

Estimation of Treatment Effects in Observational Studies by Recovering the Population Model and the Assignment Probabilities

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In observational studies the assignment of units to treatments is not under control. Consequently, the estimation and comparison of treatment effects based on the empirical distribution of the responses can be biased since the units exposed to the various treatments could differ in important unknown pretreatment characteristics, which are related to the response. An important example studied in my presentation is the question of whether private schools offer better quality of education than public schools. In order to address this question we use data collected in the year 2000 by OECD for the Programme for International Student Assessment (PISA). Focusing for illustration on scores in mathematics of 15-years old pupils in Ireland, we find that the raw average score of pupils in private schools is higher than of pupils in public schools. However, application of a newly proposed method for observational studies suggests that the less able pupils tend to enroll in public schools, such that their lower scores is not necessarily an indication of bad quality of the public schools. Indeed, when comparing the average score in the two types of schools after adjusting for the enrollment effects, we find quite surprisingly that public schools perform better on average. This outcome is supported by the methods of instrumental variables and latent variables, commonly used by econometricians for analyzing and evaluating social programs.

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