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## Index speculation – a new challenge for the world food security

In recent years, new actors from the outside the agrobusiness – the “index-oriented investors” – have entered the grain futures markets. This activity cannot be understood without considering the fact that prices for agricultural commodities have increased since the mid-1990s due to fundamental factors, both on the demand- and the supply-side. Based on this, agricultural commodities futures have become an attractive asset class for financial investors with two characteristics: first, they look for new asset classes the performance of which is not correlated with other asset classes; secondly, they believe that passive portfolio-management strategies, i.e. the “replication” of the market by distributing investments across various assets such as those being represented in popular indices, are more successful than active selection strategies. Investment in commodity futures by index-oriented investors had been facilitated by the development of new financial instruments (ETC, ETF). It has become ever more appealing as a result of falling returns on investment for traditional financial investments, such as the government bonds. However, the unconditional demand exerted by index-oriented investors on futures markets does not only lead to the reinforcement of the upward price trend on the spot market but also contributes to the emergence of short-term price bubbles (2008 and 2010/11).

### Spekulacja indeksem

#### – nowe wyzwanie dla światowego bezpieczeństwa żywnościowego

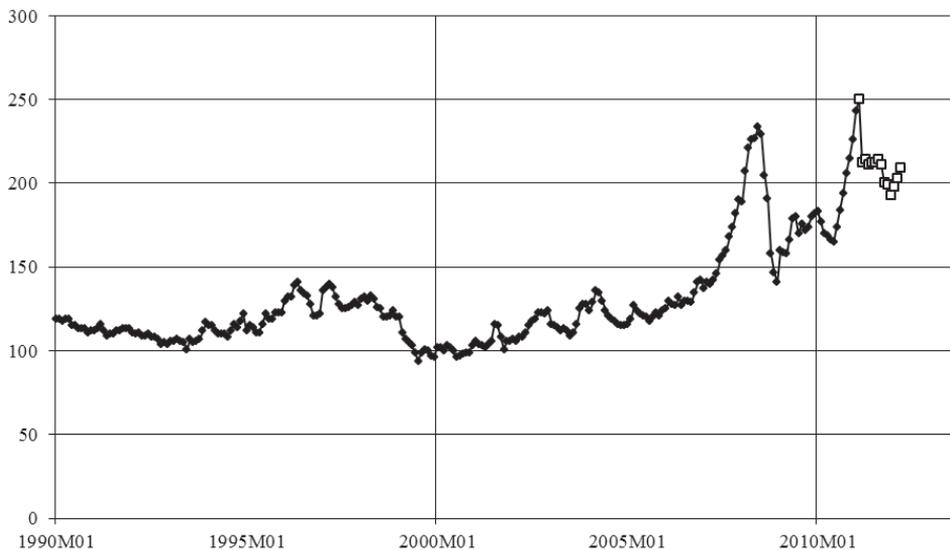
W ostatnich latach na rynku kontraktów *futures* na zboże pojawili się nowi inwestorzy spoza sektora agrobiznesu – „inwestorzy zorientowani na indeksy”. Nie można zrozumieć ich działalności bez uwzględnienia faktu, że ceny towarów rolnych wzrosły od połowy lat 90. ze względu na czynniki fundamentalne, występujące zarówno po stronie popytu, jak i podaży. W wyniku tych zmian kontrakty *futures* na towary rolne stały się atrakcyjną klasą aktywów dla inwestorów finansowych o dwóch cechach: po pierwsze, poszukujących nowych klas aktywów, których stopa zwrotu nie jest skorelowana z innymi instrumentami; po drugie, tych, którzy uważają, że pasywne strategie zarządzania portfelem – tj. „replikacja” rynku poprzez rozproszenie inwestycji w instrumenty, które zwierają się w popularnych wskaźnikach – są bardziej skuteczne niż strategie aktywnej selekcji. Inwestycje w towarowe kontrakty *futures* przez podmioty „zorientowane na indeksy” zostały ułatwione w wyniku rozwoju nowych instrumentów finansowych (ETC, ETF), a w świetle spadających stóp zwrotu z inwestycji w tradycyjne instrumenty, takie jak obligacje rządowe, stały się jeszcze bardziej atrakcyjne. Jednak bezwarunkowy wzrost popytu wśród inwestorów zorientowanych na indeksy na rynku *futures*, nie tylko doprowadzi do wzmocnienia rosnącej tendencji cen na rynku spot, ale także przyczyni się do powstania krótkoterminowych baniek spekulacyjnych (2008 i 2010/2011).

