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Chapter V

FINANCIALIZED COMMODITY MARKETS: RECENT DEVELOPMENTS AND POLICY ISSUES



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A. Introduction

Recent developments in primary commodity prices have been exceptional in many ways. The price boom between 2002 and mid-2008 was the most pronounced in several decades – in magnitude, duration and breadth. The price decline following the eruption of the current global crisis in mid-2008 stands out both for its sharpness and for the number of commodities affected. Since mid-2009, and especially since the summer of 2010, global commodity prices have been rising again. While the oil price increases up to April 2011 were modest compared with the spike in 2007–2008, food prices reached an all-time high in February 2011.

Such wide fluctuations in the international prices of primary commodities can have adverse effects for both importing and exporting countries and firms. The economic and social impacts of price changes generally depend on the specific commodity, but typically, they tend to be stronger in developing than in developed countries at both macro- and microeconomic levels. Many developing countries depend heavily on primary commodities for a large share of their export revenues, while others are net importers of food and/or energy commodities.

Net commodity importing countries tend to experience a deterioration in their terms of trade and

current account balances as a result of global price hikes. These countries often spend a larger proportion of their foreign exchange earnings on the increased bill for essential commodity imports at the expense of other imported items, including capital and intermediate goods that are necessary inputs to enable diversification of their domestic economies. At the microeconomic level, surges in the prices of food and energy commodities have severe impacts on the most vulnerable households. Indeed, the high prices can be disastrous for the poor in developing countries who spend 60–80 per cent of their total income on food (FAO, 2008). This impact raises grave humanitarian concerns, but there are also longer term economic and social repercussions, as spending is switched to less nutritious foods and away from education and health.

Additionally, and this applies also to middle-income countries, significant increases in the import prices of essential primary commodities with a very low price elasticity of demand contribute to inflation and reduce the demand for domestically produced goods. If the negative impacts of commodity price movements on domestic producers and consumers are to be mitigated by fiscal measures – such as a reduction in taxes or import duties levied on food, or an increase in food subsidies – the budgetary costs will

have to be met by cuts in other public spending. Such cuts are likely to have adverse effects on economic development. Alternatively, increased budgetary costs may require more government borrowing, which would heighten the public debt burden without strengthening the economic base for future tax receipts.

For primary commodity exporters, on the other hand, price hikes of those commodities imply revenue gains. However, depending on the specific commodity, the kind and degree of foreign control over production and distribution, and rent-sharing arrangements, a large proportion of those gains may not result in income gains for the exporting country, but may instead accrue to transnational corporations. This is often the case in the mining and hydrocarbon industries. Sharp increases in foreign exchange revenues as a result of surging export prices also pose problems for macroeconomic management in the exporting country. As expenditures on imports may not increase at the same pace as export earnings, the exchange rate will tend to appreciate, with attendant adverse effects on the competitiveness of domestic firms in markets where they compete with foreign suppliers – an effect often referred to as the “Dutch disease”. At the same time, sharply rising domestic demand may generate additional inflationary pressure if domestic supply is unable to grow at the same pace. This pressure can be managed, as discussed in the next chapter, but it requires a proactive macroeconomic policy that may be challenging for several countries.

Sharply falling prices cause an immediate deterioration in the terms of trade, balance of payments and income growth of those countries that are heavily dependent on exports of primary commodities. Moreover, to the extent that government budgets depend on revenues from commodity exports, contractionary fiscal adjustments, or, if spending levels are to be maintained, greater debt financing may become necessary. Individual producers will often incur financial difficulties as a result of prices falling beyond the level required to cover their production costs.

The extent to which price developments at the global level are transmitted to the national level will

depend on how deeply domestic markets are integrated with international markets, and on the effectiveness of domestic price support measures in dampening the impact of the international price movements on domestic prices.¹ During the 2007–2009 price hike and subsequent decline, there were fairly significant variations in the speed and degree to which world price movements of various products were felt in different regional and local markets. These differences can be explained by the diverse policy responses and degree of market openness, as well as by compensating exchange rate movements (see, for example, Robles and Torero, 2009; and Minot, 2010).

Excessive price fluctuations foster uncertainty about the validity of the price signals emanating from international commodity markets and add to the lack of transparency of those markets.

From a commodity-specific perspective, market structures have a considerable impact on the pass-through of international price changes, because in monopsonistic markets higher international prices do not always result in better prices for producers. This may explain why local producers might suffer more from higher prices of the commodities they use as inputs, such as fuel, than they gain from rising interna-

tional prices of the commodities they produce themselves (see, for example, Bargawi, 2009).

Apart from adjustment problems resulting from strongly rising or falling prices, heightened price volatility can have serious economic repercussions. Excessive price fluctuations foster uncertainty and disrupt the forecasting abilities of the various economic actors. This uncertainty about the validity of the price signals emanating from international commodity markets adds to the lack of transparency of those markets. In such an environment, it becomes extremely difficult and risky to plan the quantity and composition of production, choose inputs and decide on investments in productive capacity. This is true particularly for agricultural activities where production cycles are long. Similar problems arise for producers who use primary commodities as production inputs.

The volatility of market prices has differed across commodity groups. Food commodities have experienced dramatic price hikes, and, probably due to their social implications, have often caused greater concern than the price gyrations of other commodity groups. However, market price volatility has been

more pronounced for metal and energy commodities and for non-food agricultural commodities (see chart 1.4 in chapter I). Primary commodity markets have always exhibited greater price volatility than the markets for manufactures (*TDR 2008*, chap. II). Commodity-specific shocks, especially on the supply side of agricultural commodities, have generally played a key role in this respect. However, the frequent and wide price fluctuations that have been observed in the markets for many commodity groups since 2007, particularly in oil and agricultural markets, have been unprecedented, and in many instances they have had no obvious link to changes on the supply side.

The commodity price boom between 2002 and mid-2008 and the renewed price rise of many commodities since mid-2009 have coincided with major shifts in commodity market fundamentals. These shifts include rapid output growth and structural changes, both economic and social, in emerging-market economies, the increasing use of certain food crops in the production of biofuels and slower growth in the supply of agricultural commodities. However, these factors alone are insufficient to explain recent commodity price developments. Since commodity prices have moved largely in tandem across all major categories over the past decade, the question arises as to whether the very functioning of commodity markets has changed.

