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ECONOMIC RESEARCH & CORPORATE DEVELOPMENT

# Working Paper

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## Is speculation to blame for rising food prices? – A compilation of facts & findings

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# Working Paper

## Is speculation to blame for rising food prices? – A compilation of facts & findings

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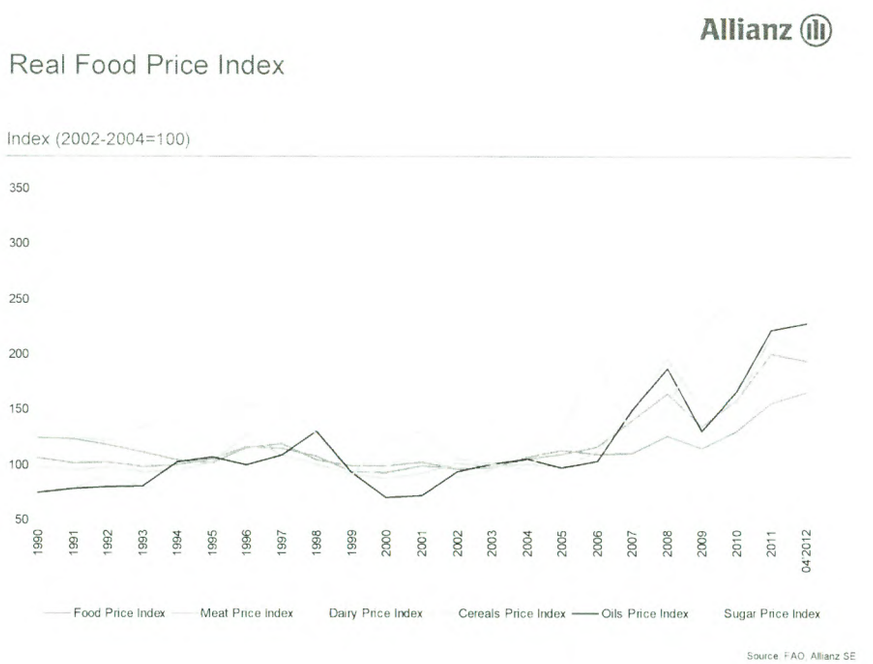
# 1. RECENT PRICE DEVELOPMENTS AND THEIR CONSEQUENCES

- Food prices were relatively stable for a long time, but recorded strong increases since 2006. Furthermore, agricultural commodity prices have experienced considerable volatility in recent years.

- Up-to-date developments: The food price index, compiled by the United Nations Food and Agricultural Organisation (FAO), reached a new peak in February 2011 and then decreased slightly throughout the rest of the year; however, since the beginning of 2012, prices have been on the rise again – although April has experienced a small decrease. The FAO food price index is now 5% higher than in December and only 7% lower than the peak in 2011.




- Increases in food prices have potentially far-reaching consequences especially in developing countries: Growing malnutrition and hunger, social unrest, rising budgetary deficits and weaker economic growth.

- According to estimations of FAO, the number of undernourished people increased from 848 million in 2003-05 by 75 million to about 923 million people at the end of 2007 – long before the price peak in 2011. Much of this increase is attributed to high food prices.[1]

- Most affected of increasing food prices are low-income countries as they spend 70-80% of their total income on food.

[1] FAO (2008a)

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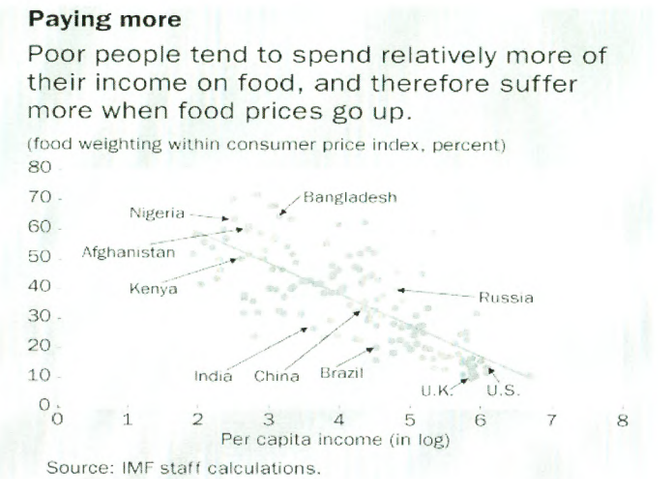
Spending on food




## 2. DRIVERS OF PRICE MOVEMENTS

### 2.1 Stock levels

- Stocks of storable commodities play a buffering role: They mitigate discrepancies in short term demand and supply, smoothing prices and reducing volatility. Generally speaking, the level of stocks has a strong inverse correlation with a commodity's price.

