

Staritz, Cornelia

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## Financial markets and the commodity price boom: Causes and implications for developing countries

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## WORKING PAPER 30

# FINANCIAL MARKETS AND THE COMMODITY PRICE BOOM: CAUSES AND IMPLICATIONS FOR DEVELOPING COUNTRIES

Cornelia Staritz

APRIL 2012

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### IMPRINT

Austrian Research Foundation for International Development /  
 Österreichische Forschungstiftung für Internationale Entwicklung – ÖFSE  
 Research Department / Bereich Wissenschaft & Forschung  
 A-1090 Vienna, Sensengasse 3  
 Phone ++43 / 1 / 317 40 10 / Fax ++43 / 1 / 317 40 10-150  
 Mail: [office@oefse.at](mailto:office@oefse.at)  
 WEB: <http://www.oefse.at> <http://www.centrum3.at> <http://www.eza.at>

**Abbreviations**

|          |  |
|----------|--|
| BIS      | Bank for International Settlement                            |
| CBOT     | Chicago Board of Trade                                       |
| CEA      | Commodity Exchange Act                                       |
| CFMA     | Commodity Futures Modernization Act                          |
| CFTC     | Commodity Futures Trading Commission                         |
| CIT      | Commodity Index Traders                                      |
| CME      | Chicago Mercantile Exchange                                  |
| COT      | Commitment of Traders  |
| CPI      | Commodity Price Index  |
| DBLCI    | Deutsche Bank Liquid Commodity Index                         |
| DCE      | Dalian Commodity Exchange (China)                            |
| DJ AIG   | Dow Jones-AIG Commodity Index                                |
| DJ-UBSCI | Dow Jones-Union Bank of Switzerland Commodity Index          |
| EC       | European Commission  |
| ECB      | European Central Bank  |
| ECOFIN   | Economic and Financial Affairs Council                       |
| EU       | European Commission  |
| FAO      | Food and Agriculture Organization                            |
| FTT      | Financial Transaction Tax                                    |
| G20      | Group of Twenty Finance Ministers and Central Bank Governors |
| HRSI     | Hard red spring wheat index                                  |
| HRWI     | Hard red winter wheat index                                  |
| ICAs     | International Commodity Agreements                           |
| ICE      | Intercontinental Exchange                                    |
| IMF      | International Monetary Fund                                  |
| KCBT     | Kansas City Board of Trade                                   |
| LDCs     | Least Developed Countries                                    |
| LICs     | Low-Income countries   |
| LME      | London Metal Exchange  |
| MCX      | Multi Commodity Exchange of India                            |
| MGEX     | Minneapolis Grain Exchange                                   |
| MiFID    | Markets in Financial Instruments Directive                   |
| MiFIR    | Markets in Financial Instruments Regulation                  |
| NCI      | National Corn Index  |
| NYCE     | New York Cotton Exchange                                     |

|          |  |
|----------|--|
| NYMEX    | New York Mercantile Exchange                           |
| ODA      | Official Development Assistance                        |
| OECD     | Organisation for Economic Co-operation and Development |
| OTC      | Over the counter                                       |
| S&P GSCI | Standard & Poor's Goldman Sachs Commodity Index        |
| SPCI     | Standard & Poor's Commodity Index                      |
| SRWI     | Soft red winter wheat index                            |
| SSA      | Sub-Saharan Africa                                     |
| UNCTAD   | United Nations Conference on Trade and Development     |
| ZCE      | Zhengzhou Commodity Exchange (China)                   |

## Abstract

The current commodity price boom in combination with high price volatility is historically unprecedented even in the volatile price history of commodities. Commodity price dynamics have crucial macroeconomic and development implications, in particular for commodity-dependent low-income countries. Commodity prices are determined by fundamental supply and demand conditions which have experienced important structural changes in the last decade related to increasing demand from highly growing emerging countries, alternative uses of commodities for energy production, and a reduction in supply due to supply constraints and low productivity. However, these factors alone are not sufficient to explain recent commodity price developments, particularly the large fluctuations between 2008 and 2011. Simultaneously to fundamental changes, trading activities on commodity derivative markets have undergone a major shift related to the increasing presence of financial investors, including banks, institutional investors and hedge funds, that has had effects on the microstructure of these markets and on price dynamics. This paper discusses these changes with regard to fundamental factors and commodity derivative markets and assesses their impact on commodity prices. Further, the paper identifies implications of these developments for developing countries and policy reforms with the objective to stabilize commodity prices and mitigate the negative impacts of the commodity price boom on developing countries.

## 1. Introduction

The current commodity price boom in combination with high price volatility is historically unprecedented even in the volatile price history of commodities. After two decades of low commodity prices in the 1980s and 1990s, many commodities had registered steep price increases since 2002 reaching a peak in mid 2008. In the second half of 2008 prices fell sharply across commodities but they began to rise again in the first half of 2009 and non-fuel prices reached an all time high during summer 2011. Thus, despite large fluctuations in recent years commodity prices remain well above their historical levels constituting a commodity price boom. While the timing varied for different types of commodities the surge in prices, the sharp correction and the subsequent rebound affected all major commodity categories, including agricultural, metals and energy commodities.

Commodity price dynamics have crucial implications for developing countries, in particular for commodity-dependent low-income countries (LICs). They are affected by high and volatile commodity prices through the import and export side with effects on import costs and export revenues as well as macroeconomic indicators, i.e. the balance of payments, public finances, inflation and exchange rates. As many developing countries are net importers of basic commodities such as fuel and food, commodity price dynamics have direct effects on food and energy security, poverty and economic stability. The impact of the price hikes in agriculture commodities has been most dramatically reflected in food crises with dramatic humanitarian, social and economic consequences in many developing countries in recent years. On the export side, the persistence of commodity dependency remains an important characteristic of many developing countries, in particular in Sub-Saharan Africa (SSA). These countries have benefited from rising revenues from commodity exports but the high price volatility has also highlighted their vulnerability and difficulties in managing their economies.

Given these far-reaching implications, the current commodity price developments call for explanations. Commodity prices are determined by fundamental supply and demand conditions in physical commodity markets. In the last decade these market fundamentals have changed importantly related to increasing demand for commodities from highly growing emerging countries, alternative uses of commodities for energy production (biofuels), and a

reduction in supply due to supply constraints and stagnation in production and productivity related to low investments in the last two decades. Simultaneously to these fundamental supply and demand related changes, trading activities on commodity markets have undergone major changes with the increasing presence of financial investors, including banks, institutional investors and hedge funds. Trading volumes on commodity derivative markets and the share accounted for by financial investors have increased sharply, particularly since 2005.

This paper discusses these changes with regard to fundamental factors and commodity markets and assesses their impact on commodity prices. Further, the paper identifies implications of these developments for developing countries and policy reforms with the objective to stabilize commodity prices and mitigate the negative impacts of the commodity price boom on developing countries.

## 2. Recent Development of Commodity Prices

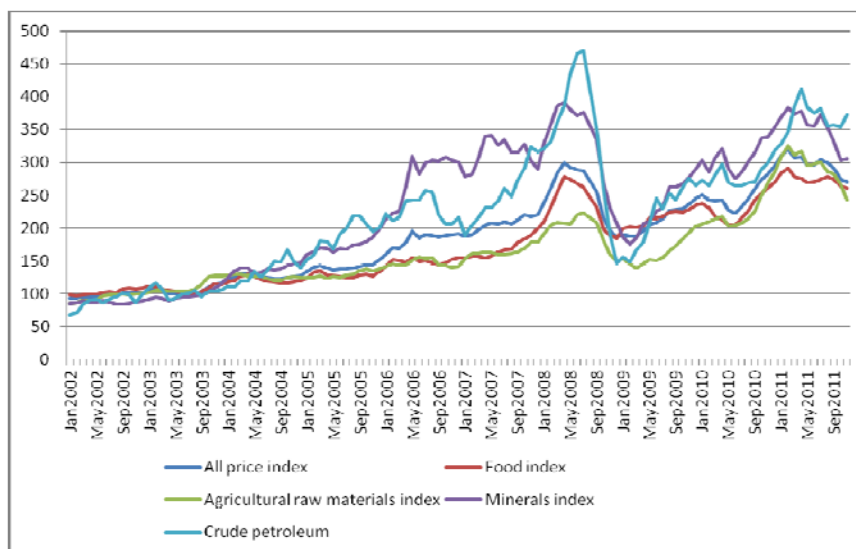
In the post-war period, primary commodity prices experienced several cycles. Prices were generally high in the 1950s in the context of the Korea war while they were low in the 1960s. In light of the two oil price shocks in the 1970s commodity prices increased again. Afterwards prices fell for the next twenty years remaining low during the 1980s and 1990s. In the late 1990s and particularly since 2002/03, many commodities have registered steep price increases culminating in a peak in mid 2008. The IMF's Commodity Price Index (CPI)<sup>1</sup> more than quadrupled in nominal terms and increased by about 50 % in real terms between 2002 and mid-2008. UNCTAD's All Price Commodity Index increased by 211 % in nominal terms for the period 2002 to mid-2008; the price of crude petroleum experienced the sharpest increase of 585 % followed by the mineral price index (335 %). Among agriculture commodities, the food price index increased by 175 % and the agricultural raw materials price index by 158 % (Figure 1).<sup>2</sup>

However, in mid-2008 prices fell sharply across commodities. Since peaking in July 2008 oil prices dropped by 68 % until end of 2008, while non-fuel prices declined by about 35 % from their peak in April 2008. Oil prices fell from over US\$140 in early July to below US\$50 in December 2008 and to US\$35-45 in February 2009. A similar dramatic fall was experienced by a number of metal prices such as nickel, zinc and copper. Grain prices recorded a fall by more than 30 % from April to December 2008. The World Bank (2009) noted that commodity prices had lost in a matter of two months in the last quarter of 2008, most of the increase of the preceding 24 months. This sharp decline in commodity prices in the second half of 2008 was one of the main transmission channels (besides the decline in export demand and the credit crunch) of the global financial crisis of 2008/09 to developing countries (Nissanke 2011).

