0 \quad (C_t) \tag{1.5}$$

$$-q_t + \beta\left((1-\delta)\,\mathrm{E}_t\left[q_{t+1}\right] + \mathrm{E}_t\left[\lambda_{t+1} r_{t+1}\right]\right) = 0 \quad (K_t^{\mathrm{s}}) \tag{1.6}$$

$$-\lambda_t + q_t = 0 \quad (I_t) \tag{1.7}$$

$$\beta \mathrm{E}_t\left[\lambda_{t+1}\pi_{t+1}{}^{-1}\right] - \lambda_t R_t{}^{-1} = 0 \quad (B_t) \tag{1.8}$$

$$\lambda_t W_t + (-1+\mu)\, C_t{}^{\mu}(1-L_t^{\mathrm{s}})^{-\mu}\left(C_t{}^{\mu}(1-L_t^{\mathrm{s}})^{1-\mu}\right)^{-\eta} = 0 \quad (L_t^{\mathrm{s}}) \tag{1.9}$$

2 FIRM

2.1 Optimisation problem

$$\max_{K_t^{\mathrm{d}}, L_t^{\mathrm{d}}} tc_t^{\mathrm{j}} = -r_t K_t^{\mathrm{d}} - L_t^{\mathrm{d}} W_t \tag{2.1}$$

s.t. :

$$Y_t^{\mathrm{j}} = Z_t K_t^{\mathrm{d}\alpha} L_t^{\mathrm{d}\,1-\alpha} \quad (mc_t) \tag{2.2}$$

2.2 First order conditions

$$-r_t + \alpha mc_t Z_t {K_t^{\mathrm{d}}}^{-1+\alpha} {L_t^{\mathrm{d}}}^{1-\alpha} = 0 \quad \left(K_t^{\mathrm{d}}\right) \tag{2.3}$$

$$-W_t + mc_t Z_t \left(1-\alpha\right) {K_t^{\mathrm{d}}}^{\alpha} {L_t^{\mathrm{d}}}^{-\alpha} = 0 \quad \left(L_t^{\mathrm{d}}\right) \tag{2.4}$$

3 PRICE SETTING PROBLEM

3.1 Identities

$$g_t^1 = \eta_t^{\mathrm{p}} + g_t^2 \left(1+\lambda^{\mathrm{p}}\right) \tag{3.1}$$

$$g_t^1 = \lambda_t \pi_t^{\star} Y_t + \beta \xi^{\mathrm{p}} \pi_t^{\star} \mathrm{E}_t \left[g_{t+1}^1 {\pi_{t+1}^{\star}}^{-1} \left({\pi_{t+1}}^{-1} {\pi_t}^{\gamma^{\mathrm{p}}} \right)^{-\lambda^{\mathrm{p}-1}} \right] \tag{3.2}$$

$$g_t^2 = \beta \xi^{\mathrm{p}} \mathrm{E}_t \left[g_{t+1}^2 \left({\pi_{t+1}}^{-1} {\pi_t}^{\gamma^{\mathrm{p}}} \right)^{-\lambda^{\mathrm{p}-1}\left(1+\lambda^{\mathrm{p}}\right)} \right] + \lambda_t mc_t Y_t \tag{3.3}$$

4 PRICE EVOLUTION

4.1 Identities

$$1 = \xi^{\mathrm{p}} \left({\pi_t}^{-1} {\pi_{t-1}}^{\gamma^{\mathrm{p}}} \right)^{-\lambda^{\mathrm{p}-1}} + \left(1-\xi^{\mathrm{p}}\right) {\pi_t^{\star}}^{-\lambda^{\mathrm{p}-1}} \tag{4.1}$$

5 PRODUCT AGGREGATION

5.1 Identities

$$Y_t^{\mathrm{s}} = Y_t^{\mathrm{j}} \tag{5.1}$$

$$\nu_t^{\mathrm{p}} = \left(1-\xi^{\mathrm{p}}\right) {\pi_t^{\star}}^{-\lambda^{\mathrm{p}-1}\left(1+\lambda^{\mathrm{p}}\right)} + \xi^{\mathrm{p}} \nu_{t-1}^{\mathrm{p}} \left({\pi_t}^{-1} {\pi_{t-1}}^{\gamma^{\mathrm{p}}} \right)^{-\lambda^{\mathrm{p}-1}\left(1+\lambda^{\mathrm{p}}\right)} \tag{5.2}$$

$$\nu_t^{\mathrm{p}} Y_t = Y_t^{\mathrm{s}} \tag{5.3}$$

6 EQUILIBRIUM

6.1 Identities

$$K_t^{\mathrm{d}} = K_{t-1}^{\mathrm{s}} \tag{6.1}$$

$$L_t^{\mathrm{d}} = L_t^{\mathrm{s}} \tag{6.2}$$

$$B_t = 0 \tag{6.3}$$

$$Div_t = Y_t - L_t^{\mathrm{d}} W_t - r_t K_t^{\mathrm{d}} \tag{6.4}$$

7 MONETARY POLICY AUTHORITY

7.1 Identities

$$addr^{\pi} + \log\left({R_{\mathrm{ss}}}^{-1} R_t\right) = \eta_t^{\mathrm{R}} + \rho \log\left({R_{\mathrm{ss}}}^{-1} R_{t-1}\right) + (1-\rho)\left(\log \pi_t^{\mathrm{obj}} + r^{\pi}\left(-\log \pi_t^{\mathrm{obj}} + \log\left({\pi_{\mathrm{ss}}}^{-1}\pi_{t-1}\right)\right) + r^{\mathrm{Y}} \log\left({Y_{\mathrm{ss}}}^{-1} Y_t\right)\right) \tag{7.1}$$

$$\log \pi_t^{\mathrm{obj}} = \eta_t^{\pi} + {\rho^{\pi}}^{\mathrm{bar}} \log \pi_{t-1}^{\mathrm{obj}} + \log {perceived_t^{\pi}}^{\mathrm{obj}} \left(1 - {\rho^{\pi}}^{\mathrm{bar}}\right) \tag{7.2}$$

8 ENDOGENOUS REGIME PROB

8.1 Identities

$$\log inflation_t^{\mathrm{gap}} = -\log {perceived_t^{\pi}}^{\mathrm{obj}} + \log \pi_t \tag{8.1}$$

$$pL_t = \left(1 + e^{pLss - \kappa \log inflation_t^{\mathrm{gap}}}\right)^{-1} \tag{8.2}$$

$$pH_t = 1 - pL_t \tag{8.3}$$

$$\log {perceived_t^{\pi}}^{\mathrm{obj}} = pH_t \log \pi^{\mathrm{H}} + pL_t \left(\log {perceived_{t-1}^{\pi}}^{\mathrm{obj}} + \tau \log inflation_t^{\mathrm{gap}}\right) \tag{8.4}$$

