Self exciting threshold auto-regressive approach for non-linear modeling of daily electricity prices in the selected regions

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Abstract

This paper is focused on the electricity market and electricity prices. The electricity sector is one of the key strategic sectors of every economy and knowledge of demand, supply and prices is very important. Because of the features occurring in the time series of electricity prices (i.e. high frequency, non-constant mean, autocorrelation, non-normal distribution, heteroscedasticity, seasonality, etc.), it is necessary to employ more sophisticated models for the purposes of their modeling. The goal of this paper is to propose the empirical model for modeling daily electricity prices in three selected regions (California, North Europe and Austria). To exploit non-linearity, we apply the SETAR (Self Exciting Threshold Auto-Regressive) models that imply and distinct regimes in time series dynamics with potentially different parameters (and thus dynamics properties) of each regime. First, the most appropriate SETAR model for modeling electricity prices at selected markets is developed; next, statistical verification of each model is performed in accordance with Hansen (1997, 2000); finally, it is verified whether the proposed non-linear models give satisfactory results in the sense of data fitting and diagnostic checks.

Keywords
Electricity, electricity price, non-linear time series, regime-switching model, SETAR model.

JEL Classification: C1, C13, C52, G1

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This paper has been written within the project supported by the Grant Agency of the Czech Republic (GAČR) Nr. 402/07/P121.