- Recent developments: Global grain stocks for most cereals have decreased significantly since the 1990s, for two reasons:

    - Many governments moved away from holding public stocks, other than small emergency or strategic reserves.

    - Private firms operating in food chains also reduced their pipeline or operational stock requirements to minimum levels as they introduced just in time inventory practices.

- The price crisis of 2007-08 was preceded by a large draw down in wheat and coarse grain stocks. Slowed consumption (because of the worldwide recession) and increased supply (as aresponse to high prices) rebuilt stocks quickly in 2009, but the production shortfall in the following season forced exporters to dig again into their reserves.

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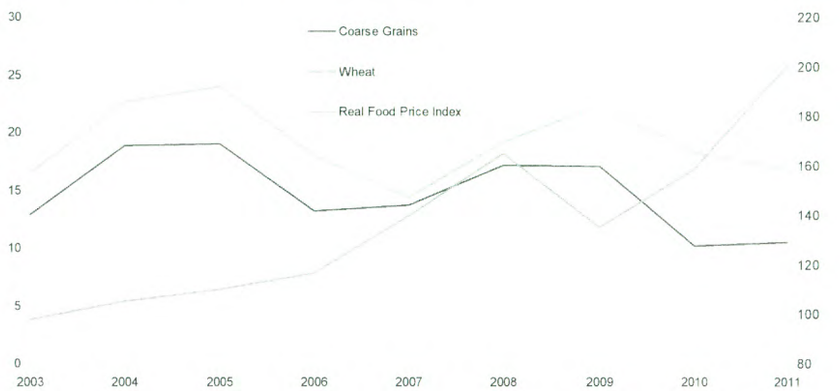
Wheat and coarse grain stocks to remain relatively low

Global stocks-to-use ratios* of major exporters (in %) vs. Real Food Price Index




*The stock-to-use ratio for cereals is defined as the ratio of cereal stocks to its domestic utilisation
Note: Stocks-to-use ratios are computed for US, EU, Canada, Australia and Argentina
Source: OECD and FAO Secretariats

- Low stocks play an important role but are not a sufficient condition for an extreme price spike. The price spikes of the early 1970s and of 2006-08 coincided with low stocks for wheat and coarse grains, but world rice stocks actually accumulated during this period. Market information plays an important role in affecting expectations on supply availability. If there widespread concerns regarding future availability and agents increase consequently their demand for stocks (or hoard), prices may spike upwards, as markets arbitrate a largely fixed production supply between stockholding and consumption.[2]

## 2.2 Trade restrictions

- High world market prices may lead to national export restrictions. Considering most food products, there is a considerable market concentration on only a few big exporting countries. If one big exporter introduces export tariffs, this has a sizeable impact on world market prices and may induce other exporters to follow suit, trying to protect their people against high food prices. A multiplicator effect is set in motion. This price spiral can also work in the opposite direction: Low world market prices lead to export subsidies in one country, others follow and prices fall further.

- The empirical results strongly support the existence of a multiplier effect in food export policy. The level of global restrictions on a food product has a positive and significant impact on the probability that a government imposes a new restriction to the exports of that product.[3]

- According to the WTO, an increase in trade barriers of 1 percent resulted in a rise in food prices of 1.1 percent between 2008 and 2010

[2] OECD/ FAO (2011)
[3] Giordani/ Rocha/ Ruta (2012)

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Export Restrictions

Figure 2: International food prices and export restrictions

Source: WTO, Staff Working Paper ERSD-2012-08

## 2.3 Energy prices

- Energy prices are an important cost factor in agricultural production as agriculture is becoming increasingly industrialised in many parts of the world, relying more heavily on petroleum-based products for fuels (transportation) and fertilisers.

