Pisa 2015 and 2018: Comparison of educational attainment between England, Scotland, Wales and Northern Ireland

Session: Session 2 (5 July – 6 August)

Background

PISA (Programme for International Student Assessment) is the Organisation for Economic Co-operation and Development's (OECD) programme for comparing educational attainment in 15-year-old students all over the world. Exams in reading, mathematics and science knowledge and skills to meet real-life challenges take place every three years in 79 countries (as of 2018). In addition to the exams, the students, teachers, and parents complete questionnaires to capture aspects of the students' backgrounds and school environments that may be related to educational outcomes. For more information please see http://www.oecd.org/pisa/.

The PISA study uses systematic probability proportional to size (PPS) sampling. Schools are assigned to strata based on school characteristics. For 2018 the sampling design is described in https://www.oecd.org/pisa/data/pisa2018technicalreport/PISA2018%20TecReport-Ch-04-Sample-Design.pdf

Potential questions:

- With a view towards improvement of Scottish school education in the future, examine which factors are associated with educational attainment and what are the nature of these associations.
- How do the PISA results differ between the UK nations (England, Scotland, Northern Ireland and Wales) and how did they change since 2015?

Besides answering the above questions, this project will involve a substantial amount of data preparation.

Useful Courses and methods: Generalised Regression Models, Bayesian Data Analysis, Statistical programming.

The response variables (the attainment scores in maths, science and reading) are modelled by PISA to standardise between different nations. They are drawn from their posterior distribution and in theory any analysis would need to take this into account. But this aspect could be ignored.

Data

There are many variables (> 3000) and many years of data. The survey happens every three years. For this project the UK 2015 and 2018 data and a tiny subset of variables are used.

The original data available from https://www.oecd.org/pisa/data/ . The particular data files used are:

https://webfs.oecd.org/pisa2018/SPSS_STU_QQQ.zip
https://webfs.oecd.org/pisa2018/SPSS_SCH_QQQ.zip
and

https://webfs.oecd.org/pisa/PUF_SPSS_COMBINED_CMB_SCH_QQQ.zip
https://webfs.oecd.org/pisa/PUF_SPSS_COMBINED_CMB_STU_QQQ.zip

The full documentation (e.g., codebooks, the actual questionnaires) is available on the PISA data website. There is some information about how the PISA index of economic, social and cultural status (ESCS) is derived at https://doi.org/10.1787/9789264266490-10-en