1 EQUILIBRIUM SYSTEM

Preferences:

$$E_0 \sum_{t=0}^{\infty} \beta^t a_t [\log(c_t - h c_{t-1}^a) - \chi n_t^{1+\eta}/(1+\eta)]$$

Budget Constraint:

$$c_t + b_t/(i_t(1+\bar{s})) = w_t n_t + b_{t-1}/\pi_t + d_t$$

Equilibrium system (11 equations):

$$a_t \lambda_t = c_t - h c_{t-1}^a \tag{1}$$
$$w_t = \chi a_t n_t^{\eta} \lambda_t \tag{2}$$
$$1 = \beta(1+\bar{s}) E_t[(\lambda_t/\lambda_{t+1})(i_t/(\bar{\pi}\pi_{t+1}^{gap}))] \tag{3}$$
$$y_t = z_t n_t \tag{4}$$
$$\varphi(\pi_t^{gap} - 1)\pi_t^{gap} = 1 - \theta + \theta w_t/z_t + \beta\varphi E_t[(\lambda_t/\lambda_{t+1})(\pi_{t+1}^{gap} - 1)\pi_{t+1}^{gap}(y_{t+1}/y_t)] \tag{5}$$
$$c_t = [1 - \varphi(\pi_t^{gap} - 1)^2/2] y_t \tag{6}$$
$$i_t = \max\{1, i_t^*\} \tag{7}$$
$$i_t^* = (i_{t-1}^*)^{\rho_i} (\bar{\imath}(\pi_t^{gap})^{\phi_\pi} (c_t/(\bar{g} c_{t-1}))^{\phi_c})^{1-\rho_i} \exp(\sigma_\nu \nu_t) \tag{8}$$
$$g_t = (1-\rho_g)\bar{g} + \rho_g g_{t-1} + \sigma_\varepsilon \varepsilon_t \tag{9}$$
$$a_t = 1 - \rho_a + \rho_a a_{t-1} + \sigma_\upsilon \upsilon_t \tag{10}$$
$$z_t = g_t z_{t-1} \tag{11}$$

Variables: $\{\lambda, w, c, y, n, i, i^*, \pi^{gap}, g, a, z\}$

De-trended Equilibrium System (10 equations):

$$a_t \tilde{\lambda}_t = \tilde{c}_t - h\tilde{c}_{t-1}/g_t \tag{12}$$
$$\tilde{w}_t = \chi a_t n_t^{\eta} \tilde{\lambda}_t \tag{13}$$
$$1 = \beta(1+\bar{s}) E_t[(\tilde{\lambda}_t/\tilde{\lambda}_{t+1})(i_t/(\bar{\pi}\pi_{t+1}^{gap} g_{t+1}))] \tag{14}$$
$$\tilde{y}_t = n_t \tag{15}$$
$$\varphi(\pi_t^{gap} - 1)\hat{\pi}_t^{gap} = 1 - \theta + \theta\tilde{w}_t + \beta\varphi E_t[(\tilde{\lambda}_t/\tilde{\lambda}_{t+1})(\pi_{t+1}^{gap} - 1)\pi_{t+1}^{gap}(\tilde{y}_{t+1}/\tilde{y}_t)] \tag{16}$$
$$\tilde{c}_t = [1 - \varphi(\pi_t^{gap} - 1)^2/2]\tilde{y}_t \tag{17}$$
$$i_t = \max\{1, i_t^*\} \tag{18}$$
$$i_t^* = (i_{t-1}^*)^{\rho_i} (\bar{\imath}(\pi_t^{gap})^{\phi_\pi} (g_t\tilde{c}_t/(\bar{g}\tilde{c}_{t-1}))^{\phi_c})^{1-\rho_i} \exp(\sigma_\nu \nu_t) \tag{19}$$
$$g_t = (1-\rho_g)\bar{g} + \rho_g g_{t-1} + \sigma_\varepsilon \varepsilon_t \tag{20}$$
$$a_t = 1 - \rho_a + \rho_a a_{t-1} + \sigma_\upsilon \upsilon_t \tag{21}$$

Variables: $\{\tilde{\lambda}, \tilde{w}, \tilde{c}, \tilde{y}, n, i, i^*, \pi^{gap}, g, a\}$

Log-linear Equilibrium System:

$$(1 - h/g)(\hat{a}_t + \hat{\lambda}_t) = \hat{c}_t + (h/g)(\hat{g}_t - \hat{c}_{t-1}) \tag{22}$$

$$\hat{w}_t = \hat{a}_t + \eta\hat{n}_t + \hat{\lambda}_t \tag{23}$$

$$\hat{\lambda}_t + \hat{\imath}_t = E_t\hat{\lambda}_{t+1} + E_t\hat{\pi}_{t+1} + E_t\hat{g}_{t+1} \tag{24}$$

$$\hat{y}_t = \hat{n}_t \tag{25}$$

$$\varphi\hat{\pi}_t = (\theta - 1)\hat{w}_t + \beta\varphi E_t\hat{\pi}_{t+1} \tag{26}$$

$$\hat{c}_t = \hat{y}_t \tag{27}$$

$$\hat{\imath}_t = \hat{\imath}^n_t \tag{28}$$

$$\hat{\imath}^n_t = \rho_i\hat{\imath}^n_{t-1} + (1 - \rho_i)\phi_\pi\hat{\pi}_t + (1 - \rho_i)\phi_c(\hat{g}_t + \hat{c}_t - \hat{c}_{t-1}) + \sigma_\nu\nu_t \tag{29}$$