Keywords: financial market, speculation, food prices, index investment, futures, spot market

## Introduction

Between the years 2000 and 2011, world market prices for food have more than doubled (see Figure 1). This trend results from both demand-side and supply-side forces. The main demand-side force is the continuing growth of world population. In the USA and Europe, there is also an increasing usage of grain for the production of agro fuels. Furthermore, important changes in the demand structure have occurred: In emerging economies, especially in China, demand for meat has increased, which translates into a multiple increase in the demand for grain as animal feed. On the other hand, growth in the world food supply has slowed in comparison to the heyday of the Green Revolution in the 1960s/1970s. The reasons include diminishing marginal returns of inputs in agro-industry, the widespread neglect of subsistence agriculture in Sub-Saharan Africa, and the increasing usage of land for the cultivation of non-food commodities such as cotton, or for housing and infrastructure. In addition to these “fundamental” factors, speculation on markets for wheat, corn, and soy has been blamed for contributing to soaring food prices, especially during price peaks in 2008 and 2010/2011.

Food speculation is by no means a new phenomenon. Already in the biblical times, there was a mention of the speculator “who withholds corn” – obviously in



Index: 2000=100 real 2000\$ (from 03/2011 onwards: 2005=100, nominal \$).

Figure 1. Index of World Food Prices, Monthly Data 1/1990 to 3/2012

Data source: World dataBank, Global Economic Monitor (GEM) Commodities, <http://databank.world-bank.org/ddp/home.do>; own design.

the hope of rising prices but much to the indignation of his fellow human beings [Proverbs 11.26]. As harvest results are not predictable at the point of sowing, in a market-based economy all participants in the grain trade have always been looking for ways and means to reduce the risk of adverse price changes. The most viable option is to agree upon guaranteed prices for future deliveries. This is the very essence of trading on the forward market – a commercial invention ascribed to ancient Greek mathematician, Thales of Miletus. The institution of grain futures exchanges was introduced as early as in the seventeenth century in Japan.

Since today's farmers, wholesalers, manufacturers, and financial institutions alike endeavor to anticipate price movements in their economic activities, speculating is not only a very old, but also a ubiquitous phenomenon on the food market – at least if we understand it in the way defined by John Maynard Keynes – as “forecasting the psychology of the market” [Keynes, 1936, p. 161].

## 1. Conventional speculation in agricultural commodities

While trade on spot markets is in physically existing commodities with an immediate delivery of and payment for the product, trade on forward markets is in rights to deliver or take delivery of commodities at guaranteed prices at a later point in time. Deals on the forward market may be either standardized or non-standardized. Contracts tailored to the volume and date of delivery (“forwards”) are agreed upon directly or via intermediaries between sellers and buyers and may be resold at any time before maturity. In this segment of the market – the “over the counter” trade (OTC) – the actual delivery of a commodity at a contract's maturity is no exception [Maslakovic, 2008]. In contrast, none of the market participants trading standardized contracts (“futures”) on commodity futures exchanges is interested in the actual delivery of the commodity. Financial settlement is only required to make up for the difference between the price previously agreed upon and the actual spot market price at the time of the contract's maturity.

If a trader expects spot-market prices to rise, he will buy contracts today that guarantee him at the contract's maturity a supply at a lower price than the price he is expecting – he is entering a “long position”. Vice versa, if he is expecting falling spot market prices, he will enter contracts guaranteeing him a higher than expected purchasing price for what he agrees to supply. He is entering a “short position”. Whoever better predicts the “psychology of the market”, will pocket a profit. This is why we may call these deals betting. If, for instance, Trader A has purchased the right to be supplied with a ton of wheat at 100 dollars, while the actual spot market price at the contract's maturity turns out to be 110 dollars, Trader A is entitled to receive a payment of 10 dollars from the contract partner Trader B. In order to really deliver, Trader B would have to purchase the wheat at 110 dol-

lars on the spot market and sell it to Trader A at 100 dollars, which results in Trader B's loss of 10 dollars – equivalent to Trader B's cash settlement obligation. In this example, Trader A has won his bet.