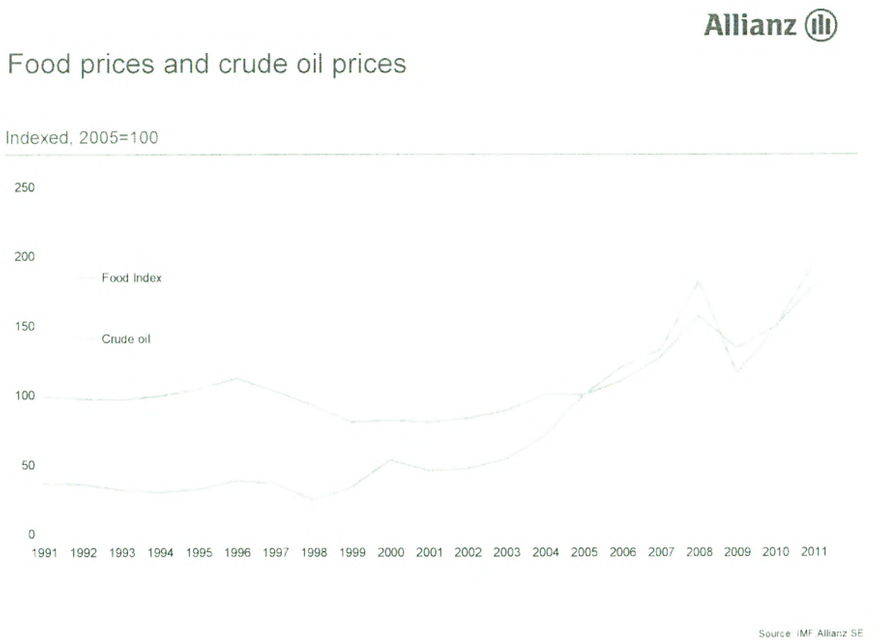
- OECD/FAO analysis (OECD/FAO, 2008, 2009, 2010) has confirmed that a close relationship exists between rising energy and food prices:

    - Higher oil prices raise the costs of running farm machinery and irrigation systems, as well as the costs of processing, handling and transporting food along the value chain.

    - Higher in-land and ocean freight costs can significantly affect both import and consumer prices.

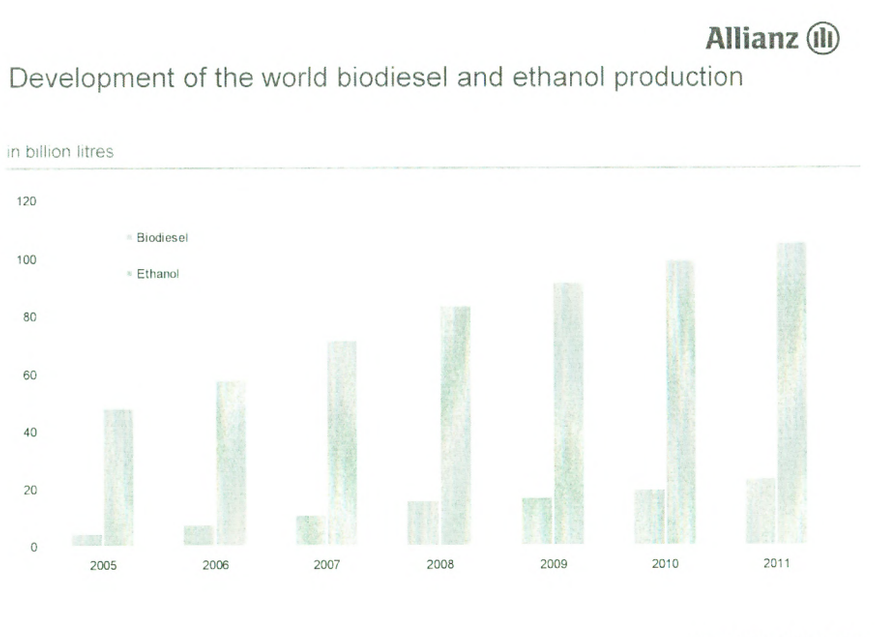
    - Agricultural production in the next year might be lower, reflecting producer decisions related to the costs of petroleum-based products, such as fertilisers and pesticides.[4]

[4] OECD/ FAO (2011)




## 2.4 Biofuels

- Global production of biofuels has grown substantially in the last ten years, primarily due to renewable energy mandates and other government policies.
- From 2005 to 2011 the production of ethanol more than doubled and showed an estimated annual growth of 13.9% on average, the production of biodiesel even grew by 30.1% on average per year and is almost five times higher than in 2005.



