



Department of Quantitative
Theory and Methods

Experimentation Platform and Learning Treatment Effects in Panels

Experiments in brick-and-mortar retail are contaminated for myriad reasons. Pragmatic inference in such settings is more akin to learning from observational data, as opposed to the typical setup one might consider for a carefully designed randomized experiment. So motivated, we consider the problem of causal inference in panels with *general* intervention patterns. We provide a novel, near-complete solution to this problem that allows for rate-optimal recovery of treatment effects. Our work expands the applicability of the synthetic control paradigm. In doing so, we extend the analysis of non-convex optimization techniques for matrix completion to non-random missing-ness patterns and noise; a non-trivial feature of independent interest. Our algorithms form the core of a new testing platform we co-developed with a USD 100B drink company, which increased revenue by millions of dollars monthly in Mexico alone. The work won the Daniel H. Wagner Prize in 2022, and the theoretical part is a finalist for the MSOM Best Student Paper Prize 2022 and an Oral for NeurIPS 2021.

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