Inference on many jumps in nonparametric panel regression models

Dr. Georg Keilbar

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1 Abstract

We investigate the significance of change-point or jump effects within fully non-parametric regression contexts, with a particular focus on panel data scenarios where data generation processes vary across individual or group units, and error terms may display complex dependency structures. In our setting the threshold effect depends on a specific covariate, and we permit the true nonparametric regression to vary based on additional latent variables. We propose two uniform testing procedures: one to assess the existence of change-point effects and another to evaluate the uniformity of such effects across units. Even though the underlying data generation processes are neither independent nor identically distributed, our approach involves deriving a straightforward analytical expression to approximate the variance-covariance structure of change-point effects under general dependency conditions. Notably, when Gaussian approximations are made to these test statistics, the intricate dependency structures within the data can be safely disregarded owing to the localized nature of the statistics. This finding bears significant implications for obtaining critical values. Through extensive simulations, we demonstrate that our tests exhibit excellent control over size and reasonable power performance in finite samples, irrespective of strong cross-sectional and weak serial dependency within the data. Furthermore, applying our tests to two datasets reveals the existence of significant nonsmooth effects in both cases.