Against this background, the French Presidency of the G-20 has made the issue of commodity price volatility a priority of the G-20 agenda for 2011, since excessive fluctuations in commodity prices undermine world growth and threaten the food security of populations around the world (G20-G8, 2011). These fluctuations are seen as being related to the functioning of financial markets and the regulation of commodity derivatives markets.² Indeed, a major new element in commodity markets over the past few years is the greater presence of financial investors, who consider commodity futures as an alternative to financial assets in their portfolio management decisions. While these market participants have no interest in the physical commodity, and do not trade on the basis of fundamental supply and demand

relationships, they may hold – individually or as a group – very large positions in commodity markets, and can thereby exert considerable influence on the functioning of those markets. This financialization of commodity markets has accelerated significantly since about 2002–2004, as reflected in the rising volumes of financial investments in commodity derivatives markets – both at exchanges and over the counter (OTC).

While the growing participation of investors in primary commodity markets is generally acknowledged, there has been considerable debate in recent years as to whether this has raised the level and volatility of commodity prices. Some authors consider broad-based changes in fundamental supply and demand relationships as the sole drivers of recent commodity price development, and argue that the greater participation of financial investors in commodity markets has actually moderated price swings (see, for example, Sanders and Irwin, 2010). Others argue that the financialization of commodity markets tends to drive commodity prices away from levels justified by market fundamentals, with negative effects both on producers and consumers (see, for example, Gilbert, 2010a; Tang and Xiong, 2010).

The issue of financialization of commodity markets was discussed by UNCTAD in its *Trade and Development Report 2008* (*TDR 2008*: 24–25), followed by a more detailed analysis in its Task Force Report (UNCTAD, 2009) and *TDR 2009*. These earlier discussions started from the observation that international commodity prices, equity prices and the exchange rates of currencies affected by carry-trade speculation had moved in parallel during much of the period of the commodity price hike in 2005–2008, during the subsequent sharp correction in the second half of 2008, and again during the rebound phase in the second quarter of 2009. *TDR 2009* concluded that a detailed empirical analysis of the link between speculation and commodity price developments was difficult due to the limited transparency and level of disaggregation of existing data. Nevertheless, that report provided some evidence that the activities of financial investors had substantially amplified commodity price movements. The strongest evidence was

The greater participation of financial investors may have caused commodity markets to follow more the logic of financial markets than that of a typical goods market.

the high correlation between commodity prices and prices on other markets, such as equity markets and currency markets, where speculative activity played a major role.³ As a result, commodity price risk hedging had become more complex and expensive, and often unaffordable for commercial users in developing countries. Moreover, the signals emanating from commodity exchanges had become less reliable as a basis for investment decisions and for supply and demand management by producers and consumers. At the time it was unclear whether financial investors would continue to consider commodities as an attractive asset class, given that the trading strategy of index investors had proved to be strongly dependent on specific conditions to be profitable. But it was expected that financial investors would move away from investing passively in indexes towards a more active trading behaviour, and that they would continue to amplify price movements (*TDR 2009: 79*). The report suggested that it would be desirable to broaden and strengthen the supervisory and regulatory powers of mandated commodity market regulators, who, in turn, would require more comprehensive trading data.

Meanwhile the debate has evolved. In reviewing recent developments in the functioning of commodity markets, this chapter pays particular attention to the crucial role of information flows in the trading decisions of financial investors that follow a more active strategy, compared with the relatively passive investment behaviour of traditional index investors which were the focus of *TDR 2009*. It also documents new empirical evidence regarding the impact of the behaviour of financial investors on international commodity price formation, complementing the evidence provided, for example, by UNCTAD (2011).

The chapter sets out to show that the trading decisions of market participants are determined not only by information on the fundamentals of a specific commodity market, but also by considerations relating to portfolio management and to profit opportunities that may arise from simply following a trend – factors totally unrelated to commodity market fundamentals. Under these circumstances it is difficult for market participants in commodity futures exchanges and OTC markets, but also for producers and consumers of the underlying physical commodity, to determine to what extent price developments accurately reflect information about fundamentals, which in any case is not always easy

to obtain or reliable. Trading decisions are thus taken in an environment of considerable uncertainty, where engaging in “herd behaviour” can be considered perfectly rational.

Thus, the greater participation of financial investors may have caused commodity markets to follow more the logic of financial markets than that of a typical goods market. In the latter, price discovery is based on information from a multitude of independent agents who act according to their own individual preferences. In typical goods markets, profit opportunities arise from individual, pioneering action based on the private, circumstantial information of market participants.

By contrast, in financial markets, especially those for assets which fall in the same broad risk category (such as equities, emerging-market currencies and, recently, commodities), price discovery is based on information related to a few commonly observable events, or even on mathematical models that mainly use past – rather than only current – information for making price forecasts. In such markets, the most profitable behaviour is often to follow the trend for some time and to disinvest just before the rest of the crowd does so. Acting against the majority, even if justified by accurate information about fundamentals, may result in large losses. A high correlation between returns on investment in commodities and those on other asset classes indicates that such behaviour has become widespread in commodity markets, thereby increasing the risk of commodity price bubbles. Perhaps most importantly, the fact that some countries have tightened monetary policy in reaction to price pressure stemming from commodity price hikes, which may well be speculative bubbles, indicates a worrisome aspect of financialization that has so far been underestimated, namely its potential to inflict damage on the real economy induced by sending the wrong signals for macroeconomic management.

Section B of this chapter discusses the recent evolution of the financialization of commodity markets. Section C investigates the trading behaviour of different types of commodity market participants and how their position-taking can cause asset prices to deviate from fundamental values. It argues that herd behaviour reduces the information content of prices, and increases the risk of commodity prices being subject to speculative bubbles and high volatility. Section D takes a closer look at the overall impact of

financialized markets on commodity price developments. It finds that financial investors in commodities are increasingly motivated by the search for yield. As a result, they are likely to continue to treat commodities as an asset class for portfolio management purposes in spite of the decline in benefits from

diversifying into investment in commodities, which gave them the initial impetus to engage in commodity markets. Section E discusses recommendations for regulatory and policy measures to contain the impact of the financialization of commodity markets and its negative economic and social repercussions.

