Decision Theory

Part I

1. What value(s) did you use for the constraint RHS δik?

I decided to take a constant δ for each pair of country. To decide what constant to take I took the lowest delta which minimizes the average rank difference between the HIC rank and the inferred rank by the model. I found delta = 0.06

2. Did your optimal solution exhibit any inconsistencies with respect to the pairwise comparisons provided? If yes, which ones?

I applied the linear system to the whole set of countries and for the different pairs in the assignment:

• Vietnam is preferred to Kazakhstan

• Slovenia is preferred to Spain

• Turkey is preferred to Argentina

• Nepal is preferred to Ghana

• Zimbabwe is preferred to Iraq

• Japan is preferred to Switzerland

• Kenya is preferred to Honduras

• Peru is preferred to Kuwait

I found that only the pair (Nepal, Ghana) was wrongly assigned.

3. What were the optimal criteria weight values wj that you obtained?

Optimal weights:

weights_Schooling = 0.25974118

weights_Life_expectency = 0.74025882

weights_Income = 0.0

4. What is Croatia's ranking out of all countries, applying your optimal weights? How does this compare with its HDI ranking?

Among the 166 countries that I used for the modeling.

New Croatia ranking = 37

HDI Croatia ranking = 40

Difference = 3

Part II

1. Which countries lie on this efficient frontier?

Australia, Hong Kong, Iceland, Ireland, Lesotho, New Zealand, Nigeria, Palau, Singapore, South Africa and United States lie on the efficient frontier.

2. What is Estonia's efficiency rating (θ)? If Estonia is not efficient, (a) what are its target values for each criteria? and (b) what is the convex combination of ERS members used to generate these target values?

efficency for Estonia: 0.51789541

weights_estonia_not_null = [0.24321174, 0.48355169, 0.27323657]

convex combination = [Indonesia, Russian Federation, Samoa]