Commodity prices stabilized in early 2009 and began to recover in the second half of 2009. In mid 2010 several commodities have bounced back to the peak levels of mid 2008 and non-fuel prices reached an all time high during summer 2011. UNCTAD's all price commodity index increased again by 43 % between January 2009 and November 2011. The price of crude petroleum experienced the sharpest price increase (140 %), followed by the minerals price index (64 %), the agricultural raw materials price index (58 %), and the food price index (31 %).

<sup>1</sup> The two most broadly used commodity price indices are the CPI of the IMF and the All Price Commodity Index of UNCTAD. For food prices the United Nations' Food and Agriculture Organisation (FAO) also publishes the Food Price Index.

<sup>2</sup> UNCTAD reports price indices for the following commodity categories: all food which includes food, tropical beverages, and vegetable oilseeds and oils; agricultural raw materials; minerals, ores and metals; and crude petroleum.

**Figure 1: Monthly nominal commodity price indices by commodity group (2002-2011)**

Source: UNCTAD Stat (2012)

Note: Free market commodity price indices; Monthly; January 2002–November 2011; Prices are in current US\$; 2000=100; Crude petroleum price is the equally weighted average of UK Brent (light), Dubai (medium) and Texas (heavy).

Two important developments can be identified in the last decade: First, nominal commodity prices have increased and remain well above their historical levels constituting a commodity price boom that has a longer duration than seen for some decades.<sup>3</sup> Besides looking at commodity prices in isolation, the relationship between commodity and manufacturer prices is crucial. In the post-war period (and also earlier at least since the 1870s), there has been a long-term trend of declining commodities-manufacturers terms of trade conceptualized in the “Prebisch-Singer thesis” (Prebisch 1950; Singer 1950).<sup>4</sup> But in the last decade the terms of trade have turned in favor of commodities as prices of commodities have risen more rapidly than those of manufacturers.<sup>5</sup> There are ongoing discussions on whether high commodity prices and the reversal of the terms of trade constitute a cyclical change as in the 1950s and 1970s or a structural shift related to permanent changes in demand for commodities and supply side constraints and in the price relations between commodities and manufacturers (Farooki/Kaplinsky 2011; Kaplan et al. 2011).

Second, commodity prices have experienced high fluctuations. High price volatility has for long been a feature of commodity prices related to specific characteristics of commodities. Although the particular reasons for commodity price volatility differ by commodity, one important common factor is low short-run elasticities of supply and demand which means that any shock in production or consumption (that are frequent for many physical commodities) translates into significant price fluctuations as demand and supply cannot adjust quickly

<sup>3</sup> However, Redrado et al. (2008) state that real prices of non-fuel commodities after accounting for world inflation were still below or at their 1960 level in 2008; real food prices dropped by 42 % between 1960 and 2008 and real metal prices just recovered their 1960 levels in 2008.

<sup>4</sup> The declining terms of trade of commodities are explained in terms of fundamental differences between commodities and manufactured goods both on the demand and the supply side such as the low price- and income-elasticities of demand for commodities as compared to manufacturers; the existence of synthetic substitutes for commodities; the technological superiority and asymmetric power relationships in favor of developed countries; the nature of technological change with higher growth rates in manufacturers; and the asymmetric division of the benefits of productivity improvements related to labor market differences (i.e. labor union power in developed countries and labor surplus in developing countries) (Prebisch 1950; Singer 1950; Maizels 1994; Nissanke 2011; Raffer/Singer 2001).

<sup>5</sup> Between 1970 and 1992 the average price of manufactures rose by 436 %. But after 1992, the price of manufactures fell for more than a decade. After 2006, the price began to rise again but at a slower pace than during the 1970s and 1980s. On a disaggregated level there are obviously different developments for different types of manufactures (Farooki/Kaplinsky 2011).



(UNCTAD 2010). For example for agriculture commodities, adverse weather conditions and pests can lead to a crop shortfall that can push up prices if the shortfall cannot be absorbed by inventories as the short-term demand elasticities are low and no supply adjustment is possible. Historical data on real commodity prices for the period 1862 to 1999 by Cashin and McDermott (2002) shows that price volatility dominates the relatively small secular decline in real commodity prices and that commodity price cycles have become more frequent with shortened duration and increased amplitude and volatility since the early 1970s. The recent boom-bust-boom cycle between 2008 and 2011 is extraordinary with regard to its short duration, amplitude and coverage of commodities (UNCTAD 2011).

### 3. Changes in Market Fundamentals

The current commodity price boom reflects profound changes in fundamental demand and supply relationships. In contrast to earlier price cycles that were primarily triggered by supply shocks of specific commodities, the recent changes are largely related to demand factors affecting a broad range of commodities (Kaplinsky 2010; Nissanke 2011). The rapid growth of China, India and other emerging countries has led to a sharp increase in their demand for commodities, particularly since the turn of the century. This rising demand has been driven by heavy investments in infrastructure, increasing urbanization, the materials utilized in manufactures, changing food consumption habits (rising demand for meat and dairy products) as incomes rise, and the growing consumption of energy (Farooki/Kaplinsky 2011).<sup>6</sup>

There are also important links between oil prices and other commodity prices through associated higher production costs (in particular for energy intensive production processes) and transport costs, and specifically between oil and agriculture prices through the use of agricultural commodities in energy production. In the context of concerns related to climate change and high oil prices governments, including the United States, the EU and Brazil, have promoted the development of biofuel production to substitute non-renewable fuels (oil) via renewable energy sources. Over the last ten years, world biofuel production has more than doubled which has led to a significant shift in acreage to the cultivation of crops that can produce biofuels and diversion of output of certain agricultural commodities to fuel production. For instance, in 2007, the United States diverted more than 30 % of its maize production, Brazil used half of its sugarcane production, and the EU used the greater part of its vegetable oil seeds production as well as imported vegetable oils for biofuel (Gosh 2010). The phenomenon of land grabbing has also an important role in this regard accelerating the diversion of land away from food production towards the production of biofuels, non-food production, or food for exports to ensure national food security in other countries.

On the supply side, there are also some common factors across commodities. Minerals, metals and oil hit supply constraints in meeting the fast growing demand due to low investments in the previous two decades and long gestation periods (Nissanke 2011; Kaplan et al. 2011). Certain hard and energy commodities, particularly fossil commodities, reached also their peak meaning that the maximum rate of global extraction was reached. In the agriculture sector, production and productivity have stagnated in many developing countries since the 1980s. This is related to soil depletion and adverse effects of climate change but also to lack of public and private investment in agriculture technology, supporting infrastructure and rural development (World Bank 2007; OECD/FAO 2009). Further, in many developing countries policies prioritized export-orientation and cash crops in the context of

<sup>6</sup> As discussed above in the context of the Prebisch-Singer thesis, commodities have generally a lower income elasticity of demand than manufacturers and services. With regard to China, India and other emerging countries the question is however at what level of incomes the demand for commodities falls off. Kaplan et al. (2011) conclude that particularly in the case of most hard and energy commodities, the income levels at which the demand elasticity falls are considerably above the current per capita incomes in China and some other high commodity consuming emerging countries.

export-led development strategies to the detriment of national food security issues (Gosh 2010). This can be also seen in the decline by half of official development aid (ODA) in the area of agriculture promotion between the 1980s and 2008 (World Bank 2008).<sup>7</sup>

## 4. Financialization of Commodity Derivative Markets

Simultaneously to these changes in market fundamentals, trading activities in commodity markets have undergone structural changes related to the increasing presence of financial investors.

### 4.1. Commodity spot and derivative markets

Commodities are traded on commodity spot and derivative markets. Transactions on both markets can be either conducted on regulated exchanges or unregulated over the counter (OTC). Spot or physical markets refer to the markets in which tangible commodities with immediate delivery are traded by actual producers and consumers, including farmers, processors and wholesalers. Commodity derivatives are contracts that give holders the right ("option") or the obligation ("future") to trade a physical commodity in the future at a given price. Commodity derivatives can be traded in derivative exchange markets (also called future markets), where these contracts are standardized as the quantity, quality and maturity dates are spelled out. The vast majority of commodity derivatives are however traded OTC which means that they are traded bilaterally between two parties outside of exchanges. These transactions are neither regulated nor standardized and risky as there is no instance that guarantees payment (TheCityUK 2011). Usually, traders on derivative markets do not physically receive commodities when the derivative contracts are due. The profit or loss of the traders (apart from the fees) arises from the price difference when the contract is made and the market price when the derivatives are due.

