Scientific Journal
Warsaw University of Life Sciences – SGGW

PROBLEMS OF WORLD AGRICULTURE

Volume 13 (XXVIII)
Number 4

Warsaw University of Life Sciences Press
Warsaw 2013

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Speculation in the agricultural commodity market

Abstract: This paper studies the role of speculators in explaining agricultural commodity price movements. The spikes in global agricultural commodity prices in 2007-2008 and 2010-2011 have opened a debate on the contribution of speculation to recent food price volatility. Most academic literature does not support the idea that speculators drive commodity prices beyond fundamental levels. There are, however, some researchers who do find empirical evidence supporting the idea that the activity of speculators affects commodity prices. This paper concludes that the activity of speculators may temporarily overprice or underprice commodity values. It is assumed, however, that both fundamental and financial factors influence commodity prices. Nevertheless, it is difficult to indicate the extent to which each factor separately affects prices.

Key words: agricultural commodities, futures market, speculation, price

Introduction

The first decade of the 21st Century has brought on remarkable structural changes to the commodity futures market. Trading volumes and open interest have increased considerably. Significant changes have been observed in both trading and participants of the commodity markets. According to Domanski and Heath [2007] commodity markets have become more like financial markets. New financial participants have entered the commodity futures market. Investments in commodity indices have turned out to be attractive alternative investments for financial institutions and pension funds [Irwin and Sanders 2012]. Commodity futures are effective in diversifying equity and bond portfolios because commodity futures returns are generally negatively correlated with bond returns and share returns. Gorton and Rouwenhorst [2006] claim that commodity futures perform better in periods of unexpected inflation, when stocks and bonds do not provide a satisfactory return. The increasing presence of market participants investing in commodities derivatives initiated the so-called process of "financialization" of commodity markets [Falkowski 2011].

During 2007-2008 and 2010-2011, prices of commodities, including agricultural commodities, increased rapidly. Figure 1 presents the monthly International Monetary Fund Primary Commodities Price Index and Food Price Index from January 2005 to December 2012. The IMF's Primary Commodities Price Index is a weighted average of prices for 51 primary commodities grouped into three main classes: energy, metals, food and beverages. The commodity weights are derived from their relative trade values. The weighted values in the commodity basket reflect the structure of trade in 2002-2004. Both the Primary Commodities Prices Index and the Food Price Index use 2005 as the base-year (average of 2005=100).

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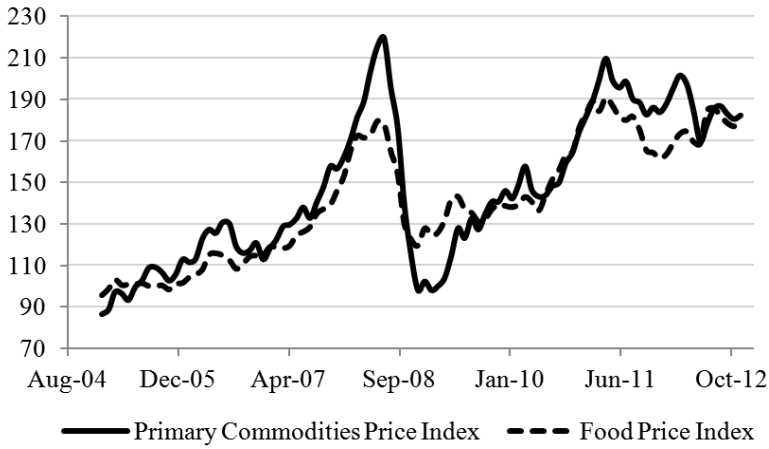

Fig. 1. IMF Primary Commodities Price Index and Food Price Index during 2005-2012
Source: International Monetary Fund, Primary Commodity Price System.

Commodity prices, including food prices, rose dramatically from 2007 to the middle of 2008. In the second half of 2008 prices collapsed sharply, and they rose rapidly during 2010-2011 (Figure 1). Many academic economists suggest that fundamental factors provide the most consistent explanations of recent commodity price movements. However, other researchers claim that macro and microeconomic factors cannot fully explain the recent increase in commodity prices. They identify investor activity in the commodity futures market as a driving force behind the sharp price rise of many commodities. In their opinion, speculation has pushed up commodity prices beyond fundamental levels. Moreover, the growing interest of speculators in the commodity futures market increases price volatility in this market. It needs to be emphasized, however, that many research studies do not provide sufficient empirical support to confirm the impact of speculators on commodity price movements.

This paper examines the literature concerning the impact of speculation on commodity prices. The article is focused on wheat and maize markets. The aim of the paper is to provide a comprehensive assessment of the sharp increase in selected grain prices during 2007-2008 and 2010-2011. The remainder of the paper is organized as follows: section 2 reviews the relevant literature; section 3 explains the reasons for recent price surges in the wheat and corn markets; the last section provides concluding remarks.

