

$$0 = \sigma \hat{c}_t + \varphi \hat{y}_t + \alpha \bar{s}_t - (1 + \varphi) a_t \quad (1)$$

$$0 = \sigma \hat{c}^*_t + \varphi \hat{y}^*_t - \bar{s}_t \alpha^* - (1 + \varphi) a^*_t \quad (2)$$

$$\tilde{\sigma} (\hat{y}_t - \delta \hat{g}_t) = \sigma \hat{c}_t + \bar{s}_t \bar{\alpha} (1 - h) w_{\bar{\alpha}} \quad (3)$$

$$\tilde{\sigma} (\hat{y}^*_t - \delta \hat{g}^*_t) = \sigma \hat{c}^*_t - \bar{s}_t w_{\bar{\alpha}} \bar{\alpha} h \quad (4)$$

$$\bar{s}_t = \tilde{\sigma}_{\bar{\alpha}} (\hat{y}_t - \hat{y}^*_t - \delta (\hat{g}_t - \hat{g}^*_t)) \quad (5)$$

$$\hat{g}_t \gamma = \sigma \hat{c}_t + \alpha \bar{s}_t \quad (6)$$

$$\hat{g}^*_t \gamma = \sigma \hat{c}^*_t - \bar{s}_t \alpha^* \quad (7)$$

$$\bar{s}^*_t = (-\bar{s}_t) \quad (8)$$

$$\hat{c}^H_t = \hat{c}_t + \bar{s}_t \alpha \eta \quad (9)$$

$$\hat{c}^F_t = \hat{c}_t + \bar{s}_t (-\eta) (1 - \alpha) \quad (10)$$

$$\hat{c}^{H*}_t = \hat{c}^*_t + \bar{s}_t \eta (1 - \alpha^*) \quad (11)$$

$$\hat{c}^{F*}_t = \hat{c}^*_t + \bar{s}_t \alpha^* (-\eta) \quad (12)$$

$$\hat{n}_t = \hat{y}_t - a_t \quad (13)$$

$$\hat{n}^*_t = \hat{y}^*_t - a^*_t \quad (14)$$

$$\hat{f}_t = \hat{g}_t - \hat{y}_t \quad (15)$$

$$\hat{f}^*_t = \hat{g}^*_t - \hat{y}^*_t \quad (16)$$

$$\bar{r}_t = (1 + \varphi) (a_{t+1} - a_t) - \varphi (\hat{y}_{t+1} - \hat{y}_t) \quad (17)$$

$$\bar{r}^*_t = (1 + \varphi) (a^*_{t+1} - a^*_t) - \varphi (\hat{y}^*_{t+1} - \hat{y}^*_t) \quad (18)$$

$$\hat{y}^{cu}_t = \hat{y}_t h + \hat{y}^*_t (1 - h) \quad (19)$$

$$\hat{g}^{cu}_t = \hat{g}_t h + (1 - h) \hat{g}^*_t \quad (20)$$

$$\hat{c}^{cu}_t = \hat{c}_t h + \hat{c}^*_t (1 - h) \quad (21)$$

$$\hat{r}^{cu}_t = h \bar{r}_t + (1 - h) \bar{r}_t^* \quad (22)$$

$$\pi^H_t = \beta \pi^H_{t+1} + \lambda \left((\varphi + \tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},h}) \hat{y}_t - \delta \tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},h} \hat{g}_t + (\tilde{\sigma} - \tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},h}) (\hat{y}_t^* - \delta \hat{g}_t^*) - (1 + \varphi) a_t \right) \quad (23)$$

$$\pi^{F*}_t = \beta \pi^{F*}_{t+1} + \lambda^* \left(\hat{y}_t^* (\varphi + \tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},1-h}) - \hat{g}_t^* \delta \tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},1-h} + (\tilde{\sigma} - \tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},1-h}) (\hat{y}_t - \delta \hat{g}_t) - (1 + \varphi) a^*_t \right) \quad (24)$$

$$\hat{y}_t = \hat{y}_{t+1} - \delta (\hat{g}_{t+1} - \hat{g}_t) - \frac{1}{\tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},h}} \left(i_t - \pi^H_{t+1} \right) + \left(\frac{1 + \bar{\alpha} \Theta \bar{\alpha}}{\Omega_{\bar{\alpha},h}} - 1 \right) (\hat{y}_{t+1}^* - \hat{y}_t^* - \delta (\hat{g}_{t+1}^* - \hat{g}_t^*)) \quad (25)$$

$$\hat{y}_t^* = \hat{y}_{t+1}^* - \delta (\hat{g}_{t+1}^* - \hat{g}_t^*) - \frac{1}{\tilde{\sigma}_{\bar{\alpha}} \Omega_{\bar{\alpha},1-h}} \left(i^*_t - \pi^{F*}_{t+1} \right) + \left(\frac{1 + \bar{\alpha} \Theta \bar{\alpha}}{\Omega_{\bar{\alpha},1-h}} - 1 \right) (\hat{y}_{t+1} - \hat{y}_t - \delta (\hat{g}_{t+1} - \hat{g}_t)) \quad (26)$$

