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

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

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

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

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

$$\hat{\tilde{g}}_t\,\gamma = \sigma\,\hat{\tilde{c}}_t + \alpha\,\bar{s}_t \tag{6}$$

$$\hat{\tilde{g}}^*{}_t\,\gamma = \sigma\,\hat{\tilde{c}}^*{}_t - \bar{s}_t\,\alpha^* \tag{7}$$

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

$$\hat{\tilde{c}}^H{}_t = \hat{\tilde{c}}_t + \bar{s}_t\,\alpha\,\eta \tag{9}$$

$$\hat{\tilde{c}}^F{}_t = \hat{\tilde{c}}_t + \bar{s}_t\;(-\eta)\;(1-\alpha) \tag{10}$$

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

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

$$\hat{\tilde{n}}_t = \hat{\tilde{y}}_t - a_t \tag{13}$$

$$\hat{\tilde{n}}^*{}_t = \hat{\tilde{y}}^*{}_t - a^*{}_t \tag{14}$$

$$\hat{\tilde{f}}_t = \hat{\tilde{g}}_t - \hat{\tilde{y}}_t \tag{15}$$

$$\hat{\tilde{f}}^*{}_t = \hat{\tilde{g}}^*{}_t - \hat{\tilde{y}}^*{}_t \tag{16}$$

$$\bar{r}_t = (1+\varphi)\;(a_{t+1} - a_t) - \varphi\;\left(\hat{\tilde{y}}_{t+1} - \hat{\tilde{y}}_t\right) \tag{17}$$

$$\bar{r}^*_t = (1+\varphi)\;(a^*{}_{t+1} - a^*{}_t) - \varphi\;\left(\hat{\tilde{y}}^*{}_{t+1} - \hat{\tilde{y}}^*{}_t\right) \tag{18}$$

$$\hat{\tilde{y}}^{cu}{}_t = \hat{\tilde{y}}_t\,h + \hat{\tilde{y}}^*{}_t\;(1-h) \tag{19}$$

$$\hat{\tilde{g}}^{cu}{}_t = \hat{\tilde{g}}_t\,h + (1-h)\;\hat{\tilde{g}}^*{}_t \tag{20}$$

$$\hat{\tilde{c}}^{cu}{}_t = \hat{\tilde{c}}_t\,h + \hat{\tilde{c}}^*{}_t\;(1-h) \tag{21}$$

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

$$\hat{\bar{c}}^{H,cu}{}_t = h\,\hat{\bar{c}}^{H}{}_t + (1-h)\;\hat{\bar{c}}^{H*}{}_t \tag{23}$$

$$\hat{\bar{c}}^{F,cu}{}_t = h\,\hat{\bar{c}}^{F}{}_t + (1-h)\;\hat{\bar{c}}^{F*}{}_t \tag{24}$$

$$\hat{\bar{f}}^{H,cu}{}_t = h\,\hat{\bar{f}}_t + (1-h)\;\hat{\bar{f}}^{*}{}_t \tag{25}$$

$$\hat{\bar{n}}^{H,cu}{}_t = h\,\hat{\bar{n}}_t + (1-h)\;\hat{\bar{n}}^{*}{}_t \tag{26}$$

$$\bar{nx}_t = \hat{\bar{y}}_t - (1-\delta)\;\left(\hat{\bar{c}}_t + \alpha\,\bar{s}_t\right) - \delta\,\hat{\bar{g}}_t \tag{27}$$

$$\bar{nx}^*_t = \hat{\bar{y}}^{*}{}_t - (1-\delta)\;\left(\hat{\bar{c}}^{*}{}_t + \alpha^*\,\bar{s}^*_t\right) - \delta\,\hat{\bar{g}}^{*}{}_t \tag{28}$$

$$\hat{\bar{nx}}^{H,cu}{}_t = h\,\bar{nx}_t + (1-h)\;\bar{nx}^*_t \tag{29}$$

$$\pi^{H}{}_t = \beta\,\pi^{H}{}_{t+1} + \lambda\;\left(\left(\varphi + \tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},h}\right)\;\hat{y}_t - \delta\,\tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},h}\,\hat{g}_t + \left(\tilde{\sigma} - \tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},h}\right)\;(\hat{y}^*_t - \delta\,\hat{g}^*_t) - (1+\varphi)\;a_t\right) \tag{30}$$

$$\pi^{F*}{}_t = \beta\,\pi^{F*}{}_{t+1} + \lambda^*\;\left(\hat{y}^*_t\;\left(\varphi + \tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},1-h}\right) - \hat{g}^*_t\;\delta\,\tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},1-h} + \left(\tilde{\sigma} - \tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},1-h}\right)\;(\hat{y}_t - \delta\,\hat{g}_t) - (1+\varphi)\;a^*{}_t\right) \tag{31}$$

