Editorial
Volume 13:01, 2022

Business and Economics Journal

ISSN: 2151-6219 **Open Access**

An Editorial Note on GARCH Models in Agricultural Commodities

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Editorial

The goal of this study was to use generalized autoregressive conditional heteroscedasticity GARCH models to describe and forecast the volatility of returns for chosen agricultural commodities prices in low-income nations. The time varying volatility of selected agricultural commodities prices was studied using GARCH family models, specifically GARCH, threshold multilevel autoregressive conditional heteroscedasticity TGARCH, and exponential clustering autoregressive conditional heteroscedasticity EGARCH, from 2011 to 2021. The data analysis demonstrated that the TGARCH model with the Normal distributional assumption of residuals was a better fit model for the price volatility of Teff and Red Pepper, in which their return series reacted significantly including both good and bad news. The study provides evidence of a leverage effect, indicating that bad news could have a higher effect on the price than equivalent good news, and the asymmetric term was significant. Teff and red pepper two commodities with similar volatility. In conclusion, TGARCH was shown to be the best fit for modelling and forecasting price return volatility of Teff and Red Pepper in African countries.

A market is by its very nature dynamic and changeable, and it can be influenced by a variety of factors including human emotions, prices, producer activity, and consumer behavior. In particular, a market in developing countries, such as Ethiopia, is often characterized by low trading volume, lack of competition, and high price volatility. A low trading volume implies that buyers receive limited quantity and quality of information, and thus the price prediction process may be faulty, resulting in inefficient market systems. According to the International Monetary Fund (IMF), food prices have risen by 45 percent since 2006, demonstrating the existence of dramatic price growth in agricultural products; many price increments have gone beyond their normal limits; examples include crude oil, tin, nickel, soybeans, corn, and wheat. Also, the TGARCH model was found to be the accurate model for forecasting price return.

The rapid growth of prices was, specifically, observed in the main food crops such as corn, wheat, and edible oil even if the raise is true in other food crops including rice. After Engle's Autoregressive Conditional Heteroscedasticity (ARCH) came into effect, various models were introduced into volatility modelling. Bollerslev introduced a generalised version of Engle's ARCH model called the Generalised Autoregressive Conditional Heteroscedasticity (GARCH) model, which was followed by the Exponential Generalised Autoregressive Conditional Heteroskedastic (EGARCH) model (Nelson), Threshold generalised autoregressive conditional Heteroskedastic (TGARGH), and others in modelling conditional variance and risk prima.

The conditional variance is given as a linear function of prior sample variances with past square returns indicating a large conditional variance for the return in Engle's ARCH model. The ARCH model, on the other hand, treats positive and negative returns equally and has very few parameters, whereas the GARCH model allows lagged conditional variances to be included, with conditional variance expressed as a linear function of past squared innovations and their past values, providing the non-negativity constraint. The GARCH model considers just the quantity of unpredicted excess returns that determine feature variance, not their positivity or negativity. Nelson created the EGARCH model to address this defect in the GARCH model by allowing for asymmetric effects.

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How to cite this article: Ali Mwanza. "An Editorial Note on GARCH Models in Agricultural Commodities." Bus Econ J 13(2022): 362.

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Received 05 January, 2022, Manuscript No. bej-21-48909; **Editor Assigned:** 7 January, 2022, PreQC No. P-48909; QC No. Q-48909; **Reviewed:** 10 - January -2022, **Revised:** 15 January, 2022, Manuscript No. R-22-48909; **Published:** 20 January, 2022, DOI: 10.37421/2151-6219.2022.13.363