Misspecification-robust Sensitivity Analysis for GMM

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October 20, 2024

Abstract

This paper proposes a local sensitivity measure of GMM estimators of structural parameters to the moment conditions, which allows for moment misspecification. We define sensitivity as the directional derivative of the structural parameters as statistical functionals with respect to the gradient of moment conditions and show that the sensitivity can be obtained from the influence functions of the estimators and moments. The sensitivity measure maps the deviation in the moment conditions to the bias in GMM estimators and is helpful for predicting the potential bias under alternative assumptions. It is shown that moment misspecification alters the sensitivity measure of Andrews, Gentzkow, and Shapiro (2017), which leads to invalid inference. We provide sensitivity measures for one-step, two-step, iterated and continuously updating GMM. Our method is illustrated with an application to the BLP model of automobile market.