9 GOVERNMENT

9.1 Identities

$$G_t = {G}^{\mathrm{bar}} \epsilon_t^{\mathrm{G}} \tag{9.1}$$

$$G_t + B_{t-1}{\pi_t}^{-1} = T_t + B_t {R_t}^{-1} \tag{9.2}$$

10 GOVERNMENT SPENDING SHOCK

10.1 Identities

$$\log \epsilon_t^{\mathrm{G}} = \eta_t^{\mathrm{G}} + \rho^{\mathrm{G}} \log \epsilon_{t-1}^{\mathrm{G}} \tag{10.1}$$

11 TECHNOLOGY

11.1 Identities

$$Z_t = e^{\epsilon_t^{\mathrm{Z}} + \rho^{\mathrm{a}} \log Z_{t-1}} \tag{11.1}$$

12 Equilibrium relationships (after reduction)

$$-B_t = 0 \tag{12.1}$$

$$-\lambda_t + q_t = 0 \tag{12.2}$$

$$-\lambda_t + \mu {C_t}^{-1+\mu} (1 - L_t^{\mathrm{s}})^{1-\mu} \left({C_t}^{\mu} (1 - L_t^{\mathrm{s}})^{1-\mu} \right)^{-\eta} = 0 \tag{12.3}$$

$$-pL_t + \left(1 + e^{pLss - \kappa \log inflation_t^{\mathrm{gap}}} \right)^{-1} = 0 \tag{12.4}$$

$$-q_t + \beta \left((1 - \delta) \, \mathrm{E}_t \left[q_{t+1} \right] + \mathrm{E}_t \left[\lambda_{t+1} r_{t+1} \right] \right) = 0 \tag{12.5}$$

$$-r_t + \alpha mc_t Z_t {K_{t-1}^{\mathrm{s}}}^{-1+\alpha} L_t^{\mathrm{s}\,1-\alpha} = 0 \tag{12.6}$$

$$-G_t + G^{\mathrm{bar}} \epsilon_t^{\mathrm{G}} = 0 \tag{12.7}$$

$$-Q_t + {\lambda_t}^{-1} q_t = 0 \tag{12.8}$$

$$-W_t + mc_t Z_t \left(1 - \alpha \right) {K_{t-1}^{\mathrm{s}}}^{\alpha} L_t^{\mathrm{s}\,-\alpha} = 0 \tag{12.9}$$

$$-Y_t^{\mathrm{j}} + Z_t {K_{t-1}^{\mathrm{s}}}^{\alpha} L_t^{\mathrm{s}\,1-\alpha} = 0 \tag{12.10}$$

$$Y_t^{\mathrm{j}} - Y_t^{\mathrm{s}} = 0 \tag{12.11}$$

$$Y_t^{\mathrm{s}} - \nu_t^{\mathrm{p}} Y_t = 0 \tag{12.12}$$

$$-Z_t + e^{\epsilon_t^{\mathrm{Z}} + \rho^{\mathrm{a}} \log Z_{t-1}} = 0 \tag{12.13}$$

$$\beta \mathrm{E}_t \left[{\lambda_{t+1} \pi_{t+1}}^{-1} \right] - \lambda_t {R_t}^{-1} = 0 \tag{12.14}$$

$$\lambda_t W_t + \left(-1 + \mu \right) {C_t}^{\mu} (1 - L_t^{\mathrm{s}})^{-\mu} \left({C_t}^{\mu} (1 - L_t^{\mathrm{s}})^{1-\mu} \right)^{-\eta} = 0 \tag{12.15}$$

$$-1+\xi^{\mathrm{p}}\left({\pi_t}^{-1}{\pi_{t-1}}^{\gamma^{\mathrm{p}}}\right)^{-\lambda^{\mathrm{p}-1}}+\left(1-\xi^{\mathrm{p}}\right)\pi_t^{\star-\lambda^{\mathrm{p}-1}}=0 \tag{12.16}$$

$$1-pH_t-pL_t=0 \tag{12.17}$$

$$\eta_t^{\mathrm{p}}-g_t^1+g_t^2\left(1+\lambda^{\mathrm{p}}\right)=0 \tag{12.18}$$

$$\eta_t^{\mathrm{G}}-\log\epsilon_t^{\mathrm{G}}+\rho^{\mathrm{G}}\log\epsilon_{t-1}^{\mathrm{G}}=0 \tag{12.19}$$

$$-g_t^1+\lambda_t\pi_t^{\star}Y_t+\beta\xi^{\mathrm{p}}\pi_t^{\star}\mathrm{E}_t\left[g_{t+1}^1{\pi_{t+1}^{\star}}^{-1}\left({\pi_{t+1}}^{-1}{\pi_t}^{\gamma^{\mathrm{p}}}\right)^{-\lambda^{\mathrm{p}-1}}\right]=0 \tag{12.20}$$

$$-g_t^2+\beta\xi^{\mathrm{p}}\mathrm{E}_t\left[g_{t+1}^2\left({\pi_{t+1}}^{-1}{\pi_t}^{\gamma^{\mathrm{p}}}\right)^{-\lambda^{\mathrm{p}-1}(1+\lambda^{\mathrm{p}})}\right]+\lambda_t mc_tY_t=0 \tag{12.21}$$

$$-\nu_t^{\mathrm{p}}+\left(1-\xi^{\mathrm{p}}\right)\pi_t^{\star-\lambda^{\mathrm{p}-1}(1+\lambda^{\mathrm{p}})}+\xi^{\mathrm{p}}\nu_{t-1}^{\mathrm{p}}\left({\pi_t}^{-1}{\pi_{t-1}}^{\gamma^{\mathrm{p}}}\right)^{-\lambda^{\mathrm{p}-1}(1+\lambda^{\mathrm{p}})}=0 \tag{12.22}$$

$$I_t-K_t^{\mathrm{s}}+K_{t-1}^{\mathrm{s}}\left(1-\delta\right)=0 \tag{12.23}$$

$$U_t-\beta\mathrm{E}_t\left[U_{t+1}\right]-\left(1-\eta\right)^{-1}\left(C_t{}^{\mu}(1-L_t^{\mathrm{s}})^{1-\mu}\right)^{1-\eta}=0 \tag{12.24}$$

$$-\log inflation_t^{\mathrm{gap}}-\log perceived_t^{\pi^{\mathrm{obj}}}+\log\pi_t=0 \tag{12.25}$$

