On Policy Evaluation with Aggregate Time-Series Shocks *

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May 7, 2020

Abstract

We propose a general strategy for estimating treatment effects, in contexts where the only source of exogenous variation is a sequence of aggregate time-series shocks. We start by arguing that commonly used estimation procedures tend to ignore the crucial time-series aspects of the data. Next, we develop a graphical tool and a novel test to illustrate the issues of the design using data from influential studies in development economics [Nunn and Qian, 2014] and macroeconomics [Nakamura and Steinsson, 2014]. Motivated by these studies, we construct a new estimator, which is based on the time-series model for the aggregate shock. We analyze the statistical properties of our estimator in the practically relevant case, where both cross-sectional and time-series dimensions are of similar size. Finally, to provide causal interpretation for our estimator, we analyze a new causal model that allows taking into account both rich unobserved heterogeneity in potential outcomes and unobserved aggregate shocks.

Keywords: Continuous Difference in Differences, Panel Data, Causal Effects, Treatment Effects, Unobserved Heterogeneity.

JEL Classification: C18, C21, C23, C26.

*This paper benefited greatly from our discussions with Manuel Arellano, Stéphane Bonhomme, and Guido Imbens. We also want to thank Martin Almuzara, Ivan Canay, Alexey Makarin, Eduardo Morales, and Christian Ochsner for helpful comments and suggestions. Asya Evdokimova and Gleb Kurovskiy provided excellent research assistance. Dmitry Arkhangelsky gratefully acknowledges financial support from "María de Maeztu Units of Excellence" Programme MDM-2016-0684. Vasily Korovkin gratefully acknowledges financial support from the Czech Science Foundation grant (19-25383S).

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