B. Trends and developments in financialized commodity markets

The term “financialization of commodity trading” implies the increasing roles of financial motives, financial markets and financial actors in the operations of commodity markets. Financial investors have long been active on commodity markets,⁴ but financialization of those markets gained increasing momentum following the bursting of the equity market bubble in 2000. This is because, based on empirical findings derived from data for the period 1959–2004, commodities as an asset class came to be considered as a quasi-natural hedge against positions in other asset markets. Commodity futures contracts exhibited the same average returns as investments in equities, while over the business cycle their returns were negatively correlated with those on equities (Gorton and Rouwenhorst, 2006). Financial innovation has played a facilitating role, as tracking commodity indexes, such as the Standard and Poor’s Goldman Sachs Commodity Index (S&P GSCI), is a relatively new phenomenon. Commodity market deregulation, such as that enacted by the Commodity Futures Modernization Act (CFMA) of 2000, was a further facilitating factor, as discussed in *TDR 2009*.⁵

It is difficult to assess the size of the financialization of commodity trading due to the lack of comprehensive data. But it is reflected, for example, in the strong increase, starting around 2002–2004,

in the number of futures and options contracts outstanding on commodity exchanges and in the amount of outstanding OTC commodity derivatives. The number of contracts outstanding on commodity exchanges has continued to increase since the collapse of commodity prices in mid-2008; it is now about 50 per cent higher than in the first half of 2008, when commodity prices peaked. In contrast, the notional amount of outstanding OTC derivatives⁶ has dropped to about one third, which corresponds to roughly half of its 2005–2006 level, but also to about five times its 1999 level.⁷

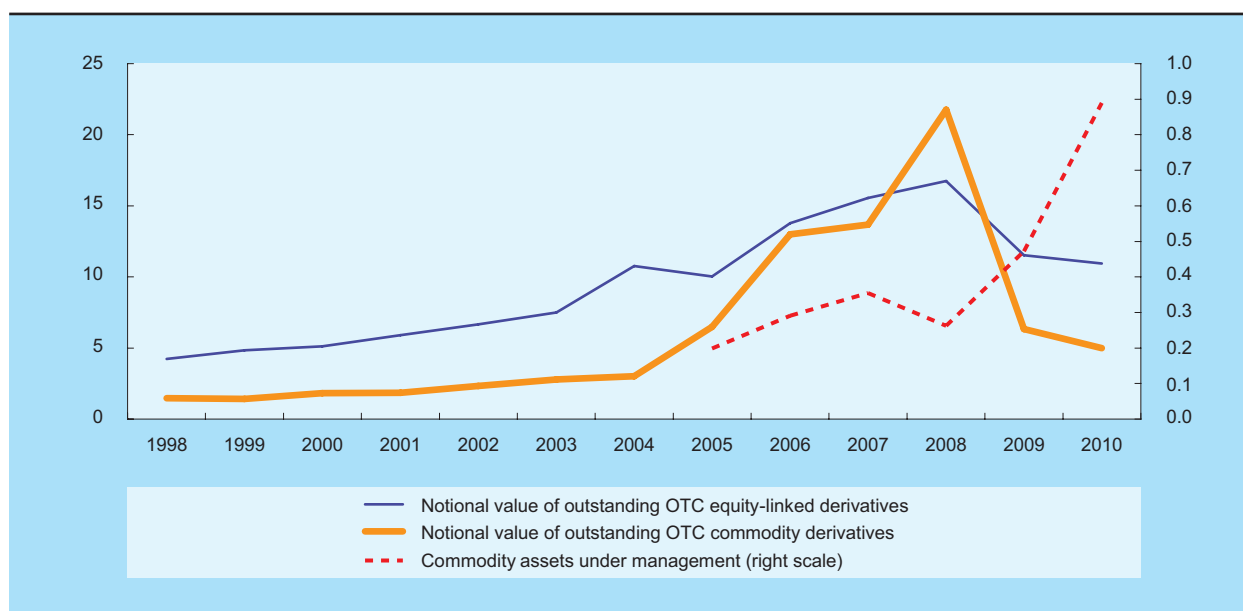
The share of commodity assets under management in global GDP increased more than fourfold during the period 2008–2010.

A number of reasons could explain the recent sharp decline in the notional value of outstanding OTC commodity derivatives. The collapse of commodity prices between mid-2008 and early 2009 to about half their previous level clearly accounts for part of this decline. A second reason could be that the financial crisis led to a greater awareness of counterparty risk, making financial investors wary of exposure in bilateral OTC deals. Third, the recent fall in recorded OTC activity probably reflects a decline in the relative importance of broad-based passive index investments by financial investors in commodities, including the use of swaps on OTC markets, and an increase in the relative importance of more sophisticated active trading strategies that emphasize the use of futures contracts traded on organized exchanges.

Chart 5.1

FINANCIAL INVESTMENT IN COMMODITIES AND EQUITIES AS A SHARE OF GLOBAL GDP, 1998–2010

(Per cent)



Source: UNCTAD secretariat calculations, based on Bank for International Settlements (BIS), *Derivatives Statistics*; Barclays Capital, *The Commodity Investor*; and UNCTADstat.

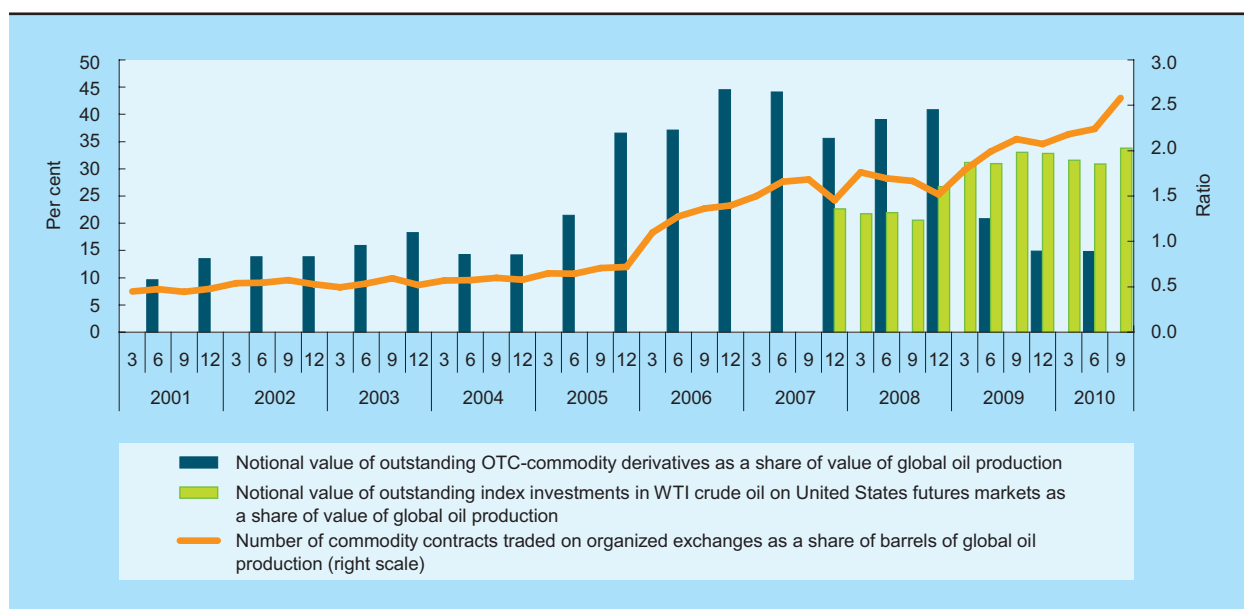
Evidence on the value of assets under management by financial investors in commodities (Barclays Capital, various issues) reveals two salient features. First, those investors have increased their involvement in commodities even more rapidly since mid-2010 than before the financial crisis when it was already growing fast. Judging from currently available data, commodity-related assets under their management recorded a historic high in March 2011, when they reached about \$410 billion – about double the pre-crisis level of 2007. Second, while index investments accounted for 65–85 per cent of the total between 2005 and 2007, their relative importance has fallen to only about 45 per cent since 2008. This decline has occurred despite a roughly 50 per cent increase in the value of index investments between 2009 and the end of 2010 (UNCTAD, 2011: 16).

