

# The speculator's bread: what is behind rising food prices?

SSS Science & Society Series on Food and Science

Markus Henn

Most citizens in developed countries buy and consume their food without any consideration of how it is produced or how it gets from the field or slaughterhouse to the supermarket. They take for granted that they can afford it and do not care about its production and the economic, financial and other factors that eventually determine its price on the supermarket shelf. However, the market price of agricultural commodities is more important than those of nearly all other products. Increasing prices can cause hunger for millions of people and enormous political repercussions. In 2007–2008, a price explosion for grain and other commodities caused malnutrition among an estimated 115 million people and triggered hunger revolts in several nations. The prices subsequently dropped, only to soar again three years later (Fig 1), surpassing previous highs by the end of 2010. The revolt in Tunisia in January 2011 that eventually led to the government's downfall was originally triggered by rising food prices.

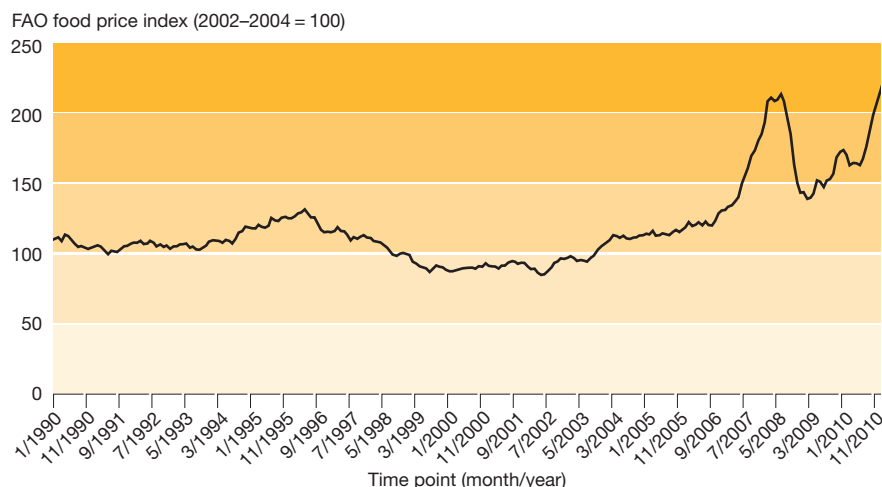
Which factors or mechanisms determine the market price of food? If a drought or a flood were to destroy harvests in wheat-exporting countries such as Australia or Russia, it would certainly drive up the price of wheat. Yet, there is also ongoing debate about whether and how the 2007–2008 price spike might have been driven by financial speculation in commodity markets. This is not only a media debate, but also of scientific interest as it gets to the heart of economic theory; indeed, various research articles have tried to analyse and explain the causes of the 2007–2008 price spike.

...the market price of agricultural commodities is more important than those of nearly all other products

The global market-prices for agricultural commodities are determined in different ways, depending on the commodity. Some products, such as rice, are mainly traded nationally, with only a small share being traded internationally; other commodities are traded in large quantities on international commodity exchanges, particularly in the USA. As the USA is one of the main producers and exporters of wheat, corn and soybean—and has a liberal market

tradition—these exchanges are important for both the US and the global agricultural industry. In Europe, commodity exchanges for agricultural products play a lesser role, partly owing to the former Common Agricultural Policy of the European Union (EU), which tightly regulated the production of foodstuffs. However, this policy is now changing and exchanges are set to have a more important role in Europe too. The Paris commodity exchange is already a relevant marketplace for wheat, and the London commodity exchange has an important role in the global trade of coffee, cocoa and sugar.

The price of any commodity should reflect the levels of supply and demand. Of course,



**Fig 1** | FAO Food Price Index values from 1990 to 2010. “The FAO Food Price Index is a measure of the monthly change in international prices of a basket of food commodities. It consists of the average of five commodity group price indices (representing 55 quotations), weighted with the average export shares of each of the groups for 2002–2004” (<http://www.fao.org>). FAO, Food and Agricultural Organization.

fluctuations occur and are sometimes justified by fundamental factors, for example a bad harvest or increased demand. However, other external factors—such as a lack of information, asymmetries, externalities, conflicts of interest and agency problems—can also influence prices on commodity markets. In addition, outright speculation (for instance by hoarding), price bubbles and even market manipulation can repeatedly influence prices. The largest grain companies in the world, such as ADM, Cargill, Dreyfus and Bunge, have an interest in maximizing their profits and do so by buying and selling commodities at the most suitable time. Even farmers speculate on commodity markets, for example by withholding their harvest when they expect a price rise. To keep these factors and interests under control it is necessary and indeed legitimate to regulate and control markets, not just for food commodities.

