

Marginal Interventional Effects

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Abstract

Conventional causal estimands, such as the average treatment effect (ATE), capture how the mean outcome in a population or subpopulation would change if all units were assigned to treatment versus control. Real-world policy changes, however, are often incremental, changing treatment status for only a small segment of the population—those at or near the “margin of participation.” To formalize this idea, two parallel literatures in economics and in statistics and epidemiology have developed what we call interventional effects. In this article, we unify these perspectives by defining the interventional effect (IE) as the per capita effect of a treatment intervention on an outcome of interest, and the marginal interventional effect (MIE) as its limit when the intervention size approaches zero. The IE and MIE can be viewed as unconditional counterparts of the policy-relevant treatment effect (PRTE) and marginal PRTE (MPRTE) from the economics literature. Unlike the PRTE and MPRTE, however, the IE and MIE are defined without reliance on a latent index model and can be identified either under unconfoundedness or with instrumental variables. For both scenarios, we show that MIEs are typically identified without the strong positivity assumption required of the ATE, highlight several “stylized interventions” that may be particularly relevant for policy analysis, discuss several parametric and semiparametric estimation strategies, and illustrate the proposed methods with an empirical example.