

IV versus OLS: “either, or” or “both, and?”

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Abstract

Instrumental variable (IV) estimation is widely used to address endogeneity when ordinary least squares (OLS) would produce biased estimates. OLS and IV estimators have competing pros and cons in the presence of endogeneity: OLS is inaccurate yet more precise than IV, while IV is accurate but less precise than OLS. In light of this tradeoff, a specification test by Hausman is commonly applied to select between IV and OLS estimators when the presence or the strength of endogeneity is uncertain. I study three versions of estimators that combine OLS and IV rather than selecting one or the other: 1) a hybrid estimator, which is a convex combination of OLS and IV; 2) a shrunken hybrid estimator, which is a convex combination of the hybrid estimator and 0; and 3) a double hybrid estimator, which is a non-convex combination of OLS and IV. I derive optimal weights for each estimator by minimizing its mean-squared error (MSE)—which combines accuracy and precision to minimize the risk of policy errors—and use the plug-in principle to develop feasible versions of each estimator. Following Hansen (2017), I use Monte Carlo simulations to compare the MSE performance of the hybrid estimators to the conventional Hausman-pretest estimator under a wide range of data conditions to learn under what conditions we might expect the hybrid estimators to outperform the conventional approach in practice. I supplement the simulations with textbook examples from Wooldridge’s *Introductory Econometrics* to show which estimator has the lowest MSE in these examples.