

# Appendix

## Equilibrium System

### Households:

Euler equation:

$$u'(c_t^{eH}) = \beta \mathbf{E}_t \left( \frac{1 + i_{t+1}}{\Pi_{t+1}} [e_{t+1}^H u'(c_{t+1}^{eH}) + e_{t+1}^L u'(c_{t+1}^{eL}) + u_{t+1} u'(c_{t+1}^u) + (1 - l_{t+1}) u'(c_{t+1}^n)] \right) \quad (1)$$

Constraints:

$$x_t = \frac{b_{t+1}}{P_t} + (1 + i_t) \frac{a_t}{P_t} - (1 + i_t) \frac{b_t}{P_t} \quad (2)$$

$$c_t^{eL} = x_t + (1 - \tau_t) \frac{w_t^L}{P_t} \quad (3)$$

$$c_t^u = x_t + \frac{\tau_t^u}{P_t} \quad (4)$$

$$c_t^n = x_t \quad (5)$$

$$\begin{aligned} \frac{a_{t+1}}{P_t} = & x_t + (1 - \tau_t) \left[ e_t^H \frac{w_t^H}{P_t} + e_t^L \frac{w_t^L}{P_t} \right] + (1 - \tau_t) D_t + u_t \frac{\tau_t^u}{P_t} + \\ & - [e_t^H c_t^{eH} + e_t^L c_t^{eL} + u_t c_t^u + (1 - l_t) c_t^n] \end{aligned} \quad (6)$$

Employment accumulation:

$$e_t^x = \rho_t^x e_{t-1}^x + f_{x,t}^s s_t^x, \text{ for } x \in \{H, L\} \quad (7)$$

with searchers  $s_t^x$  given by:

$$s_t^x = l_t^x - \rho_t^x e_{t-1}^x, \text{ for } x \in \{H, L\} \quad (8)$$

Participation condition:

$$\begin{aligned} MRS_{N,C,t}^x - \Omega_t^x = & f_{x,t}^s \left[ (1 - \tau_t) \frac{w_t^x}{P_t} - \Upsilon_t^x \right] + \\ & + f_{x,t}^s \beta \mathbf{E}_t \rho_{t+1}^x \frac{(1 - f_{x,t+1}^s)}{f_{x,t+1}^s} u'(c_{t+1}^{eH}) (MRS_{N,C,t+1}^x - \Omega_{t+1}^x), \text{ for } x \in \{H, L\} \end{aligned} \quad (9)$$

where:

$$MRS_{N,C,t}^x = \frac{(\mu^x - l_t^x) [\xi^x * (\mu^x - l_t^x)^{-\phi}]}{u'(c_t^{eH})} \quad (10)$$

and:

$$\Omega_t^x = \frac{\tau_t^u}{P_t} + (c_t^n - c_t^u) + \frac{u(c_t^u) - (u(c_t^n) + \xi_t^x)}{u'(c_t^{eH})} \quad (11)$$

$$\Upsilon_t^x = \frac{\tau_t^u}{P_t} + (c_t^{e^x} - c_t^u) + \frac{u(c_t^u) - (u(c_t^{e^x}) - (2 + \iota)\chi_t^x)}{u'(c_t^{eH})}, \text{ for } x \in \{H, L\} \quad (12)$$

Asset market equilibrium:

$$\frac{b_{t+1}}{P_t} = \frac{a_{t+1}}{P_t} = \bar{b}_t \quad (13)$$

**Firms:**

Optimal hiring:

$$\frac{k_t^H}{f_{H,t}^v} = \frac{q_t^H}{P_t} z_t - \frac{w_t^H}{P_t} + \mathbf{E}_t \left\{ \Lambda_{t,t+1} \rho_{t+1}^H \frac{k_{t+1}^H}{f_{H,t+1}^v} \right\} \quad (14)$$

$$\frac{k_t^L}{f_{L,t}^v} = \frac{q_t^L}{P_t} z_t - \frac{w_t^L}{P_t} + \mathbf{E}_t \left\{ \Lambda_{t,t+1} \rho_{t+1}^L \frac{k_{t+1}^L}{f_{L,t+1}^v} \right\} \quad (15)$$

Discount factor:

$$\Lambda_{t,t+1} = \beta \mathbf{E}_t \left\{ \frac{(1 - \tau_{t+1}) u'(c_{t+1}^{eH})}{(1 - \tau_t) u'(c_t^{eH})} \right\} \quad (16)$$

Dividends definition:

$$d_{H,t}^w = \frac{q_t^H}{P_t} z_t e_t^H - \frac{w_t^H}{P_t} e_t^H - k_t^H v_t^H \quad (17)$$

$$d_{L,t}^w = \frac{q_t^L}{P_t} z_t e_t^L - \frac{w_t^L}{P_t} e_t^L - k_t^L v_t^L \quad (18)$$

