A controversial debate between financial speculation and changes in agricultural commodity spot prices

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Abstract

Some research works state that speculation with agricultural commodities on the futures market has risen agricultural commodity spot prices. This research work analyzes the causal relationships between spot prices of corn, wheat, and soybean and agricultural commodity futures trading activities. These causal relationships between agricultural commodity spot prices and financial variables are tested for Granger-causality. Model results show that causal relationships have been found among changes in “volume traded” and “open positions” of futures contracts and changes in spot prices for corn. These results do not show that financial speculation might be a major driver of rising agricultural commodity prices.

Keywords: Financialization, Agricultural Commodity Spot Prices, Futures Markets, Granger-Causality Relations, Speculation, Vector Autoregressive (VAR) Model

1. Introduction

My interest on the effects of speculation with agricultural commodities on the agricultural commodity spot prices began after the reading of the article published by Amann, Lehecka and Schmid (2012). Some researchers argue that the extreme rise in agricultural prices on the spot market is fairly explained by market fundamentals of demand and supply such as a strong demand from China, the financial and economic crises, weather catastrophes, oil prices, inflation, declining value of the U.S. dollar, and growing financialization on futures exchange markets. Others respond that disruptive non-fundamental drivers – trading activities with futures by financial market participants – are responsible for soaring agricultural commodity spot prices. There are inconsistencies in the arguments that increasing trading activity leads to increasing agricultural commodity spot prices. A major one is that of equating the demand for futures positions with the demand for the physical

commodity. Long positions are not considered to be a new demand as short positions are not a new supply of the physical commodity. There is a long for every short position such that futures markets are a zero-sum game.

Some researchers such as Colman and Young (1989) and Tomek and Robison (2003) argue that prices on the spot market are based on physical demand and supply factors, and information available. Moreover, pricing of commodities on futures markets is based on information on demand, supply, and inventory. A buyer has the possibility either to buy grains on the spot market today and stores the grains until they are needed or buy a futures contract and wait until delivery of the commodity (Peirson, 2008). In this case, the buyer on the spot market faces storage costs and opportunity costs. The price difference between a futures price and a spot price of the futures contract underlying physical commodity is called basis. The basis is not well explained by the theory of storage (Hull, 2002), but the tests between spot prices and futures trading activities for bi-directional Granger-causality show that the theory of storage does not have a strong theoretical base (Amann et al., 2012). According to the efficient market hypothesis, price changes should follow a random walk process and all currently available information of any relevance in evaluating the asset in question is already incorporated in the market price (Hens and Schenk-Hoppé, 2009). Schulmeister (2012) argues that financialization describes the circumstance of increasing investments of hedge funds, commodity index funds and investment banks in commodity derivatives, because the widely used trend following trading techniques cause agricultural commodity spot prices to move in a sequence of long-term upward and downward trends,

overshooting their fundamental equilibrium in both directions, which could destabilize speculation and may drive up agricultural commodity spot prices.

The objective of this research work is to test for causal relationships between agricultural spot prices of corn, wheat and soybean and agricultural commodity futures trading activities.

This paper has the following chapters. The next chapter explains the methodology. The third chapter describes the data and information. The fourth chapter analyzes and discusses model results. The last chapter presents conclusions.

2. Methodology

This research work analyses whether changes in long futures positions of hedgers and speculators are causal for changes in the particular agricultural commodity spot price. Some researchers and politicians consider that financial speculation in agricultural commodity futures prices is the major driver for increasing (or decreasing) agricultural commodity spot prices.

This research work uses a multivariate framework to test for causal relationships among time series. Granger-causality tests were conducted to test for causalities between time series variables. Our econometric model follows LÜTKEPOHL and KRÄTZIG (2004) approach. A vector autoregressive (VAR) model is applied in this research work. In the case of two-time series, the model is presented as follows:

$$\begin{bmatrix} X_{1,t} \\ X_{2,T} \end{bmatrix} = \sum_{i=1}^{p} \begin{bmatrix} \gamma_{11,i} & \gamma_{12,i} \\ \gamma_{21,i} & \gamma_{22,i} \end{bmatrix} \begin{bmatrix} X_{1,t-i} \\ X_{2,t-i} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \end{bmatrix} \quad (1)$$

Granger causes X_2 if X_2 can be better predicted using the histories of both X_1 and X_2 than using histories of X_2 alone. X_2 is not Granger causal for X_1 if the bi-variate VAR(p) process presented above has $\gamma_{12,i} = 0$, for all i = 1,2,…,p. In this case, it is necessary checking whether specific coefficients are zero and standard tests for zero restrictions are applied. The null hypothesis in the test is no Granger causality. Since Granger-causality tests are incorrect in the presence of nonstationarity in the time series data, the procedure of Toda and Yamamoto (1995) is applied.

We test time series for unit roots and the order of integration by applying Augmented Dickey-Fuller (ADF) tests. Each agricultural commodity is subject to four hypotheses (position data Granger-cause price) and delivers eight results, as the Granger causality procedure tests for (possible) bi-directional relationships (Amann et a., 2012).

3. Data and Information

Agricultural commodity data for corn, wheat and soybeans are collected from CFTC, FAO, World Bank and Thompson Reuters. The data describe the situation in the US. Four futures positions data series have been used for each commodity: open interest data (long positions of commercials, long positions of non-commercials, total reportable positions) and volume traded at the Chicago Board of Trade (CBOT). All data are available on a monthly base. Logarithms of data are used.