To put the size of financial investments in commodities in perspective, it is useful to consider how these have evolved relative to investments in equity

markets, and relative to developments in the real economy. Between about 2002 and the outbreak of the financial crisis, the notional amount of outstanding OTC commodity derivatives increased considerably faster than comparable investments in equity-linked contracts. However, in 2008–2009 the value of commodity investments also declined considerably faster than that of equity-linked investments (chart 5.1). Perhaps more importantly, the share of the notional amount of outstanding OTC commodity derivatives in global gross domestic product (GDP) increased from 2–3 per cent in the early 2000s to more than 20 per cent in 2008, and, in spite of its subsequent rapid decline, this share has remained at about 5–6 per cent (i.e. roughly double its share about a decade ago). The evidence in chart 5.1 also reflects the differences in the evolution of commodity investments on exchanges and on OTC markets, noted above. It shows that the share of the value of commodity assets under management in global GDP increased more than fourfold during the period 2008–2010.

Chart 5.2

FINANCIAL INVESTMENT IN COMMODITIES AS A PROPORTION OF GLOBAL OIL PRODUCTION, 2001–2010



Source: UNCTAD secretariat calculations, based on BIS, *Derivatives Statistics*; Commodity Futures Trading Commission (CFTC), *Index Investment Data*; Energy Information Administration (EIA), *International Petroleum Monthly*; and UNCTADstat.

A comparison of the evolution of physical commodity production and financial investment in commodities sheds some further light on the size of the financialization of commodity markets. Concentrating on oil, which constitutes the largest share of total commodity production, reveals that the ratio of the notional value of total (i.e. not just oil for which no separate data are available) outstanding OTC-commodity derivatives to the value of global oil production increased about fourfold between the early 2000s and 2007–2008 when it reached 40–45 per cent (chart 5.2). A similar measure relating to financial investment in commodity futures exchanges shows

that the ratio of the notional value of the outstanding index investments in West Texas Intermediate (WTI) crude oil on United States futures exchanges to the value of global oil production in 2010 was about 50 per cent higher than in 2007–2008 (chart 5.2). Given that WTI appears to have ceded part of its function as a benchmark for global crude oil prices to Brent, this increase may well be an underestimation. Indeed, the constant rise in the ratio of the number of commodity contracts traded on organized exchanges to global oil production (chart 5.2), is a clear indication that the financialization of commodity markets has been increasing unabated.

C. Commodity price formation: the roles of information and herd behaviour

1. Information and uncertainty in commodity markets

The crucial role of information in commodity price formation has long been recognized. But the kind of information that determines the behaviour of the most influential market participants has rarely been investigated. Is it mainly information about fundamental supply and demand relationships regarding a specific commodity? Or rather, is it information of a more general nature, including information about developments in the world economy and global equity and currency markets, or about long-term economic trends that would not have an immediate direct impact on the current supply and demand relationships in commodity markets?

The importance of information is closely related to the high degree of uncertainty on commodity markets. Indeed, uncertainty in decision-making has always been a defining characteristic of those markets. This is because: (i) medium- and longer-term commodity supply and demand conditions are subject to unknown factors, such as undetermined depletion rates of non-renewable resources and unknown effects of climate change on agricultural production; (ii) inventory data, which provide valuable signals for short-term price expectations, suffer from significant measurement errors (Gorton, Hayashi and Rouwenhorst, 2007; Khan, 2009); and (iii) data on current global commodity supply and demand conditions are published with long time lags and are frequently revised. Therefore, even well-informed traders must

formulate price expectations on the basis of partial and uncertain data.

To make matters worse, uncertainty in commodity markets is likely to have increased even further. In recent years, rapid industrialization, urbanization and changes in dietary habits in emerging economies, especially in Asia, have led to a growing demand for commodities. And repeated news about these developments may well have signalled to market participants the beginning of a new commodity super cycle. On the other hand, it has been difficult to accurately assess the impact of these signals on the short-term evolution of supply and demand relationships. This is not only due to uncertainties about

the stability of rapid economic growth in emerging economies, but also, especially, to the often wide gaps in the availability of data regarding these economies' commodity demand, supply and inventory situations.

These signals from the demand side have combined with growing doubts about the possibility of realizing technological breakthroughs any time soon, and the ability to promptly overcome emerging technological obstacles to a commensurate increase in commodity supply as had often been the case in the past. With regard to oil, for example, there has been a debate about whether the point of "peak oil" will be reached in the near future. With regard to agricultural commodities, news about slower growth of agricultural productivity has added to already growing concerns about land use, water shortages, and, more generally, the link between agricultural production and climate change. Moreover,

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first-generation biofuels, which are based on food stocks, seem to have greatly increased the relevance of information on energy for trading in agricultural commodities, and vice versa.

Low investment in production, infrastructure and research into ways of improving growth in commodity supply over the past few decades, when commodity prices were low, is identified as a major cause of these supply constraints. As a result, together with uncertainty about demand, a stream of information on the growing cost of profitable investment in sustained and resilient commodity supply growth has signalled to market participants that the probability of falling commodity prices is rather low. Consequently, information about fundamental supply and demand in commodity markets today has been supplemented by expectations that prices could rise any time soon, and for a long period of time.

In such a situation of enhanced price uncertainty, the traditional roles of commodity futures exchanges in price discovery and risk transfer have gained increasing importance. Commodity exchanges appropriately fulfil these roles if market participants, in addition to using publicly available information, trade on the basis of independent and individual information derived from an intimate knowledge of specific events relating to commodity markets and on their own plans to supply or demand commodities.

However, the financialization of commodity trading has increasingly jeopardized this function of commodity exchanges. Financial investors in commodity markets base their position-taking on risk and return considerations in which information about other asset markets and the overall economy plays a key role, as do financial motives more generally (see also box 5.1). Such trading behaviour, while relying on similar types of information, also anticipates the price impact of that information in similar ways. Taken together, the financialization of commodity trading poses the risk of herd behaviour and of self-fulfilling prophecy due to the pecuniary power of these market participants.

