

Matched Triple-Differences: A Framework for Covariate Adjustment ^{*}

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Abstract

This paper studies how covariate adjustment should be conducted in triple-differences designs. The leading empirical approach is linear regression adjustment, which augments the triple-differences regression with covariates. Under the conditional parallel gap assumption, we first derive a covariate balancing condition that a weighting estimator should satisfy to consistently estimate the average treatment effect on the treated (ATT). Expressing estimators from commonly used linear regression adjustments as weighting estimators reveals that they generally fail to satisfy this balancing condition and are therefore inconsistent for the ATT. To address this limitation, we propose a *matched triple-differences* framework that achieves the required covariate balance through matching. Within this framework, we construct a consistent matched triple-differences estimator, establish its asymptotic normality, and provide a consistent variance estimator. The framework accommodates a general class of matching procedures, including nearest-neighbor matching and kernel matching.

Keywords: Triple-Differences; Difference-in-Differences-Differences; Parallel Gaps; Matching

JEL Classification: C14, C21, C23

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