Modelling the asymmetric volatility in hog prices in Taiwan: The impact of joining the WTO

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Abstract

Prices in the hog industry in Taiwan are determined according to an auction system. There are significant differences in hog prices before, during and after joining the World Trade Organization (WTO). The paper models growth rates and volatility in daily hog prices in Taiwan from 23 March 1999 to 30 June 2007, which enables an analysis of the effects of joining the WTO. The empirical results have significant implications for risk management and policy in the agricultural industry. The three sub-samples for the periods before, during and after joining the WTO display significantly different volatility persistence of symmetry, asymmetry and leverage, respectively.
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1. Introduction

Time-varying volatility in agricultural commodity prices, such as hog prices, usually accompanies riskiness in the rates of growth (or returns). How to capture the pattern or characteristics of volatility is of concern to farmers. Under the World Trade Organization (WTO) regulations, direct price support programs of agricultural authorities have had to be progressively eliminated, so that farm prices are essentially determined by the market. Therefore, the volatility associated with prices imposes significant pressures on agricultural producers.

Price changes are associated with volatility and risk. If agricultural commodity prices have predictable time-varying volatility, they can be analysed using recently developed financial econometric methods that incorporate important aspects of optimal portfolio management. Ref. [29] explains why time-varying volatility can be useful in areas such as environmental finance and tourism finance. Similar arguments can be used for applications in agricultural finance. Volatility from high frequency data can be aggregated, whereas aggregated data at low frequencies typically display no volatility, thereby enabling the prediction of risk associated with the imposition of agricultural taxes. Dynamic confidence intervals can also be computed. Moreover, modelling volatility permits an analysis of the asymmetric and leveraged responses of prices and associated commodity inflation rates to positive and negative shocks of equal

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