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Vortragstitel: "Orthogonality conditions for identification of joint production technologies"

Abstract:

The use of a regression residual as a productivity indicator is deeply rooted in economics. However, the observed input demands are endogenous if rational managers adjust their input use for inefficiency. A large stream of studies considers possible solutions to the endogeneity problem that require as little external information for instrumental variables as possible. This paper pursues the distance function approach to address the endogeneity problem. We first establish probabilistic duality results for deterministic input and output distance functions evaluated at input-output vectors that contain inefficiency and noise. We then resort to the directional distance function (DDF) as a functional representation of technology, and show that it is possible to use the direction vector of the DDF as an internal instrument to cancel out the effects of inefficiency and noise from the observed input-output data. Our main result is to establish orthogonality conditions for econometric identification of the DDF in the case where the direction vector governing the data generating process is known to the econometrician. We also examine possible endogeneity caused by the use of imperfect proxy direction vectors. Building on these insights, an axiomatic, fully nonparametric step-wise approach to estimate the DDF representation of technology is outlined.