Commodities are not only traded physically on ‘spot’ or cash markets, but also subject to forward buying through ‘futures’. A future is a contract between a producer—that is, a farmer—and a buyer that specifies the amount, the price and the delivery date of a purchase. Similarly, buyers—such as millers—can use futures to buy a certain amount of grain at a guaranteed price ahead of time. Many farmers and end-users take advantage of futures to pre-sell or pre-purchase agricultural goods to insure themselves against market fluctuations. This ‘hedging’ reduces their risks and enables them to invest more safely.

**The revolt in Tunisia in January 2011 that eventually led to the government’s downfall was originally triggered by rising food prices**

Intermediary traders ensure that the two sides meet. Traditionally, these traders are established firms that buy and sell futures from producers and to consumers, thereby providing the necessary liquidity. They shoulder the risks and gain their profits from the difference between the price stipulated in a future and the final market-price. These firms, naturally, have a profound knowledge and understanding of the commodity markets in which they are trading.

In addition, such trading can take place both on exchanges (then called ‘futures

trading’) and bilaterally ‘over-the-counter’ (OTC). Modern trading in commodity futures began in the USA during the mid-nineteenth century. Chicago, where the first modern wheat futures were traded, is still the largest and most important marketplace for agricultural commodities in the world, even though Asian countries have contested this in recent years.

As futures no longer require the seller to possess the actual goods and because physical delivery is replaced by cash exchanges, their volume can be separated from the actual quantity of the commodity; their volume can also increase indefinitely as long as enough intermediaries want to deal with them. In the past, though, relatively few investors and intermediaries speculated on future markets. Moreover, regulatory agencies can and have imposed rules to limit the extent of speculation, for instance by regulating delivery dates, delivery locations, the timeframe for buying, certified stocks, storage fees, position limits, price limits and other factors.

However, an increasing number of investors from outside the traditional markets—including banks, and pension and investment funds—have begun to speculate on agricultural futures exchanges. These large investors not only push the exploitation of price trends, but also—in contrast to the traditional intermediaries—are often not familiar with the cash market and the fundamentals. These outside speculators also often invest for reasons that have nothing to do with the cash market, for instance to protect themselves against price fluctuations on financial markets.

This is the main reason that the US government imposed strict limits for financial speculation on commodity future exchanges. Only commercial participants with an interest in hedging were exempted. However, these rules and limits have been slowly eroded or removed. In 1991, one financial investor managed to get an official exemption from the limits in order to hedge his financial risk. In the following years, more traders were granted such exemptions or limit expansions. In 2000, the Commodity Futures Modernization Act exempted OTC trading from regulatory oversight and control. As a result of laxer oversight, other speculators joined the market, especially after the beginning of the financial crisis in 2006. These newcomers include banks such as Goldman Sachs,

JP Morgan and Deutsche Bank; pension funds, such as the California State Teachers’ Retirement System; and hedge funds. A good deal of their trading is carried out through ‘swaps’, a type of OTC instrument.

As these new and powerful speculators have entered the market, the total volume of new speculative investments in commodity indexes has increased more than tenfold in five years: from an estimated \$15 billion in 2003 to around \$200 billion in 2008. ‘Index funds’, which aim to imitate the cash markets with futures, rose particularly high: between 2006 and 2008, index traders increased the demand for wheat futures from 33% to 100%. The number of daily outstanding contracts held by index traders on the Chicago Mercantile Exchange grew from approximately 30,000 in early 2004 to 220,000 in mid-2008 (US Senate PSI, 2009).

The unexpected price hike in 2007–2008 has triggered a lively debate among economists about whether this increased speculation in futures has driven up cash prices. This discussion is both a theoretical debate about how futures markets work and an empirical debate about the reasons behind the price rise. The main questions are: Can speculation alone move the prices of futures and can there be excessive, that is, harmful, speculation in futures? Can futures prices influence the cash markets, and if so, how?

**...an increasing number of investors from outside the traditional markets—including banks, and pension and investment funds—have begun to speculate on agricultural futures exchanges**

Some claim that that the amount of trading in futures is irrelevant to the real price, because it is always a “zero-sum game” between traders (Irwin & Sanders, 2010). For every position that bets on a rising price (long position), there is a counterparty which bets on a falling price (short position). By this view, the amount of trading is detached from the price level. Indeed, it is not possible to demonstrate an unequivocal relationship between the amount of trading and the price.