Literature review

According to Working [1960], futures markets are primarily hedging markets and the amount of speculation in this market depends mainly on the number of hedging transactions. However, much has changed in the futures market since Working was published. During the last few years, a rapid increase in the level and volatility of commodity futures prices has been observed. Many researchers have attempted to identify

the factors that might have brought about the surge in commodity prices in 2007-2008 and 2010-2011. Some of them claim that fundamental factors are the main determinants of commodity prices. However, others argue that an increase in the activity of speculators leads to the price bubbles in commodity markets. The recent commodity price boom has been examined in a number of papers. The article is focused on works concerning mainly food commodities.

The fundamental causes of high agricultural commodity prices are divided into supply-side and demand-side factors. The most debatable cause of recent commodity price spikes is the conversion of land and crops from food production to biofuels production. Other commonly cited factors are high energy cost, crop failures, decelerated productivity growth in agriculture, trade policies, global growth in population and per capita incomes, etc. Moreover, prices of agricultural commodities are generally traded in US dollar currency. Hence, the recent spike in food prices in 2007-2008 would have been lower if the price had been adjusted for the depreciation of the US dollar in 2007-2008. [Cardwell and Barichello 2009] It needs to be emphasized that dollar depreciation also contributed to the 2010-2011 spike in commodity markets. Between July 2010 and April 2011, the U.S. dollar depreciated 12.9% against the euro [World Bank, 2011]. Plantier [2012] claims that since 2004 the movement of commodity prices has been driven mainly by US dollar depreciation, slow global supply growth and rapid growth in emerging markets such as China, Brazil, India and Russia.

The spikes in global agricultural commodity prices in 2007-2008 and 2010-2011 have opened a debate on the contribution of speculation to recent food price volatility. Most academic literature do not support the idea that speculators drive commodity prices beyond fundamental levels. Irwin et al. [2009] claim that economic fundamentals provide better explanations for commodity price movements. He argues, however, that the complexity of macro and microeconomic factors causes the difficulty of assessing in real-time the fundamental reasons for commodity price surges. Speculator activity provides a convenient explanation for rapidly rising or falling prices. Petzel [1981] has written "Futures market speculators have frequently been blamed for variations in grain prices. In periods of rising prices (e.g., the early 1920s, the Korean War, inflation, and the 1970s) grain speculators have been accused of increasing the prices of agricultural commodities artificially. During the early 1930s when agricultural prices were low, grain speculators were accused of depressing prices." According to Irwin et al. [2009] whenever commodity prices have rapidly increased or decreased over the last 125 years, there were many attempts to impose limits on speculative positions and to control prices. However, there is little historical evidence proving that the regulation of speculation had the desired effect on market price.

There are some researchers who do find empirical evidence supporting the idea that speculators drive commodity prices beyond fundamental value. Baffes and Haniotis [2010] examined three main factors (speculation, higher demand for agricultural commodities by emerging economies and higher biofuels production) that may have caused the commodity price surge during 2006-2008. They have shown that speculation played a crucial role during the commodity price rise in 2008. Higher biofuels production had an impact on commodity price movements, however the influence was much lower than initially thought. They have found no evidence that stronger demand by emerging economies had any effects on commodity prices. According to Wahl [2009], speculation on agricultural prices played a decisive role in the commodity price bubble in 2007-2008. The FAO food price index increased by 71% between the end of 2006 and March 2008. He claims that fundamental

factors alone cannot explain such a high volatility in the agricultural commodity market during 2006-2008.

It needs to be emphasized that no single factor alone determines the market price. Speculation might have affected commodity prices. Many academic economists believe that speculators enhance market efficiency. Keynes [1930] argues that speculators provide market liquidity and underwrite the risk of high volatility in the spot market. Friedman [1953] claims that speculation stabilizes market prices. Some researchers claim, however, that speculation increases volatility and drives prices beyond fundamental level. Literature reports conflicting conclusions about the influence of speculators on commodity price [Zawojska 2011]. Moreover, it is hard to examine the relationship between speculation and commodity price movements. The problem results mainly from the lack of appropriate and comprehensive data which will allow assessment of the connection.

Wheat and maize price volatility

We can distinguish three fundamental groups of commodities with different characteristics and return drivers [Geman, 2005]:

- Energy: oil, natural gas, coal, etc.
- Metals and minerals: iron, copper, gold, etc.
- Agricultural products: soybeans, wheat, maize, rice, etc.

This paper is focused on agricultural commodities, mainly on crops like maize and wheat. Figure 2 shows monthly nominal prices (in U.S. dollars per metric ton) of maize and wheat from January 2005 to December 2012.

