MODELLING TIME SERIES DATA WITH SELF EXCITING TRESHOLD AUTOREGRESSIVE (SETAR) AND STRUCTURAL CHANGE

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ABSTRACT

Time series data with mean shift can be caught through two models that is nonlinier SETAR and Structural Change. Modelling procedure of SETAR and Structural Change are started with stationerity and nonlinierity test. Delay parameter and treshold at SETAR and how many break at Structural Change is determined with a minimum BIC criterion. Estimating of parameter $\phi$ dan $\theta$ for both models through method Ordinary Least Square obtained by stepwise regression and dummy regression to parameter which are significant based on different criterion of dummy. From simulation study results indicates that SETAR model can analyse change of regime which is unsimmetrical and catches jumping movement which cannot be caught by linear time series model, while Structural Change can catch fickle parameter value in specified period. However if parameter simulated close to 0 at SETAR, will cause data is not detected as nonlinier therefore forecasting with SETAR will be unmatch to planning, while weakness of Structural Change is if we simulating break point less than 10% from data, it causes not precisely Minimum BIC to read break point. Models SETAR is not guaranted can be analysed with Structural Change, however model Structural Change can be analysed with SETAR. At monthly inflation data Surabaya period January 1989 up to December 1998, best model of SETAR is SETAR with 1 treshold or two regime $(2;0,[1,4,5,6,8,10,12])$, best model for ARIMA is ARIMA($(0,1,3,5,6,8],0,0)$ and best model for Structural Change is Structural Change with 2 break or 3 segment $(3;0,[1,3],[1,3,5,6,8])$. Result of in sample and out sample forecasts indicates that SETAR model gives smallest MSE and RMSE value. Therefore SETAR model is the best model in modelling inflation data Surabaya.

Keywords : SETAR, Structural Change, Nonlinear, Inflation.