Rice Price Volatility Measurement in Indonesia Using GARCH and GARCH-X Method

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Abstract

Typical agricultural price series may seem to follow a typical pattern, such that price increases in accelerating pace in one year followed by a sharp drop in the following year, yet their movements are unpredictable. In case of rice in Indonesia, this broad price movement within a short period is highly undesirable since it is a staple food and it is also a source of income for the majority of people, especially those living in the rural areas. Due to its strategic significance, rice price stabilisation plays a key role in the long term policy making process of Indonesian agriculture. This study aims to understand the volatility trend of rice price in Indonesia, by exploring some possible drivers and test the significance impact those drivers to overall volatility measurement. The methodology follows GARCH and GARCH-X technique to model volatility. Some of the drivers that we tested are the impact of national rice reserve level, harvest season, international rice price, and other macroeconomic variable. Our study on rice price volatility shows that the volatility of rice price was driven more by its own-variance rather than external shocks. Introduction of relevant external regressors such as stock level estimations or dummy vector for other macroeconomic variable to GARCH-X were found to be able to overall volatility estimation. Parameters of these external regressors were statistically significant to better describe price observations in GARCH-X model. However, the impacts of these external regressors are very small compare to the impacts of own-variance or external shocks. Maintaining sufficient level of rice stock at government reserve is important to keep rice market's social-psychology stable, but it is not enough to give meaningful impact in reducing price volatility. Obviously, good price stabilisation policy should be able to combine reasons for price volatility and cost of stabilisation at balance proportion.

Keywords: GARCH model, GARCH-X model, price volatility, rice

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