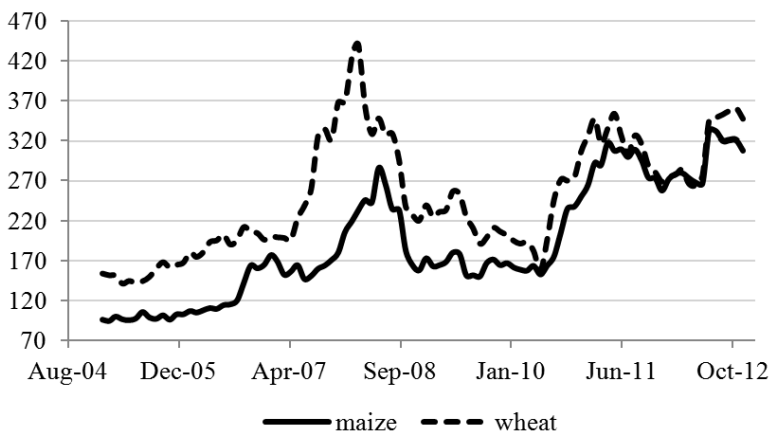

Fig. 2. Nominal price of corn and wheat during 2005-2012

Source: International Monetary Fund.

Between January 2007 and June 2008 most commodities prices rose sharply. At that time maize price increased by 74% and wheat by 78%. By the end of November, maize

stood at 43% of its peak level, wheat at 48%. A new surge was observed in 2010, with price peaking in the middle of 2011 and again in the middle of 2012. Such a high food price volatility arises from shocks that may come from a number of sources.

There are many researchers who claim that fundamental factors play a crucial role in explaining recent price movement in the grain market. The increase in biofuel demand is one of the strong explanations for the sharp rise in commodity prices. It concerns mainly the price of maize since the use of maize for ethanol has been rising rapidly over the last few years. The growth in biofuel production does not impact directly the price of wheat or soybean, however, the substitution effect may have occurred. The expansion of maize area has contributed to the decline in soybean and wheat areas [Mitchell, 2008]. Collins [2008] calculated that 60% of the increase in maize prices during 2006-2008 was brought about by the surge in usage of maize in biofuel production. Rising oil prices account for another explanation for rapidly increasing commodity prices. Oil prices have an important impact on the cost of agricultural production. Oil prices affect the price of fuel, fertilizers and other chemicals used in crop production. Heady and Fan [2008] estimated that the surge in oil prices increased the cost of US production of wheat, maize and soybeans by 30%-40% during 2001-2007 relative to the scenario in which oil-related prices increased only by the inflation of the US GDP deflator.

Some researchers claim that speculation has driven grain prices up to excessive levels. It concerns mainly grain futures prices. It needs to be stressed that future prices are the benchmark of spot prices. A popular method of monitoring speculator activity in futures markets is the analysis of open interests in the Commodity Futures Trading Commission's (CFTC) Commitments of Traders Report (COT). The U.S. Commodity Futures Trading Commission distinguishes two main commodity markets participants: commercial traders (hedgers) and non-commercial traders (speculators). Commercial participants are physically involved with the production and consumption of commodities. They use derivatives markets to hedge against price fluctuations. Non-commercial participants want to improve or diversify their portfolios and do not take physical delivery of the underlying commodity. They want to generate profit from changes in prices. The Commodity Futures Trading Commission publishes the positions held by traders in the Commitment of Traders Report. There are two versions of the report. The Futures Only Commitment of Traders Report includes futures market open interest and the Futures and Options Combined Commitment of Traders Report which aggregates futures and options markets open interest. The weekly reports are released every Friday and provide data of each Tuesday's open interest.

Since 2006, the CFTC has published the Commitments of Traders Commodity Index Trader Supplement. The Supplemental report provides information about futures and options markets open interest in selected agricultural markets. Moreover, it shows the positions of additional traders category, the so-called commodity index traders. Index traders are drawn from the non-commercial and commercial categories. From the one side their positions belong to the hedgers (commercial traders), from the other side their behavior is similar to the behavior of large hedge funds (non-commercial traders). Index traders are likely to be responsible for sharp falls and rises of commodities prices. Their positions are generally used as a proxy of speculative activity. The group of index speculators covers mainly institutional investors like pension funds, sovereign wealth funds, public and private foundations and life insurance companies. Index traders generally take long positions. This direction of investment decisions is favorable in the capital market. It is detrimental, however, to commodities markets. If index traders take both long

and short positions, then the commodity prices would both fall and rise. Index traders lean mainly toward long directions and as a result, they push commodity prices up. On the other hand, during turbulent days in the financial market, index traders withdraw their investment in the commodity market and it provokes a drop in prices. Moreover, it needs to be emphasized that index speculators buy commodity futures irrespective of the price and regardless of supply and demand fundamentals. Therefore, it pushes agricultural commodity prices beyond the level warranted by fundamental forces.