$$\hat{y}_t = \hat{y}_{t+1} - \delta\;(\hat{g}_{t+1} - \hat{g}_t) - \frac{1}{\tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},h}}\;\left(i_t - \pi^{H}{}_{t+1}\right) + \left(\frac{1+\bar{\alpha}\,\Theta\bar{\alpha}}{\Omega_{\bar{\alpha},h}} - 1\right)\;\left(\hat{y}^*_{t+1} - \hat{y}^*_t - \delta\;\left(\hat{g}^*_{t+1} - \hat{g}^*_t\right)\right) \tag{32}$$

$$\hat{y}^*_t = \hat{y}^*_{t+1} - \delta\;\left(\hat{g}^*_{t+1} - \hat{g}^*_t\right) - \frac{1}{\tilde{\sigma}_{\bar{\alpha}}\,\Omega_{\bar{\alpha},1-h}}\;\left(i^*{}_t - \pi^{F*}{}_{t+1}\right) + \left(\frac{1+\bar{\alpha}\,\Theta\bar{\alpha}}{\Omega_{\bar{\alpha},1-h}} - 1\right)\;(\hat{y}_{t+1} - \hat{y}_t - \delta\;(\hat{g}_{t+1} - \hat{g}_t)) \tag{33}$$

$$s_t = \tilde{\sigma}_{\bar{\alpha}}\;(\hat{y}_t - \hat{y}^*_t - \delta\;(\hat{g}_t - \hat{g}^*_t)) \tag{34}$$

$$s^*{}_t = (-s_t) \tag{35}$$

$$\hat{n}_t = \hat{y}_t - a_t \tag{36}$$

$$\hat{n}^*_t = \hat{y}^*_t - a^*{}_t \tag{37}$$

$$\tilde{\sigma}\;(\hat{y}_t - \delta\,\hat{g}_t) = \sigma\,\hat{c}_t + \bar{\alpha}\;(1-h)\;w_{\bar{\alpha}}\,s_t \tag{38}$$

$$\tilde{\sigma}\;(\hat{y}^*_t - \delta\,\hat{g}^*_t) = \sigma\,\hat{c}^*_t - w_{\bar{\alpha}}\,\bar{\alpha}\,h\,s_t \tag{39}$$

$$\hat{f}_t = \hat{g}_t - \hat{y}_t \tag{40}$$

$$\hat{f}^*_t = \hat{g}^*_t - \hat{y}^*_t \tag{41}$$

$$\hat{c}_t^H = \hat{c}_t + \alpha\,\eta\,s_t \tag{42}$$

$$\hat{c}_t^F = \hat{c}_t + (-\eta)\ (1-\alpha)\ s_t \tag{43}$$

$$\hat{c}_t^{H*} = \hat{c}_t^* + \eta\ (1-\alpha^*)\ s_t \tag{44}$$

$$\hat{c}_t^{F*} = \hat{c}_t^* + \alpha^*\ (-\eta)\ s_t \tag{45}$$

$$i_t = {i^{cu}}_t \tag{46}$$

$${i^*}_t = {i^{cu}}_t \tag{47}$$

$${\pi^{cu}}_t = h\,{\pi^H}_t + (1-h)\ {\pi^{F*}}_t \tag{48}$$

$$\hat{y}_t^{cu} = h\,\hat{y}_t + (1-h)\ \hat{y}_t^* \tag{49}$$

$$\hat{g}_t^{cu} = h\,\hat{g}_t + (1-h)\ \hat{g}_t^* \tag{50}$$

$$\hat{c}_t^{cu} = h\,\hat{c}_t + (1-h)\ \hat{c}_t^* \tag{51}$$

$$\hat{c}_t^{H,cu} = h\,\hat{c}_t^H + (1-h)\ \hat{c}_t^{H*} \tag{52}$$

$$\hat{c}_t^{F,cu} = h\,\hat{c}_t^F + (1-h)\ \hat{c}_t^{F*} \tag{53}$$

$$\hat{f}_t^{cu} = h\,\hat{f}_t + (1-h)\ \hat{f}_t^* \tag{54}$$

$$\hat{n}_t^{cu} = h\,\hat{n}_t + (1-h)\ \hat{n}_t^* \tag{55}$$

$$nx_t = \hat{y}_t - (1-\delta)\ (\hat{c}_t + \alpha\,s_t) - \delta\,\hat{g}_t \tag{56}$$

$${nx^*}_t = \hat{y}_t^* - (1-\delta)\ (\hat{c}_t^* + \alpha^*\,{s^*}_t) - \delta\,\hat{g}_t^* \tag{57}$$

