

„Estimating structural parameters in regression models with adaptive learning“

(joint work with Norbert Christopeit, Uni Bonn)

This paper examines the ordinary least squares (OLS) estimator of the structural parameters in a class of stylised macroeconomic models in which agents are boundedly rational and use an adaptive learning rule to form expectations of the endogenous variable. Two prominent learning algorithms are considered, namely constant gain and decreasing gain learning. For each of the two learning rules, the analysis proceeds in two stages. First, the paper derives the asymptotic properties of agents' expectations. At the second stage, the paper derives the asymptotics of OLS in the structural model, taken the learning dynamics as given. The structural model effectively amounts to a static, cointegrating or co-explosiveness regression in the case of constant gain learning. With decreasing gain learning, the regressor converges to a constant such that OLS does not satisfy, in general, any of the sufficient conditions for consistent estimability available in the literature. The asymptotics of OLS hence turn out to be highly nonstandard in almost all models of interest. Importantly, the paper proves that the OLS estimator nevertheless remains consistent, although its asymptotic distribution may be non-normal. Finally, the issue of inference in the structural model is considered.