Commodity future markets provide two important functions for producers and consumers of commodities participating on spot markets: First, the price discovery function as trading on future markets enables the open-market discovery of prices of commodities that are used as a benchmark for spot transactions (Masters/White 2008).<sup>8</sup> Spot markets of commodities are often geographically dispersed because commodities are bulky and costly to transport and the prices in these markets can vary substantially. Centralized futures markets are accepted as the best indicator for overall supply and demand conditions across spot markets and became important in the 1980s as a pricing mechanism for particularly agriculture and energy commodities. Masters and White (2008: 27) explain: "When they say on the news that a certain commodity reached a record-high price, they are typically referring not to spot prices but instead to the nearest-to-expiration futures contract. There is not a spot market trader in any physical commodity market that is not continuously aware of what futures prices are doing." Further, there is an arbitrage link between spot and future prices as the future price should be equal to the spot price plus interest and storage costs. When there is a significant difference between futures and spot prices, market participants can enter into arbitrage transactions, which will enable them to earn risk-free profits resulting in driving futures and spot prices together (UNCTAD 2011).

<sup>7</sup> Low investments are also related to agriculture policies and subsidies in the EU and United States that led to artificially low prices and limited incentives for investments in local capacities in developing countries.

<sup>8</sup> However, the role of future markets in price setting differs for different commodities. Some products, such as rice, are largely traded on national or regional markets; others, such as wheat, are traded strongly on international markets and exchanges.

A second function of commodity future markets is the insurance function as those markets enable spot market participants to hedge against the risk of price fluctuations. As commodity prices are more volatile than other products as discussed above, the insurance against price risks has played an important role for a long time. In the 1950s and 1960s instruments such as buffer stocks and export quota in the context of International Commodity Agreements (ICAs) (e.g. for cocoa, coffee, rubber and sugar) and national commodity boards (e.g. for cotton, cocoa and coffee) had prominent roles in dealing with price risks of commodities (Nissanke 2011). But in the 1970s and 1980s such institutions were largely dismantled and commodity future markets have become the main mechanisms to manage these risks. This was an important shift from trying to address price volatility at source to reactive and market-based measures that was particularly encouraged by the World Bank (Nissanke 2011). Hedging on derivative markets can take several forms; the most important one is the purchase of futures on commodity exchanges. For instance, a producer of wheat can sell future contracts against the amount of the expected harvest which secures a certain price for wheat while a consumer of wheat can buy future contracts to secure input costs.

There exist around fifty major commodity exchanges that trade in more than ninety commodities. Trading on exchanges is however concentrated. In 2009, the top five exchanges accounted for 86 % of all contracts traded globally (TheCityUK 2011). Soft commodities are traded around the world and dominate exchange trading in Asia and Latin America. Metals are predominantly traded in London, New York, Chicago and Shanghai while energy related contracts are predominantly traded in New York, London, Tokyo and the Middle East (TheCityUK 2011). In terms of future contracts traded in 2009<sup>9</sup>, China and the UK accounted for three out of the top ten exchanges while the United States accounted for two and Japan and India for one. China and India have gained in importance in recent years with their emergence as significant commodity consumers and producers.<sup>10</sup> London, New York and Chicago remain however the main centers of commodity future trading. Table 1 shows an overview of leading commodity future exchanges for soft, hard and energy commodities.

<sup>9</sup> The number of future contracts traded is however misleading as future contracts at different exchanges may differ substantially in size. Data that rank exchanges by volume are however not broadly available (UNCTAD 2011).

<sup>10</sup> Over the last decade a number of large exchanges have opened in both countries such as the Shanghai Futures Exchange, Zhengzhou Commodity Exchange and the Dalian Commodity Exchange in China and the National Commodity and Derivatives Exchange and the Multi Commodity Exchange of India (MCX) in India.

**Table 1: Leading commodity future exchanges (2009)**

| Exchanges   | Commodities   | Importance   |
|---|---|--|
| <b>Soft commodities</b>   |   |  |
| Chicago Board of Trade (CBOT, US) (part of Chicago Mercantile Exchange (CME) Group) | Maize, soft red winter wheat – futures and options  | Leading exchange for maize and soft red winter wheat   |
| Dalian Commodity Exchange (DCE, China)  | Maize – futures   | Most important exchange for maize in Asia  |
| Intercontinental Exchange (ICE)   | US/New York: cocoa, Arabica coffee, raw sugar (no. 11) – futures and options (ICE Futures US)<br>Canada: barley – futures and options                       | Leading exchange for raw sugar and cocoa futures   |
| Kansas City Board of Trade (KCBT, US)   | Hard red winter wheat – futures and options   | Specialized exchange for wheat   |
| Minneapolis Grain Exchange (MGEX, US)   | Hard red spring wheat index (HRSI), hard red winter wheat index (HRWI), soft red winter wheat index (SRWI), national corn index (NCI) – futures and options | Leading exchange for hard red spring wheat   |
| Multi Commodity Exchange of India (MCX, India)                                      | Barley, wheat, feed maize, white sugar  |  |
| New York Mercantile Exchange (NYMEX, US) (part of CME Group)                        | Cocoa, raw sugar (no. 11) – futures   |  |
| NYSE LIFFE (part of NYSE Euronext Group)  | London: white sugar, cocoa, Robusta coffee, feed wheat – futures and options<br>Paris: milling wheat, malting barley, maize – futures and options           | European biggest exchange for soft commodities, offers a single electronic market for products listed on its Amsterdam, Brussels, London, Lisbon and Paris exchanges |
| Zhengzhou Commodity exchange (ZCE, China)   | Hard white wheat, strong gluten wheat white sugar – futures   | Largest number of contracts for white sugar but contract size is 20 % of NYSE LIFFE  |
| New York Cotton Exchange (NYCE)   | Cotton  |  |
| Mercado a Término de Buenos Aires (Argentina)                                       | Agriculture   |  |
| <b>Hard commodities</b>   |   |  |
| London Metal Exchange (LME, UK)   | Non-ferrous metals  | Leading global exchange for non-ferrous metals with a 90 % share of global trading   |
| Shanghai Futures Exchange (China)   | Non-precious metals   |  |
| Multi Commodity Exchange of India (MCX, India)                                      | Metals  |  |
| <b>Energy commodities</b>   |   |  |
| Intercontinental Exchange (ICE)   | Europe: Brent, WTI – futures and options (ICE Futures Europe)<br>OTC: crude oil (various) – swaps   | Leading exchange for Brent crude oil futures and biggest exchange for energy commodities in Europe   |
| Multi Commodity Exchange of India (MCX, India)                                      | Brent crude oil, crude oil  | Among leading exchanges for crude oil  |
| New York Mercantile Exchange (NYMEX, US) (part of CME Group)                        | WTI, Brent, others – futures and options  | Leading exchange for light sweet crude oil futures   |

Source: Extended from UNCTAD (2011) and TheCityUK (2011)

#### 4.2. Main actors on commodity derivative markets

Traditional actors on commodity derivative markets are commercial traders – actual producers and consumers of commodities that buy or sell on spot markets and try to reduce the related price risks through hedging on future markets – and non-commercial traders that do not have an underlying physical commodity position to hedge but take over the price exposure from hedgers in exchange for a risk premium and are hoping to profit from changes in futures prices. As commodity future contracts do not pay interest, rents or dividends, the only return a trader can achieve is a favorable change in the price of the contract. This is why buying future contracts without having an underlying physical position to hedge is considered speculation and not investment (Masters/White 2008). These speculators provide an essential function as they accept price risks in exchange for providing liquidity by actively trading in futures. Speculators take a view either on the basis of information based on fundamentals or through the use of more or less sophisticated trend-spotting procedures, i.e. technical trading on the basis of past trends or other more complicated price patterns (Gilbert 2008). Until recently, speculators on commodity future markets were dominated by experts of physical markets whose activities were closely linked to the fundamental supply and demand dynamics in the underlying physical markets (Masters/White 2008).

