Utility function

CES utility function may be expressed as follows:

$$U(x_1, x_2 ... x_n) = A \cdot (\sum_{i=1}^{n} a_i^{\frac{1}{\sigma}} x_i^{\frac{\sigma-1}{\sigma}})^{\frac{\sigma}{\sigma-1}}$$

Where parameter $a_i \in (0, 1)$ is responsible for $\dots$, A is and $\dots$, σ is the elasticity of substitution between each good represented by a x_i variables.

Production function

CES production function may be expressed as follows:

$$Q(K_t, L_t) = B \cdot (b_K^{\frac{1}{\gamma}} K_t^{\frac{\gamma-1}{\gamma}} + b_L^{\frac{1}{\gamma}} L_t^{\frac{\gamma-1}{\gamma}})^{\frac{\gamma}{\gamma-1}}$$

Where parameter $b_i \in (0, 1)$ is responsible for the intensity in production, B is and efficiency parameter or in others words factor productivity, γ is the elasticity of substitution between capital K and labor L.

Calibration of parameters from exogenous variables

Utility function:

- σ is obtained from econometric method, literature or conjecture.
- a_i is determined as: $a_i = (\frac{p_i x_i^{\frac{1}{\sigma}}}{\sum_{i=1}^{n} p_i x_i^{\frac{1}{\sigma}}})^{\sigma}$
- A is just $A = \frac{U(x_1, x_2 ... x_n)}{(\sum_{i=1}^{n} a_i^{\frac{1}{\sigma}} x_i^{\frac{\sigma-1}{\sigma}})^{\frac{\sigma}{\sigma-1}}}$

Production function:

- γ is obtained from econometric method, literature or conjecture.
- b_K and b_L is determined as: $b_K = (\frac{w_K K^{\frac{1}{\gamma}}}{w_K K^{\frac{1}{\gamma}} \cdot w_L L^{\frac{1}{\gamma}}})^{\gamma} \quad and \quad b_L = (\frac{w_L L^{\frac{1}{\gamma}}}{w_K K^{\frac{1}{\gamma}} \cdot w_L L^{\frac{1}{\gamma}}})^{\gamma}$
- B is just $B = \frac{Q(K_t, L_t)}{(b_K^{\frac{1}{\gamma}} K_t^{\frac{\gamma-1}{\gamma}} + b_L^{\frac{1}{\gamma}} L_t^{\frac{\gamma-1}{\gamma}})^{\frac{\gamma}{\gamma-1}}}$