Based on the motives for their transactions, two categories of conventional market participants can be distinguished on the forward market: hedgers (rooted in the food industry, thus also called commercial traders) and conventional financial speculators including arbitrageurs. Market participants from the food industry, either large producers or manufacturers, want to hedge risks from adverse spot-market price movements for their future physical deliveries and purchases. Conventional financial speculators, on the other hand, are attracted to the futures market by the prospects of profits in a game based on information, rumors, and calculations.

Participants from both groups may hold net long positions or net short positions, based on their respective hopes and fears. However, as a group the hedgers usually hold net short positions, while the conventional speculators as a group usually hold net long positions. The conventional finance-industry speculators thus usually contribute to the functioning of the market by providing the necessary liquidity when taking the counter-positions to the hedgers. If, for instance, a farmer seeks to enter a short position at a given price, the deal will only work if someone else, no matter whether a manufacturer or a finance institution, enters a long position.

A particular sub-group within the conventional speculators is the group of arbitrageurs. Their strategy is to take advantage of minute price differentials between different futures exchanges (such as between Chicago and exchanges in Kansas City, Paris, or Dalian) or between futures of different maturities. As such, arbitrageurs perform an important role of integrating different markets, thus contributing to the efficiency of the system as a whole.

It is self-evident that the high risk-taking behavior as well as herd behavior among these market participants can trigger strong fluctuations of prices, including extreme peaks. Also, price bubbles are possible, i. e. market situations in which "the price of an asset rises [for some time] above what appears to be its fundamental value" [Mankiw, 2012, p. 590] – the latter usually understood to be a sort of average or normal value derived from "real" demand and supply factors. The development of a price bubble has to be understood as a self-enforcing process: for whatever reason, contracts are increasingly bought, which results in price increases and hence in potential profits from the futures that have already been taken into a trader's portfolio – which, in turn, attracts further buyers. As long as buyers can be found to join the bandwagon, the price of the future will continue to increase – until suspicion arises and somebody begins to sell and the crash sets in.

Such developments are probably the price that an economic system has to pay for the provision of financial market-based insurance against possible losses

among the farmers. The participation of financial speculators in this market ensures the readiness of commercial farmers to produce food under essentially unpredictable conditions. The alternative would be a planned economy with price guarantees for the producers given by the state, as was the case for instance in the European Economic Community (EEC) grain market regulations of the 1960s.

Very recently, however, a third category of market participants has emerged on the futures exchange – the index investors, suspected of additionally pushing the upward trend of world food prices. Readers of crime novels know that once a new suspect appears on the stage, his motive and opportunities have to be investigated. Therefore, the next section will deal with the motives which the index speculators drive to engage in activities on the grain futures markets and whether they are capable of influencing food prices on the spot market.

## 2. A new dimension of speculation: Index investment

Index-oriented financial investors distribute their investment among different classes of assets that are weighted in analogy to an index which describes price developments for a group or a sub-group of commodities with certain weights (for instance equal-weighted or according to their relevance in world trade). Index investors keep futures on different commodities in their portfolio according to the weights used in the index. When contracts reach maturity, they are sold in order to avoid actual delivery, but new contracts are then purchased in roughly the same volume to be represented in the portfolio according to the pre-defined proportion – fairly insensitive to actual prices or market rumors. This process of swapping near-to-mature contracts for contracts due to be settled later is called “rolling”.

### 2.1. Motives of index-oriented investors

What are the motives of the index-oriented investors? First, as has been explicated in the first section of this paper, demand for grain is growing worldwide, and the expansion of production can hardly keep pace with an increase in demand. Since the mid-1990s world-market prices have been increasing and this trend is set to continue over the next few years. Thus, it makes sense for investors to have assets in their portfolio that are going to increase in value in the medium term. However, since no financial investor wishes to store grain, they do not engage on the spot markets but on the futures exchanges with rolling contracts (while in the case of precious metals financial investors may actually wish to own warehouse stocks).

Second, since the times of Harry Markowitz [Markowitz, 1952] it is common knowledge that investors should not put all their eggs into one basket. Rather it can be shown mathematically that the total profit is maximized if assets are diversified in a way that the profits and losses from the individual asset classes develop independently of one another. In empirical studies [most influential: Gorton and Rouwenhorst 2005], it has been demonstrated that this applies to investment in commodities in relation to stocks or government bonds.