$$-\log perceived_t^{\pi^{\mathrm{obj}}}+pH_t\log\pi^{\mathrm{H}}+pL_t\left(\log perceived_{t-1}^{\pi^{\mathrm{obj}}}+\tau\log inflation_t^{\mathrm{gap}}\right)=0 \tag{12.26}$$

$$\eta_t^{\pi}-\log\pi_t^{\mathrm{obj}}+\rho^{\pi^{\mathrm{bar}}}\log\pi_{t-1}^{\mathrm{obj}}+\log perceived_t^{\pi^{\mathrm{obj}}}\left(1-\rho^{\pi^{\mathrm{bar}}}\right)=0 \tag{12.27}$$

$$-Div_t+Y_t-K_{t-1}^{\mathrm{s}}r_t-L_t^{\mathrm{s}}W_t=0 \tag{12.28}$$

$$-G_t+T_t-B_{t-1}{\pi_t}^{-1}+B_t{R_t}^{-1}=0 \tag{12.29}$$

$$-addr^{\pi}+\eta_t^{\mathrm{R}}-\log\left({R_{\mathrm{ss}}}^{-1}R_t\right)+\rho\log\left({R_{\mathrm{ss}}}^{-1}R_{t-1}\right)+\left(1-\rho\right)\left(\log\pi_t^{\mathrm{obj}}+r^{\pi}\left(-\log\pi_t^{\mathrm{obj}}+\log\left({\pi_{\mathrm{ss}}}^{-1}\pi_{t-1}\right)\right)+r^{\mathrm{Y}}\log\left({Y_{\mathrm{ss}}}^{-1}Y_t\right)\right)=0 \tag{12.30}$$

$$-C_t+Div_t-I_t-T_t+B_{t-1}{\pi_t}^{-1}+K_{t-1}^{\mathrm{s}}r_t-B_t{R_t}^{-1}+L_t^{\mathrm{s}}W_t=0 \tag{12.31}$$

13 Steady state relationships (after reduction)

$$-B_{\rm ss} = 0 \tag{13.1}$$

$$-\lambda_{\rm ss} + q_{\rm ss} = 0 \tag{13.2}$$

$$-\lambda_{\rm ss} + \mu {C_{\rm ss}}^{-1+\mu} (1 - L^{\rm s}_{\rm ss})^{1-\mu} \left({C_{\rm ss}}^{\mu} (1 - L^{\rm s}_{\rm ss})^{1-\mu} \right)^{-\eta} = 0 \tag{13.3}$$

$$-pL_{\rm ss} + \left(1 + e^{pLss - \kappa \log inflation^{\rm gap}_{\rm ss}} \right)^{-1} = 0 \tag{13.4}$$

$$-q_{\rm ss} + \beta \left(\lambda_{\rm ss} r_{\rm ss} + q_{\rm ss} \left(1 - \delta \right) \right) = 0 \tag{13.5}$$

$$-r_{\rm ss} + \alpha mc_{\rm ss} Z_{\rm ss} {K^{\rm s}_{\rm ss}}^{-1+\alpha} {L^{\rm s}_{\rm ss}}^{1-\alpha} = 0 \tag{13.6}$$

$$-G_{\rm ss} + G^{\rm bar} \epsilon^{\rm G}_{\rm ss} = 0 \tag{13.7}$$

$$-Q_{\rm ss} + {\lambda_{\rm ss}}^{-1} q_{\rm ss} = 0 \tag{13.8}$$

$$-W_{\rm ss} + mc_{\rm ss} Z_{\rm ss} \left(1 - \alpha \right) {K^{\rm s}_{\rm ss}}^{\alpha} {L^{\rm s}_{\rm ss}}^{-\alpha} = 0 \tag{13.9}$$

$$-Y^{\rm j}_{\rm ss} + Z_{\rm ss} {K^{\rm s}_{\rm ss}}^{\alpha} {L^{\rm s}_{\rm ss}}^{1-\alpha} = 0 \tag{13.10}$$

$$Y^{\rm j}_{\rm ss} - Y^{\rm s}_{\rm ss} = 0 \tag{13.11}$$

$$Y^{\rm s}_{\rm ss} - \nu^{\rm p}_{\rm ss} Y_{\rm ss} = 0 \tag{13.12}$$

$$-Z_{\rm ss} + e^{\rho^{\rm a} \log Z_{\rm ss}} = 0 \tag{13.13}$$

$$-\lambda_{\rm ss} {R_{\rm ss}}^{-1} + \beta \lambda_{\rm ss} {\pi_{\rm ss}}^{-1} = 0 \tag{13.14}$$

$$\lambda_{\rm ss} W_{\rm ss} + \left(-1 + \mu \right) {C_{\rm ss}}^{\mu} (1 - L^{\rm s}_{\rm ss})^{-\mu} \left({C_{\rm ss}}^{\mu} (1 - L^{\rm s}_{\rm ss})^{1-\mu} \right)^{-\eta} = 0 \tag{13.15}$$

$$-1 + \xi^{\rm p} \left({\pi_{\rm ss}}^{-1} {\pi_{\rm ss}}^{\gamma^{\rm p}} \right)^{-\lambda^{\rm p}{}^{-1}} + \left(1 - \xi^{\rm p} \right) {\pi^{\star}_{\rm ss}}^{-\lambda^{\rm p}{}^{-1}} = 0 \tag{13.16}$$

$$1 - pH_{\rm ss} - pL_{\rm ss} = 0 \tag{13.17}$$

$$-g^1_{\rm ss} + g^2_{\rm ss} \left(1 + \lambda^{\rm p} \right) = 0 \tag{13.18}$$

$$-\log \epsilon^{\rm G}_{\rm ss} + \rho^{\rm G} \log \epsilon^{\rm G}_{\rm ss} = 0 \tag{13.19}$$

$$-g^1_{\rm ss} + \lambda_{\rm ss} \pi^{\star}_{\rm ss} Y_{\rm ss} + \beta \xi^{\rm p} g^1_{\rm ss} \left({\pi_{\rm ss}}^{-1} {\pi_{\rm ss}}^{\gamma^{\rm p}} \right)^{-\lambda^{\rm p}{}^{-1}} = 0 \tag{13.20}$$

$$-g^2_{\rm ss} + \lambda_{\rm ss} mc_{\rm ss} Y_{\rm ss} + \beta \xi^{\rm p} g^2_{\rm ss} \left({\pi_{\rm ss}}^{-1} {\pi_{\rm ss}}^{\gamma^{\rm p}} \right)^{-\lambda^{\rm p}{}^{-1}(1+\lambda^{\rm p})} = 0 \tag{13.21}$$