Over the last two decades and in particular since the early 2000s a third category of actors has become important on commodity future markets – financial investors, in particular banks, institutional investors and hedge funds that invest in commodities as an asset class similar to stocks, bonds and real estate assets (Gilbert 2008; UNCTAD 2009). Three factors are particularly important for the increasing involvement of financial investors (Bass 2011): First, since the late 1990s commodity prices have risen related to fundamental factors which made them an attractive investment object for financial investors that expected commodity prices to rise further. Second, the increasing involvement of financial investors is related to institutional and regulatory changes, namely the deregulation of financial markets and the emergence of new investment instruments. In the United States, the significant regulatory change occurred in 2000. While commodity future contracts existed before, they were traded on exchanges where trading was regulated by the Commodity Futures Trading Commission (CFTC) and dominated by commercial traders given the existence of position limits for non-commercial traders. In 2000, the Commodity Futures Modernization Act (CFMA) effectively deregulated commodity trading by exempting OTC trading from CFTC oversight and control and by raising, circumventing and eliminating position limits (Gosh 2010). Third, trading on commodity derivative markets are related to broader developments in financial markets as can be seen in the context of the dot-com crisis in 2000/01 and more pronounced in the global financial crisis of 2008/09 where financial investors searched for new investment opportunities given the losses and low returns in traditional investments (i.e. stock, bond and real estate markets). By trading commodity derivatives, financial investors also aimed to diversify their portfolios given the perceived low or negative correlation with returns of traditional assets such as stocks and bonds (Gorton/Rouwenhorst 2006).<sup>11 & 12</sup>

Financial investors can be divided into two main groups – those with longer-term horizons and those with short-term horizons (Mayer 2009; Farooki/Kaplinsky 2011; UNCTAD 2011). The first group consists of index investors. Index investors are institutional investors such as

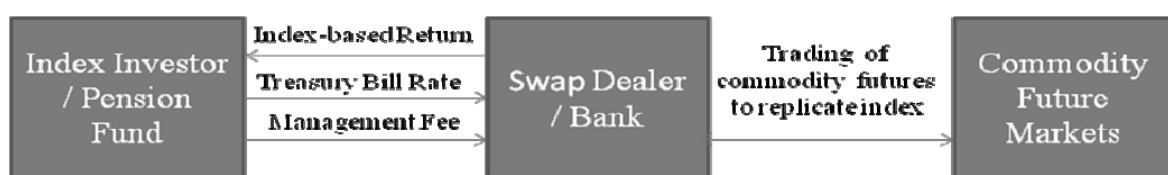
<sup>11</sup> More recently, however, Basu and Gavin (2011) did not find a negative correlation between daily equity and commodity returns which may be explained by the increasing influence of financial investors triggering the co-movement of different asset markets, including commodities (see below for a more detailed discussion).

<sup>12</sup> Commodity future contracts have been also used as a vehicle for inflation- and currency-hedging (IMF 2008; UNCTAD 2011). Contrary to equities and bonds, commodity futures have good hedging properties against inflation as their return is positively correlated with inflation as commodities such as energy and food have a strong weight in the goods baskets used for measuring price levels (Mayer 2009). As most commodities are traded in US Dollars and commodity prices in Dollar terms tend to increase as the Dollar depreciates, commodity futures provide also a good hedge against changes in the Dollar exchange rate (IMF 2008; Mayer 2009).

pension funds, sovereign wealth funds, university endowments, public and private foundations and life insurance companies that follow passive trading strategies based on the assumption that commodities have a unique risk premium and form a relatively homogenous class (Gilbert 2008; Masters/White 2008). They generally invest in commodity indexes that are composites of future contracts of a broad range of commodities. The two largest ones are the Standard & Poor's Goldman Sachs Commodity Index (S&P GSCI) that includes 24 commodities that are weighted according to their worldwide production values and the Dow Jones-Union Bank of Switzerland Commodity Index (DJ-UBSCI) that includes 19 commodities that are weighted based on worldwide production and liquidity factors.<sup>13</sup> & <sup>14</sup> Index investors invest in a broad basket of commodities without taking into account the supply and demand fundamentals of individual commodities. Their trading strategy is based on holding long forward positions and taking advantage of the long-term increase in commodity prices.

Index investors seek to replicate one of the major commodity indices by mechanically following that index's methodology (Masters/White 2008). Because commodity futures expire every one to three months, futures have to be "rolled over" from the expiring contract to the next available contract as expiry approaches. Since this rolling over requires an active involvement in the future market, most institutional investors outsource the future trading to banks. They generally enter into OTC swap agreements with a bank where the institutional investor agrees to pay the three months Treasury bill rate plus a management fee to the bank and the bank agrees to pay the return based on the price development of the index (Masters/White 2008). In this construct the bank hedges its swap exposure through an offsetting future contract on commodity exchanges. Hence, banks (or so-called swap dealers) use commodity exchanges for hedging purposes but contrary to commercial traders that hedge physical positions they hedge financial positions. The four largest swap dealers in 2008 were Goldman Sachs, Morgan Stanley, J.P. Morgan and Barclays Bank that controlled around 70 % of commodity index swaps positions (Masters/White 2008). Figure 2 shows the relationship between index investors such as pension funds, swap dealers (i.e. banks) and commodity future markets.

**Figure 2: Index investments**



Source: Adapted from Masters/White (2008: 9f)

The second group of financial investors consists of financial intermediaries with much shorter time horizons called money managers, including a range of investors, most importantly hedge funds, floor traders (i.e. individuals on the trading floor of investment firms) and institutional investors (Farooki/Kaplinisky 2011). They follow more active trading strategies and take positions on both sides of the market (long and short) which enables them to earn positive returns in rising and declining markets (Mayer 2009). Their investments are generally smaller in size compared to index investors and characterized by the frequency of their transactions seeking to take advantage of arbitrage and speculation opportunities.

<sup>13</sup> The following commodities are included in both indices: coffee, corn, cotton, soybeans, sugar, wheat, lean hogs, live cattle, WTI crude oil, heating oil, gasoline, natural gas, aluminium, nickel, zinc, copper, gold and silver; the S&P GSCI further includes cocoa, wheat KC, feed cattle, Brent crude oil, gasoil and lead; the DJ AIG further includes soybean oil.

<sup>14</sup> Other indexes include the Deutsche Bank Liquid Commodity Index (DBLCI), the DBLCI-Mean Reversion Index, Standard & Poor's Commodity Index (SPCI), and the Reuters/Jefferies CRB Index.

These investors profit from their success in forecasting future prices and often rely on computerized technical trading systems. A great variety of technical trading systems have been developed that attempt to identify and exploit price trends. Trends are identified by application of more or less sophisticated moving average procedures (Gilbert 2008; Schulmeister 2009). These technical tools may be calibrated to signals from commodity markets alone or also include signals from other asset markets (Mayer 2009). Hence, as index investors, the trading activities of money managers are not based on the supply and demand fundamentals of individual commodities.<sup>15</sup>

#### 4.3. Trading volumes on commodity derivative markets

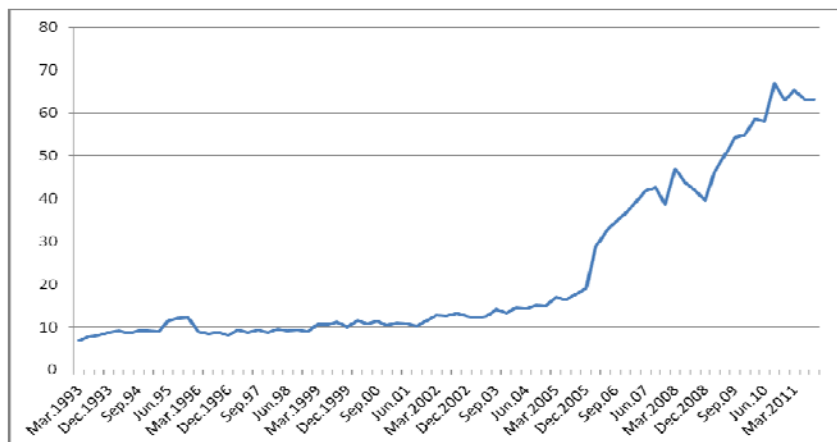
The Bank for International Settlement (BIS) is the only source that provides publicly available data on commodity market trading, including trade on officially registered commodity exchanges and OTC markets. According to BIS data, trading in both markets has increased sharply, in particular since 2005. The number of outstanding derivative contracts on commodity exchanges increased from roughly 12.7 million contracts in March 2002 to 47 million contracts in March 2008 (Figure 3). The rise in OTC commodity trading was even more pronounced – the notional value of OTC commodity derivatives<sup>16</sup> increased from US\$0.77 trillion to US\$13.23 trillion in the same period (Figure 4). In the second half of 2008 trading activities on both markets fell however sharply related to changing market sentiments. In 2007 and the first half of 2008, financial investors fled from equity, bond and real estate markets to commodity future markets as commodities were perceived as relatively safe assets (Schulmeister 2009). However, as the financial crisis emerged and uncertainty increased, investments in commodities became also too risky and financial investors fled into the “safe haven” of government bonds (Nissanke 2011). A massive liquidation of long positions in commodity future markets and OTC trade were the results. Trading on commodity exchanges has picked up again strongly since early 2009 while OTC commodity trade has continued to fall which is likely to be related to a risk reduction of investors following the five-fold increase in values outstanding in the previous three years (TheCityUK 2011). OTC trade however still accounts for the overwhelming majority of overall commodity derivative trade.

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<sup>15</sup> A newer phenomenon is the involvement of financial investors in commodity spot markets by buying and accumulating inventories of physical commodities. This strategy used to be confined to precious metals such as gold and silver as it is more difficult and involves higher costs to store other types of commodities but has recently also extended to other commodities. For example, in 2009, Goldman Sachs, Barclays and JP Morgan reportedly controlled physical commodities worth £16 billion which is more than three times the amount they controlled in 2008 (TheCityUK 2011). This strategy is also related to new regulations that demand position limits for non-commercial actors that do not hold physical commodities. Some financial investors try to circumvent this regulation by engaging in physical commodity trading (see below for a more detailed discussion).

<sup>16</sup> Notional amount refers to the value of the underlying commodity.