Yet, a large in-flow or out-flow of money can create a price shift. Statistical research has demonstrated the growing interdependence of commodity markets, both

between the markets themselves and with financial markets. Tang & Xiong (2010) found that “concurrent with the rapidly growing index investment in commodities markets since the early 2000s, futures prices of different commodities in the US became increasingly correlated with each other. [...] In contrast, such commodity price co-movements were absent in China, which refutes growing commodity demands from emerging economies as the driver.”

**As these new and powerful speculators have entered the market, the total volume of new speculative investments in commodity indexes has increased more than tenfold in five years...**

Silvennoinen & Thorp (2010) observe, “higher and more variable correlations between commodity futures and stock returns.” This trend—often called financialization—has also been observed by the United Nations Conference on Trade and Development (UNCTAD, 2009; Mayer, 2009). Similarly, an investigation by the US Senate took the view that the price of US futures had been influenced by excessive speculation (US Senate PSI, 2009).

The second question, which is more relevant to consumers, remains: how can futures prices influence the cash price? Theoretically, the cash price should always converge with the futures price once the future is delivered. Some economists therefore assume that if futures are overpriced, the cash market will simply solve this problem by speculative arbitrage trading: buying something at a lower price and immediately reselling it for a higher price. Futures markets, in this view, are always driven by the cash markets, which themselves are determined by the fundamental mechanisms of supply and demand (Irwin & Sanders, 2010). However, it is logical to assume that futures markets have an influence on cash markets because, as all economists agree, they should predict the future price on the cash markets.

Thus: how does speculation in futures influence prices on cash markets and how long does the effect last? Some scientists at the UN Food and Agricultural Organization were able to identify only short-term effects (Dreschler *et al.*, 2010), but what does short-term mean? Different economists use

different definitions: some define short-term as one day, others one week and some others one month. However, if the same effect leads to a one-month deviation, why should it not cause a deviation of many months? And what is the effect of a month-long deviation for people who need to buy food every day? As the famous economist John Maynard Keynes noted, in the long run we are all dead. Indeed, financial speculators cannot suspend the laws of supply and demand in the long-term, but they are able to cause short- to medium-term price increases, which, for the world at large, is bad enough.

Traders are usually open about the effects of their trading. In April 2006, a hedge fund manager commented: “There is so much money going into commodity markets that it almost doesn’t matter how fundamentals behave” (WDM, 2010). At the same time, the investment bank Merrill Lynch estimated that commodity prices had increased by 50% through speculation (Thornton, 2006). One of the most well-known speculators, George Soros, commented that, “Every speculation is also rooted in reality [however] speculators create the bubble that lies above everything. Their expectations, their gambling on futures help drive up prices, and their business distorts prices, which is especially true for commodities. It is like hoarding food in the midst of a famine, only to make profits on rising prices. That should not be possible” (WDM, 2010).

Furthermore, if the futures price is higher than the cash price, traders on the cash market are inclined to store food in order to gain higher incomes. This is a common occurrence in hard commodity markets, such as oil or metal. However, hoarding of agricultural commodities driven by expectations of higher prices can also take place. Finally, divergent cash and futures prices, along with market volatility, cause other problems; higher costs are required for risk management and hedging, which harms the food business and ultimately affects food supply and prices (US Senate PSI, 2009).

Many observers initially argued that the price spike of 2007–2008 was related to bad harvests, rising demand from importing countries—notably China—and the growing production of biofuels. A leading study by the World Bank was perhaps most influential at the time (World Bank, 2008). However, even when it became clear in early 2008 that harvests had

recovered, the prices still rose. Moreover, prices on the cash and futures markets plummeted from mid-2008 onwards although demand from emerging countries remained high, even during the financial crisis. Some researchers are still not convinced that the 2007–2008 price spike was caused by speculation and continue to point to the increasing demand for biofuels, depreciation of the US dollar and the rising price of oil to explain this phenomenon (Headey & Fan, 2010).

