

ASYMMETRIC PRICE TRANSMISSION IN GLOBAL ENERGY GRAIN NEXUS: THRESHOLD COINTEGRATION APPROACH

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Overview

Asymmetric price transmission has been considerably applied to and studied in agricultural commodity market. It is referred to a phenomenon that price series responds systematically differently to previous positive and negative price changes. Global energy price and the development of biofuel technology have been widely accused of causing the increase in global food prices as well as global food crisis in recent years, since biofuel can be a substitute for fossil fuel. The results from the existing literature about the price transmission between energy and grain are mixed. Some authors point out misspecification in cointegration test may lead to failure to detect price transmission. Microeconomics theory also suggests in the production process could have asymmetric response to input price changes due to adjustment cost, which could be modelled by threshold. Therefore, it is useful to apply nonlinear cointegration and error correction model with threshold to investigate the energy and grain nexus.

Methods

Linear and nonlinear cointegration, Error Correction Model with (Momentum) Threshold Autoregression Cointegration, Monte Carlo Simulation, Bootstrapping

Results

First, traditional linear cointegration finds evidence on cointegration relation between energy price and grain price indices.

Second, nonlinear cointegration which incorporates asymmetric adjustment found MTAR with consistently estimated threshold value by grid search method as the most suitable model. Later model based bootstrap is performed to compute the standard error for the searched threshold value and find evidence on threshold effect. Hypotheses testing with critical values obtained from Monte Carlo Simulation are also in favour of the asymmetry.

Third, asymmetric error correction model reveals only grain price index corrects to disequilibrium, which could be interpreted by exogeneity of the energy price. Asymmetry is also found by hypotheses testing.

Conclusions

Price transmission between energy and grain exists in a nonlinear way with threshold effect and also exhibits asymmetry in adjustment path, but the latter only appears in grain price index but not energy price index. This coincides with asymmetric adjustment cost in biofuel production suggested by microeconomic theory.

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