Charlie Clark
ECO 322.01 Spring 2022
Project 1 – COVID-19 Data
March 4, 2021

Stringency Index Notes

Indicators:

Containment & Closure Policies

C1 – School closing $\in \{0, 1, 2, 3, Blank\}$
C2 – Workplace closing $\in \{0, 1, 2, 3, Blank\}$
C3 – Cancel Public Events $\in \{0, 1, 2, Blank\}$
C4 – Gathering Restrictions $\in \{0, 1, 2, 3, 4, Blank\}$
C5 – Public Transport Closed $\in \{0, 1, 2, Blank\}$
C6 – Stay at Home Requirements $\in \{0, 1, 2, 3, Blank\}$
C7 – Internal Movement Restrictions $\in \{0, 1, 2, Blank\}$
C8 – International Movement Restrictions $\in \{0, 1, 2, 3, 4, Blank\}$

Health Policies

H1 – Public Information Campaigns $\in \{0, 1, 2, Blank\}$

Calculation:

Each time *t* index is simply an arithmetic mean of k indicator sub-indices, where k is the number of indicators used in calculating the index.

$$Index_t = \frac{1}{k}\sum_{j=1}^{k} I_{j,t}$$

In the above equation, $I_{j,t}$ is the time *t* calculated sub-index for the *j*-th indicator.

For stringency index, $Indicator_j \in \{C1, C2, C3, C4, C5, C6, C7, C8, H1\}$, and $k = 9$.

Each time *t* sub-index $I_{j,t}$ is calculated using the formula

$$I_{j,t} = 100\left\{\frac{v_{j,t} - \frac{1}{2}(F_j - f_{j,t})}{N_j}\right\}$$

where N_j is the maximum value of indicator j, F_j is an flag variable which indicates whether or not indicator *j* has a Boolean flag component (see next page), $v_{j,t}$ is the recorded policy value on date *t* using indicator *j*'s ordinal scale, and $f_{j,t}$ is the value of the Boolean flag component for indicator *j* on date *t*.

$$F_j = \begin{cases} 0, \text{if there is no Boolean flag component} \\ 1, \text{if there is a Boolean flag component} \end{cases}$$

Note, if $v_{j,t} = 0$, then $I_{j,t} = 0$.

Therefore,

$$Stringency\ Index_t = \frac{1}{9}\sum_{j=1}^{9} I_{j,t}$$

$$= \frac{1}{9}\sum_{j=1}^{9} 100\left\{\frac{v_{j,t} - \frac{1}{2}(F_j - f_{j,t})}{N_j}\right\}$$

$$= \frac{100}{9}\sum_{j=1}^{9} \frac{1}{N_j}\left\{v_{j,t} - \frac{1}{2}(F_j - f_{j,t})\right\}$$