- Between 2005 and 2007, when oil prices were rising and global food prices began to increase rapidly, the use of cereals (wheat and coarse grains) for biofuels production grew by 80%.

- Biofuels now account for a significant and growing part of global production of a number of crops. On average for the 2008-10 period, that share was 21% in the case of sugar cane, 11% for both vegetable oil and coarse grains, and 8% for sugar beets.[5]

- The tremendous growth rates resulted in substantial changes in land use and the decline of grain stocks. In the USA maize displaced soybeans, and in the EU and other countries oilseeds displaced wheat.[6]

- There can be no doubt that both the land reallocations and new demand patterns contributed to the price boom of these commodities.[7]

### 2.5 Weather and climate change

- One of the most frequent factors behind volatility on agricultural markets is weather, and adverse weather is indeed generally considered to have played a significant role in the 2006-08 price spike.

- Again in 2010, adverse weather also played a major role in the commodity price spike. For example, drought reduced the grain harvest in the Russian Federation and Ukraine by a third and flooding caused harvest problems in North-East Australia, affecting sugar and downgrading some wheat to feed quality.[8]

### 2.6 Changing demand in emerging markets

- The latest UN estimates of population growth suggest that by the end of 2020 the planet will be populated by 7.7 bn persons. While the rate of population growth is slowing, this represents a rise of 1% annually over the next decade. The vast majority of this population growth (86%) is set to take place in large urban centres and mega cities in developing countries.

- On-going urbanization as well as rising wealth affect consumption patterns: The composition of the food basket will shift to more processed, convenience and higher value-added products.

- As a consequence, aggregate food demand is set to become increasingly "inelastic" or insensitive to price developments. As expenditure shares for food fall, price changes have less impact on real incomes, and consumers adjust food purchases less in response to a rise in prices.[9]

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[5] OECD/ FAO (2011)
[6] FAO (2008b), Mitchell (2008)
[7] Kappel/ Pfeiffer/ Werner (2010)
[8] OECD/ FAO (2011)
[9] OECD/ FAO (2011)

## 2.7 Speculation

- Trading in futures markets and commodity derivatives without any link to the underlying cash markets is often described as "financial speculation" and has been suggested as one of the possible causes of volatile agricultural commodity price movements.

- Classification of the main actors on futures markets for food markets:

    - Hedgers or commercials: They trade commodities physically on cash markets (either as producers, processors or merchants) and offset their positions in cash markets with opposite positions in future markets (hedging against price risk).

    - Speculators or non-commercials: They generally trade in the short-term, based on views about price developments; motivation is not to hedge against price risk, but to make profits from expected price movements on which they bet; speculators are necessary counterparts for hedgers.

    - Investors: They regard commodities as an asset class like equities, bonds, real estate etc.; contrary to short-term speculators, investors hold positions in the longer run, but are also "speculators" in the sense that they bet on future price developments.

  The last class of actors has grown dramatically over the last years and is suspected by some observers as the main driver of the price boom.[10]

- Financial investors have built up large long positions on commodity markets between 2003 and mid-2008. The assets allocated to index traders and swap dealers have risen from 13 billion US-Dollars at the end of 2003 to 161 billion US-Dollars as of June 2008, 17% of the total market value of 945 billion US-Dollars.[11]

- This shift has been attributed to several factors, among them the Commodities Futures Modernisation Act of 2000 in the United States, which exempted private over-the-counter derivatives (OTCs) from supervision by the US Commodity Futures Trading Commission (CFTC) and the US Securities and Exchange Commission (SEC).

[10] Kappel/ Pfeiffer/ Werner (2010).
[11] CFTC (2008), Masters (2008).