$$-\nu^{\rm p}_{\rm ss} + \left(1 - \xi^{\rm p} \right) {\pi^{\star}_{\rm ss}}^{-\lambda^{\rm p}{}^{-1}(1+\lambda^{\rm p})} + \xi^{\rm p} \nu^{\rm p}_{\rm ss} \left({\pi_{\rm ss}}^{-1} {\pi_{\rm ss}}^{\gamma^{\rm p}} \right)^{-\lambda^{\rm p}{}^{-1}(1+\lambda^{\rm p})} = 0 \tag{13.22}$$

$$I_{\mathrm{ss}} - K^{\mathrm{s}}_{\mathrm{ss}} + K^{\mathrm{s}}_{\mathrm{ss}}\left(1-\delta\right) = 0 \tag{13.23}$$

$$U_{\mathrm{ss}} - \beta U_{\mathrm{ss}} - \left(1-\eta\right)^{-1}\left({C_{\mathrm{ss}}}^{\mu}(1-L^{\mathrm{s}}_{\mathrm{ss}})^{1-\mu}\right)^{1-\eta} = 0 \tag{13.24}$$

$$-\log \mathit{inflation}^{\mathrm{gap}}_{\mathrm{ss}} - \log \mathit{perceived}^{\pi^{\mathrm{obj}}}_{\mathrm{ss}} + \log \pi_{\mathrm{ss}} = 0 \tag{13.25}$$

$$-\log \mathit{perceived}^{\pi^{\mathrm{obj}}}_{\mathrm{ss}} + \mathit{pH}_{\mathrm{ss}} \log \pi^{\mathrm{H}} + \mathit{pL}_{\mathrm{ss}}\left(\log \mathit{perceived}^{\pi^{\mathrm{obj}}}_{\mathrm{ss}} + \tau \log \mathit{inflation}^{\mathrm{gap}}_{\mathrm{ss}}\right) = 0 \tag{13.26}$$

$$-\log \pi^{\mathrm{obj}}_{\mathrm{ss}} + {\rho^{\pi}}^{\mathrm{bar}} \log \pi^{\mathrm{obj}}_{\mathrm{ss}} + \log \mathit{perceived}^{\pi^{\mathrm{obj}}}_{\mathrm{ss}}\left(1-{\rho^{\pi}}^{\mathrm{bar}}\right) = 0 \tag{13.27}$$

$$-\mathit{Div}_{\mathrm{ss}} + Y_{\mathrm{ss}} - r_{\mathrm{ss}} K^{\mathrm{s}}_{\mathrm{ss}} - L^{\mathrm{s}}_{\mathrm{ss}} W_{\mathrm{ss}} = 0 \tag{13.28}$$

$$-G_{\mathrm{ss}} + T_{\mathrm{ss}} - {\pi_{\mathrm{ss}}}^{-1} B_{\mathrm{ss}} + B_{\mathrm{ss}} {R_{\mathrm{ss}}}^{-1} = 0 \tag{13.29}$$

$$-\mathit{addr}^{\pi} + (1-\rho)\left(\log \pi^{\mathrm{obj}}_{\mathrm{ss}} - r^{\pi} \log \pi^{\mathrm{obj}}_{\mathrm{ss}}\right) = 0 \tag{13.30}$$

$$-C_{\mathrm{ss}} + \mathit{Div}_{\mathrm{ss}} - I_{\mathrm{ss}} - T_{\mathrm{ss}} + {\pi_{\mathrm{ss}}}^{-1} B_{\mathrm{ss}} + r_{\mathrm{ss}} K^{\mathrm{s}}_{\mathrm{ss}} - B_{\mathrm{ss}} {R_{\mathrm{ss}}}^{-1} + L^{\mathrm{s}}_{\mathrm{ss}} W_{\mathrm{ss}} = 0 \tag{13.31}$$

14 Calibrating equations

$$-0.18 + G_{\mathrm{ss}} {Y_{\mathrm{ss}}}^{-1} = 0 \tag{14.1}$$

$$-0.05 + \mathit{pL}_{\mathrm{ss}} = 0 \tag{14.2}$$

$$\pi_{\mathrm{ss}} - \pi^{\mathrm{obj}}_{\mathrm{ss}} = 0 \tag{14.3}$$

15 Parameter settings

$$\alpha = 0.3 \tag{15.1}$$

$$\beta = 0.99 \tag{15.2}$$

$$\delta = 0.025 \tag{15.3}$$

$$\eta = 2 \tag{15.4}$$

$$\gamma^{\mathrm{p}} = 0.469 \tag{15.5}$$

$$\kappa = 1 \tag{15.6}$$

$$\lambda^{\mathrm{p}} = 0.5 \tag{15.7}$$

$$\mu = 0.3 \tag{15.8}$$

$$\pi^{\mathrm{H}} = 1 \tag{15.9}$$

$$r^{\pi} = 1.684 \tag{15.10}$$

$$r^{\mathrm{Y}} = 0.099 \tag{15.11}$$

$$\rho = 0.961 \tag{15.12}$$

$$\rho^{\pi^{\mathrm{bar}}} = 0.924 \tag{15.13}$$

$$\rho^{\mathrm{G}} = 0.949 \tag{15.14}$$

$$\rho^{\mathrm{a}} = 0.823 \tag{15.15}$$

$$\tau = 0.085 \tag{15.16}$$

$$\xi^{\mathrm{p}} = 0.908 \tag{15.17}$$

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16 Steady-state values

	Steady-state value
ϵ^{G}	1
g^1	7.3514
g^2	4.9009
$inflation^{\mathrm{gap}}$	1
λ	1.5467
mc	0.6667
ν^{p}	1
$perceived^{\pi^{\mathrm{obj}}}$	1
π	1
$\pi^{\star}$	1
π^{obj}	1
pH	0.95
pL	0.05
q	1.5467
r	0.0351
B	0
C	0.3255
Div	0.1601
G	0.0865
I	0.0684
K^{s}	2.7374
L^{s}	0.2279
Q	1
R	1.0101
T	0.0865
U	-167.8256
W	0.9837
Y	0.4804
Y^{j}	0.4804
Y^{s}	0.4804
Z	1

