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.

1.3 Debugger

The R script is also here.

1.4 Setup Github

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

2 Sign up NBER working paper series

The title of the second paper listed on the NBER weekly working paper series that I most recently received is ””.

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

4 Roy Model

4.1 Review

1.

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

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

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

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

2. b