$$\hat{nx}_t^{cu} = h\,nx_t + (1-h)\ {nx^*}_t \tag{58}$$

$$\tilde{y}_t = \hat{y}_t - \hat{\tilde{y}}_t \tag{59}$$

$$\tilde{g}_t = \hat{g}_t - \hat{\tilde{g}}_t \tag{60}$$

$$\tilde{c}_t = \hat{c}_t - \hat{\tilde{c}}_t \tag{61}$$

$$\tilde{c}_t^H = \hat{c}_t^H - {\hat{\tilde{c}}^H}_t \tag{62}$$

$$\tilde{c}_t^F = \hat{c}_t^F - {\hat{\tilde{c}}^F}_t \tag{63}$$

$$\tilde{n}_t = \hat{n}_t - \hat{\bar{n}}_t \tag{64}$$

$$\tilde{f}_t = \hat{f}_t - \hat{\bar{f}}_t \tag{65}$$

$$\tilde{s}_t = s_t - \bar{s}_t \tag{66}$$

$$\tilde{i}_t = i_t - \bar{r}_t \tag{67}$$

$$\tilde{y}^*_t = \hat{y}^*_t - \hat{\bar{y}}^*{}_t \tag{68}$$

$$0 = \hat{g}^*_t - \hat{\bar{g}}^*{}_t \tag{69}$$

$$\tilde{c}^*_t = \hat{c}^*_t - \hat{\bar{c}}^*{}_t \tag{70}$$

$$\tilde{c}^{H*}_t = \hat{c}^{H*}_t - \hat{\bar{c}}^{H*}{}_t \tag{71}$$

$$\tilde{c}^{F*}_t = \hat{c}^{F*}_t - \hat{\bar{c}}^{F*}{}_t \tag{72}$$

$$\tilde{n}^*_t = \hat{n}^*_t - \hat{\bar{n}}^*{}_t \tag{73}$$

$$\tilde{f}^*_t = \hat{f}^*_t - \hat{\bar{f}}^*{}_t \tag{74}$$

$$\tilde{s}^*_t = s^*{}_t - \bar{s}^*_t \tag{75}$$

$$\tilde{i}^*_t = i^*{}_t - \bar{r}^*_t \tag{76}$$

$$\tilde{y}^{cu}_t = h\,\tilde{y}_t + (1-h)\;\tilde{y}^*_t \tag{77}$$

$$\tilde{g}^{cu}_t = h\,\tilde{g}_t \tag{78}$$

$$\tilde{c}^{cu}_t = h\,\tilde{c}_t + (1-h)\;\tilde{c}^*_t \tag{79}$$

$$\tilde{i}^{cu}_t = i_t - \hat{\bar{r}}^{cu}{}_t \tag{80}$$

$$\tilde{g}^r_t = \tilde{g}_t \tag{81}$$

$$\tilde{n}^{cu}_t = \hat{n}^{cu}_t - \hat{\bar{n}}^{H,cu}{}_t \tag{82}$$

$$\tilde{f}^{cu}_t = h\,\tilde{f}_t + (1-h)\;\tilde{f}^*_t \tag{83}$$

$$\tilde{c}^{H,cu}_t = h\,\tilde{c}^H_t + (1-h)\;\tilde{c}^{H*}_t \tag{84}$$

$$\tilde{c}^{F,cu}_t = h\,\tilde{c}^F_t + (1-h)\;\tilde{c}^{F*}_t \tag{85}$$

$$\tilde{nx}_t = nx_t - \bar{nx}_t \tag{86}$$

$$\tilde{nx}^*_t = nx^*{}_t - \bar{nx}^*_t \tag{87}$$

$$\tilde{nx}^{cu}_t = h\,\tilde{nx}_t + (1-h)\;\tilde{nx}^*_t \tag{88}$$

$$i^{cu}{}_t - \hat{\bar{r}}^{cu}{}_t = \pi^{cu}{}_t\,1.5 + \tilde{y}^{cu}_t\,0.5 \tag{89}$$

$$\tilde{g}^*_t = 0 \tag{90}$$

$$\tilde{g}_t = RHOG\,\tilde{g}_{t-1} + FP\_nx\_gapH\;\left(\tilde{nx}_{t-1} - \tilde{nx}^{cu}_{t-1}\right) \tag{91}$$

$$a_t = RHOA\,a_{t-1} - \epsilon_{a\,t} \tag{92}$$

$$a^*{}_t = RHOA\,a^*{}_{t-1} - \epsilon^*_{a\,t} \tag{93}$$

$$a\_cu_t = a_t\,h + a^*{}_t\;(1-h) \tag{94}$$