

## **Unit Root Testing and Non-Causal Autoregressive Models**

(project in collaboration with Frédérique Bec and Sarra Saïdi - Thema)

Non-causal, and in particular mixed causal/non-causal, autoregressions (MAR models) have recently seen an increased interest within economics and finance. The MAR model allows dependence on both past and future observations, and offers a parsimonious representation of non-linear dynamics, including locally explosive (bubble-type) behaviour. Most theory for likelihood based estimation and inference is established for stationary cases, but a unit root test for the causal part of the MAR model has recently been suggested (Saikkonen and Sandberg, 2016; *Journal of Time Series Analysis*).

In this research project we consider the properties of the Saikkonen and Sandberg (2016) unit root test, as well as unit root tests suggested against non-linear alternatives, that can easily be mistaken for non-causal processes. In addition, we consider the role of unit root pretesting for forecast accuracy. The aim is to provide some grounded guidance to practitioners when non-causality is suspected—or turns out to be a relevant parsimonious representation of more complex dynamics.