PRIN 2022, Progetto "*Uncertainty and tail risk*"
20229PFAX5

On the Identification of Vector Autoregressions: Statistical Methods Meet External Instruments

Abstract

The project is part of the broader PRIN 2022 MUR project entitled: "*Uncertainty and tail risk*" and is specifically focused on its third workpackage "*WP3-Uncertainty and the identification of macroeconomic shocks*" which aims at combining different identification schemes to better identify structural macroeconomic shocks.

The aim of this project is to combine recently developed “purely statistical” approaches to the identification of structural shocks in Structural Vector Autoregressions (SVARs), with a more "semi-structural" approach which instead relies on the use of external instruments. In particular, it will be investigated to what extent statistical methods such as Independent Component Analysis (ICA) (see, e.g. Lanne, Meits and Saikkonen, 2017) or the so-called "heteroskedasticity approach" (see, e.g. Angelini, Bacchiocchi, Caggiano and Fanelli, 2019) provide value information for assessing the conditions behind the identification of SVARs through external instruments: relevance and exogeneity.

The relationship between instrument properties and break in unconditional volatility has been partially investigated in a recent study by Angelini, Fanelli and Neri (2023), which can represent a starting point of the analysis. Conversely, the potential of ICA analysis in this respect is still unexplored and will be the core target of the project.

References

Angelini, G., Bacchiocchi, E., Caggiano, G. and Fanelli, L. (2019), Uncertainty across volatility regimes*, Journal of Applied Econometrics* 34, 437-455.
Angelini, G., Fanelli, L., Neri, L. (2023), Invalid proxies and volatility changes, Working Paper, University of Bologna;
Lanne, M., Meitz, M. and Saikkonen, P. (2017), Identification and estimation of non-Gaussian structural vector autoegressions, Journal of Econometrics 196, 288-304.

Programma delle attività/Activity plan

The activities of the 18-month project can be ideally divided into two phases.

Phase 1: In the initial stage, not exceeding, say, 6 months, the researcher will conduct a comprehensive review of the existing literature on methods employed for the identification of structural macroeconomic shocks by integrating various identification schemes. Based on this informed review, the investigator will select a potentially pertinent empirical issue within macroeconomics and gather the required data for subsequent empirical analyses.

Phase 2: The final and pivotal phase of the project, expected to span approximately 12 months, will constitute its central component. This phase will entail the development of a methodology that amalgamates insights derived from recent statistical methods in the identification of SVARs with an assessment of the 'quality' of identification achieved through the use of external instruments. The methodology will be complemented by a robust empirical illustration, which will be encapsulated in a working paper.