

To do this we set some auxiliary parameters.

$$\begin{aligned}
a_1 &= \frac{\alpha}{1-\alpha} \frac{w}{r} z \mu, & a_2 &= \frac{\frac{A}{z}}{v^p}, & a_3 &= \frac{\gamma^L - (1-\delta)}{z \mu}, & a_4 &= \frac{1}{n^c} \left(\frac{p^c}{p} \right)^{-\epsilon_c}, & a_5 &= a_4 n^i \left(\frac{p^i}{p} \right)^{\epsilon_i} \\
a_6 &= a_4 v^x \frac{\frac{\epsilon x p^W}{p}}{\frac{p}{p}}, & a_7 &= n^x \left(\frac{q^x}{p} \right)^{\epsilon_x}, & a_8 &= v^M \Omega_X (1 - n^x) \left(\frac{\frac{p^M}{p}}{\frac{q^x}{p}} \right)^{-\epsilon_x}, & a_9 &= a_4 \rho_g, \\
a_{10} &= v^M \Omega^c (1 - n^c) \left(\frac{\frac{p^M}{p}}{\frac{p^c}{p}} \right)^{-\epsilon_c}, & a_{11} &= v^M \Omega^i (1 - n^i) \left(\frac{\frac{p^M}{p}}{\frac{p^i}{p}} \right)^{-\epsilon_i}, & a_{12} &= \frac{z - h \beta \gamma^L}{(1 + \tau_C)(z - h) \left(\frac{p^c}{p} \right)}, \\
a_{13} &= \frac{[1 - \beta \theta_w z^{\eta(1+\vartheta)} \Pi^{\eta(1-\chi_w)(1+\vartheta)} \gamma^L] \frac{\eta-1}{\eta} (1 - \tau_W) w^*}{[1 - \beta \theta_w z^{\eta-1} \Pi^{-(1-\eta)(1-\chi_w)} \gamma^L] \psi(\Pi^{w^*})^{-\eta \vartheta}}, & a_{14} &= \vartheta, & a_{15} &= \alpha.
\end{aligned}$$

Substituting these parameters into above equations, we get

$$\begin{aligned}
k &= a_1 l^d, & y^d &= a_2 k^{a_{15}} (l^d)^{1-a_{15}}, & i &= a_3 k, & x &= \frac{a_6}{a_4} M, & c &= a_4 y^d - a_5 i - a_6 a_7 M - a_4 g, \\
g &= \rho_g c, & M &= a_{10} c + a_{11} i + a_8 x, & \lambda &= a_{12} \frac{1}{c}, & (l^d)^{a_{14}} &= a_{13} \lambda.
\end{aligned}$$

After some easy algebra

$$\begin{aligned}
M &= a_{10} c + a_{11} i + a_8 \frac{a_6}{a_4} M \Rightarrow M = \frac{a_{10} c + a_{11} i}{1 - a_8 \frac{a_6}{a_4}} \text{ where } a_{16} = 1 - a_8 \frac{a_6}{a_4} \\
c &= a_4 y^d - a_5 i - a_6 a_7 M - a_9 c \Rightarrow c = \frac{a_{16} a_4 y^d - (a_5 a_{16} - a_6 a_7 a_{11}) i}{a_{16} + a_6 a_7 a_{10} + a_9 a_{16}} \\
&= \frac{a_{16} a_4 a_2 a_1^{a_{15}} - (a_5 a_{16} - a_6 a_7 a_{11}) a_1 a_3}{a_{16} + a_6 a_7 a_{10} + a_9 a_{16}} l^d \\
(l^d)^{a_{14}} &= a_{13} \frac{a_{12}}{c} \Rightarrow l^d = \left(\frac{a_{17}}{a_{18}} \right)^{\frac{1}{1+a_{14}}}
\end{aligned}$$

where $a_{17} = a_{12} a_{13} (a_{16} + a_6 a_7 a_{10} + a_9 a_{16})$, $a_{18} = a_{16} a_4 a_2 a_1^{a_{15}} - (a_5 a_{16} - a_6 a_7 a_{11}) a_1 a_3$

When we know l^d , we can simply derive steady states of $k, i, y^d, c, M, \lambda, x$ and g .

$$\begin{aligned}
k &= a_1 l^d, & i &= a_3 k, & y^d &= a_2 k^\alpha (l^d)^{1-\alpha}, & c &= \frac{a_{16} a_4 y^d - (a_5 a_{16} - a_6 a_7 a_{11}) i}{a_{16} + a_6 a_7 a_{10} + a_9 a_{16}}, \\
M &= \frac{a_{10} c + a_{11} i}{1 - a_8 \frac{a_6}{a_4}}, & \lambda &= \frac{a_{12}}{c}, & x &= \frac{a_6}{a_4} M, & g &= \rho_g c.
\end{aligned}$$

From equations (58), (97), (54), (55), (96), (95) and from the above, we get

$$\begin{aligned}
l &= v_w l^d, & c^d &= n^c \left(\frac{p^c}{p} \right)^{\epsilon_c} c, & i^d &= n^i \left(\frac{p^i}{p} \right)^{\epsilon_i} i, & x^d &= n^x \left(\frac{q^x}{p} \right)^{\epsilon_x} x, \\
c^M &= c^d \Omega^c \frac{1 - n^c}{n^c} \left(\frac{p^M}{p} \right)^{-\epsilon_c}, & i^M &= i^d \Omega^i \frac{1 - n^i}{n^i} \left(\frac{p^M}{p} \right)^{-\epsilon_i}, & x^M &= x^d \Omega^x \frac{1 - n^x}{n^x} \left(\frac{p^M}{p} \right)^{-\epsilon_x}, \\
y^M &= c^M + i^M + x^M.
\end{aligned}$$