Bias in Instrumental Variable Estimates

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The relative size of the treated and untreated groups, or the T/UT ratio, in an analysis sample often diverges from the T/UT ratio in the population (or original sample) because of choice-based sampling, missing values, and data limitations. While divergences of the sample from the population T/UT ratio do not generate bias for many estimators, instrumental variable (IV) estimates are biased by such divergences even when (1) the IV is analytically valid for the population in estimating the Local Average Treatment Effect (LATE) and (2) the treated and untreated group characteristics are intact conditional on the treatment status. We survey published empirical manuscripts to show that this issue is prevalent across various fields. We also prove that the bias in IV estimates, generated by divergences of the sample from population T/UT ratio, is a monotonic function of the difference between the sample and population T/UT ratios. Based on our findings, we suggest possible solutions and how to interpret the biased IV estimates when the true T/UT ratio is unknown.

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