

Summary

Environmental issues have been a challenge faced globally and increasingly recognized to be a high-priority concern. With that, the Environmental Performance Index (EPI) was developed to support policy making and decisions using a data-driven approach. Besides having indicator scores that are a measure of how well a country is doing in a particular area, the EPI score weighs these indicator scores and summarizes overall environmental performance with a single value as a standardization across countries. This EPI score, together with the rankings, allow for easier comparison of countries.

This project made use of data available from EPI official website. We used both data from 2014 and 2016 where sensitivity and uncertainty analysis were conducted. I have applied Markov Chain Monte Carlo using JAGS sampling with the package `rjags` installed into R software. The models used in Chapter 3 were constructed based on how the data behaved generally. We build on the random walk model and hierarchical model in this case for our prior distributions.

The former model included a smoothing parameter which resembled that of the tuning parameter seen in Least Absolute Shrinkage and Selection Operator (LASSO) which does shrinking of parameters to achieve a simpler model. Likewise, we find an optimal smoothing parameter that minimizes out of sample prediction error performed using k-fold cross validation. Meta-analysis was also carried out to provide estimates for countries with complete missing data using package metafor installed in R.

Author's contribution

All R codes were written by the author. The full script of R code can be assessed by the zipped file.