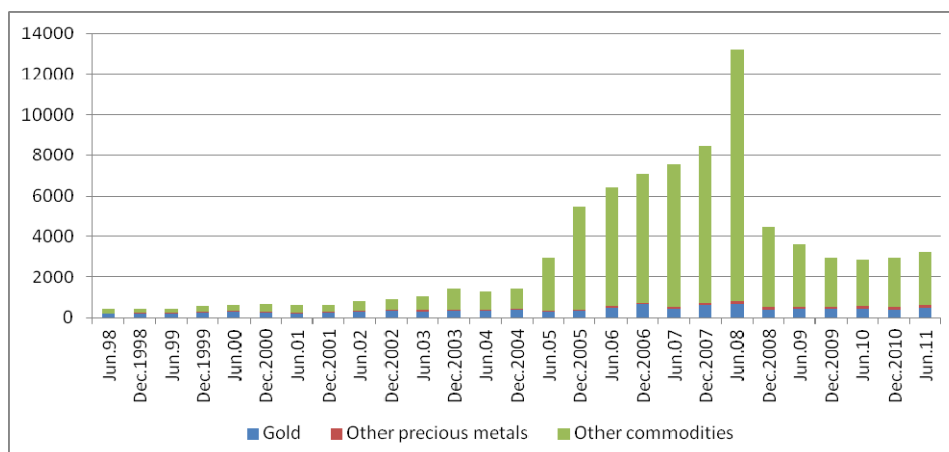
**Figure 3: Futures and options contracts outstanding on commodity exchanges (1993-2011)**



Source: BIS, Quarterly Review, December 2011, Table 23B.

Note: Derivative financial instruments traded on organized exchanges; March 1993-September 2011; Quarterly data; Number of contracts in millions.

**Figure 4: Notional amount of outstanding OTC commodity derivatives (1998-2011)**

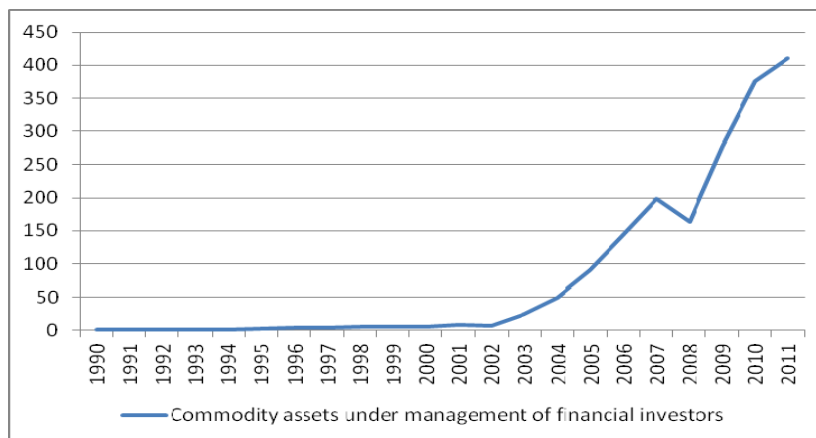


Source: BIS, Quarterly Review, December 2011, Table 22A.

Note: Amounts outstanding of OTC equity-linked and commodity derivatives; June 1998-June 2011; Half-year data; US\$ billions.

Barclays Capital reports data on the value of commodity assets under management of financial investors in commodity exchanges. Investments by financial investors increased from US\$13 billion at the end of 2003 to roughly US\$260 billion in mid 2008 constituting about a quarter to a third of the notional amounts of commodity futures. After a dip in 2008, investments almost doubled in 2009 and reached an historic high in March 2011 accounting for around US\$410 billion (Figure 5). While index investors accounted for 65-85 % of the total between 2005 and 2007, their relative importance fell to around 45 % in 2008 (despite a sharp increase in their absolute value from US\$75 billion in 2005 to US\$175 billion in the first quarter of 2011). This shift highlights the increasing importance of money managers (UNCTAD 2011).



**Figure 5: Commodity assets under management of financial investors (1990-2011)**

Source: Barclays Capital, The Commodity Investor, various issues.

Note: Year end with the exception of 2011 where data is from March; US\$ billions.

The CFTC – the institution that oversees commodity future trading in the United States – publishes in its weekly Commitment of Traders (COT) reports trading positions for commercial and non-commercial traders. In contrast to non-commercial traders, commercial traders are defined as traders that hedge an existing exposure, including physical and financial exposures. Index investments are therefore largely classified as commercial as swap dealers trade in commodity futures to offset financial positions. To take into account the increasing importance of index investors, the CFTC started in 2007 to report supplementary data on positions of commodity index traders (CIT) for twelve agriculture future markets<sup>17</sup> in its Supplementary Commodity Index Traders reports (CIT reports) (CFTC 2006).<sup>18</sup> The CFTC estimates the notional value of positions held by CITs to be US\$146 billion at the end of 2007 which rose to \$200 billion in June 2008 (CFTC 2008). Index-based investments accounted for between 20 and above 60 % of total long open interest positions in important U.S. future markets in mid 2008. On average, index investors accounted for 6.5 % of all long open interest positions in commodity future markets in 1998 which sharply increased to 40.9 % in 2008 (Table 2).<sup>19</sup>

<sup>17</sup> These twelve commodities are: feeder cattle, live cattle, cocoa, coffee, cotton, lean hogs, maize, soybeans, soybean oil, sugar, Chicago wheat and Kansas wheat. There is no similar data reported for hard and energy commodities as contrary to agricultural commodities where there is nearly a one to one relations between swap dealers and index investors as the dealers execute orders of index investors, this is not the case for hard and energy commodities where swap dealers are also involved in physical markets. For example for energy commodities, only about 40 % of swap dealer activity represents index investors (Frenk 2010).

<sup>18</sup> CIT positions include both pension funds, previously classified as non-commercial traders, and swap dealers, that had been classified as commercial traders.

<sup>19</sup> In 2009, CFTC started to publish more disaggregated data for five trader categories in its Disaggregated Commitment of Traders (DCOT) reports that provide weekly data for the twelve agricultural commodities from the CIT reports plus a range of energy and metal commodities distinguishing between producers, merchants, processors and users (PMPU), swap dealers, money managers, other reporting traders, and non-reporting traders (CMTC 2009). The index trader category of the CIT reports does not directly coincide with the swap dealer category in the DCOT reports because the swap dealer category of the DCOT reports includes also swap dealer that do not have index-related positions and the index trade category of the CIT reports includes also pension and other investment funds that place index investments directly (and not through swap dealers) into future markets (UNCTAD 2011).

**Table 2: Long open interest of different traders in commodity future markets (1998 and 2008)**

|                | 1998             |                         |                   | 2008             |                         |                   |
|----------------|------------------|-------------------------|-------------------|------------------|-------------------------|-------------------|
|                | Physical Hedgers | Traditional Speculators | Index Speculators | Physical Hedgers | Traditional Speculators | Index Speculators |
| <b>Average</b> | <b>77,3</b>      | <b>16,2</b>             | <b>6,5</b>        | <b>31,3</b>      | <b>27,8</b>             | <b>40,9</b>       |
| Lean Hogs      | 56,6             | 27,6                    | 15,8              | 13,6             | 19,1                    | 67,3              |
| Wheat          | 67,5             | 21,3                    | 11,3              | 15,9             | 18,2                    | 65,9              |
| Live Cattle    | 67,6             | 23,8                    | 8,6               | 11,7             | 27,3                    | 61                |
| Heating Oil    | 87,7             | 2                       | 10,2              | 36,5             | 14                      | 49,5              |
| Sugar          | 87,2             | 9,4                     | 3,4               | 36               | 17,4                    | 46,5              |
| Soybeans       | 86,6             | 11                      | 2,4               | 28,5             | 28,2                    | 43,3              |
| Coffee         | 80,6             | 17,7                    | 1,7               | 28,7             | 29,6                    | 41,7              |
| Cotton         | 84,4             | 13,5                    | 2,2               | 36,3             | 22,6                    | 41,1              |
| Unleaded Gas   | 80               | 4,3                     | 15,7              | 36,5             | 23,4                    | 40                |
| Feed Cattle    | 52,4             | 37,3                    | 10,3              | 17               | 45,2                    | 37,8              |
| Corn           | 87,2             | 8,5                     | 4,4               | 40,6             | 22,5                    | 36,8              |
| Soybean Oil    | 72,7             | 27,3                    | 0                 | 45,5             | 19,8                    | 34,8              |
| Wheat KC       | 86,3             | 5,4                     | 8,3               | 38,1             | 27,6                    | 34,2              |
| Silver         | 40,7             | 59                      | 0,4               | 24,2             | 44,1                    | 31,7              |
| Natural Gas    | 90               | 3                       | 7                 | 58,3             | 12,7                    | 29                |
| WTI Crude Oil  | 84,1             | 3,5                     | 12,4              | 42,5             | 28,6                    | 28,8              |
| Gold           | 90,1             | 8,5                     | 1,3               | 19,8             | 54,5                    | 25,7              |
| Cocoa          | 89,3             | 9,2                     | 1,5               | 34,4             | 44,7                    | 20,9              |

Source: CFTC Commitments of Traders CIT Supplement, c.f. Master/White (2008: 34)

Note: Physical hedgers are equivalent to commercial traders; Annual averages with the exception of 2008 where the average until June 2008 is reported.