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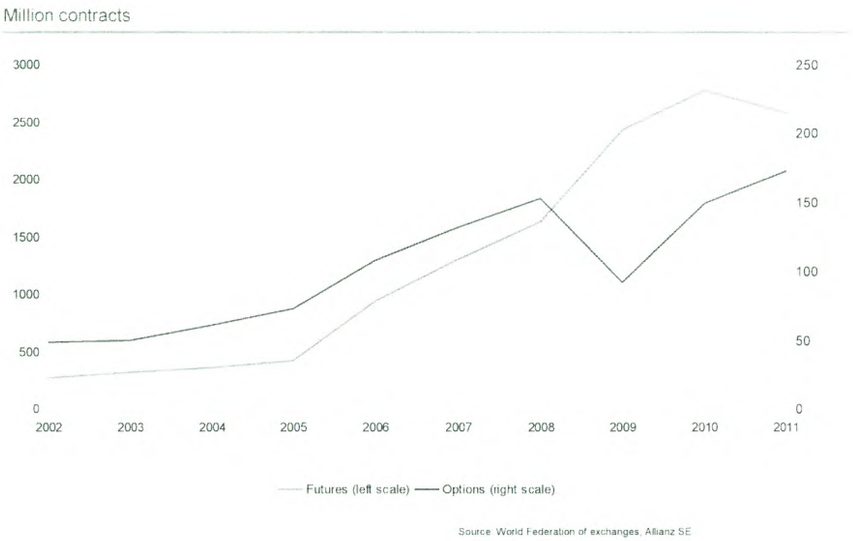
Volume traded of Derivative contracts increased strongly




Source: World Federation of exchanges, Allianz SE

- Trying toestablish a causal link between financial investments and food prices has been the subject of many studies. However, there is no consensus on the role of financial markets in setting food prices as it is nearly impossible to distinguish between price fluctuation caused by "speculation" and price fluctuation caused by fundamentals.

- On one side, some observers assert that speculators on futures markets for commodities created a "bubble".[12] Some studies find evidence that commodity index funds have impacted commodity futures prices.[13] This view has led to new regulatory initiatives to limit speculative positions in commodity futures markets.[14] (see section 3.2).

- On the other side, a number of economists have expressed scepticism about the bubble argument arguing that commodity markets were driven by fundamental factors.[15] Irwin and Sanders (2010) conclude in their work undertaken for the OECD that index funds did not cause a bubble in commodity futures prices. In its October 2008 World Economic Outlook (WEO), the IMF concluded that there was no evidence of a long term systemic effect due to speculation on commodity prices; however, short term expectations might be influenced by sentiment and investor behaviour possibly amplifying short-term price fluctuations (as in other asset markets). The IMF has repeated this position in its WEO of September 2011: Financialization has influenced commodity price behaviour, but recent research does not provide evidence that it either destabilizes or distorts spot markets.

- Almost all researchers agree that noncommercial participation in futures markets may amplify price movements in the short term, even if they differ in their conclusions about other possible impacts.[16]

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[12] See i.e. De Schutter (2010), Masters (2008), Robles/ Torero/ von Braun (2009)
[13] Gilbert (2010), Gilbert (2009), Einloth (2009), Tang/ Xiong (2010)
[14] Irwin/ Sanders (2010)
[15] See i.e. IOSCO (2009), Irwin/ Sanders/ Merrin (2009), Krugman (2008), Irwin/ Sanders (2010), Smith (2009), Wright (2009)
[16] Baffes/ Hanniotis (2010), Robles et al. (2009), UNCTAD (2009)

# 3. CONCLUSIONS

## 3.1 Impact of speculation on prices

- Taken together, all these considerations strongly support the hypothesis that fundamental market forces, i.e. supply and demand, were the predominant drivers of the food price rise. They were superimposed by price-raising effects of energy and environment policy, trade policy, and increasing energy prices. Prices declined steeply in the second half of 2008 after markets were informed about good harvests and after the financial crisis had turned into a global economic slowdown reducing demand expectations. Without the market fundamentals the boom and bust cycle would not have been conceivable[17]

- However, taking into consideration the huge influx of funds and non-traditional participants into commodity markets, it cannot be totally dismissed, that speculation at least supports excessive price developments, and this in both directions. Even if speculative capital flows were not necessarily the trigger for the price movements seen in 2007 and 2008, it seems reasonable that at least they enforced price trends.

## 3.2 Regulatory framework and recent changes

- The leaders of the G20 agreed at their summit in September 2009: "All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest [... ] Non-centrally cleared contracts should be subject to higher capital requirements."[18]

    - At national level, both the US (Dodd-Frank Act) and Japan have passed OTC derivatives legislation in 2010.