Third, most investors have become convinced that in the long run no single investor is smarter than the collective intelligence of all market participants – “the market”. This means that no fund manager will be able to consistently outperform the average performance of an asset class by investing in particularly promising assets. Owing to its non-selective behaviour, this investment strategy is referred to as the random-walk strategy [Malkiel, 1973]. Therefore, instead of an active fund management or stock picking, a passive replication of the market developments has been more and more often recommended – such as keeping shares in one’s portfolio according to their weight in an index.

## 2.2. Opportunity and feasibility of index-oriented investments

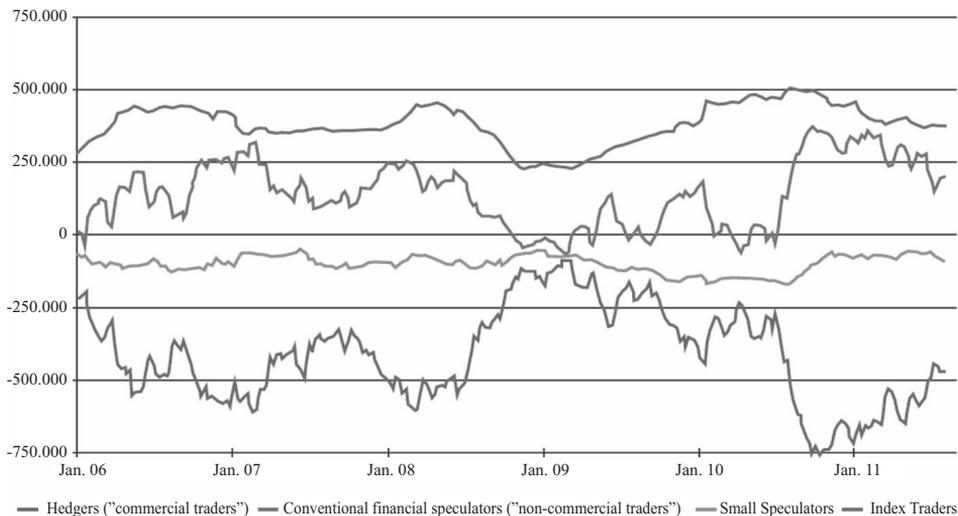
The Index-oriented investor behavior has been made possible through the creation of new investment instruments in the course of the worldwide liberalization of the financial markets: Exchange Traded Commodities (since 2006), Exchange Traded Funds (since 1993), and commodity-based Investment Certificates (since the 1990s). With these instruments, capital can be accumulated and invested in commodity markets, either by the funds themselves or by the financial market actors who have specialized in trading risks of different classes – the swap traders (previously considered a sub-category of conventional speculators but more recently considered a sub-category of those applying an index-oriented investment strategy).

Index-oriented investment behavior has become feasible as a global savings (or: liquidity) glut [Bernanke, 2007; see also Bracke, Fidora, 2008] has emerged since the turn of the millennium in both the high-income countries and emerging economies such as China. As, during the last decade, low-risk government bonds have hardly performed above the rate of inflation, large and small investors alike have looked for more profitable investment options, and an increasing amount of money has been directed to index speculation. Moreover, in the wake of the 2009 financial crisis and the 2011 Eurozone crisis, the global market has been flooded by central-bank money available virtually free of charge – mainly to restore inter-bank lending. Financial investors, however, have been seeking profitable investments for this easily available money. In addition to nourishing a new bubble on the stock market, a flight into tangible assets such as metals and real estate had set

in. This again constitutes a self-fulfilling prophecy: for not only can rising commodity prices result in a monetary inflation, but they can also lead to deteriorating profits from commodity-processing manufacturing industries. Thus, incentives arise to redeploy capital to financial investment in commodities (futures or, in the case of metals: real stocks<sup>1</sup>), the price of which in turn continues to rise.

### 2.3. Volume of index-oriented investments

Data collected in Chicago, the world's largest food commodity futures exchange, offer some insight into the size of the transactions of different groups of traders – even if the data collection still exhibits methodological shortcomings and has only recently (June 2006) become reasonably comprehensive. According to these data, each of the three groups accounts for roughly one third of the market volume in grain futures (see Figure 2).



Positive values: long positions, negative value: short positions. Data source: CFTC, <http://www.cftc.gov/MarketReports/Commitmentsso/Traders/HistoricalCompressed/index.htm> [01. September 2011]. Diagram author's own design.

