APPENDIX E

FINAL DEMAND IN TWO-COUNTRY MODEL

From equation (4.2.5),

$$
\begin{aligned}
Y_{st}^{W} = Y_{dt}^{N} + Y_{dt}^{S} &= \left[(\beta^{N} N_{t}^{N} + \beta^{S} N_{t}^{S}) + \left((1-\beta^{N}) N_{t}^{N} + (1-\beta^{S}) N_{t}^{S} \right) \right] \delta_{w} p_{1t}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} \\
&+ \left[(1-\beta^{N}) N_{t-1}^{N} + (1-\beta^{S}) N_{t-1}^{S} \right] \delta_{w} p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} \\
&+ \left[(1-\beta^{N}) N_{t-1}^{N} + (1-\beta^{S}) N_{t-1}^{S} \right] \delta_{r} \delta_{w} p_{1t}^{\frac{\alpha_2-1}{\alpha_2-\alpha_1}} p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}}
\end{aligned} \tag{E.1}
$$

Since $N_{t}^{j} = (1+n^{j}) N_{t-1}^{j}$, then $N_{t-1}^{j} = \dfrac{N_{t}^{j}}{(1+n^{j})}$.

$$
\begin{aligned}
Y_{st}^{W} = Y_{dt}^{N} + Y_{dt}^{S} &= \left[(\beta^{N} N_{t}^{N} + \beta^{S} N_{t}^{S}) + \left((1-\beta^{N}) N_{t}^{N} + (1-\beta^{S}) N_{t}^{S} \right) \right] \delta_{w} p_{1t}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} \\
&+ \left[\frac{(1-\beta^{N})}{(1+n^{N})} N_{t}^{N} + \frac{(1-\beta^{S})}{(1+n^{S})} N_{t}^{S} \right] \delta_{w} p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} \\
&+ \left[\frac{(1-\beta^{N})}{(1+n^{N})} N_{t}^{N} + \frac{(1-\beta^{S})}{(1+n^{S})} N_{t}^{S} \right] \delta_{r} \delta_{w} p_{1t}^{\frac{\alpha_2-1}{\alpha_2-\alpha_1}} p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}}
\end{aligned} \tag{E.2}
$$

For the total world population, N_{t}^{W}, there are $N_{t}^{W} = N_{t}^{N} + N_{t}^{S} = \eta^{N} N_{t}^{W} + \eta^{S} N_{t}^{W}$, where $\eta^{N} + \eta^{S} = 1$, total share of world population is equal to 1. Thus, the final good demand is

$$
\begin{aligned}
Y_{st}^{W} = Y_{dt}^{N} + Y_{dt}^{S} &= \left[(\beta^{N} \eta^{N} + \beta^{S} \eta^{S}) + \left((1-\beta^{N}) \eta^{N} + (1-\beta^{S}) \eta^{S} \right) \right] N_{t}^{W} \delta_{w} p_{1t}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} \\
&+ \left[\frac{(1-\beta^{N})}{(1+n^{N})} \eta^{N} + \frac{(1-\beta^{S})}{(1+n^{S})} \eta^{S} \right] N_{t}^{W} \delta_{w} p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} \\
&+ \left[\frac{(1-\beta^{N})}{(1+n^{N})} \eta^{N} + \frac{(1-\beta^{S})}{(1+n^{S})} \eta^{S} \right] N_{t}^{W} \delta_{r} \delta_{w} p_{1t}^{\frac{\alpha_2-1}{\alpha_2-\alpha_1}} p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}}
\end{aligned} \tag{E.3}
$$

Consider that $\left[(\beta^{N} \eta^{N} + \beta^{S} \eta^{S}) + \left((1-\beta^{N}) \eta^{N} + (1-\beta^{S}) \eta^{S} \right) \right] = 1$, and let

$\Theta = \left[\dfrac{(1-\beta^{N})}{(1+n^{N})} \eta^{N} + \dfrac{(1-\beta^{S})}{(1+n^{S})} \eta^{S} \right]$. Then,

$$Y_{st}^{W} = Y_{dt}^{N} + Y_{dt}^{S} = N_t^W \delta_w p_{1t}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} + \Theta N_t^W \delta_w p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}} + \Theta N_t^W \delta_r \delta_w p_{1t}^{\frac{\alpha_2-1}{\alpha_2-\alpha_1}} p_{1t-1}^{\frac{\alpha_2}{\alpha_2-\alpha_1}}, \quad \text{(E.4)}$$

which is the same as (4.2.7) in chapter 4.