    - In March 2012 the EU-Parliament agreed to a stricter and uniformly regulated trading in OTC derivatives: Standardised OTC derivatives have to be processed through central clearing houses.

  Clearly, these measures will bring more transparency to commodities' futures and options markets as well.

- In the year of the French G20 presidency, Nikolas Sarkozy has made the volatility of food prices to a focal topic of the G20. At their summit in November 2011, the G20 agreed to improve the functioning of commodity derivatives markets through more regulation and transparency. The regulatory authorities should, among other instruments, in particular, set position limits to an appropriate extent in order to prevent market disruptions or market abuse

    - The CFTC has responded on the rising food prices: Under its proposal from November 2011, the CFTC established "position limits" to futures markets for crude oil, wheat and other commodities.

    - In October 2011 the EU-Commission proposed more stringent rules to commodity derivatives markets. An obligation to report positions is proposed to be introduced, broken down by categories of traders. This makes it easier for

[17] Kappel/ Pfeiffer/ Werner (2010)
[18] Leaders' Statement, G20, Pittsburgh Summit

regulators and market participants to assess the role of speculations on these markets. Furthermore, the Commission proposed to delegate the power on financial regulators to monitor all trading activities in the field of commodity derivatives and to intervene when market disruptions are to be feared.

- Taken together, these measures will curb the role of market speculation mitigating the possible over-shooting of food prices. The conditions for "responsible investment behavior" have definitely been improved.

# 4. APPENDIX

**Overview of seminal studies**

| Study | |
|---|---|
| Baffes/ Haniotis (2010) | Prices of agricultural commodities were affected by<br>- the combination of adverse weather conditions and the diversion of some food commodities to the production of biofuels → global stock-to-use ratios down to levels not seen since the early 1970s → further accelerating the price increases<br>- export bans and prohibited taxes<br>Any commodity-related activity on the financial side is unlikely to alter long-term price trends, which will ultimately be determined by market fundamentals. But, such activities can induce higher price variability in the sense of exacerbating the length and the amplitude of price cycles, as they most likely did during the 'perfect storm' of 2007/08 |
| De Schutter (2010) | - The initial causes related to market fundamentals, including the supply and demand for food commodities, transportation and storage costs, and an increase in the price of agricultural inputs<br>- However, a significant portion of the increases in price and volatility of essential food commodities can only be explained by the emergence of a speculative bubble<br>- In particular, there is a reason to believe that a significant role was played by the entry into markets for derivatives based on food commodities of large, powerful institutional investors such as hedge funds, pension funds and investment banks, all of which are generally unconcerned with agricultural market fundamentals |
| CFTC (2008) | - Based on the analysis of millions of swap dealer and index trader contracts between January and June 2008, this report illustrates that there is no significant positive correlation between the development of commodity prices and the number of contracts held by investors |
| Einloth (2009) | - Speculation did not play a role in the historic rise in oil price to $100 per barrel in early 2008, though it is likely that the building of speculative stores did contribute to the rise in price from that level to the peak price of over $140 later that year. The following collapse in price was due to a demand shock rather than the unloading of speculative positions. Finally, the recovery in price in the first half of 2009 has been accompanied by inventory held for speculation |
| Gilbert (2010) | - Concluded that "By investing across the entire range of commodity futures, index-based investors appear to have inflated food commodity prices" |
| Giordani/ Rocha/ Ruta (2012) | - This paper studies the relationship between export policy and food prices<br>- Food exporters may use trade policy to shield the domestic economy from large price shocks → |

