Synethic Impulse Response Functions

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Abstract

We adopt techniques from an inferential procedure known as synthetic control to construct a new impulse response function (IRF) estimator. Distinct from estimates generated from Wold decomposition or local projections (LP), synthetic IRFs leverage information from the context surrounding a shock with the goals of both reducing risk while also limiting bias. The method relies upon Wold and/or LP IRF estimates on multivariate time series from a "donor pool". These estimates in turn are aggregated using distanced-based weighting, a procedure in which the donor multivariate series are judged based on similarity to the target multivariate series. We also develop a procedure to discount the donor series based on signal-to-noise ratio. This adjustment supports the "unit-shock" convention used in impulse response function analysis. Simulations and empirical examples are provided.

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