Rehabilitating the Lagged Dependent Variable with Structural Equation Modeling

Henrik Kenneth Andersen & Jochen Mayerl

Chemnitz University of Technology, Institute of Sociology

Keywords: causal analysis, panel analysis, cross-lagged panel models, autoregression, collider bias

There is a long history of including the lagged dependent variable in panel models, especially in the structural equation modeling framework. These include, but are not limited to, cross-lagged panel models, for example.

However, it is often argued that this practice is ill-advised. Namely, in the presence of time-invariant unobserved heterogeneity, the inclusion of the lagged dependent variable is said to open up unintended back-door paths and bias the estimates of the causal variable. Much existing literature therefore recommends avoiding lagged dependent variable models.

We show that panel analysis in the structural equation modeling framework is generally not affected by this issue. Including the lagged dependent variable has the benefit of closing back-door paths due to unobserved time-varying confounders. The existence of time-invariant unobserved confounders is unproblematic.

We demonstrate this using simulated data and argue that the broad use of cross-lagged panel models is legitimate and these models can provide benefits compared to models that do not include the lagged dependent variable.