Figure 2. Net positions in corn (maize) futures (à 5,000 bushel) held by different groups of traders, Chicago Board of Trade, January 2006 to August 2011 (weekly data)

Source: Hans-Heinrich Bass, *The relevance of speculation*, Rural 21, 05/2011, pp. 17–21, [http://www.rural21\\_com/uploads/media/rural\\_2011\\_5\\_17-21.pdf](http://www.rural21_com/uploads/media/rural_2011_5_17-21.pdf).

By definition, the net values of all groups cancel each other out since there is a corresponding short position on the market for each long position that has been

<sup>1</sup> In the case of food, "land grabbing", i.e. the seizure of land in developing countries by private or public funds from emerging economies can be considered an equivalent to financial investment in real stocks [Wohlmut, 2012].

entered. The counter-position to the hedgers (who, by definition, also hold physical stocks or wish to purchase them, the price of which they are hedging by trading in futures) is assumed by traditional speculators and index speculators. While the hedgers and the traditional speculators are mirror images of one another (and both sides could trade with reversed signs in net values, see data for early 2009 in Figure 2) and their positions are also subject to severe fluctuations, the index speculators maintain a virtually constant, high net long position. The average of 400,000 corn (maize) futures (á 5,000 bushel; 25 kg per bushel) hold by index speculators in Chicago alone represents about 6 per cent of a world harvest of 800+ million tons [Bass, 2011b].

#### 2.4. Impacts of index-oriented investments

Academic and policy-oriented research has only recently begun to analyze the impact of index-oriented investment on price formation on spot markets (for the first, albeit partisan overview see Meijerink and Shutes 2012). While some authors, both dissidents from the financial industry and scientists in the UN- and World Bank system, see very strong statistical links [e.g. Masters, 2008; UNCTAD, 2008; Robles, Torero, von Braun, 2009; Baffes, Haniotis, 2010], others, including authors from the OECD and the IMF, do not see any links at all [e.g. Antoshin, Samiei 2006; Irwin, Sanders 2010].

According to our understanding [Bass, 2011b], the links are established via the rolling process and the activities of the arbitrageurs. Whenever the contracts in their portfolio reach maturity, they have to purchase new ones. This is, of course, beneficial to the commercial trader since he has better chances to hedge against falling prices. If prices on the spot market fall, the hedger will nevertheless receive the higher guarantee price, while the index trader takes the loss. On the other hand, if the spot market price rises, the index trader will have won the bet, and the hedger will pay the insurance premium equivalent. Obviously, the index investor's strategy can only work if commodity prices continue to rise more often than they fall, i.e. if they are following an upward trend – as they have done over the past ten years.

The conventional speculators enter both short and long positions and can thus reinforce both price fluctuations and price bubbles on the futures market – but not the trend. Leaving aside smaller portfolio corrections, the index speculators, on the other hand, only enter long positions and enforce both an already existing upward trend in prices as well as an emerging bubble, but not volatility – as more or less regardless of the price a large demand for futures exists to maintain the prescribed proportion of assets in the portfolio.

An upward trend on the futures market is transmitted to the spot market by the activity of the arbitrageurs. The reason is obvious: with a high price for the

next due wheat contract and a low price on the wheat spot market, an arbitrageur could stock up on cheap wheat from the spot market and offer to fulfill his future contract with this delivery. The spot market suppliers will anticipate this rising demand and for their part increase prices.

It is this international spot market for grain where the traders from food-importing countries replenish their supplies. With increasing international spot market prices, their import prices will usually also increase. For many countries, where poor people pay (as is predicted by Engels' law) half and more of their income for food, rising import prices for food can exacerbate already existing food insecurity.

As, however, price quotation on the world market for grain is in US dollars, import price changes may be cushioned or amplified by the development of the value of a country's currency. An upvaluation vis-a-vis the US dollar – such as that experienced by the Euro-linked West and Central African CFA-Franc during the 2011 global food price bubble – helps, while other countries – such as famine-hit Haiti and Kenya – had to accept adverse developments also from the foreign exchange market.

## Conclusion

Without political intervention, index investment on the global food market will continue to grow in importance as the causal factors for this behavior continue to exist. Much more research is needed to fully understand the transmission mechanism between index investment and food price formation. However, from what we know today, it can already be concluded that index-investment is a type of market participants' behavior detrimental to the majority of consumers – especially those in poor, food-importing countries. As index investment in food commodities was made possible only by a far-reaching liberalization of the financial markets in the 1990s, governments are well advised to re-regulate these activities today.

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