**Higher food prices not only cause immediate problems; by reducing the available money for health care and education, they also produce negative long-term effects**

Nonetheless, criticism of financial speculations on commodity markets has been growing. In 2009, US hedge fund manager Michael W. Masters testified to the US Senate that passive investment, such as index funds, “provides no benefits to the markets while it exacts a heavy toll” (Masters, 2009). Accordingly, the US Senate and various scholars found signs of excessive and harmful speculation in US wheat markets (US Senate PSI, 2009; Lines, 2010; Gilbert, 2010). Headey & Fan (2010) reject the argument that rising demand from emerging countries could have caused the spike, writing that “low interest rates, and investment portfolio adjustments in favour of commodities” have an important role in price formation. The World Bank, in a recent working paper (Baffes & Haniotis, 2010), has also recognized the influence of financial speculators on prices: “We conjecture that index fund activity [...] played a key role during the 2008 price spike. Biofuels played some role too, but much less than initially thought. And we find no evidence that alleged stronger demand by emerging



#### Science & Society Series on Food and Science

This article is part of the EMBO reports Science & Society series on ‘food and science’ to highlight the role of natural and social sciences in understanding our relationship with food. We hope that the series serves a delightful menu of interesting articles for our readers.



economies had any effect on world prices.” In a more recent paper by the UN Special Rapporteur on the Right to Food, Olivier de Schutter (2010) found that “a significant portion of the price increases and volatility of essential food commodities can only be explained by the emergence of a speculative bubble.”

Another reason to assume that speculation is a harmful influence is that the oil-price peak of 2008 also seems to have been caused by speculation (Masters, 2009; Chevalier *et al*, 2010). This is not an independent explanatory variable for the price rise in agricultural commodities, but it highlights the impact of speculation.

In addition to index funds, hedge funds have become increasingly important players in commodity markets. These funds, which can invest more freely than any other type of fund, often take highly speculative long and short positions to profit from rising or falling

prices. Hedge funds can also move huge amounts of money. In July 2010, a single hedge fund bought almost all cocoa futures on the London commodity exchange, in an attempt to force cocoa buyers to buy from it at a monopolistic price. Afterwards, a group of cocoa processing companies called on the London International Financial Futures and Options Exchange to prevent such speculations and threatened to go to the New York commodity exchange, where tighter regulations are in force.

Today, there is again a debate about whether speculation has a role in rising prices. On the one hand, harvest losses for wheat crops in July 2010 would justify a slight price rise. On the other hand, National Farmers Union representative Doug Sombke said at a US Commodity Futures Trading Commission hearing in the USA, “I think speculators have created

**The USA has learned its lesson from the past few years and is once again restricting financial speculation through reforms introduced in July 2010**

a huge mess here for us. Farmers are feeling this today” (Reuters, 2010). Klaus Josef Lutz, CEO of BayWa, one of Europe’s biggest grain traders, commented that, “70 percent of the price rise can be blamed on speculators” (Handelsblatt, 2010). Finally, wheat is not nearly as scarce as the price rise would suggest: the global 2010 harvest is estimated to be the third largest of all time (FAO, 2010a).

Two-thirds of developing countries are net importers of basic food commodities, even if the percentage of farmers in these countries is much higher than in industrialized countries. Furthermore, the relative

household expenditure on food is much higher in developing countries: 60–80% compared with approximately 15% in the EU. This makes developing countries particularly vulnerable to price rises. They were hit hard in 2007–2008 and are again facing serious problems; the recent revolt in Tunisia being the most visible uprising sparked by food prices. Higher food prices not only cause immediate problems; by reducing the money available for health care and education, they also produce negative long-term effects.

**...farmers and buyers have a strong interest in managing their risks, and futures markets have proven to be an appropriate, if imperfect, mechanism...**

Some developing countries are commodity producers. As such, they profit, more or less, from price increases. However, their small-scale farmers are the weakest link in the production chain and profit the least from price rises. Apart from speculators, it is larger intermediaries, retailers or bigger farms that reap most of the profits (Höffler & Owour Ochieng, 2009).

Growing 'financialization' makes it vital to reform commodity futures markets and set clear limits for speculation. Trading by financial speculators must take place on regulated and transparent commodity exchanges. The number and influence of speculators must be controlled through market and position limits. As Ann Berg, former commodity trader, stressed at a recent FAO special committee, "Over 150 years of futures trading history demonstrates that position limits are necessary in commodities of finite supply to curb excessive speculation and hoarding" (FAO, 2010b). Furthermore, some types of investment, such as index funds, could be strongly restricted. Generally, a legal demarcation between the commodities futures markets and the financial markets and a special agency to oversee it is required, such as the US Commodity Futures Trading Commission.