Even more worrying is the fact that herding fundamentally changes the behaviour of markets

and the role that information plays in determining the right prices. As discussed in some detail in the following section, herd behaviour raises questions as to whether price determination is really based on the collection of vast amounts of independent and individual information about market-specific supply and demand relationships. It is also questionable whether market participants that are subject to herding actually bring liquidity to the market. A liquid market is one where many different participants with different sets of information and preferences are able to find counterparts who are willing to accept an offer to sell or buy because they have a different view of how a market is evolving. The textbook ideal of an atomistic goods market would be characterized by such conditions. By contrast, a market with a strong element of herding, which may be defined as the tendency of individuals to mimic the actions of a larger group rather than acting independently and on the basis of their own information, will not display those characteristics of differing views and dispositions.

2. Herd behaviour

Herd behaviour can take various forms (chart 5.3), and may be rooted in irrational behaviour, but it may also be fully rational. Early models of herd behaviour were based on assumed deviations from perfect rationality, or so-called “noise trading” (Shleifer and Summers, 1990). Investment by noise traders⁸ is affected by pseudo-signals that convey no information about future returns in a specific asset market, or by changes in traders’ beliefs and sentiments that are not justified by news on fundamentals. An example of pseudo-signals for positions in commodity markets is information related to other asset markets that triggers portfolio rebalancing, and hence leads to changes in investors’ exposures to commodities.

Changes in beliefs and sentiments may reflect investors’ judgemental biases, such as overreacting to news or overoptimism.⁹ It may also reflect the use of inflexible trading strategies, such as momentum investment or positive feedback strategies. Such strategies

Herd behaviour may be rooted in irrational behaviour, but it may also be fully rational.

Box 5.1**VIEWS OF COMMODITY MARKET PARTICIPANTS: RESULTS OF AN UNCTAD SURVEY**

Interviewing commodity market participants is useful as it provides their perspectives on market developments, the process of price formation and trading strategies. It also gives an indication of how the presence of financial investors influences trading activities. Moreover, discussing regulatory issues with market participants helps in understanding potential compliance problems and unintended adverse effects of regulations on trading practices.

Between December 2010 and February 2011, the UNCTAD secretariat conducted interviews with commodity traders, financial institutions and other entities which are actively involved in the grain, cocoa, sugar and oil markets. Most of the interviewees were physical commodity traders and financial investors, such as bank and asset managers, located mainly in Geneva.⁴

Interviews with physical traders

The physical traders reported being subject to strict risk parameters set by the boards of directors of their companies. Therefore, they usually had only a marginal, if any, flat price exposure and tended to focus on spreads. The physical grain traders reported trading mainly on futures exchanges and only occasionally using OTC markets. Trading on OTC markets allowed very specific types of hedging, while the standardized specifications of futures contracts could result in mismatches with respect to desired trading patterns in terms of time and product quality. On the other hand, futures exchanges, being more liquid, made it easier to find a counterpart.

The interviews revealed that trading patterns for crude oil differ considerably from those for grains and soft commodities. Exchanges offer only a limited range of crude oil futures contracts and their specifications do not match the usual hedging requirements. Oil traders, in particular those who trade not only Brent and WTI but also a variety of other crude oils, therefore combine exchange-traded contracts (e.g. for WTI or Brent) with more specific OTC contracts to hedge their exposures. The OTC contracts they usually use are swaps (e.g. WTI against Dubai) for which the price is determined on the basis of quotations of a price reporting agency (e.g. Platts or Argus) that gathers information on market prices of different crude oil qualities in different locations on a daily basis.

Physical traders reported using a wide range of information from different sources, including: (i) publicly available statistics from official sources (such as the United States Department of Agriculture) and publicly available reports (both on “fundamentals” and financial markets); (ii) private information obtained from internal company sources; and (iii) communication with other market participants.

All the interviewed physical traders agreed that medium- to long-term price trends were driven by market fundamentals, and that this was the reason why they focused on fundamental supply and demand relationships in their market analyses. But they also mentioned the impact of the growing activities of financial players on trading in commodity markets, as evidenced by rising volumes of financial investments. Moreover, financial investors increasingly entered the physical markets by opening their own trading desks or devising physically backed exchange-traded funds (ETFs) or exchange-traded notes (ETNs). Banks were also reported to engage in commodity production.

There was a consensus that financial traders could not move prices in the long run, but they could cause substantial price volatility and distortions in the short run. Reasons cited for their strong short-term price effects were the enormous volumes of their trades, as well as the timing of their investments and withdrawals of funds. Further, most financial traders did not know the specifics of the respective commodity markets, but based their trading decisions on other considerations, algorithms (including high frequency trading) and/or their desired portfolio structure. The traders suggested that volatility made price discovery more difficult in all commodity markets and it also made hedging more difficult and expensive, as large price movements might trigger margin calls. Nevertheless, the overall assessment of financial players' presence in commodity markets was ambiguous. Most traders also saw benefits. They emphasized that speculators or financial investors provided liquidity which was indispensable for hedging.

The majority of traders agreed that further regulation was needed, particularly in Europe, in order to increase transparency. Adhering to reporting standards in Europe, such as those followed by the

Box 5.1 (concluded)

Commodity Futures Trading Commission (CFTC) for the United States, would be a big step forward. Nevertheless, they believed CFTC reporting was insufficient, with some flaws in its classification of traders. While most traders considered position limits to be necessary, they deemed them ineffective because they could easily be circumvented. For example, positions could be split between trading venues or between different subsidiaries of the same group, transactions could be carried out in the OTC market, and financial entities could acquire physical trading companies thereby obtaining exemptions from certain regulatory rules. While most of the respondents welcomed the Dodd-Frank Act, they regretted that similar regulatory reforms were not being extended to at least the other G-20 countries.

Interviews with financial traders

The financial traders interviewed were a less homogeneous group than the physical traders. While their experiences and views diverged significantly, most of them reported using all available financial instruments and trading both at exchanges and OTC, depending on the needs of their clients. They mentioned using official statistics about fundamentals most often, with a strong focus on crude oil. One banker at a large financial institution, focusing on the oil market, reported paying much more attention to financial markets than to fundamentals. For him, the most relevant information was the United States dollar exchange rate, “sentiments in equity and commodity markets” and CFTC data. He was mainly concerned with what the market was thinking. For the longer term, GDP growth, the Purchasing Managers Index (PMI), unemployment data and other economic indicators were other sources of information. He emphasized that financial investors tended to look at financial data, although they generally based their judgement on fundamentals.

Abundant liquidity due to the expansionary monetary policies adopted by many countries over the past two years and relatively low returns on other assets were mentioned as major reasons for recent investments in commodities. The respondents believed that the effects of financial investors’ activities on prices were limited to the short term. One asset manager said that speculators could corner the market in the short run because of their strong financial power, but all interviewed financial traders were of the opinion that financial investors could not drive up commodity prices in the long run.