4. Results

Results show the tests mostly failed to reject the null hypotheses at the 5% significance level. Four out of 24 hypotheses (we test 12 hypotheses bi-directionally) are rejected and only one is associated with the question of a causal relationship from trading activities to agricultural commodity spot prices. These tests rejected null hypotheses associated with corn. None of the null hypotheses for wheat and soybeans are rejected (Table 1).

Null-Hypotheses	Direction of Granger-causality	Commercial Long	Non-Commercial Long	Total reportable positions	Volume traded
Corn	→	0.005*	0.443	0.007*	0.012*
Corn	←	0.882	0.023*	0.136	0.091
Wheat	→	0.593	0.264	0.176	0.383
Wheat	←	0.778	0.107	0.517	0.603
Soybeans	→	0.799	0.078	0.482	0.631
Soybeans	←	0.261	0.406	0.832	0.672

Table 1 – Granger-causality test results
Source: Model results
Notes: The asterisk (*) means significance at the 5% level. The table includes p-values.

Arrows (←/→) indicate the direction of Granger-causality. For example, the null hypothesis (H_0) for corn (→), "corn spot prices do not have Granger-causality for commercial long positions on corn", was rejected. However, Granger-causality test of the vice-versa null-hypothesis (H_0') for corn (←), "commercial long positions on corn do not have Granger-causality corn spot prices", failed to reject the H_0'. Model results indicate a weak evidence for Granger-causal relationships and this research work did not find the Amann, Lehecka and Schmidt's results for soybeans.

The debate about the role of financial speculation in driving up agricultural commodity spot prices is very controversial, but these results do not show that financial speculation might

be the major driver of rising agricultural commodity spot prices. We have found that only one out of 12 tests show the Granger-causal relationship between financial trading activities and agricultural commodity spot prices i.e. non-commercial long trading (speculative open interest) may cause Granger corn spot price. This is a hard explanation why this should be the case only for corn and not for the other traded agricultural commodities. In contrast, the remaining three rejected cases may weakly indicate that agricultural commodity spot prices do Granger-cause futures market positions. A direct link between financial trading activities and agricultural commodity spot prices might be information. Thus, misinterpretation of information about futures trading may lead to deviated agricultural commodity spot prices as wrong information is incorporated in agricultural commodity spot prices.

5. Conclusions

Model results do not find an empirical evidence that financial speculation might rise agricultural spot prices. However, this empirical evidence found in this research work for causal relationships between traded positions on futures markets and changes in agricultural commodity spot prices calls for further research when alternative policies "against financial speculation" in agricultural commodity markets are requested. Mainly, increasing transparency and adopting trade policies are some rules that can reduce trade distortions and instability in futures markets. Researchers and policy makers should investigate causalities of fundamental market factors before limiting futures markets.

References

AMANN, S., LEHECKA, V. and SCHMID, E., (2012). Does speculation drive agricultural commodity spot prices? Treibt Spekulation agrarische Kassapreise? Dieser Artikel wird im Jahrbuch der ÖGA erscheinen, Band 22, Jahr 2012.

COLMAN, D. and YOUNG, T. (1989): Principles of Agricultural Economics: Markets and Prices in Less-Developed Countries. Cambridge University Press.

GILBERT, C. L. (2010): How to Understand High Food Prices. Journal of Agricultural Economics, 2010, 61 (2), 398–425.

GILBERT, C.L. and S. PFUDERER (2013): The Financialization of Food Commodity Markets. Forthcoming in Jha, R., T. Gaiha and A. Deolalikar (eds.): Handbook on Food: Demand, Supply, Sustainability, and Security.

HENS, T., and SCHENK-HOPPÉ, K. R. (2009): Handbook of Financial Markets: Dynamics and Evolution. North Holland: Elsevier.

HULL, J. (2002): Fundamentals of Futures and Options Markets. Prentice Hall. IRWIN, S. H., and SANDERS, D. R. (2011a): Index Funds, Financialization, and Commodity Futures Markets. Applied Economic Perspectives and Policy, 2011, 33 (1), 1-31.

LÜTKEPOHL, H., and KRÄTZIG, M. (2004): Applied Time Series Econometrics. Cambridge: Cambridge University Press.

PEIRSON, G. (2008): Business Finance. Sydney: McGraw-Hill Australia.

SCHULMEISTER, S. (2012): Technical Trading and Commodity Price Fluctuations. 2012/258/S/WIFO project no: 13811. Austrian Institute of Economic Research. Vienna.

TODA, H. Y. and YAMAMOTO, T. (1995): Statistical Inference in Vector Autoregressions with Possibly Integrated Processes. Journal of Econometrics, 66, 225-250.

TOMEK, W. G., and ROBINSON, K. L. (2003): Agricultural Product Prices. Cornell University Press.

UNCTAD (2011): Price Formation in Financialized Commodity Markets: The Role of Information. New York and Geneva: United Nations.

WILL, M. G., PREHN, S., PIES, I. and GLAUBEN, T. (2012): Is financial speculation with agricultural commodities harmful or helpful? – A literature review of current empirical research. Discussion Paper No. 2012-27. Martin-Luther-University Halle-Wittenberg. ISBN 978-3-86829-553-5 (printed version).