1 Programming Setup

1.1 Set up DataCamp

I finished ”XX” course on the DataCamp.

1.2 R

The markdown file and the pdf file are here. Please find it in folder ”PS1.”

1.3 Debugger

The R script is also here. Please find it in folder ”PS1.”

1.4 Setup Github

The repository is here, including the rmd, pdf, and the R script for 1.3 and 4.2.

2 Sign up NBER working paper series

1. The title of the second paper listed on the NBER weekly working paper series that I most recently received is ”A Human Capital Theory of Who Escape the Grasp of the Local Monopsonists.”
2. I download the paper ”Trade Diversion and Trade Deficits: The Case of the Korea-U.S. Free Trade Agreement”, which interests me.

3 Sign up SRDA

I downloaded the 2020 PSFD.

4 Roy Model

4.1 Review

1.

$$\begin{aligned}
\mathbb{E}\left[w_0|I\right] &= \mu_0 + \mathbb{E}\left[\varepsilon_0|\frac{v}{\sigma_v} > Z\right] \\
&= \mu_0 + \sigma_0\mathbb{E}\left[\frac{\varepsilon_0}{\sigma_0}|\frac{v}{\sigma_v} > Z\right] \\
&= \mu_0 + \sigma_0\mathbb{E}\left[\ \mathbb{E}\left(\frac{\varepsilon_0}{\sigma_0}|\frac{v}{\sigma_v}\right)|\frac{v}{\sigma_v} > Z\right] \qquad (1) \\
&= \mu_0 + \sigma_0\rho_{0v}\mathbb{E}\left[\frac{v}{\sigma_v}|\frac{v}{\sigma_v} > Z\right] \qquad (2) \\
&= \mu_0 + \sigma_0\rho_{0v}\left(\frac{\phi(z)}{1-\Phi z}\right) \\
&= \mu_0 + \sigma_0\frac{\sigma_{0v}}{\sigma_0\sigma_v}\left(\frac{\phi(z)}{1-\Phi z}\right) \\
&= \mu_0 + \frac{\sigma_{0v}}{\sigma_v}\left(\frac{\phi(z)}{1-\Phi z}\right) \\
&= \mu_0 + \frac{\sigma_{01} - {\sigma_0}^2}{\sigma_v}\left(\frac{\phi(z)}{1-\Phi z}\right) \\
&= \mu_0 + \frac{\sigma_0\sigma_1}{\sigma_v}\left(\frac{\sigma_{01}}{\sigma_0\sigma 1} - \frac{\sigma_0}{\sigma_1}\right)\left(\frac{\phi(z)}{1-\Phi z}\right) \\
&= \mu_0 + \frac{\sigma_0\sigma_1}{\sigma_v}\left(\rho_{01} - \frac{\sigma_0}{\sigma_1}\right)
\end{aligned}$$

Note that from (1) to (2) need to be further explained. First, let $s = \frac{v}{\sigma_v} \sim N(0,1)$. Then

$$\mathbb{E}\left(\frac{\varepsilon_0}{\sigma_0}|\frac{v}{\sigma_v}\right) = \frac{1}{\sigma_0}\,\mathbb{E}\left(\varepsilon_0|s\right) = \frac{1}{\sigma_0}\frac{\sigma_{0s}}{{\sigma_s}^2}s = \frac{1}{\sigma_0}\frac{\frac{\sigma_{0v}}{\sigma_v}}{1}\frac{v}{\sigma_v} = \rho_{0v}\frac{v}{\sigma_v}$$

Similarly, we can derive $\mathbb{E}\left[w_1|I\right] = \mu_1 + \frac{\sigma_1\sigma_0}{\sigma_v}\left(\frac{\sigma_1}{\sigma_0} - \rho_{01}\right)\left(\frac{\phi(z)}{1-\Phi z}\right)$ □

2. b

4.2 Simulation

The R script of this simulation is also here. Please find it in folder "PS1".