Regarding regulation, the interviewed financial traders agreed that more transparency was a key issue in commodity markets, and that position limits could easily be circumvented.

Interviews with brokers and consultants

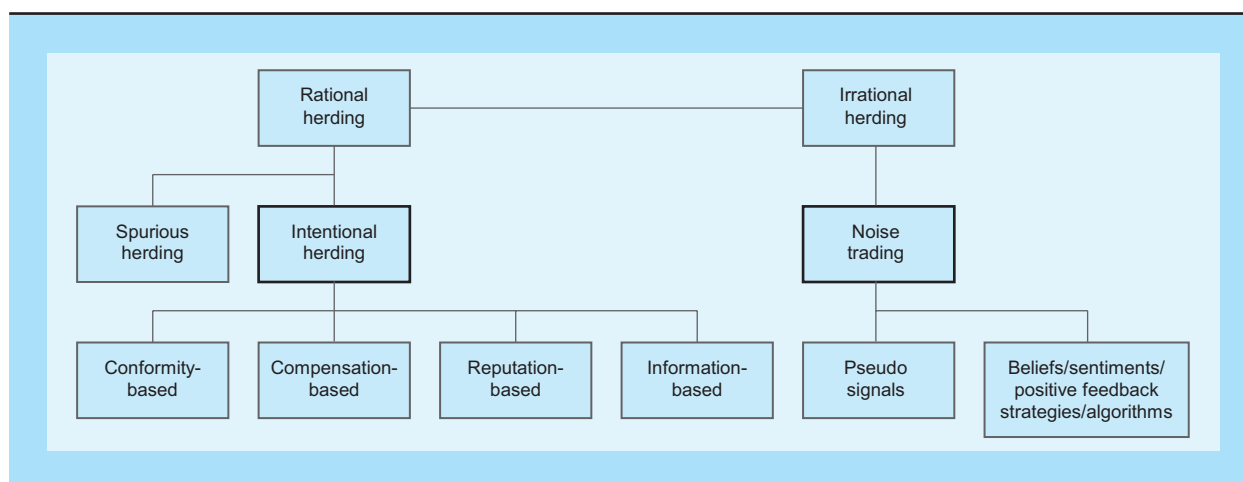
The interviewed brokers and consultants operated close to the market, even though their business activities did not usually include position-taking. They observed that financial investors had come to play an increasingly important role in commodity markets, and that the recent emergence of ETFs caused commodities to be traded in the same way as equities. They noted that one consequence of financial investors’ presence in commodity markets was increased volatility and divergences between the cash and the futures markets; another was the increasing short-run correlation between commodity and other financial markets.

Overall, the commodity market participants were in general agreement that: (i) due to their financial strength, financial investors could move prices in the short term, leading to increased volatility, which may harm markets and drive hedgers with an interest in the physical commodities away from commodity derivatives markets; (ii) in the medium to long term, commodity prices were determined by fundamental supply and demand relationships, even though the type of information used by market participants suggested that financial market information was much more important for trading decisions than was commonly acknowledged; (iii) market transparency needed to be increased, especially in Europe, where significant gaps existed, but also in the OTC market in the United States; and (iv) care should be taken with regard to introducing general bans (e.g. of high-frequency trading) and position limits, given that regulations were rather difficult to enforce.

^a For detailed information about the methodology, choice of participants and questionnaires used, see UNCTAD, 2011.

Chart 5.3

DIFFERENT TYPES OF HERD BEHAVIOUR



Source: UNCTAD secretariat, derived from Bikhchandani and Sharma, 2001; and Shleifer and Summers, 1990.

assume that past price developments carry information on future price movements, giving rise, for example to trend chasing. This will result in buying after prices rise and selling after prices fall, independently of any changes in fundamentals. Simple types of positive feedback strategies are closely related to technical analysis that utilizes past price and position data to assess patterns of activity that might be helpful in making predictions. More sophisticated trading techniques use computer-based algorithms that strictly adhere to a predetermined set of rules. Algorithms analyse market activity and produce signals for trading strategies, established either on the basis of past trading and price developments or on the basis of the anticipated reactions by other algorithmic traders to current market developments.¹⁰ Given that several positive-feedback and algorithmic traders may use similar rules, they run the risk of collectively generating market movements that they then individually identify and follow. Moreover, to the extent that algorithms follow statistical strategies and monitor market developments across different asset markets, such rules will cause price signals to spill over from, for example equity or currency markets to commodity markets, even when there is no change in the fundamentals on commodity markets.

Herd behaviour can also be fully rational. In this context, “spurious herding” should be distinguished from “intentional herding” (Bikhchandani

and Sharma, 2001). Spurious herding describes situations where agents facing similar decision-making problems and information sets take similar decisions. Given that this type of herding reflects agents’ common reaction to public information, it is entirely compatible with the efficient market hypothesis (EMH), provided the information refers to the fundamentals of the specific market.¹¹ Fundamentals-driven spurious herding in commodity investment can arise if, for example, a significant share of international supply is suddenly cut off, as occurred with oil during the Gulf war in 1990–1991 and with rice following the imposition of export bans by various large exporting countries in 2008.

Intentional herding may be based on four motives (Devenow and Welch, 1996; Bikhchandani and Sharma, 2001). First, conformity-based herding relates to an alleged intrinsic preference of individuals for conformity. Second, reputation-based herding relates to imitation which arises when traders and their employers are uncertain about the traders’ abilities (Scharfstein and Stein, 1990). Traders who doubt their own abilities will not take positions contrary to those taken first by other traders, even if their own information would lead them to do otherwise. Such doubtful traders, by imitating others, will thus avoid being considered low-skilled if taking positions contrary to those taken by others turned out to be loss-making. If the common decision turns out to be

loss-making, it will be attributed to a change in general market sentiment, rather than to poor individual judgement or performance.¹² Third, closely related to reputation-based herding is compensation-based herding. This refers to agents who invest on behalf of others and whose compensation schemes and terms of employment provide incentives that reward imitation. For example, risk-averse investors will align their positions with benchmark portfolios if their compensation increases when they do better than the benchmark but decreases when they underperform the benchmark. Compensation rules based on such relative performance measures can lead not only to herding but also to risk-loving investors taking excessively high risk.

Fourth, information-based herding is perhaps the most important motive for intentional herding. It refers to imitation in situations where traders believe that they can glean information by observing the behaviour of other agents. In other words, investors converge in their behaviour because they ignore their private information signals (Hirshleifer and Teoh, 2003). As explained by Banerjee (1992), who calls this effect “herd externality”, information-based herding exerts an external influence on decision-making processes and causes position-taking that is not in line with an agent’s own information. Position-taking based only on other peoples’ previous actions will lead to price changes without infusing any new information into the market. A sequence of such actions causes a so-called “informational cascade” (Bikhchandani, Hirshleifer and Welch, 1992) – a snowballing effect which will eventually lead to self-sustaining asset price bubbles.

