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UNTANGLING FIXED EFFECTS AND CONSTANT REGRESSORS

Abstract:

Fixed effects (FE) in panel data models overlap each other and prohibit the identification of the impact of "constant" regressors. Think of regressors that are constant across countries in a country-time panel with time FE. The traditional approach is to drop some FE and constant regressors by normalizing their impact to zero, such that the remaining parameters can be estimated. We introduce "untangling normalization", meaning that we orthogonalize the FE and, if present, the constant regressors. The untangled FE are much easier to interpret, because they do no longer overlap but are now in deviations with respect to each other. Moreover, the impact of constant regressors can now be estimated, and the untangled FE indicate to what extent the estimates reflect the true value. Our untangled estimates are a linear transformation of the traditional, zero-normalized estimates; no new estimation is needed. We apply the approach to a gravity model for OECD countries' exports to the US. The constant regressors US GDP, world GDP, and the US effective exchange rate explain 90% of the time FE. We use an F-test to show that the time FE are redundant, so the estimated impacts of the constant regressors indeed reflect the true value.

Keywords:

gravity model, fixed effects, multicollinearity, normalization, orthogonalization

JEL Classification: C18, C23, F14