Desired sector-specific price:

$$p_{x,t}^* = \frac{p_{x,t}^A}{p_{x,t}^B}, \text{ for } x \in \{H, L\} \quad (19)$$

with:

$$p_{x,t}^A = \frac{\varepsilon_p}{\varepsilon_p - 1} q_t^x \Psi_t^x + \mathbf{E}_t \Lambda_{t,t+1} (1 - \theta) \Pi_{t+1,t}^{-1} p_{x,t+1}^A \quad (20)$$

and:

$$p_{x,t}^B = \Psi_t^x + \mathbf{E}_t \Lambda_{t,t+1} (1 - \theta) \Pi_{t+1,t}^{-1} p_{x,t+1}^B \quad (21)$$

and :

$$\Psi_t^x = \left(\frac{1}{P_t^x}\right)^{-\varepsilon_p} \left(\frac{P_t^x}{P_t}\right)^{-\varepsilon_s} Y_t \quad (22)$$

Sector-specific and aggregate price level:

$$P_t^x = \left(\theta (p_{x,t}^*)^{1-\varepsilon_p} + (1 - \theta) (P_{t-1}^x)^{1-\varepsilon_p}\right)^{\frac{1}{1-\varepsilon_p}}, \text{ for } x \in \{H, L\} \quad (23)$$

$$P_t = \left[\gamma^H (P_t^H)^{1-\varepsilon_s} + \gamma^L (P_t^L)^{1-\varepsilon_s}\right]^{\frac{1}{1-\varepsilon_s}} \quad (24)$$

Output:

$$\varsigma_t^x Y_t^x = z_t e_t^x, \text{ for } x \in \{H, L\} \quad (25)$$

$$(26)$$

Price dispersion:

$$\varsigma_t^x = \theta \left(\frac{P_{x,t}^*}{P_t^x}\right)^{-\varepsilon_p} + (1 - \theta) \left(\frac{P_t^x}{P_{t-1}^x}\right)^{\varepsilon_p} \varsigma_{t-1}^x, \text{ for } x \in \{H, L\} \quad (27)$$

Total dividends:

$$D_t = d_t^H + d_t^L \quad (28)$$

where :

$$d_t^x = Y_t \left( \frac{P_t^x}{P_t} \right)^{1-\epsilon_s} - \frac{1}{\gamma^x} \frac{q_t^x}{P_t} z_t e_t^x + d_{x,t}^w, \text{ for } x \in \{H, L\} \quad (29)$$

## Government

Government budget constraint:

$$\tau_t \left[ e_t^H \frac{w_t^H}{P_t} + D_t + e_t^L \frac{w_t^L}{P_t} \right] = u_t \frac{\tau_t^u}{P_t} \quad (30)$$

Unemployment Insurance:

$$\tau_t^u = 0.5 * w_{t-1}^L + \varepsilon_{\tau,t} \quad (31)$$

Taylor rule:

$$1 + i_t = (1 + \bar{i}) \left( \frac{P_t}{P_{t-1}} \right)^\psi e^{\varepsilon_{it}}$$

## Labor Market:

Job finding rate:

$$f_{x,t}^s = \alpha_m^x \left( \frac{v_t^x}{s_t^x} \right)^{1-\alpha}, \text{ for } x \in \{H, L\} \quad (32)$$

Job filling rate:

$$f_{x,t}^v = \alpha_m^x \left( \frac{v_t^x}{s_t^x} \right)^{-\alpha}, \text{ for } x \in \{H, L\} \quad (33)$$

**Wages:**

Bargained wage:

$$\frac{w_{x,t}^*}{P_t} = \vartheta \left( \frac{q_t^x}{P_t} z_t + \mathbf{E}_t \Lambda_{t,t+1} \rho_{t+1}^x (1 - u'(c_t^{eH}) (1 - f_{x,t+1}^s)) \frac{k_{t+1}^x}{f_{x,t+1}^v} \right) + (1 - \vartheta) \frac{\Upsilon_t^x}{1 - \tau_t}, \text{ for } x \in \{H, L\} \quad (34)$$

**Shocks:**

Productivity:

$$\log(z_t) = (1 - \rho_z) \log(\bar{z}) + \rho_z \log(z_{t-1}) + \sigma_z \varepsilon_{z,t} \quad (35)$$

Separation:

$$\log(\rho_t^x) = (1 - \rho_\rho^x) \log(\bar{\rho}^x) + \rho_\rho^x \log(\rho_{t-1}^x) + \sigma_{\rho^x} \varepsilon_{\rho^x,t}, \text{ for } x \in \{H, L\} \quad (36)$$

Borrowing:

$$\bar{b}_t = (1 - \rho_b) (\bar{b}) + \rho_b \bar{b}_{t-1} + \sigma_b \varepsilon_{b,t} \quad (37)$$

Monetary policy:

$$\epsilon_{it} = \rho_i \epsilon_{i,t-1} + \sigma_i \varepsilon_{it} \quad (38)$$