Informational cascades are most likely to occur when market participants are unequally informed and ignore the accuracy of other peoples’ information. Market participants who judge their own information to be incomplete and approximate will tend to delay their decision-making, preferring

to act only once they can make inferences on the basis of other, supposedly better informed and more experienced people’s actions. This implies that position-taking by investors that make early decisions is likely to determine which way followers will decide to move, and it therefore has a disproportionate impact on price changes. This will be the case even if the assessments of the early movers are incorrect, based on overconfidence or on idiosyncratic motives (such as readjusting portfolio composition following price changes in other asset markets). It also implies that an increase in the number of market participants and in trading volume does not necessarily indicate that market transactions are based on more information.

Informational cascades are not limited to one market; they can spread across different asset markets if prices in those markets are correlated. Herding across markets can lead to excess correlation (i.e. a level of correlation between asset prices that exceeds the correlation between their fundamentals) (Cipriani and Guarino, 2008). Moreover, informational cascades and information-based herding can be altered or even reversed by a publicly observable shock or by the release of public information (Hirshleifer and Teoh, 2003). Both events add new information to the market. They also allow followers to assess the accuracy of the information on which they assumed precursors were acting, as they know that the newly released public information is more accurate than what they had inferred from the actions of the early position-takers. Such new public information may consist of easily observable events (such as extreme weather events that impact harvests) or well-researched findings by specialized agencies.¹³ However, it may also consist of newsletter recommendations by investment banks or other analysts who base those recommendations

on models that are proprietary knowledge.¹⁴ This means that the methodologies that produce those findings are impossible to verify, and therefore their objectivity is open to question, which can lead to

Information-based herding refers to imitation in situations where traders believe that they can glean information by observing the behaviour of other agents.

The speed at which opportunities for high return and incentives to engage in herding behaviour decline, and the extent to which herding affects prices, depend on the degree of uncertainty.

scepticism about the objectivity of such findings. Unless investment banks keep research and trading departments completely independent of one another, such predictions may well be an attempt to ignite a new informational cascade and be combined with the analysts' prior position-taking, the returns on which will increase through imitation by others.

If herd behaviour has an impact on price movements, early movers will benefit the most. Imitation by followers will gradually become less profitable the longer it is delayed, and the greater is the probability that newly arriving public information will alter the informational cascade. The speed at which opportunities for high return and incentives to engage in herding behaviour decline, and the extent to which herding affects prices, depend on the degree of uncertainty. When it is difficult to differentiate between uninformed traders, who are herding, and informed traders, market participants may believe, mistakenly, that most traders possess accurate information. The ensuing confusion allows uninformative herd behaviour to have dramatic effects on prices, and can lead to bubbles and excessive volatility (Avery and Zemsky, 1998). Such situations occur when the prevalence of uninformative noise trading is underestimated, either because of a lack of data on the relative importance of different trader categories, or because of the mistaken belief that trading from rational arbitrageurs will instantaneously balance any price effect from trading that is not based on fundamentals, as discussed below.

The persistence of price deviations from fundamental values caused by herding depends on the speed and efficiency of arbitrage. An arbitrage opportunity offers the possibility of earning a positive return at no risk. Such a possibility will arise if prices diverge from fundamental values or across markets on which identical assets are traded. According to the EMH, an arbitrageur will detect such an opportunity immediately, act upon it and thereby make such price divergences disappear. Given that all these actions are assumed to happen instantaneously, the notion of unlimited arbitrage implies the

There are limits to arbitrage so that price deviations from fundamental values may persist.

It may not be optimal for rational arbitrageurs to counter the position-taking of irrational investors that follow positive feedback strategies.

absence of any arbitrage opportunities. It also implies that irrational position-taking that drives prices away from fundamental values will not make profits, and hence be forced out of the market. Thus, from an EMH perspective, speculation must be stabilizing (Friedman, 1953).

However, there is widespread agreement that there are limits to arbitrage (for a recent survey, see Gromb and Vayanos, 2010). For example, rational arbitrageurs may not be able to correct mispricing, either because of risk aversion (de Long et al., 1990a) or because of capital constraints. Shleifer and Vishny (1997) argue that arbitrageurs may need to use other people's capital. In that case, if the market initially moves against the arbitrageurs, they will need to report intermediate losses. This will cause the arbitrageurs' client investors to withdraw part of their money, forcing the arbitrageurs to liquidate their positions at a loss. Given that arbitrageurs are aware of this possibility, they will exploit arbitrage possibilities only partially.

What is more, it may not even be optimal for rational arbitrageurs to counter the position-taking of irrational investors that follow positive feedback strategies. Instead, they may want to buy and push up the price following some initial good news, thereby providing an incentive for feedback traders to aggressively buy the asset. This reaction by feedback traders will allow the rational arbitrageurs to sell their positions at a profit. But in so doing, profitable arbitrage also contributes to the movement of prices away from fundamentals and feeds short-term price bubbles (de Long et al., 1990b).

Bubbles may persist even over a substantial period of time. This can occur when a bubble bursts only once a sufficient mass of arbitrageurs have sold out and rational arbitrageurs know that there will always remain some agents that are overconfident or pursue momentum-trading strategies. Rational arbitrageurs who know perfectly well that the bubble will eventually burst then need to weigh the risk of overestimating the remaining number of irrational traders, which would

imply losing all capital gains by getting out too late, against maximizing profits by riding the bubble as it continues to grow and exiting from the market just prior to the crash. New public information about market fundamentals would allow rational arbitrageurs to synchronize their exit strategies, and thus make the bubble burst earlier (Abreu and Brunnermeier, 2003). The same may be true for disclosure of data that indicate the true number of remaining “irrational traders”.¹⁵

Taken together, the above discussion shows that financial investors have a variety of motives, either rational or irrational, for engaging in trend-following and momentum trading, as well as for engaging in arbitrage only to a limited extent. As a result, asset prices can deviate from fundamental values, at least for some time. The discussion also shows that herding can have sizeable detrimental effects since it reduces the information content of prices, and because, being based on only a little information, existing price levels become very sensitive to seemingly small shocks. Consequently, commodity prices risk being subject to speculative bubbles, moving far from fundamental values and displaying high volatility.