| | |
|---|---|
| | complementarity between the price of food in international markets and export policy<br>- They estimate that a 1 per cent surge in global restrictions increased international food prices by 1.1 per cent on average during 2008-10 |
| International Monetary Fund (2008) | - Although financialization may have led to increases in comovement between some commodities, particularly with respect to gold, no apparent systematic connection is found to either price volatility or price changes<br>- There is little evidence to suggest that trading in futures markets has driven the price run-up or has destabilized the commodity markets during the first half of 2008 |
| IOSCO (2009) | - The Task Force, formed at the request of G8 to examine the issue of speculation in commodity markets, found that economic fundamentals, not speculative activity, are the possible explanation for recent price changes in commodities |
| Irwin/ Sanders (2010) | - While the increased participation of index fund investments in commodity markets represents a significant structural change, this has not generated increased price volatility, implied or realised, in agricultural futures markets<br>- Based on new data and empirical analysis, the study finds that index funds did not cause a bubble in commodity futures prices<br>- There is no statistically significant relationship indicating that changes in index and swap fund positions have increased market volatility<br>- The evidence presented here is strongest for the agricultural futures markets because the data on index trader positions are measured with reasonable accuracy |
| Kappel/ Pfeiffer/ Werner (2010) | - Fundamental market forces of demand and supply were the main drivers of the price boom on food markets in 2008<br>- Deficits in global food supply and declining inventories pushed prices upwards and led to expectations of further imbalances<br>- Speculators on futures markets played a minor impact on prices, but exuberant expectations of all market participants had an influence |
| Krugman (2008) | - Krugman not only rejected the view that speculation fueled the boom but also dismissed the idea that commodity trading activity in futures exchanges may have affected commodity prices at all, arguing that "a futures contract is a bet about the future price. It has no, zero, nada direct effect on the spot price" |
| Masters (2008) | - Masters asserts that speculative buying by index funds on such a wide scale created a "bubble" with the result that commodity futures prices far exceeded fundamental values during the 2007/08 period |
| Mitchell (2008) | - This paper examines the factors behind the rapid increase in internationally traded food prices since 2002 and estimates the contribution of various factors such as the |

| | |
|---|---|
| | increased production of biofuels from food grains and oilseeds, the weak dollar, and the increase in food production costs due to higher energy prices<br>- It concludes that the most important factor was the large increase in biofuels production in the U.S. and the EU<br>- Recent export bans on grains and speculative activity would probably not have occurred without the large price increases due to biofuels production because they were largely responses to rising prices |
| OECD/ FAO (2011) | Key drivers of agricultural markets and price volatility:<br>- Weather and climate change<br>- Stock levels<br>- Energy prices<br>- Exchange rates<br>- Growing demand<br>- Rising energy related production costs and resource pressures<br>- Trade restrictions<br>- Financialisation of agricultural markets ("Most researchers agree that high levels of speculative activity in futures markets may amplify price movements in the short term although there is no conclusive evidence of longer term systemic effects on volatility") |
| Robles/ Torero/ von Braun (2009) | - Identified speculative activity in the futures market as a source of the 2007/08 agricultural commodity price increases |
| Smith (2009) | - Smith argues that it is plausible that a series of seemingly small supply disruptions in the spring and summer of 2008 could explain the large increase in crude oil prices during this time period in view of the extreme convexity of the pricing function for crude oil in the short-run |
| UNCTAD (2009) | - They conclude that their findings suggest that a part of the commodity price boom between 2002 and mid-2008, as well as the subsequent sharp decline in commodity prices, were due to the financialization of commodity markets<br>- Based on their findings they support the view that financial investors have accelerated and amplified price movements driven by fundamental supply and demand factors, at least in some periods of time<br>- Regarding the impact of financial investors on individual commodities, some effect can be observed in the oil market, but it appears that most of the impact occurred in the smaller and less liquid markets for agricultural commodities, including food products<br>- However, the non-transparency of existing data and the lack of a comprehensive breakdown of data by individual commodity and trader category preclude more detailed empirical analysis |
| Tang/ Xiong (2010) | They conclude that as a result of the bundling of commodities in index funds correlations among commodities have gone up and that shocks from oil and financial factors now spill-over more strongly to non-energy |

| | |
|---|---|
| | commodities |
| Wright (2009) | What led to the grain price spikes of 2007/08?<br>- Unpredictable factors in 2006–2008 included the boost in biofuel production beyond planned levels, induced by a spike in petroleum prices, the unprecedented extension of the multi-year Australian drought, other regional production problems, transport cost increases and exchange rate movements contributed importantly to price rises in global market made vulnerable by lack of stocks<br>- Finally, the sequence of export controls, taxes and bans adopted by key exporters beginning in the thin global rice market in the fall of 2007, initially in response to consumer concerns about wheat supplies, turned market anxiety into panic<br>- Available empirical evidence does not support claims that noncommercial traders have increased the volatility of grain prices. Nor has a cogent rationale been presented for intervention against long-run noncommercial traders, including index traders, in grain futures markets |

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