Prediction of industrial production based on nonlinear time series models

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Abstract

The use of linear time series models to model economic data can be put into question by the commonly held view that many economic phenomena is, in some sense, nonlinear. One example is the business cycle that by many is believed to be asymmetric. The expansions of the economy tend to last longer with moderate growth while recessions are short-lived with steep downturns in economic activity. To deal with nonlinearities, several nonlinear times series models have been developed. In this study, we compare autoregressive integrated moving average (ARIMA) models with the nonlinear models logistic smooth transition autoregressive (LSTAR) and self exiting threshold autoregressive (SETAR). We use monthly data of Swedish industrial production in 28 branches over the period January 1990 to December 2008. Each model type is fitted to successive subsets of each time series. Based on the fitted models we make out of sample predictions of the industrial production over the next 12 months. We compare the relative performance of the models as judged by the mean square error of their predictions. Our results show that in general, ARIMA models outperform both SETAR and LSTAR models. ARIMA models performed better over the whole range of the prediction horizon. When we break down the results by industrial branch we find a few branches where LSTAR and SETAR models appear to perform better.

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