ANALYZING THE CONSUMER'S RICE PRICE USING MULTIPLE LINEAR REGRESSION AND X-12 ARIMA

Dian Kusumaningrum, Asep Saefuddin, and Anang Kurnia

Departemen Statistika, FMIPA, Institut Pertanian Bogor, Indonesia
asaefuddin@crescent.web.id, anangk@fmipa.ipb.ac.id, dian_kusuma_37@plasa.com

Rice is one of the main foods in Indonesia. A change of rice price will cause a major effect in the lives of consumers. On the other hand, there are so many factors that influence the rice price. Thus finding key factors which are significant to the rice price, as well as forecasting the consumer's rice price are needed in order to maintain the stabilization of rice price. The second objective is to find key factors which influence the rice price by using multiple linear regression models. The parameters were estimated by ordinary least square methods. There are 6 variables that are significant at $\alpha=5\%$, which are the consumer's rice price at the previous period, rice production at the current and previous period, farmer's GKP price, realization of domestic stock, and total rice import. The rice price will increase if the GKP price and realization of domestic stock increase whereas total rice import and the consumer's rice price at the previous period have negative influences towards the rice price. In this model rice production at the current and previous period have positive signs, contradictory to the microeconomic theory where when the rice production increases, there will be an excess supply and the price will drop. That condition will occur only if the commodity is a free commodity and the rice is at the sufficiency level but in Indonesia, rice is affected by the government's policy and the rice productivity is left behind by the demand. Forecasting the consumer's rice price for the next five years was the last objective of this research. ARIMA Box–Jenkins Method, X-12 ARIMA, Winter's Method, and Trend Analysis were compared to find the best statistical model to forecast the consumer's rice price. X-12 ARIMA turns out to be the best method because it has the smallest MAPE, MAD, and MSD value. This result is a satisfactory because according to Findley et al. (1998) X-12 ARIMA has the capability to adjust seasonal and trading day factors which usually causes fluctuations in an economic time series data. Besides that, the X-12 ARIMA method also enhances the lack of other forecasting techniques used in this research to add regression effects. The regARIMA makes it possible to add the user defined parameters, in this case the length of month parameter. The length of month parameter rescales the monthly observation by a weight corresponding to the month relative length with respect to the average length. The seasonal adjusted data from the original time series data is aimed to simplify the data without loosing important information.