

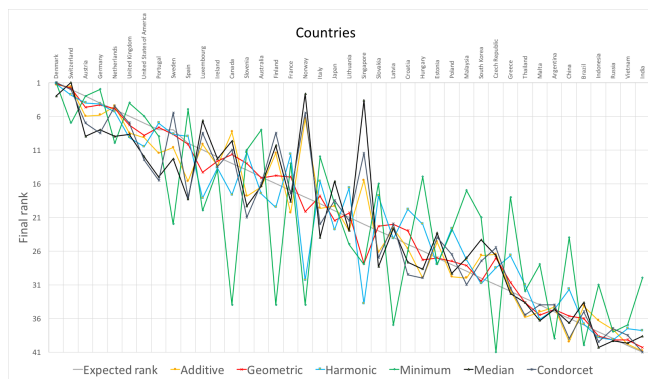
Master thesis:

Exploration of implicit weights in composite indicators: the case of
resilience assessment of countries' electricity supply

Research background

Resilience of electricity supply has received increasing attention over the last decade due to a number of severe disruptions affecting our economies.

Within the FRS module 2.1 (<http://www.frs.ethz.ch/research/energy-and-comparative-system/energy-systems-resilience.html>) at Singapore-ETH Centre (<http://www.sec.ethz.ch/>) we have developed a set of indices (different colours in the figure below) to rank the resilience of countries from a security of electricity supply perspective.

**Master thesis project context**

This research project will look at a complementary and fundamental component of indices construction, namely **the weighting step**, which is used to assign different importance levels to the building blocks of indices, i.e. the indicators.

Objectives of the research project

1. Assess the implicit weights of the indicators for the construction of the resilience indices;
2. Provide recommendations about how to adjust them according to preferences of different decision-makers.

Practical contribution of this project consists in *discussing the learning process* enabled by the understanding of *how far weights are from the desired values*, which *indicators' weights have reduced impact* on the results and *could even be removed*.

Tasks

1. Literature review on weighting methods for construction of indices (1 month, PSI Switzerland);
2. Learn the Matlab toolbox for analysis and adjustment of weights (Mat-toolbox) in composite indicators (1 month, PSI Switzerland / just under 1 month, FRS-Lab Singapore);
3. Application of Mat-toolbox to the in-house dataset of 41 countries evaluated according to their resilience of electricity supply (just over 2 months, FRS-Lab Singapore);
4. Writing of thesis report and preparation of presentation (1 month, PSI Switzerland).

Timeframe

From January 2018, 6 months full-time

Location

Technology Assessment Group, Laboratory for Energy System Analysis (LEA), Paul Scherrer Institute (PSI), Switzerland (3 months)

Future Resilient Systems Lab (FRS), Singapore-ETH Centre (SEC), Singapore (3 months)

Benefits for the student

- Enhance the student's capacity of creation and management of rankings, which can equip him/her with key analytical and critical analysis skills for the next career steps, either in academia, industry or policy-making work settings;
- Learn how to write scientific reports and to present results for conferences/workshops;
- International research experience.

Student profile

Interested in implementation of statistical analysis methods. Matlab is the software to be used for the analysis.

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