## 5. The Impact of Financial Investors on Commodity Price Dynamics

In spite of the extent and the important implications of current commodity price dynamics, there is no consensus about the causes of these developments and how the increasing presence of financial investors has impacted on commodity prices. The discussion involves a theoretical debate about how futures markets work and if speculation can move future prices and trigger speculative bubbles and an empirical debate about the factors behind the recent price developments.

### 5.1. Theoretical discussion

Theoretically, there are diverging explanations of the link between financial investors and commodity price developments that can be broadly categorized in the “fundamentals hypothesis” and the “financialization hypothesis” (Schulmeister 2009).<sup>20</sup> In both hypotheses the role of information flows is crucial and both assume that fundamental factors that

<sup>20</sup> These two hypotheses are based on the “fundamentalist hypothesis” and the “bull-bear hypothesis” developed in Schulmeister (2009).

influence the demand and supply of physical commodities influence commodity prices. The difference between the two hypotheses is based on the additional impact of financial investors and their trading strategies on accelerating price movements and volatility.

The fundamentals hypothesis assumes that commodity prices are determined almost exclusively by fundamental factors as traders in commodity future markets build their expectations according to the future development of supply and demand conditions in the underlying spot markets. This hypothesis is based on the efficient market hypothesis that assumes that markets are efficient in absorbing and processing instantaneously information regarding market fundamentals and that therefore prices in a freely operating market perfectly incorporate all relevant fundamental information. Due to the predominance of rational market participants it is assumed that uninformed speculation cannot distort commodity prices in any systematic and/or persistent way. If uninformed speculation should drive market prices away from fundamentally-determined levels, informed traders will take advantage of the profitable trading opportunity with the result that prices will return to their fundamental values.

The financialization hypothesis assumes that in addition to fundamental factors also non-fundamental factors exert a substantial influence on commodity prices as price dynamics are driven by the expectations, behavior and interactions of heterogeneous traders, including informed traders, noise traders and uninformed traders. Informed traders are interested in physical markets and use derivatives for hedging. Noise traders make decisions in commodity derivative markets based on developments in other asset markets as part of their portfolio decisions (including index investors or money managers that calibrate their technical tools to signals from other asset markets). Uninformed traders typically apply statistical techniques on price trends instead of basing their decision on information about market fundamentals of physical markets (including money managers that calibrate their technical tools to signals from commodity markets). These traders may misinterpret certain information as genuine price signals and by incorporating these signals into their trading strategy, perpetuate the “informational” value of these signals across the market (Mayer 2009). Given that traders often use similar trend-following trading techniques, this can lead to herd behavior as “collectively they may generate the trends that they individually identify and follow” (UNCTAD 2009: 26). Thus, noise and uninformed trading combined with herd behavior can increase short-term price volatility and lead to an overshooting of prices. In this context, acting against the trend, even if justified by information on fundamentals, can be irrational leading to complex interrelations among different types of traders (UNCTAD 2011). Hence, according to the financialization hypothesis whether commodity markets function efficiently depends on their microstructures; whether markets are dominated by informed traders or by noise and uninformed traders.<sup>21</sup>

Another argument against the fundamental hypothesis is stated in the “weight of money hypothesis” that argues that individual market participants may make position changes that are so large relative to the size of the market that they move prices temporarily or even persistently (Mayer 2009; UNCTAD 2009, 2011). The number of counterparties in commodity future markets (especially those with an interest in physical commodities) and the size of their positions are less than perfectly price elastic. In this context, large orders may face short-term liquidity constraints and cause significant price shifts. The weight-of-money effect

<sup>21</sup> As the U.S. hedge fund manager Michael W. Masters and the financial analyst Adam White state (Masters/White 2008: 31): “In a market that is dominated by speculators and not by physical hedgers, traditional speculators’ trading is not necessarily disciplined by traditional supply and demand considerations because the “enforcers” of supply and demand, the physical hedgers, are no longer wielding the influence over prices that they once were. In this scenario, speculators that see prices rising for any reason at all (it does not have to be based on fundamental supply and demand, although it could be) will want to jump on the bandwagon and profit too. There are many trading strategies, such as trend-following and momentum investing that encourage exactly this type of trading.”

relates primarily to index investors that generally take very large positions in one side of the market.

Another hypothesis that can be related to the financialization hypothesis is the “excess co-movement hypothesis” that focuses on the co-movement of prices in different commodity markets on the one side and in commodity and financial asset markets on the other side. With regard to the relationship of different commodity prices, the hypothesis asks whether the co-movement in commodity prices can be explained in terms of demand-supply relationships in physical markets that are subject to common fundamental or macroeconomic developments. Co-movements can be excessive if they are above what can be explained by such common developments. In the context of the increased importance of financial investors, co-movements of commodity prices and financial asset prices have also become relevant. Traditionally, investments into commodities were seen as a possibility to diversify portfolios given the low or negative correlation of commodity prices with returns of traditional assets such as stocks and bonds (Gorton/Rouwenhorst 2006). More recently, however, this negative correlation between commodity and financial asset returns has not been confirmed (Basu/Gavin 2011). This may be explained by the increasing influence of financial investors which makes commodity prices exposed to swings in market sentiments in asset markets in general (Nissanke 2011).

## 5.2. Empirical studies

It is not straightforward to assess the role of fundamental factors versus financial investors in determining commodity prices empirically due to the difficulty to disentangle fundamental from non-fundamental factors as commodity prices are determined on the basis of expectation formation by heterogeneous market participants (UNCTAD 2011). Methodologically, studies on the determinants of commodity prices use generally descriptive data and regression-based analysis and tend to focus either on fundamental supply and demand factors or variables that reflect the financialization of commodity markets in explaining and estimating price dynamics; few also include both fundamental and financial variables. A common way to test for the financialization and weight of money hypotheses is the use of Granger causality tests that examine causal lead and lag dynamics between changes in positions of financial investors and commodity prices. To test the excessive co-movement hypothesis, the correlation between prices in different asset markets that should be uncorrelated are assessed, in particular the cross-market correlation between currency, stock and commodity markets.

Empirical studies come to different conclusions stating that financial investors have either no impact on future prices that are solely determined by fundamental factors (e.g. Irwin/Sanders 2010; Sanders/Irwin 2010) or that they have moderate up to considerable impact on future as well as spot prices (e.g. Gilbert 2008, 2010; Mayer 2009; Schulmeister 2009; Lescaroux 2009; Tang/Xiong 2010; Silvennoinen/Thorp 2010; Masters/White 2008). Before 2009, empirical studies generally reported no systematic impact of financial investors on commodity prices. However, more recently there seems to be a convergence towards the opinion that financial investors and their trading strategies have affected commodity price developments in the last decade and particularly in the period 2008-09 in addition to fundamental factors. Disagreement prevails however on the precise role of financial investors and the extent of their influence in commodity price formation.

International institutions have also had different views on the role of financial investors in determining commodity prices that are most prominently represented by the World Bank and IMF on the one side and the UNCTAD on the other side. A special study on commodity markets by the World Bank (2009) or periodical analyses on commodity price developments reported in the World Economic Outlook by the IMF (e.g. IMF 2009) interpret price dynamics

basically in terms of fundamental demand and supply developments and do not consider the effects of financial investors. In contrast, UNCTAD (e.g. 2008, 2009, 2011) supports the financialization hypothesis stating that financial investors and their trading strategies can have sizable impacts on commodity prices. The World Bank has more recently at least partly changed its view. In a recent working paper (that does, however, not necessarily represent the view of the World Bank), the influence of financial investors on prices is recognized: “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 economies had any effect on world prices.” (Baffes/Haniotis 2010: 20)

Commodity future market traders generally agree that their trading activities have an effect on price developments as can be seen in the following quotes from recent research reports that are cited by Henn (2011): 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”. The Citigroup stated in April 2008: “Despite the economic gloom many commodity prices hit new highs in recent weeks, driven largely by investment inflows.” Greenwich Associates stated in May 2008: “The entry of new financial or speculative investors into global commodities markets is fuelling the dramatic run-up in prices.” Goldman Sachs also in May 2008: “Without question increased fund flow into commodities has boosted prices.” Lehman Brothers also in May 2008: “We have argued recently that some of the price buoyancy during Q1 reflected financial flows and investments in oil and other commodities. (...) Our study indicated that for every \$100 million in new inflows, WTI prices increase by 1.6 %. (...) Our conclusion for this study is that we are seeing the classic ingredients of an asset bubble.” The investment bank Merrill Lynch estimated that commodity prices had increased by 50 % through speculation. One of the most well-known speculators, George Soros, commented: “You have a generalized commodity bubble due to commodities having become an asset class that institutions use to an increasing extent.”