17 The solution of the 1st order perturbation

Matrix P

	$\epsilon^{\mathrm{G}}_{t-1}$	ν^{p}_{t-1}	$perceived^{\pi^{\mathrm{obj}}}_{t-1}$	π_{t-1}	π^{obj}_{t-1}	B_{t-1}	K^{s}_{t-1}	R_{t-1}	Z_{t-1}
ϵ^{G}_t	0.949	0	0	0	0	0	0	0	0
ν^{p}_t	0	0.908	0	0	0	0	0	0	0
$perceived^{\pi^{\mathrm{obj}}}_t$	0	0.0002	0.0498	0.0014	0.0015	0	−0.0002	−0.0047	−0.0003
π_t	−0.0001	0.0549	0.0015	0.3348	0.3434	0	−0.0399	−1.1153	−0.0645
π^{obj}_t	0	0	0.0038	0.0001	0.9241	0	0	−0.0004	0
B_t	0	0	0	0	0	0	0	0	0
K^{s}_t	0.0052	0.553	0.0151	−1.2485	3.509	0	0.4383	−15.1027	−0.4035
R_t	0.0006	0.0147	0.0003	0.0313	0.0718	0	−0.0135	0.5465	−0.011
Z_t	0	0	0	0	0	0	0	0	0.823

Matrix Q

	ϵ^{Z}	η^{p}	η^{R}	η^{π}	η^{G}
ϵ^{G}	0	0	0	0	1
ν^{p}	0	0	0	0	0
$perceived^{\pi^{\mathrm{obj}}}$	−0.0003	0.0001	−0.0049	0.0016	0
π	−0.0783	0.0121	−1.1605	0.3716	−0.0001
π^{obj}	0	0	−0.0004	1.0001	0
B	0	0	0	0	0
K^{s}	−0.4903	−0.0064	−15.7156	3.7977	0.0055
R	−0.0133	−0.0002	0.5686	0.0777	0.0007
Z	1	0	0	0	0

Matrix R

	$\epsilon^{\mathrm{G}}_{t-1}$	ν^{p}_{t-1}	$perceived^{\pi^{\mathrm{obj}}}_{t-1}$	π_{t-1}	π^{obj}_{t-1}	B_{t-1}	K^{s}_{t-1}	R_{t-1}	Z_{t-1}
g^1_t	0.1474	0.9169	0.0235	−1.976	5.4626	0	−0.8828	−15.6845	−0.8633
g^2_t	0.1474	0.9169	0.0235	−1.976	5.4626	0	−0.8828	−15.6845	−0.8633
$inflation^{\mathrm{gap}}_t$	−0.0001	0.0547	−0.0483	0.3334	0.3419	0	−0.0398	−1.1105	−0.0642
λ_t	0.118	0.1357	−0.0094	0.804	−2.192	0	−0.2745	9.2064	−0.0383
mc_t	0.086	4.973	0.123	−10.2094	28.5968	0	−4.1819	−122.7528	−4.7432
$\pi^{\star}_t$	−0.0012	0.5422	0.0146	−1.3243	3.3889	0	−0.3942	−11.0072	−0.6364
pH_t	0	−0.0027	0.0024	−0.0167	−0.0171	0	0.002	0.0555	0.0032
pL_t	−0.0001	0.052	−0.0459	0.3167	0.3248	0	−0.0378	−1.055	−0.061
q_t	0.118	0.1357	−0.0094	0.804	−2.192	0	−0.2745	9.2064	−0.0383
r_t	0.2501	9.6861	0.2305	−19.112	53.5762	0	−8.6812	−230.1222	−7.5864
C_t	−0.0535	0.9657	0.0317	−2.6399	7.358	0	−0.6515	−31.4613	−0.803
Div_t	−0.008	−7.957	−0.1386	11.5161	−32.2143	0	4.8645	138.1362	6.6432
G_t	0.949	0	0	0	0	0	0	0	0
I_t	0.2069	22.1186	0.6037	−49.9414	140.3617	0	−21.4666	−604.1071	−16.1403
L^{s}_t	0.2344	6.7329	0.1535	−12.718	35.6848	0	−5.4276	−153.3848	−5.2374
Q_t	0	0	0	0	0	0	0	0	0
T_t	0.949	0	0	0	0	11.5637	0	0	0
U_t	−0.0107	−0.0272	0.0003	−0.0234	0.0592	0	0.0226	−0.1954	0.0162
W_t	0.0157	2.9532	0.077	−6.394	17.8914	0	−2.2536	−76.7373	−2.349
Y_t	0.1641	3.805	0.1074	−8.9026	24.9794	0	−3.4993	−107.3694	−2.8432
Y^{j}_t	0.1641	4.713	0.1074	−8.9026	24.9794	0	−3.4993	−107.3694	−2.8432
Y^{s}_t	0.1641	4.713	0.1074	−8.9026	24.9794	0	−3.4993	−107.3694	−2.8432

Matrix S

	ϵ^{Z}	η^{p}	η^{R}	η^{π}	η^{G}
g^1	-1.049	0.1095	-16.321	5.9119	0.1553
g^2	-1.049	-0.0266	-16.321	5.9119	0.1553
$inflation^{\mathrm{gap}}$	-0.078	0.012	-1.1556	0.37	-0.0001
λ	-0.0465	0.0051	9.5801	-2.3722	0.1243
mc	-5.7633	-0.0535	-127.7344	30.949	0.0906
$\pi^{\star}$	-0.7732	0.1192	-11.4539	3.6676	-0.0012
pH	0.0039	-0.0006	0.0578	-0.0185	0
pL	-0.0741	0.0114	-1.0978	0.3515	-0.0001
q	-0.0465	0.0051	9.5801	-2.3722	0.1243
r	-9.218	-0.0995	-239.4611	57.9829	0.2635
C	-0.9757	-0.0144	-32.7381	7.9632	-0.0564
Div	8.072	0.061	143.7421	-34.864	-0.0084
G	0	0	0	0	1
I	-19.6116	-0.2544	-628.6234	151.9066	0.218
L^{s}	-6.3638	-0.0657	-159.6096	38.6199	0.247
Q	0	0	0	0	0
T	0	0	0	0	1
U	0.0197	-0.0003	-0.2033	0.0641	-0.0113
W	-2.8542	-0.0338	-79.8515	19.363	0.0165
Y	-3.4547	-0.046	-111.7267	27.034	0.1729
Y^{j}	-3.4547	-0.046	-111.7267	27.034	0.1729
Y^{s}	-3.4547	-0.046	-111.7267	27.034	0.1729

