

Estimation in Non-Linear Non-Gaussian State Space Models with Precision-Based Methods

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Abstract

In recent years, interest rates in many countries have approached the zero lower bound (ZLB). As the ZLB has become effectively binding this has in turn complicated modelling of monetary policy transmission using the standard framework of state space models. The implied state space model is now non-linear and non-Gaussian models. Existing methods for estimating such models are computationally intensive, and often cannot be applied to models with more than a few states. Building upon recent developments in precision-based algorithms, we propose a general approach to estimating high-dimensional non-linear non-Gaussian state space models. To illustrate the proposed approach, we investigate the effect of the zero lower bound of interest rate on monetary transmission mechanism in the US.

Keywords: integrated likelihood; accept-reject Metropolis-Hastings; cross-entropy; liquidity trap; zero lower bound

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