“Energy and Speculation: New Dynamics in Agricultural Price Volatility”

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Energy and Speculation: New Dynamics in Agricultural Commodity Price Volatility

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Introduction

Recent developments in biofuels have altered the relationship between agricultural and energy. Historically energy has been an input to agricultural production. As the amount of corn utilized for ethanol production in the US has increased from 5% in 2001 to over 30% by the end of the decade, the correlation of agricultural commodity prices to energy prices has been transformed (Abbott et al, 2008, 2009). A number of authors have suggested a new era in which energy prices will pay a more important role in driving agricultural commodity prices (Gohin and Chantret, 2010; Tyner, 2010). However disagreement in literature exists relative to the extent of influence from the energy to the agricultural markets and the existence of long run relationships (Nazlioglu, 2011; Nazlioglu and Soytas, 2011).

A new potential connection between energy and agricultural markets will likely manifest itself in short-run volatilities. The volatility of agricultural prices was historically determined by supply-side shocks. The recent strengthening of the connection between energy and agriculture markets bears the question whether it has created a shift in the volatility of commodity prices by introducing marketable demand-side volatility in the market. Du, Yu, and Hayes (2009) find evidence of volatility spillovers among crude oil, corn and wheat markets after the fall of 2006. Further, Hertel and Bedman (2010) argue that in the future agricultural volatility, particularly for biofuel feedstocks, will depend critically on renewable energy policies.

Methodological Approach

According to Serra (2011), the degree of the estimated transmission between energy and agricultural markets depends on the methodology used. To avoid inferring the results by choosing a specific model of stochastic volatility we use the standard deviation of effective daily log price returns as a measure of volatility (Koop and Korobilis, 2010). The SSVS prior (George, Sun and Ni, 2008) automatically shrinks the parameter space by allowing the data to determine which time-varying coefficients are important to the model. Basically, the SSVS prior shrinks uninformative coefficients to zero. Based upon the model results we will offer a series of posterior impulse response function plots to visually inspect the shocks to the endogenous variables.

To analyze the volatilities we conducted the following analyses: Augmented Dickey Fuller (ADF) tests and structural break tests to evaluate structural changes, correlation analysis, Granger causality tests, and finally the regression analysis. The ADF tests are used to determine if the individual volatility series are characterized by mean reversion or stationarity. The test results suggest that we reject the null hypothesis of a unit root at a one percent level for all commodities volatilities (except for barley, corn, and wheat) with 16 lags. However, the ADF results do not provide any evidence on a unit root within which we include a trend for corn and wheat with 16 lags.

| Table 1: Mean Values of Correlation Analysis for Corn Over Time |
|---|---|---|---|---|---|---|
| Year | Corn | Oil | Spec | Corn | Oil | Spec |
| 1981-1990 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 |
| 1991-2000 | | | | | | |
| 2001-2011 | | | | | | |

Note: Average correlations with ranges in parentheses where applicable.

Figure 1: Structural Breaks Test for (a) Monthly Corn Volatility and (b) Monthly Oil Volatility, 1983-2009

3. Preliminary Results

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References