Co-integration and control: California smoking and German re-unification

Andrew Harvey and Stephen Thiele

Faculty of Economics, Cambridge University and
School of Economics and Finance, Queensland University of Technology.
ACH34@CAM.AC.UK

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Abstract

Control groups can sometimes be used to provide counterfactual evidence for assessing the impact of an event or policy change on a target variable. Fitting time series model to target and control series offers potential gains over a direct comparison between the target and a weighted average of the controls. More importantly it highlights the assumptions underlying methods such as difference in differences and synthetic control and in doing so suggests ways in which they may be tested. Our focus is on structural time series models because they are both simple and transparent. Some of the drawbacks to current methodology are illustrated with examples taken from the literature. These range from the California smoking law of 1988 to German re-unification and Hong Kong's integration with China. Building on this analysis, a new strategy is proposed. We favour less emphasis on 'data-driven' regression methods and more on time series analysis, including simple graphical procedures.

KEYWORDS: common trends; difference in differences; intervention analysis; stationarity tests; synthetic control; unobserved components.

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