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Smooth Regimes, Macroeconomic Variables, and Bagging for the Short-Term Interest Rate Process

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Abstract

In this paper we propose a smooth transition tree model for both the conditional mean and the conditional variance of the short-term interest rate process. Our model incorporates the interpretability of regression trees and the flexibility of smooth transition models to describe regime switches in the short-term interest rate series. The estimation of such models is addressed and the asymptotic properties of the quasi-maximum likelihood estimator are derived. Model specification is also discussed. When the model is applied to the US short-term interest rate we find (1) leading indicators for inflation and real activity are the most relevant predictors in characterizing the multiple regimes' structure; (2) the optimal model has three limiting regimes, with significantly different local conditional mean and variance dynamics. Moreover, we provide empirical evidence of the strong power of the model in forecasting the first two conditional moments of the short rate process, in particular when it is used in connection with bootstrap aggregating (bagging).

Keywords: Short-term interest rate, Regression tree, Smooth transition, Conditional variance, Bagging, Asymptotic theory

JEL Classification: C13, C22, C51, C53

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Tree structured multiple regimes in interest rates

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