

Regression Discontinuity Designs Under Interference

Elena Dal Torrione¹, Tiziano Arduini², Laura Forastiere³

¹ *Yale University, Department of Biostatistics,
elena.daltorrione@yale.edu*

² *Tor Vergata University of Rome, Department of Economics and Finance,
tiziano.arduini@uniroma2.it*

³ *Yale University, Department of Biostatistics,
laura.forastiere@yale.edu*

Abstract

We extend the continuity-based framework to Regression Discontinuity Designs (RDDs) to identify and estimate causal effects in the presence of interference when units are connected through a network. In this setting, assignment to an “effective treatment”, which comprises the individual treatment and a summary of the treatment of interfering units (e.g., friends, classmates), is determined by the unit’s score and the scores of other interfering units, leading to a multiscore RDD with potentially complex, multidimensional boundaries. We characterize these boundaries and derive generalized continuity assumptions to identify the proposed causal estimands, i.e., point and boundary causal effects. Additionally, we develop a distance-based non-parametric estimator, derive its asymptotic properties under restrictions on the network degree distribution, and introduce a novel variance estimator that accounts for network correlation. Finally, we apply our methodology to the PROGRESA/Oportunidades dataset to estimate the direct and indirect effects of receiving cash transfers on children’s school attendance.

Keywords

Causal inference, regression discontinuity, interference, networks, local polynomials, statistical dependence.