### 5.3. General conclusions

The following general conclusions can be identified with regard to the role of fundamental factors and financial investors in influencing recent commodity price developments:

- The prices of many commodities across all categories have moved largely in tandem in the last decade – a steep increase in prices started in 2002 and particularly in 2005 reaching historical heights in mid 2008 followed by a steep price decline in the second half of 2008 and a rebound since mid 2009. These developments coincide with major shifts in commodity market fundamentals but the co-movement in prices across this wide range of commodities makes an explanation that is solely based on fundamental supply and demand factors questionable.
- Although there are common fundamental (particularly demand-side) and macroeconomic developments that have affected all commodities, commodity-specific demand and supply related developments have not always been consistent with this strong co-movement. Data with regard to supply (production and inventories) and demand (consumption) conditions in physical markets for different commodities cannot alone explain the price developments and particularly the large fluctuations experienced in the last decade. For example, during the sharp increase in oil prices between 2005 and mid 2008, worldwide inventories and the supply of oil were increasing and demand stagnating and later decreasing (Schulmeister 2009; Frenk 2010).

- An explanation solely based on fundamental demand and supply factors can also not explain why the fundamental factors that explained the rise in prices until mid 2008 have suddenly reversed and contributed to a deep decline in prices in the second half of 2008. Most of the factors which were cited as price drivers before mid 2008 such as high demand and changing consumption patterns in emerging countries and biofuels have continued to exist after mid 2008.
- Recent commodity price developments can only be understood by taking into account the mechanisms of commodity derivative markets. Trading volumes on commodity derivative markets – exchanges and OTC – have increased sharply, particularly since 2005. It seems rather implausible that fundamentals-oriented trading related to price discovery or hedging processes would have led to such a sharp increase in trading (Schulmeister 2009). The increase in trading is accounted for by financial investors that see commodities as an asset class. The number of counterparties with an interest in physical commodities and the size of their positions have become small relative to the size of the position of financial investors in many commodity future markets.
- The activities and trading strategies of financial investors are not based on information on market fundamentals and may drive commodity prices away from levels justified by market fundamentals. The parallel development of financial investment in commodity future markets and commodity prices is an indicator for the role of speculative activity in driving commodity prices first up until mid 2008, then down in the second half of 2008, and then up again. As Masters and White (2008) show with regard to index investors, the price of every single one of the 25 commodities which make up the two most important commodity indices – the S&P GSCI and the DJ-UBSCI – rose substantially, by an average of more than 200 % from July 2003 to July 2008.
- Commodity prices and the returns of financial assets such as stocks and bonds traditionally had low or negative correlation but these prices have become positively correlated in the last decade (Basu/Gavin 2011). High correlation between different asset markets that should be uncorrelated may point to participants reacting to the same information or news unrelated to the fundamentals in the specific markets.

## 6. Implications for Developing Countries

Price dynamics of commodities have important implications for developing countries, in particular for commodity-dependent LICs. The most direct impacts of global commodity prices are through trade on the import and export side and related macroeconomic effects. High and volatile commodity prices have led to profound challenges for developing countries that are dependent on basic commodities such as food and fuel on the import side. Two-thirds of developing countries are net importers of basic food commodities, but even in developing countries where imports only account for a small share of the total food consumption, global commodity prices tend to have an important impact on local markets and prices (Bass 2011). The FAO (2008) estimates that food costs of least developed countries (LDCs) in 2008 increased by 37-40 % after having already risen by 30-37 % in 2007.<sup>22</sup> The impact of high and volatile import prices has been most dramatically reflected in food crisis and social and political unrest in a diverse range of countries with important impacts on poverty, economic stability and social and economic development. The FAO (2008) estimates that 33 countries experienced severe or moderate food crises in 2008.<sup>23</sup>

<sup>22</sup> In an industrial country the portion of expenditure for food in a typical household budget amounts to 10-20 % whereas it is between 60-80 % in a LDC (FAO 2008).

<sup>23</sup> As a result of the increases in food and fuel prices in 2007-08, the World Bank (2009) estimates that the number of people in extreme poverty rose by 130 to 150 million and FAO (2008) estimates that at least 40 million people were driven into hunger.

The current commodity price boom has questioned the pessimistic perception on commodity-based development related to the secular fall in terms of trade and may provide new opportunities on the export side (e.g. Farooki/Kaplinisky 2011; Kaplan et al. 2011). The persistence of commodity dependency remains an important characteristic of many developing countries, in particular in SSA.<sup>24</sup> The commodity price boom has benefited LICs as well as resource-rich middle-income countries where growth rates in the last decade have been driven by commodity exports and increased investment in resource extraction and production, in particular from emerging countries, most importantly China. Besides the direct impact of high commodity prices on export earnings and public revenues that can be used in productive and development-enhancing ways, a crucial factor that determines the broader development impact of commodity-based exports is the extent of local value added and linkages to the local economy (Hirschman 1981; Kaplan et al. 2011). Despite these new opportunities, there remain significant dangers of commodity based development related to often very problematic labor and environmental conditions and the capital-intensive nature of many commodity sectors which limits employment and the distribution of gains and facilitates the development of enclave economies.<sup>25</sup>

High and volatile import and export prices impact on macroeconomic indicators, in particular the balance of payments, public finances, inflation and the exchange rate. Deteriorating current accounts and public finances related to high commodity import prices may impose constraints on fiscal policy. In the absence of alternative financial facilities countries may be forced into pro-cyclical policies. Further, as many developing countries pursue inflation targeting, high commodity prices may force central banks to use restrictive monetary policies to counteract inflationary pressures.<sup>26</sup> The high volatility of commodity prices may make macroeconomic management even more difficult and further limit possibilities for counter-cyclical fiscal and monetary interventions. The current high price volatility has also highlighted the vulnerability of commodity-dependent export-strategies to price shocks emanated from global commodity markets and associated difficulties in managing economies (Nissanke 2011). Further, commodity exports may undermine industrial development through its appreciating effects on currencies as is discussed under the “Dutch disease” phenomena.

Another crucial implication of the recent developments in commodity derivative markets and the increasing presence of financial investors relates to whether commodity derivative markets still fulfill their fundamental functions for producers and consumers of physical commodities. Physical commodity producers and consumers rely upon the price discovery function to accurately reflect fundamental supply and demand conditions and upon the insurance function to eliminate price risks in the absence of other price stabilization mechanisms. The financialization of commodity future markets has however made the functioning of commodity derivative markets controversial. Their traditional functions are impaired to the extent that trading by financial investors has increased price volatility and has driven prices away from fundamentals (UNCTAD 2011). If prices in commodity future markets are not only determined by fundamental supply and demand conditions, they provide unreliable, misleading and wrong price signals to producers and consumers of commodities and may trigger reactions that are not justified by fundamental supply and demand conditions. This leads to a greater insecurity about the reliability of future market signals with respect to making storage, production and investment decisions (Nissanke 2011).

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<sup>24</sup> In Africa 34 countries are dependent on three or less commodities and 23 countries are dependent on a single commodity for more than 50 % of total export earnings (UNCTAD 2008).

<sup>25</sup> High commodity-related revenues say nothing about the distribution of revenues between transnational mining and agro-business companies or intermediaries, local firms or farmers, and the government and about the use of these revenues in a development-enhancing way.

<sup>26</sup> For instance, rising commodity prices have played a role in the tightening of monetary policy in China and India since early 2010 and in the interest rate hike by the European Central Bank (ECB) in April 2011 (UNCTAD 2011).

If future prices do not correlate with spot prices it becomes also impossible to hedge effectively (Masters/White 2008). The greater the divergence between spot and future prices the harder it is to use futures for hedging as losses in one market cannot be effectively offset by gains in the other. But even if future prices correlate with spot prices and may still function for hedging purposes, the costs of hedging have increased as hedging against price risks has become more complex and expensive in the last decade, in particular for small producers and consumers in developing countries. High transaction and financial costs, skewed access to information and high technical barriers make it hard to popularize these instruments. Most hedging instruments are furthermore limited to maturities of less than three months (as the risk premium becomes very large for longer maturities) which is too short for many physical traders (Nissanke 2011). Hence, derivative markets have become increasingly complex, costly and imperfect in providing physical traders with efficient means for ensuring against price volatility (Nissanke 2011).<sup>27</sup>

## 7. Regulation of Commodity Derivative Markets

Politically, a relatively broad consensus has developed against “excessive speculation” on commodity derivative markets as reflected in the agendas of the last G20 meetings and the call for certain restrictions on commodity derivative trading. In the context of the G20, especially the French President Sarkozy made the topic a priority and in the final declaration of the summit in Cannes in November 2011 some measures were recommended to improve the functioning of agricultural futures trading, including the possibility to set position limits (Weed 2012). Also the Mexican G20 Presidency took the topic on the agenda. The process is however slow and no concrete steps have been taken at the international level.

In the United States where still the largest share of commodity future trading takes place, CFTC is in charge of supervising and regulating commodity markets. Limits on the size of speculators’ positions have existed since 1936 on U.S. commodity derivative markets to prevent excessive speculation (as stipulated in the Commodity Exchange Act (CEA)) (Masters/White 2008). These speculative position limits were, however, gradually raised, circumvented or eliminated starting in 1991 and particularly in 2000 with the CFMA. Since then the involvement of financial investors has been facilitated and particularly OTC trade was effectively deregulated by exempting it from CFTC oversight and control. Position limits still exist in commodity exchanges (in contrast to OTC trade) but only for non-commercial traders. Swap dealers that trade derivatives in the OTC market and “hedge” these financial positions on future markets are, however, classified as commercial traders and have been provided the same virtually unlimited access to future markets than physical hedgers (which is called the “swap dealer loophole”). In the context of the financial crisis of 2008/09 and large commodity price fluctuations, the regulation of commodity markets was adapted in the Dodd Frank Act that was approved in July 2010. The act includes important regulations such as an increase in transparency through higher reporting standards in future and OTC trading, the strengthening of position limits without exemptions for financial investors (hence closing the “swap dealer loophole”), and prevention of own account trading.

