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Statistical Inference for Independent Component Analysis: Application to Structural VAR Models

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Abstract

The well-known problem of non-identifiability of structural VAR models disappears if the structural shocks are independent and if at most one of them is Gaussian. In that case, the relevant estimation technique is the Independent Component Analysis (ICA). Since the introduction of ICA by Comon (1994), various semi-parametric estimation methods have been proposed for "orthogonalizing" the error terms. These methods include pseudo maximum likelihood (PML) approaches and recursive PML. The aim of our paper is to derive the asymptotic properties of the PML approaches, in particular to study their consistency. We conduct Monte Carlo studies exploring the relative performances of these methods. Finally, an application based on real data shows that structural VAR models can be estimated without additional identification restrictions in the non-Gaussian case and that the usual restrictions can be tested.

JEL Codes: C14, C32.

Key-words: Independent Component Analysis, Pseudo Maximum Likelihood, Identification, Cayley Transform, Structural Shocks, Structural VAR , Impulse Response Functions.

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