18 Model statistics

18.1 Basic statistics

	Steady-state value	Std. dev.	Variance	Loglin
ϵ^{G}	1	1.3033	1.6986	Y
g^1	7.3514	20.4293	417.3582	Y
g^2	4.9009	20.4291	417.3479	Y
$inflation^{\mathrm{gap}}$	1	1.2239	1.4979	Y
λ	1.5467	12.2835	150.8847	Y
mc	0.6667	127.9284	16365.6722	Y
ν^{p}	1	0	0	Y
$perceived^{\pi^{\mathrm{obj}}}$	1	0.0053	0	Y
π	1	1.2291	1.5108	Y
$\pi^{\star}$	1	11.8882	141.3285	Y
π^{obj}	1	1.2961	1.6798	Y
pH	0.95	0.0612	0.0037	Y
pL	0.05	1.1627	1.3518	Y
q	1.5467	12.2835	150.8847	Y
r	0.0351	246.1829	60606.0446	Y
B	0	0	0	N
C	0.3255	30.8502	951.733	Y
Div	0.1601	145.1801	21077.2735	Y
G	0.0865	1.3033	1.6986	Y
I	0.0684	635.6958	404109.1599	Y
K^{s}	2.7374	20.0074	400.2969	Y
L^{s}	0.2279	161.275	26009.6363	Y
Q	1	0	0	Y
R	1.0101	0.6891	0.4748	Y
T	0.0865	1.3033	1.6986	Y
U	-167.8256	0.5475	0.2997	Y
W	0.9837	77.7172	6039.9577	Y
Y	0.4804	110.7744	12270.972	Y
Y^{j}	0.4804	110.7744	12270.972	Y
Y^{s}	0.4804	110.7744	12270.972	Y
Z	1	1.227	1.5056	Y

18.2 Correlation matrix

	ϵ^{G}	g^1	g^2	$inflation^{\mathrm{gap}}$	λ	mc	$percieved^{\pi^{\mathrm{obj}}}$	π	$\pi^\star$	π^{obj}	pH	pL	
ϵ^{G}	1	0.009	0.009	-0.001	0.013	0	-0.001	-0.001	-0.001	0	0.001	-0.001	0.
g^1		1	1	0.771	-0.134	0.94	0.742	0.771	0.958	0.148	-0.771	0.771	-0.
g^2			1	0.771	-0.134	0.94	0.741	0.771	0.958	0.148	-0.771	0.771	-0.
$inflation^{\mathrm{gap}}$				1	-0.626	0.899	0.999	1	0.888	0.284	-1	1	-0.
λ					1	-0.445	-0.641	-0.626	-0.411	-0.244	0.626	-0.626	
mc						1	0.878	0.899	0.994	0.109	-0.899	0.899	-0.
$percieved^{\pi^{\mathrm{obj}}}$							1	0.999	0.865	0.29	-0.999	0.999	-0.
π								1	0.888	0.284	-1	1	-0.
$\pi^\star$									1	0.189	-0.888	0.888	-0.
π^{obj}										1	-0.284	0.284	-0.
pH											1	-1	0.
pL												1	-0.
q													
r													
C													
Div													
G													
I													
K^{s}													
L^{s}													
R													
T													
U													
W													
Y													
Y^{j}													
Y^{s}													
Z													

18.3 Cross correlations with the reference variable (π)

	$\sigma[\cdot]$ rel. to $\sigma[\pi]$	π_{t-5}	π_{t-4}	π_{t-3}	π_{t-2}	π_{t-1}	π_t	π_{t+1}	π_{t+2}	π_{t+3}	π_{t+4}	π_{t+5}
ϵ_t^{G}	1.06	0	-0.001	-0.001	-0.001	-0.002	-0.001	-0.001	0	0	0	0
g_t^1	16.621	0.015	0.037	0.075	0.152	0.329	0.771	-0.358	-0.245	-0.186	-0.146	-0.11
g_t^2	16.621	0.015	0.037	0.075	0.152	0.328	0.771	-0.358	-0.245	-0.186	-0.146	-0.11
$inflation_t^{\mathrm{gap}}$	0.996	-0.116	-0.113	-0.083	0.011	0.277	1	0.277	0.011	-0.083	-0.113	-0.11
λ_t	9.994	0.276	0.32	0.342	0.301	0.081	-0.626	-0.476	-0.367	-0.278	-0.204	-0.14
mc_t	104.079	-0.076	-0.072	-0.047	0.034	0.265	0.899	-0.161	-0.113	-0.091	-0.077	-0.06
$perceived_t^{\pi^{\mathrm{obj}}}$	0.004	-0.12	-0.117	-0.088	0.007	0.273	0.999	0.322	0.027	-0.081	-0.115	-0.1
π_t	1	-0.116	-0.113	-0.083	0.011	0.277	1	0.277	0.011	-0.083	-0.113	-0.11
$\pi_t^\star$	9.672	-0.066	-0.059	-0.031	0.051	0.277	0.888	-0.196	-0.121	-0.09	-0.075	-0.06
π_t^{obj}	1.054	-0.051	-0.035	-0.009	0.035	0.115	0.284	0.21	0.147	0.095	0.052	0.01
pH_t	0.05	0.116	0.113	0.083	-0.011	-0.277	-1	-0.277	-0.011	0.083	0.113	0.11
pL_t	0.946	-0.116	-0.113	-0.083	0.011	0.277	1	0.277	0.011	-0.083	-0.113	-0.11
q_t	9.994	0.276	0.32	0.342	0.301	0.081	-0.626	-0.476	-0.367	-0.278	-0.204	-0.14
r_t	200.288	-0.058	-0.051	-0.024	0.056	0.278	0.881	-0.2	-0.143	-0.113	-0.094	-0.07
C_t	25.099	-0.142	-0.151	-0.137	-0.057	0.199	0.933	0	0.009	0.003	-0.007	-0.01
Div_t	118.115	0.07	0.065	0.04	-0.041	-0.27	-0.894	0.173	0.122	0.098	0.083	0.07
G_t	1.06	0	-0.001	-0.001	-0.001	-0.002	-0.001	-0.001	0	0	0	0
I_t	517.186	-0.068	-0.064	-0.038	0.043	0.27	0.891	-0.177	-0.126	-0.1	-0.084	-0.07
K_t^{s}	16.278	-0.275	-0.319	-0.341	-0.299	-0.077	0.633	0.477	0.365	0.276	0.202	0.14
L_t^{s}	131.209	-0.069	-0.064	-0.039	0.042	0.27	0.893	-0.175	-0.124	-0.099	-0.084	-0.07
R_t	0.561	0.256	0.305	0.336	0.308	0.109	-0.559	-0.395	-0.297	-0.226	-0.17	-0.12
T_t	1.06	0	-0.001	-0.001	-0.001	-0.002	-0.001	-0.001	0	0	0	0
U_t	0.445	-0.27	-0.321	-0.358	-0.351	-0.22	0.253	0.606	0.467	0.359	0.269	0.19
W_t	63.229	-0.099	-0.1	-0.078	0.003	0.244	0.917	-0.107	-0.072	-0.06	-0.054	-0.0
Y_t	90.123	-0.083	-0.081	-0.057	0.024	0.258	0.905	-0.145	-0.101	-0.081	-0.07	-0.06
Y_t^{j}	90.123	-0.083	-0.081	-0.057	0.024	0.258	0.905	-0.145	-0.101	-0.081	-0.07	-0.06
Y_t^{s}	90.123	-0.083	-0.081	-0.057	0.024	0.258	0.905	-0.145	-0.101	-0.081	-0.07	-0.06
Z_t	0.998	0.009	0.003	-0.006	-0.02	-0.04	-0.071	-0.047	-0.027	-0.013	-0.002	0.00

