

Spatial Difference-in-Differences Techniques: Ignorability and Interaction

Raymond J.G.M. Florax^{a,b} and Michael S. Delgado^a

^a Department of Agricultural Economics, Purdue University,
403 W. State Street, West Lafayette, IN 47907, USA

^b Department of Spatial Economics, Vrije Universiteit Amsterdam,
and Tinbergen Institute,
De Boelelaan 1105, 1081HV Amsterdam, The Netherlands

Abstract

The linear difference-in-differences (DID) model is a benchmark empirical framework in the program evaluation literature, and has been deployed in countless empirical applications throughout all areas of economics and applied social science to estimate causal effects. The attraction of the difference-in-differences framework is that it is a simple extension of the familiar least squares regression, while under certain assumptions it identifies the average treatment effects and controls for time-invariant unobservables that may be correlated with treatment. A well-known requirement, though less commonly discussed in empirical applications, is the stable unit treatment value assumption (SUTVA). The SUTVA assumption implies that potential outcomes for a person are unrelated to the treatment status of other individuals. Identification in the linear DID model fails when SUTVA is violated. Certain types of spatial processes that commonly arise in observational data lead to violations of SUTVA, and hence invalidate the traditional DID setup. In this paper, we discuss which types of spatial processes violate SUTVA, and develop spatially explicit DID regression tools for identifying treatment parameters under these types of spatial violations of SUTVA.