$$s_t = \tilde{\sigma}_{\bar{\alpha}} (\hat{y}_t - \hat{y}_t^* - \delta (\hat{g}_t - \hat{g}_t^*)) \quad (27)$$

$$s^*_t = (-s_t) \quad (28)$$

$$\hat{n}_t = \hat{y}_t - a_t \quad (29)$$

$$\hat{n}_t^* = \hat{y}_t^* - a^*_t \quad (30)$$

$$\tilde{\sigma} (\hat{y}_t - \delta \hat{g}_t) = \sigma \hat{c}_t + \bar{\alpha} (1 - h) w_{\bar{\alpha}} s_t \quad (31)$$

$$\tilde{\sigma} (\hat{y}_t^* - \delta \hat{g}_t^*) = \sigma \hat{c}_t^* - w_{\bar{\alpha}} \bar{\alpha} h s_t \quad (32)$$

$$\hat{f}_t = \hat{g}_t - \hat{y}_t \quad (33)$$

$$\hat{f}_t^* = \hat{g}_t^* - \hat{y}_t^* \quad (34)$$

$$\hat{c}_t^H = \hat{c}_t + \alpha \eta s_t \quad (35)$$

$$\hat{c}_t^F = \hat{c}_t + (-\eta) (1 - \alpha) s_t \quad (36)$$

$$\hat{c}_t^{H*} = \hat{c}_t^* + \eta (1 - \alpha^*) s_t \quad (37)$$

$$\hat{c}_t^{F*} = \hat{c}_t^* + \alpha^* (-\eta) s_t \quad (38)$$

$$i_t = i^{cu}_t \quad (39)$$

$$i^*_t = i^{cu}_t \quad (40)$$

$$\pi^{cu}_t = h \pi^H_t + (1 - h) \pi^{F*}_t \quad (41)$$

$$\hat{y}_t^{cu} = h \hat{y}_t + (1 - h) \hat{y}_t^* \quad (42)$$

$$\hat{g}_t^{cu} = h \hat{g}_t + (1 - h) \hat{g}_t^* \quad (43)$$

$$\hat{c}_t^{cu} = h \hat{c}_t + (1 - h) \hat{c}_t^* \quad (44)$$

$$\tilde{y}_t = \hat{y}_t - \hat{\hat{y}}_t \quad (45)$$

$$\tilde{g}_t = \hat{g}_t - \hat{\hat{g}}_t \quad (46)$$

$$\tilde{c}_t = \hat{c}_t - \hat{\hat{c}}_t \quad (47)$$

$$\tilde{c}_t^H = \hat{c}_t^H - \hat{\hat{c}}_t^H \quad (48)$$

$$\tilde{c}_t^F = \hat{c}_t^F - \hat{\hat{c}}_t^F \quad (49)$$

$$\tilde{n}_t = \hat{n}_t - \hat{\hat{n}}_t \quad (50)$$

$$\tilde{f}_t = \hat{f}_t - \hat{\hat{f}}_t \quad (51)$$

$$\tilde{s}_t = s_t - \bar{s}_t \quad (52)$$

$$\tilde{i}_t = i_t - \bar{r}_t \quad (53)$$

$$\tilde{y}_t^* = \hat{y}_t^* - \hat{\hat{y}}_t^* \quad (54)$$

$$\tilde{g}_t^* = \hat{g}_t^* - \hat{\hat{g}}_t^* \quad (55)$$

$$\tilde{c}_t^* = \hat{c}_t^* - \hat{\hat{c}}_t^* \quad (56)$$

$$\tilde{c}_t^{H*} = \hat{c}_t^{H*} - \hat{\hat{c}}_t^{H*} \quad (57)$$

$$\tilde{c}_t^{F*} = \hat{c}_t^{F*} - \hat{\hat{c}}_t^{F*} \quad (58)$$

$$\tilde{n}_t^* = \hat{n}_t^* - \hat{\hat{n}}_t^* \quad (59)$$

$$\tilde{f}_t^* = \hat{f}_t^* - \hat{\hat{f}}_t^* \quad (60)$$

$$\tilde{s}_t^* = s_t^* - \bar{s}_t^* \quad (61)$$

$$\tilde{i}_t^* = i_t^* - \bar{r}_t^* \quad (62)$$

$$\tilde{y}_t^{cu} = h \tilde{y}_t + (1 - h) \tilde{y}_t^* \quad (63)$$

$$\tilde{g}_t^{cu} = h \tilde{g}_t + (1 - h) \tilde{g}_t^* \quad (64)$$

$$\tilde{c}_t^{cu} = h \tilde{c}_t + (1 - h) \tilde{c}_t^* \quad (65)$$

$$\tilde{i}_t^{cu} = i_t - \hat{r}_t^{cu} \quad (66)$$

$$a_t = RHO A a_{t-1} - \epsilon_{at} - 0.5 \epsilon_{at}^* \quad (67)$$

$$a_t^* = RHO A a_{t-1}^* - \epsilon_{at}^* \quad (68)$$