The USA has learned its lesson from the past few years and is once again restricting financial speculation through reforms introduced in July 2010. The US government aims to return OTC trading—mostly carried out as swaps—to multilateral trading and clearing platforms. Higher transparency

requirements will apply and financial speculators will once again be limited by stricter position limits, without exemptions.

As mentioned above, fewer agricultural commodities are traded on a large scale in the EU, but the London and Paris commodity exchanges still exert an influence. Moreover, stricter regulations in the USA could induce speculators to move their activities to European exchanges, even though there are strong position limits, at least at the Paris commodity exchange. Reforms of the financial markets in the EU are therefore necessary, and these are currently being debated. Michel Barnier, the European Commissioner for Internal Market and Services, has rightfully called speculation with food commodities a scandal. Whether his words will be followed with actions remains to be seen.

In September 2010, the European Commission released draft regulations for OTC derivatives that include plans to create new trading platforms called 'central counterparties'. The draft regulations require that OTC trades are limited and fulfil transparency requirements (EC, 2010). Along with these, two other directives will be revised: one on markets in financial instruments, such as futures, and one on market abuse. However, the EU has not yet acknowledged that commodities markets are not the same as financial markets. It is therefore not certain whether they will propose and pass appropriate regulation, which ought to include a special regulatory body, full transparency and position limits.

Given the problems that commodity futures markets have caused, it might be tempting to renounce them. Conversely, farmers and buyers have a strong interest in managing their risks, and futures markets have proven to be an appropriate, if imperfect, mechanism by which to do so. Other measures such as harvest assurances bring their own disadvantages. Moreover, local markets can also cause problems, as can political measures, especially when these include export bans.

Nonetheless, it is prudent to explore alternatives. These could include regional or bilateral treaties between states, which have been successfully practised in several cases in Asia. The build-up of higher, more reliable reserves at the national, regional or global level is another option for dealing with volatility and uncertainty. Such reserves could also be virtual, as has been suggested by one leading agricultural researcher, Professor

Joachim von Braun from Bonn University in Germany (von Braun, 2010).

In the meantime, banks and hedge funds have also begun to invest in cash markets. In 2009, Goldman Sachs, Barclays and JP Morgan reportedly controlled physical commodities worth £16 billion—more than three times the amount they controlled in 2008. The head of one cocoa retail company commented on this development: "A lot of branch-alien money has poured into the market. The banks that are part of the game now are not giving us loans anymore or require much more collateral, as the markets have become more volatile. This is really grotesque" (Handelsblatt, 2010). This seems to be the next step in the 'financialization' of commodity markets, but the central question is whether banks should be able to buy our food or if they should get back to their initial purpose: serving the economy with credit.

**Food markets should serve the interests of people and not those of financial investors**

Food markets should serve the interests of people and not those of financial investors. In this regard, politics has failed to protect food markets from excessive speculation. As former US President Bill Clinton said in a speech at the United Nations' World Food Day on 16 October, 2008, "We need the World Bank, the IMF, all the big foundations, and all the governments to admit that, for 30 years, we all blew it, including me when I was President. We were wrong to believe that food was like some other product in international trade, and we all have to go back to a more responsible and sustainable form of agriculture" (Clinton, 2008).

Given that hunger still exists in the world, even small price increases that are driven by financial investment are scandalous. We must not allow food to become a purely financial asset.

#### CONFLICT OF INTEREST

The author declares that he has no conflict of interest.

#### ACKNOWLEDGEMENTS

The author's work is co-funded by the European Union. The views expressed are the author's only.

#### REFERENCES

- Baffes J, Haniotis T (2010) Placing the 2006/08 Commodity Price Boom into Perspective. *World Bank Research Working Paper 5371*. Washington DC, USA: World Bank