18.4 Autocorrelations

	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
ϵ^{G}	0.713	0.471	0.271	0.109	-0.017
g^1	-0.071	-0.04	-0.035	-0.037	-0.04
g^2	-0.071	-0.04	-0.035	-0.037	-0.04
$inflation^{\mathrm{gap}}$	0.277	0.011	-0.083	-0.113	-0.116
λ	0.682	0.438	0.246	0.095	-0.022
mc	-0.121	-0.08	-0.062	-0.052	-0.045
$perceived\pi^{\mathrm{obj}}$	0.319	0	-0.085	-0.119	-0.125
π	0.277	0.011	-0.083	-0.113	-0.116
$\pi^{\star}$	-0.142	-0.08	-0.056	-0.045	-0.039
π^{obj}	0.704	0.456	0.254	0.092	-0.032
pH	0.277	0.011	-0.083	-0.113	-0.116
pL	0.277	0.011	-0.083	-0.113	-0.116
q	0.682	0.438	0.246	0.095	-0.022
r	-0.124	-0.082	-0.063	-0.053	-0.045
C	-0.034	-0.024	-0.028	-0.036	-0.042
Div	-0.122	-0.081	-0.063	-0.052	-0.045
G	0.713	0.471	0.271	0.109	-0.017
I	-0.122	-0.081	-0.063	-0.053	-0.045
K^{s}	0.677	0.433	0.242	0.093	-0.023
L^{s}	-0.123	-0.081	-0.063	-0.052	-0.045
R	0.651	0.406	0.221	0.078	-0.031
T	0.713	0.471	0.271	0.109	-0.017
U	0.832	0.539	0.308	0.125	-0.016
W	-0.105	-0.07	-0.056	-0.049	-0.045
Y	-0.117	-0.078	-0.061	-0.052	-0.045
Y^{j}	-0.117	-0.078	-0.061	-0.052	-0.045
Y^{s}	-0.117	-0.078	-0.061	-0.052	-0.045
Z	0.644	0.368	0.159	0.006	-0.102