Figure 3 shows commodity index traders net positions in commodity futures and options markets from January 2006 to December 2012. Net position is defined as long position minus short position. The higher amount of net positions, the higher the activity of index traders is supposed to be. On the other hand, higher activity of index speculators in the commodity market is associated with higher price levels.

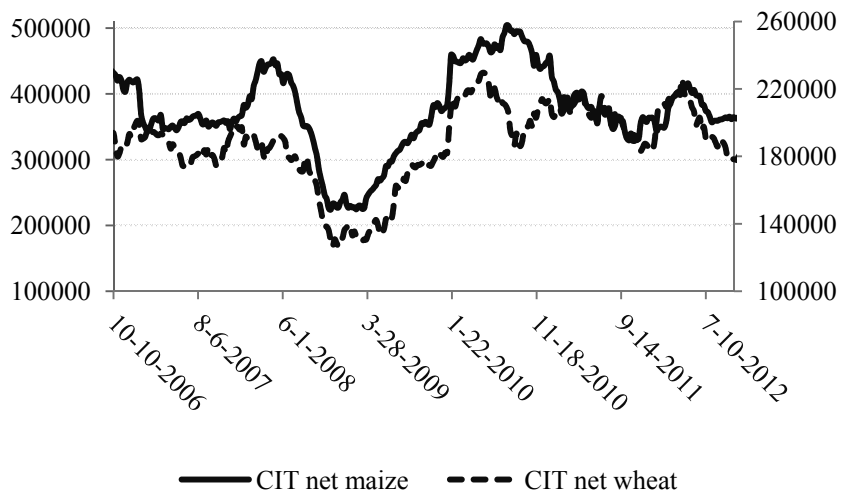

Fig. 3. Commodity index traders net positions in futures and options during 2006-2012

Source: Commodity Futures Trading Comission's (CFTC) Commitments of Traders Report (COT).

On the basis of Figure 3, the following conclusions can be drawn. Between 2006 and 2008, when the commodity prices were going up, speculators were buying large amounts of future contracts. Between late 2008 and early 2009 speculators temporarily exited the analyzed commodity markets. They were selling the contracts, which brought about the fall in prices. From the middle of 2009 they started buying contracts again, triggering the new price peak between 2010-2011. It needs to be emphasized that the higher the amount of contracts they buy, the higher the amount of net open positions. The higher the amount of contracts they sold, on the other hand, the lower the volume of net open positions. Under the above statements, it is shown that the activity of index traders (speculators) may have an impact on the price movements in the maize and wheat markets.

The majority of empirical evidence does not support the conclusion about the impact of speculators on commodity market prices. The problem is that it is difficult to find a proper measure of the extent to which speculation accounts for the commodity price

volatility. The lack of sufficient information about the commodity derivatives market hampers the analysis of the above phenomenon. Data about net positions of each category of traders are available only for U.S. centralized exchange markets and only for the period from January 2006 till today. Moreover, the classification of commercial traders, non-commercial traders and index traders is not perfect, e.g. there is a possibility that some commercial traders also take speculative positions. Moreover, not only the futures contracts market but also the over-the-counter forward market constitute an important part of commodity market liquidity. Subject to these caveats, however, these data are the best publicly available data which reflect the activity of speculators in the agricultural commodity market.

Conclusions

The majority of empirical evidence does not support the conclusion about the impact of speculators on commodity market prices. Many researchers claim that only fundamental factors affect commodity prices. In their opinion recent surges in the agricultural commodities prices were driven mainly by rising oil prices, biofuels demand, crop shortfalls, U.S. dollar depreciation, etc. Some researchers believe, however, that speculation has driven commodities prices up to excessive levels. A popular method of monitoring the activity of speculators in the futures market is the analysis of open interests in the Commodity Futures Trading Commission's (CFTC) Commitments of Traders Report (COT). It concerns mainly the open interests of index speculators. Index traders are likely to be responsible for sharp falls and rises of commodities prices. This group of traders covers mainly institutional investors like pension funds, sovereign wealth funds, public and private foundations and life insurance companies. The analysis of index traders' net positions in maize and wheat markets from January 2006 to December 2012 has shown that the activity of index speculators might have had an impact on their price movements.

It is not clear what effects commodity index traders have on prices for agricultural products. According to Irwin and Sanders [2011], there is little evidence that index funds (index speculators) drove commodity prices up between 2007-2008. Girardi [2012] has shown, on the other hand, that commodity index traders have affected wheat prices, linking them to stock market volatility and to the price of oil. However, lack of sufficient information concerning the activity of speculators hampers support for the hypothesis that speculation, not the fundamental factors, caused commodity prices to rise so sharply in analyzed periods. Nevertheless, the activity of speculators is likely to temporarily overprice and underprice the commodity values. In general, both fundamental and financial factors may have an impact on commodity prices. It is difficult, however, to indicate the extent to which each of them affects prices.

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