The Machine Learning Control Method for Counterfactual Forecasting

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Tuesday 16 Jan 2024 | 2.30 p.m.
Room SC60
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Without a credible control group, the most widespread methodologies for estimating causal effects cannot be applied. To fill this gap, we propose the Machine Learning Control Method (MLCM), a new approach for causal panel analysis based on counterfactual forecasting with machine learning. The MLCM estimates policy-relevant causal parameters in short- and long-panel settings without relying on untreated units. We formalize identification in the potential outcomes framework and then provide estimation based on supervised machine learning algorithms. To illustrate the advantages of our estimator, we present simulation evidence and an empirical application on the impact of the COVID-19 crisis on educational inequality in Italy. We implement the proposed method in the companion R package MachineControl.

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