Anatomy of Event Studies: Hypothetical Experiments, Exact Decomposition, and Robust Estimation

José R. Zubizarreta
Harvard University

Abstract

In recent decades, event studies have emerged as a leading methodology in health and social research for evaluating the causal effects of staggered interventions. In this work, we will analyze event studies from the perspective of experimental design and provide a novel characterization of the classical dynamic two-way fixed effects (TWFE) regression estimator for event studies. Our decomposition is expressed in closed form and reveals in finite samples the hypothetical experiment that TWFE regression adjustments approximate. This decomposition offers insights into how standard regression estimators use information from various units and time points, clarifying and generalizing the notion of forbidden comparison noted in the literature in simpler settings. We propose a robust weighting approach for estimation in event studies, which allows investigators to progressively build larger valid weighted contrasts by leveraging, in a sequential manner, increasingly stronger assumptions on the potential outcomes and treatment assignment mechanisms. This weighting approach is adaptable to a general class of estimates and allows for the generalization of treatment effect estimates to a target population. We provide weighting diagnostics and visualization tools. We illustrate these methods in a case study of the impact of divorce reforms on female suicide.

.