

Counterfactual and Synthetic Control Method: Causal Inference with Instrumented Principal Component Analysis*

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Abstract

We propose a novel method for causal inference within the frameworks of counterfactual and synthetic control methods. Building on the Generalized Synthetic Control method developed by ?, we instrument factor loadings with predictive covariates rather than including them as direct regressors. These instrumented factor loadings exhibit time-varying dynamics, offering a better economic interpretation. Covariates are instrumented through a transformation matrix, Γ , when we have a large number of covariates it can be easily reduced in accordance with a small number of latent factors helping us to effectively handle high-dimensional datasets. Most importantly, our simulations show that this method is less biased in the presence of unobserved covariates compared to other mainstream approaches.

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