19 Impulse response functions

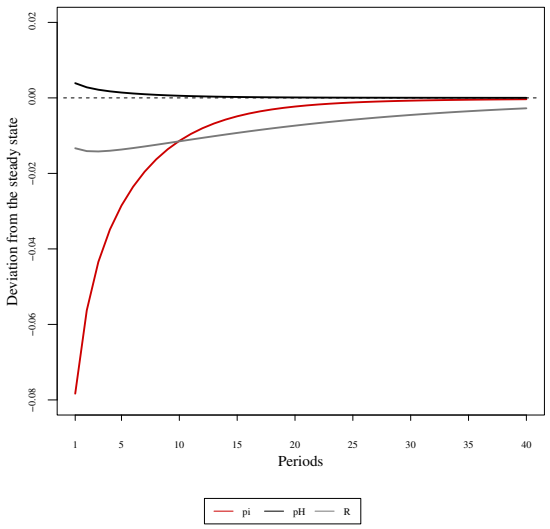

Figure 1: Impulse responses (π, pH, R) to ϵ^{Z} shock

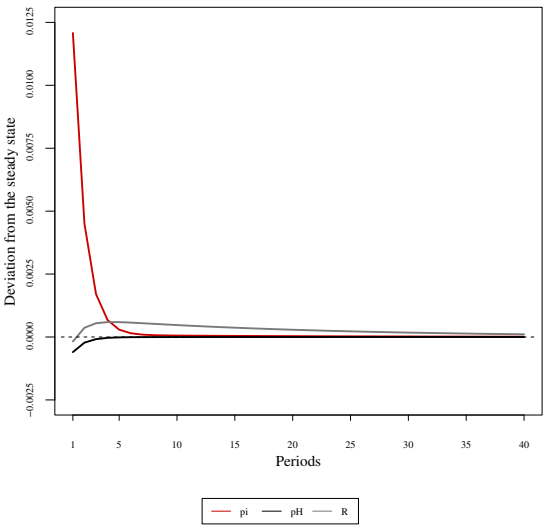

Figure 2: Impulse responses (π, pH, R) to η^{P} shock

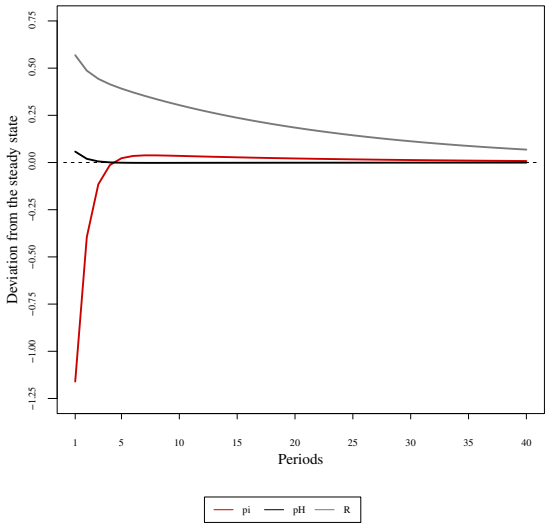

Figure 3: Impulse responses (π, pH, R) to η^{R} shock

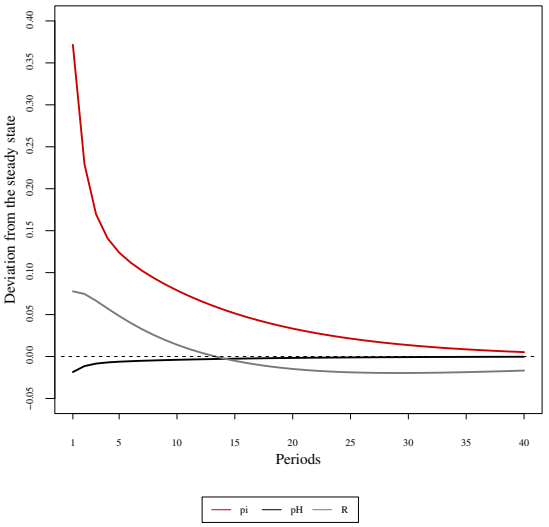

Figure 4: Impulse responses (π, pH, R) to η^{π} shock

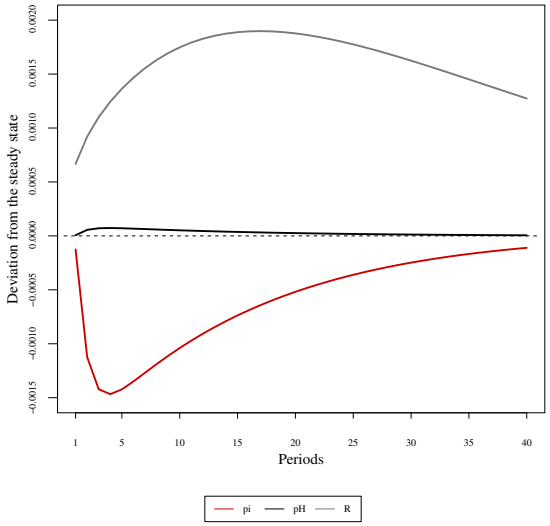

Figure 5: Impulse responses (π, pH, R) to η^{G} shock

20 Impulse response functions

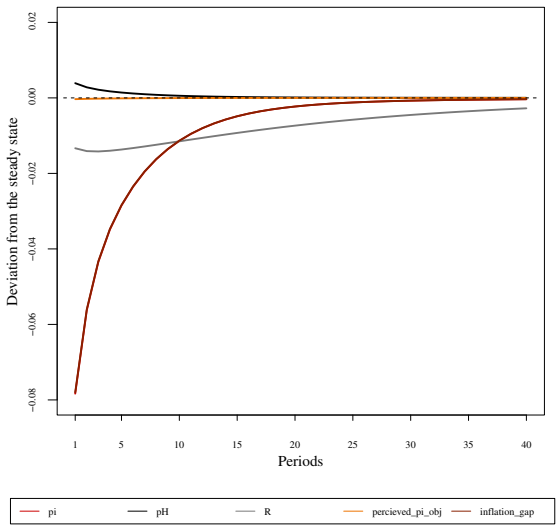

Figure 6: Impulse responses $(\pi, pH, R, perceived^{\pi^{obj}}, inflation^{gap})$ to ϵ^{Z} shock

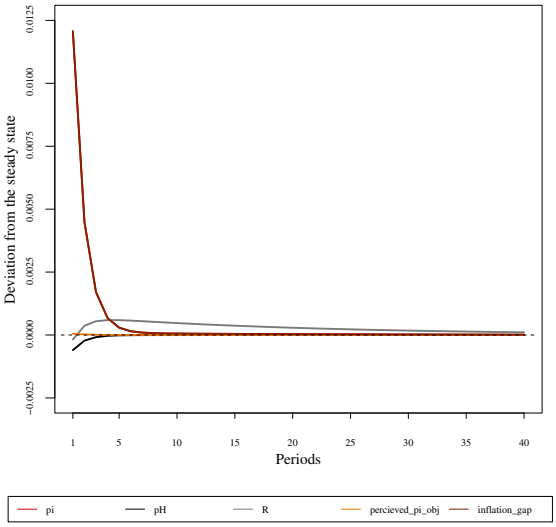

Figure 7: Impulse responses $(\pi, pH, R, perceived^{\pi^{obj}}, inflation^{gap})$ to η^{p} shock

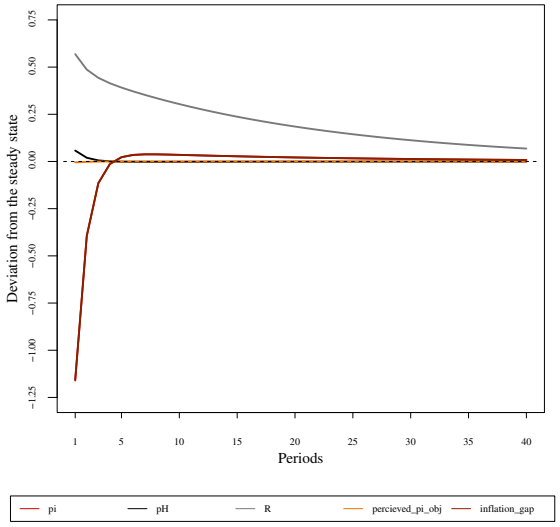

Figure 8: Impulse responses $(\pi, pH, R, perceived^{\pi^{obj}}, inflation^{gap})$ to η^{R} shock

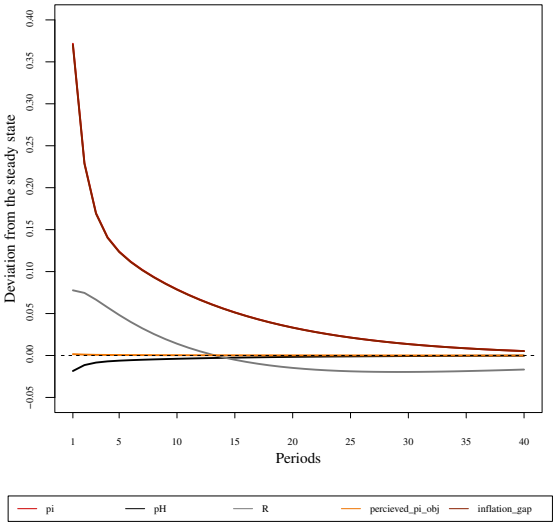

Figure 9: Impulse responses $(\pi, pH, R, perceived^{\pi^{obj}}, inflation^{gap})$ to η^{π} shock

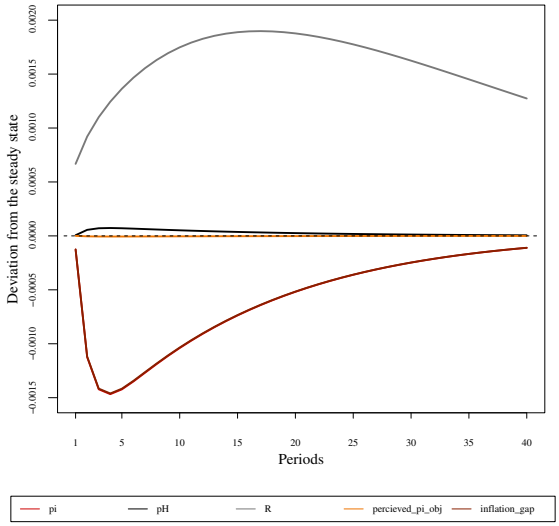

Figure 10: Impulse responses $(\pi, pH, R, percieved^{\pi^{\mathrm{obj}}}, inflation^{\mathrm{gap}})$ to η^{G} shock