In the EU reforms are currently debated in the context of the revision of its regulations for financial instruments, i.e. the Markets in Financial Instruments Directive (MiFID) that covers all kinds of financial instruments, including commodity derivatives. After a long period of internal discussions, the European Commission (EC) released proposals for a revision of

<sup>27</sup> Masters and White (2008: 36) state: “Because of this disassociation between futures prices and the supply and demand realities in the physical markets, the commodities futures markets are no longer able to serve the only constituency they were ever intended to serve: bona fide physical hedgers. (...) If this trend continues, we can expect to see many physical commodity producers and consumers abandon the futures markets entirely as a vehicle for hedging purposes and price discovery. At that point, the futures markets’ destruction from excessive speculation will be complete.”



MiFID and for a new regulation on the same issue, the Markets in Financial Instruments Regulation (MiFIR), in October 2011. The European Parliament and the European Council (exactly the ECOFIN) will decide about the revisions related to MiFID and MiFIR. The revision process will extend at least until autumn 2012 and likely until 2013 (Weed 2011). The EC-proposal includes creating new trading platforms and requires that OTC trade is limited and fulfills transparency and capital requirements. Real-time reporting by traders to the platforms and a weekly report by trading platforms with a “complete breakdown of the positions” for the “different categories of traders” is proposed. Trading platforms should further have the possibility to set position limits, i.e. “limits on the number of contracts” which any trader “can enter into over a specified period of time” (Weed 2012). These proposals are broadly seen as an important first but insufficient step to act against excessive speculation in commodity derivative markets as OTC trading is not severely restricted and brought back on regulated exchanges, the position limits proposed are too weak, and there is no strong regulation of specific investment forms, in particular index investments, hedge funds and high frequency trading.

To stabilize commodity prices and mitigate the negative impacts of the commodity price boom on developing countries, further reforms are therefore required. In a first step, it is necessary to secure the functioning of commodity derivative markets so that they fulfill their role of providing reliable price signals and risk hedging functions to producers and consumers of physical commodities and contribute to a stable global environment for economic development. For this re-regulation of commodity derivative markets is necessary. Regulation has to find a balance between overly restrictive limitations on speculative position holdings which could impair market liquidity and the current overly lax surveillance and regulation (UNCTAD 2009). Regulation has to effectively reduce speculation and the role of financial investors on commodity derivative markets.

The following policies would be required:<sup>28</sup>

- **Reduction of OTC trade:** The sharp increase in largely unregulated OTC trade has increased risks and reduced the control and regulation of commodity derivative trade. As far as possible, trading should take place on regulated, transparent and public commodity exchanges and not on OTC markets. The large majority of OTC transactions should be brought back to commodity exchanges. In cases where OTC trading is necessary there should be reporting and high security requirements in the form of capital requirements.
- **Increased transparency with respect to fundamentals:** Although, a variety of sources of information on commodity production, consumption and inventories exists, there is substantial uncertainty in terms of data quality and timeliness, particularly with respect to inventories as a significant proportion of stocks is held privately (UNCTAD 2011). The availability of up to date and reliable information on commodity supply, demand and inventories is essential for the formation of accurate price expectation and the functioning of commodity markets.
- **Increased transparency on commodity exchanges and OTC markets:** Information should be made publicly available with regard to disaggregated positions of different categories of traders on commodity derivative markets. In Europe, there is generally a greater lack of transparency than in the United States. The adoption of real time

<sup>28</sup> Regulation of commodity derivative markets has to be embedded in broader regulations of financial markets and bank supervision. Reforms would not be complete without an assessment and understanding of how the recent developments in commodity markets and financial markets have interacted to exacerbate price fluctuations and the instability in the global economy (Nissanke 2011).

reporting and the publication of public reports similar to that of the CFTC are important steps – but not only for exchanges as in the United States but also for OTC trading. This data is a precondition for public debates and effective regulation.

- **Introduction of position limits for traders and categories of traders:** To prevent excessive speculation position limits for non-commercial traders on exchanges and OTC markets are imperative. Ann Berg, director at the Chicago Board of Trade, explains this as follows: „(...) Over 150 years of futures trading history demonstrates that position limits are necessary in commodities of finite supply to curb excessive speculation and hoarding.” (c.f. Oxfam Deutschland/Weed 2012: 2) Establishing meaningful speculative position limits that apply to all exchange trading and to OTC transactions are necessary to ensure that physical hedgers dominate in commodity trading. This should not only include position limits for individual traders that can be circumvented but also aggregated position limits for categories of traders such as index investors, pension funds and hedge funds. This makes it possible to set aggregate and differential position limits for certain categories of traders. Position limits should not be set on individual exchanges or trading platforms but at the national and ideally also regional and global level by regulatory authorities.
- **Introduction of a multi-tier transaction tax on commodity derivative trading:** To reduce speculative trading activities and stabilize prices a multi-tier transaction tax that was originally discussed in the context of foreign exchange markets is also a very useful instrument for commodity derivative markets (Spahn 1996; Schulmeister et al. 2008). Nissanke (2011) proposes this scheme in the context of commodity future markets. Under a two tier tax system the first tax rate would be set at a small rate comparable to the financial transaction tax (FTT) of around 0.01 to 0.1 %.<sup>29</sup> Once prices leave a certain dynamic price band, a significantly higher second tier tax rate would kick in of between 50 to 100 % and would thus bring the price back within the band. The tax rates and the bandwidth could be adapted to the fundamental market conditions of different commodity markets. Such a tax based price control system would allow price adjustments but large short-term fluctuations would be prevented. The small tax rate would in particular affect and reduce high frequency trading as the tax accrues for each transaction.
- **Creation of a Global Intelligence Unit:** A Global Intelligence Unit in the context of the United Nations would have a central function as a global oversight authority that oversees commodity derivative markets and trading at the global level and coordinates regulations at the national level. Given the global character of commodity derivative trading and that some contracts involve the jurisdiction of regulatory authorities in different countries, cooperation between national regulatory authorities would be necessary. In a further step the Global Intelligence Unit could propose a step-wise harmonization of national regulations or at least global minimum standards. The end goal would be a global oversight authority with certain regulatory competencies.

<sup>29</sup> A tax at such a small rate would already reduce "excessive liquidity" stemming from very short-term oriented and destabilizing transactions. "There are two reasons for this presumption. First, a FTT makes trading the more costly the shorter its time horizon is (e. g., technical trading based on intraday data). Second, a FTT will dampen specifically derivatives trading since the tax rate refers to contract value (e. g., the effective tax on the margin "invested" is by the leverage factor higher than the tax relative to the value of the transaction). For the same reasons, derivatives transactions for hedging purposes as well as "real-world-transactions" (spot) would hardly be affected by a low FTT between 0.1 % and 0.01 %." (Schulmeister 2009: 4)

In addition to the regulation of commodity derivative markets, broader reforms will be necessary that go beyond the re-regulation of derivative trading to stabilize commodity prices, reduce commodity dependency, and secure and increase the potential development effects of commodity production and exports. In particular mechanisms to effectively manage physical inventories at the national and international level are crucial for avoiding extreme price volatility. Further, the creation of insurance instruments beyond derivative markets would be required as they have not provided effective insurance particularly for small producer and consumers in developing countries due to the high costs and complexity involved. Broader agricultural and industrial development strategies are also crucial with the objective to reduce commodity import- and export dependency, secure food sovereignty, diversify economies and ensure sustainable local commodity production and broader development effects.

## 8. Conclusions

There have been important structural changes in fundamental supply and demand conditions across physical commodity markets related particularly to increasing demand from highly growing emerging countries, alternative uses of commodities for energy production, and a reduction in supply due to supply constraints and low productivity. However, these factors alone are not sufficient to explain recent commodity price developments, particularly the large fluctuations between 2008 and 2011. Simultaneously to fundamental changes, trading activities on commodity derivative markets have undergone a major shift related to the increasing presence of financial investors since the early 2000s. Despite commodity-specific differences, the increasing presence of financial investors has affected the microstructure of commodity derivative markets, the behavior of actors in these markets and price dynamics. Generally, the interactions between commodity derivative markets and financial markets have been intensified while the links between commodity spot and derivative markets have been weakened in the last decade (Nissanke 2011; Mayer 2009; UNCTAD 2011).

These developments have crucial implications for developing countries, in particular for LICs that are dependent on commodities on the import side for basic items such as food and fuel and on the export side for revenues, exports and employment. To stabilize commodity prices, mitigate the negative impacts of the commodity price boom on developing countries and secure the functioning of commodity derivative markets for producers and consumers of physical commodities, the regulation of commodity derivative markets is required. In addition to these regulations, broader reforms will be necessary to reduce commodity import- and export dependency, diversify economies, and secure and increase the potential development effects of commodity production and exports.

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