

Dynamic Bayesian Smooth Transition Autoregressive (DBSTAR) model

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The main goal of this work is to introduce a Bayesian formulation of a special class of nonlinear time series models known as the Smooth Transition Autoregressive (STAR) model.

This proposal consists of writing the STAR model in a Dynamic Linear Model (DLM) form, called Dynamic Bayesian Smooth Transition Autoregressive (DBSTAR) model.

Compared to the classical STAR model, the proposed DBSTAR model has the advantage of not requiring extensive data for the parameter estimation, as it estimates both the linear and nonlinear parameters in analytical closed form sequentially in time. Furthermore, the DBSTAR model allows formal inputs and interventions from experts, where appropriate.

Unlike existing Bayesian formulations of the STAR model which estimate the parameters using approximation methods like Markov Chain Monte Carlo, our model allows for fast estimation of the model's parameters based on the closeness.

Our methodology is extensively studied with some simulated time series and also illustrated with real examples.

References

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