Instruments Combining Quasi-Random Shocks with Non-Random Exposure: Theory and Applications

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Abstract

We study the properties of "shock-exposure instruments": functions of quasi-experimental shocks and pre-determined but endogenous measures of heterogeneous shock exposure. Examples include linear shift-share instruments, nonlinear instruments based on transportation and other networks, simulated eligibility instruments, and model-implied instruments. We show that the validity of such instruments generally requires a simple but non-standard correction, derived from knowledge of counterfactual shocks that might well have been realized. This shock assignment process can also be used for exact randomization inference and specification tests that are valid in finite samples. We further establish conditions for large-sample consistency and characterize the shock-exposure instruments that are asymptotically efficient. We illustrate the practical implications of our framework in several applications.

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