- Chevalier J, Baule F, Lasserre F, Odonnat I, Viellefond E, Laffitte M, Chevallier J (2010) *Rapport du Groupe de Travail sur la Volatilité des Prix du Pétrole*. Paris, France: Ministère de l'Economie, de l'Industrie et de l'Emploi. [www.economie.gouv.fr/services/rap10/100211rapchevalier.pdf](http://www.economie.gouv.fr/services/rap10/100211rapchevalier.pdf)
- Clinton B (2008) *Speech: United Nations World Food Day*. New York NY, USA: William J Clinton Foundation. [www.clintonfoundation.org](http://www.clintonfoundation.org)
- De Schutter O (2010) Food commodities speculation and food price crises: Regulation to reduce the risks of financial volatility. *Briefing Note 02, September 2010*. Louvain-la-Neuve, Belgium: Université de Louvain. [www.srfood.org](http://www.srfood.org)
- Drechsler D, Rapsomanikis G, Sarris A (2010) Is speculating on food dangerous? <http://www.project-syndicate.org/commentary/drechsler2/English>
- EC (2010) *Proposal for a Regulation on OTC Derivatives, Central Counterparties and Trade Repositories, COM 484/5: 15 Sep*. Brussels, Belgium: European Commission
- FAO (2010a) *Global Food Price Monitor*. Rome, Italy: Food and Agricultural Organization. [www.fao.org](http://www.fao.org)
- FAO (2010b) *Agricultural Futures: Strengthening Market Signals for Global Price Discovery. Committee on Commodity Problems*. Rome, Italy: Food and Agricultural Organization. [www.fao.org](http://www.fao.org)
- Gilbert C (2010) How to understand high food prices. *J Agricultural Econ* **61**: 398–425
- Handelsblatt (2010) Beim Rohstoff-Roulette gewinnt immer die Bank. *Handelsblatt* 9 Aug
- Headey D, Fan S (2010) Reflections on the Global Food Crisis. *Research Monographs* 165. Washington DC, USA: International Food Policy Research Institute
- Höffler H, Owour Ochieng BW (2009) *High Commodity Prices—Who Gets the Money? A Case Study on the Impact of High Food and Factor Prices on Kenyan Farmers*. Berlin, Germany: Heinrich-Boell-Foundation
- Irwin S, Sanders DR (2010) The Impact of Index and Swap Funds on Commodity Futures Markets: Preliminary Results. *Food OECD, Agriculture and Fisheries Working Papers No. 27*. Paris, France: OECD
- Lines T (2010) *Speculation in Food Commodity Markets*. London, UK: World Development Movement. [www.tomlines.org.uk/Speculation\\_in\\_food\\_commodity\\_markets\\_Tom%20Lines\\_final\\_04.10.pdf](http://www.tomlines.org.uk/Speculation_in_food_commodity_markets_Tom%20Lines_final_04.10.pdf)
- Masters MW (2009) Testimony before the Commodities Futures Trading Commission, 8 May. Washington DC, USA: Commodities Futures Trading Commission. [www.cftc.gov](http://www.cftc.gov)
- Mayer J (2009) The Growing Interdependence between Financial and Commodity Markets. *UNCTAD Discussion Paper 195*. Geneva, Switzerland: United Nations Conference on Trade and Development
- Reuters (2010) No clear link between funds, convergence woes. *Reuters CFTC* 5 Aug
- Silvennoinen A, Thorp S (2010) Financialization, crisis and commodity correlation dynamics. *Research Paper Series 267*. Sydney, Australia: Quantitative Finance Research Centre, University of Technology
- Tang K, Xiong W (2010) Index Investment and the Financialization of Commodities. Princeton, NJ, USA: Princeton University. <http://www.princeton.edu/~wxiong/papers/commodity.pdf>
- Thornton E (2006) Inside Wall Street's culture of risk. *Bloomberg Businessweek* 12 Jun. [www.businessweek.com](http://www.businessweek.com)
- UNCTAD (2009) Impact of financialization on commodity price developments. In *Trade and Development Report 2009*, Ch 2D, pp 66–74. Geneva, Switzerland: United Nations Conference on Trade and Development
- US Senate PSI (2009) *Excessive Speculation in the Wheat Market*. Washington DC, USA: US Senate Permanent Subcommittee on Investigations. [levin.senate.gov/newsroom/supporting/2009/PSI.WheatSpeculation.062409.pdf](http://levin.senate.gov/newsroom/supporting/2009/PSI.WheatSpeculation.062409.pdf)
- von Braun J (2010) Interview with Der Spiegel. *Der Spiegel* 23 Aug. [www.spiegel.de](http://www.spiegel.de)
- WDM (2010) *The Great Hunger Lottery*. London, UK: World Development Movement
- World Bank (2008) *Rising Food Prices: Policy Options and World Bank Response*. Washington DC, USA: World Bank



**Markus Henn is a political scientist and project officer for financial markets at World Economy, Ecology & Development (WEED) in Berlin, Germany. E-mail: [markus.henn@weed-online.org](mailto:markus.henn@weed-online.org)**

**Received 17 January 2011; accepted 14 February 2011; published online 18 March 2011**

EMBO reports advance online publication 18 March 2011; doi:10.1038/embor.2011.38