

Given $\frac{D^*}{GDP^N}; L; L^X$

$$r = \frac{1}{\beta} - 1, \quad (1)$$

$$L^N = L - L^X, \quad (2)$$

$$P^N = \left[(P^X)^{\frac{1}{1-\alpha_X}} \frac{(1-\alpha_X) \left(\left(\frac{1}{\beta} - (1-\delta) \right) \frac{1}{\alpha_N} \right)^{\frac{\alpha_N}{1-\alpha_N}}}{(1-\alpha_N) \left(\left(\frac{1}{\beta} - (1-\delta) \right) \frac{1}{\alpha_X} \right)^{\frac{\alpha_X}{1-\alpha_X}}} \right]^{\frac{(1-\alpha_N)(1-\alpha_X)}{(1-\alpha_X)+\gamma(\alpha_X-\alpha_N)}}, \quad (3)$$

$$P^I = (P^N)^\gamma, \quad (4)$$

$$Q^X = P^I. \quad (5)$$

$$Q^N = P^I. \quad (6)$$

$$P^T = (P^X)^X, \quad (7)$$

$$YK^X \left(:= \frac{Y^X}{K^X} \right) = \frac{P^I}{P^X} \left(\frac{1}{\beta} - (1-\delta) \right) \frac{1}{\alpha_X}, \quad (8)$$

$$YK^N \left(:= \frac{Y^N}{K^N} \right) = \frac{P^I}{P^N} \left(\frac{1}{\beta} - (1-\delta) \right) \frac{1}{\alpha_N}, \quad (9)$$

$$K^X = L^X (YK^X)^{-\frac{1}{1-\alpha_X}}, \quad (10)$$

$$K^N = L^N (YK^N)^{-\frac{1}{1-\alpha_N}}, \quad (11)$$

$$Y^X = K^X \cdot YK^X, \quad (12)$$

$$Y^N = K^N \cdot YK^N, \quad (13)$$

$$W = P^X (1-\alpha_X) \frac{Y^X}{L^X}, \quad (14)$$

$$I^X = \delta K^X, \quad (15)$$

$$I^N = \delta K^N, \quad (16)$$

$$I = I^X + I^N, \quad (17)$$

$$IC^M = (1-\gamma)P^I I, \quad (18)$$

$$IC^N = \gamma \left(\frac{P^I}{P^N} \right) I, \quad (19)$$

$$C^N = Y^N - IC^N, \quad (20)$$

$$GDP^R = Y^N + Y^X, \quad (21)$$

$$GDP = GDP^R + Y^{Co}, \quad (22)$$

$$GDP^N = P^N Y^N + P^X Y^X + P^C Y^C, \quad (23)$$

$$TBY \left(:= \frac{TB}{GDP^N} \right) = \frac{D^*}{GDP^N} \frac{r}{1+r} + s^* \frac{P_t^{Co} Y_t^{Co}}{GDP^N} \quad (24)$$

$$\varphi = \left[1 - \frac{(TBY \cdot GDP^N + IC^M - P^{Co} Y^{Co} - P^X Y^X)}{(P^T)^{1-\epsilon} (P^N)^\epsilon C^N} \right]^{-1} \quad (25)$$

$$P = \left[\varphi (P^N)^{1-\epsilon} + (1-\varphi) (P^T)^{1-\epsilon} \right]^{\frac{1}{1-\epsilon}}. \quad (26)$$

$$C = \frac{C^N}{\varphi} \left(\frac{P^N}{P} \right)^\epsilon, \quad (27)$$

$$C^T = (1 - \varphi) \left(\frac{P}{P^T} \right)^\epsilon C, \quad (28)$$

$$C^X = \chi \left(\frac{P^T}{P^X} \right) C^T, \quad (29)$$

$$C^M = (1 - \chi) (P^T) C^T. \quad (30)$$

$$-\frac{U_C}{U_L} = \frac{P}{W}, \quad (31)$$

$$\zeta = \frac{C^{-\theta} W}{L^\nu P} \quad (32)$$

$$\lambda = \frac{U_c}{P}, \quad (33)$$

$$RER = 1/P, \quad (34)$$