An empirical assessment of herd behaviour is notoriously difficult. It is particularly difficult to test models of informational herding where intentional herding must be distinguished from spurious herding (which reflects a common and simultaneous reaction to public announcements). Observing market transactions and prices cannot enable an identification of the factors that ultimately determine the decisions of market participants. This is because actions do not reveal the kind of private information or signals that agents receive and that motivate their position-taking. For commodity markets, this problem is exacerbated by the fact that data on market transactions are available only in aggregated form and at relatively long intervals, and it is often difficult to pinpoint what constitutes fundamentals and how they should be measured and quantified. This is the case especially when a variety of big events may change fundamentals gradually but permanently, such as

climate-change-related events, peak-oil concerns, or increasing demand in emerging markets.

Nonetheless, despite these difficulties, a small number of studies have attempted to test for herd behaviour in commodity markets. In principle, trend-following and momentum trading in commodity markets can be examined by regressing speculative position-taking over price changes on previous days. In addition to the unresolved question as to which trader categories should be appropriately considered as “speculators”, daily data on speculative position-taking are not publicly available. Therefore, using confidential position data from the CFTC, Irwin and Yoshimaru (1999), based on data for 1988–1989, and Irwin and Holt (2005), based on data for 1994, found evidence for the existence of trend-following or momentum trading strategies, but they also found that these had relatively low price effects. However, the data used in these studies are dated, and thus cannot reveal the effects of herding behaviour over the past few years.

Herding can have sizeable detrimental effects, since it reduces the information content of prices, and because, being based on only a little information, existing price levels become very sensitive to seemingly small shocks.

A recent study by Gilbert (2010a) uses data for seven commodities (aluminium, copper, crude oil, maize, nickel, soybeans and wheat) and looks for evidence of trend-following behaviour in the pricing process itself. Using monthly data for the period 2000–2009, the study finds a single eight-month bubble for copper (February to October 2006), as well as one-month bubbles for aluminium (May 2006) and nickel (April 2007). Using daily data for the period 2006–2008 for crude oil and the three grains, and for the period 2000–2008 for the non-ferrous metals, the study finds clear evidence of price bubbles in copper trading (2004, 2006 and 2008), weak evidence for crude oil (first half of 2008), nickel (January–March 2007) and soybeans (early 2008), and clear evidence of the absence of any bubble for aluminium, maize and wheat.

In a further step, Gilbert (2010a) estimates the price impact of index-based investment by comparing the actual price developments with those that would have prevailed had there been no index investment. The evidence indicates that for crude oil, index investors accounted for about 3–10 per cent of the price

increases in 2006–2007, but that their impact rose to 20–25 per cent in the first half of 2008. Their impact on grain prices is estimated to have been about half that for oil. Gilbert (2010a: 26, 28) concludes that during the first half of 2008 “index-based investment generated a bubble in commodity futures prices” and that overall “it would be incorrect to argue that high oil, metals and grains prices were driven by index-based investment but index investors do appear to have amplified fundamentally-driven price movements.” However, Gilbert emphasizes that the results must be interpreted with caution because the identification of bubbles may be sensitive to the selection of the initial date for the sample,¹⁶ and also because explosive price developments may indicate buoyant fundamentals (i.e. spurious herding) rather than speculative bubbles.

Phillips and Yu (2010), on examining the migration of price bubbles across equity, bond, currency and commodity markets (for cocoa, coffee, cotton, crude oil, heating oil, platinum and sugar) since the mid-1990s, find a sequence of price bubbles, each followed by a financial collapse. They show that

with the eruption of the subprime crisis in August 2007, financial investment transited from the United States housing and mortgage markets onto certain commodity and foreign-exchange markets. Growing awareness of the serious impact of the financial crisis on real economic activity, both in the United States and globally, caused the general collapse of asset prices in mid-2008. With respect to commodity prices, their results point to a price bubble in crude oil between March and July 2008, in heating oil between March and August 2008, and in platinum between January and July 2008, while no price bubbles are detected in cocoa, coffee, cotton and sugar. This supports the finding of Gilbert (2010a), whose product sample overlaps with that of Phillips and Yu (2010) only with respect to crude oil, for which he identifies a price bubble during the first half of 2008. Phillips and Yu (2010: 26) explain that early phases of speculative bubbles are characterized by only small price divergences from fundamental values, and are therefore statistically indistinguishable. This may explain why the estimated date for when the oil price bubble begun is somewhat later than the observed beginning of the rapid price increase.

D. Financialized markets: overall impact on commodity price developments

1. *Trader positions and commodity prices*

Several categories of market participants are active in commodity markets. These categories are usually distinguished on the basis of the reports on traders’ positions published in anonymous and summary form by the CFTC, which is the institution mandated to regulate and oversee commodity futures trading in the United States.

The CFTC distinguishes three main trader categories.¹⁷ One of them refers to market participants

with a commercial interest in commodities, and includes producers, merchants, processors and users. The other two categories refer to financial investors, and include “swap dealers”, who may be considered a broad approximation of index traders,¹⁸ and money managers. The money manager category includes a range of investors, such as hedge funds and institutional investors that adopt different trading strategies based on macroeconomic fundamentals, detailed commodity research, algorithmic trading or trend following, and general financial portfolio diversification considerations. Thus they are able to adjust their exposure in commodity markets according to

changes in asset prices with a view to stabilizing the structure of their portfolios.

Scepticism is often expressed with regard to the link between financial investment and commodity price developments. The more theoretical aspects of this issue are addressed in box 5.2; the empirical evidence, comparing price developments and net financial positions of different trader categories, reveals a number of salient features (see chart 5.4A–C for maize, crude oil and copper).¹⁹ First, market participants that have an interest in physical commodities (i.e. the category producers, merchants, processors, users (PPMU)) almost always take net short positions (i.e. they are net sellers of futures and options contracts). Second, financial investors almost always take net long positions (i.e. they are net buyers of futures and options contracts). Third, overall, the comparison provides only scant evidence of a *long-running* correlation between price changes, on the one hand, and index positions for cotton and maize or swap dealer positions for copper and crude oil, on the other. While there are clearly periods and commodities where positions and prices moved in tandem, especially during the price collapse in 2008 and occasionally during the previous price upturn, there are other times when positions did not increase during periods of rapid price appreciation. For example, in the wheat market, neither money managers nor index traders increased their positions during the price hike from mid-2007 to the end of the first quarter of 2008 (see *TDR*, 2009). By contrast, there appears to have been a positive correlation between market positions and maize prices during the same period (chart 5.4A). In the oil market, when oil prices rose almost continuously from the beginning of 2007 through the second quarter of 2008, money managers' positions exhibited strong volatility (chart 5.4B). Nevertheless, all graphs in chart 5.4 indicate some *short-term* correlation between index or swap positions and price changes, as peaks and turning points seem to have occurred at around the same time.

Fourth, there has been a fairly close correlation between money manager positions and prices of all the three commodities shown in chart 5.4. The occurrence of position peaks and troughs in the net

positions taken by money managers closely mirrors those in prices – especially for copper and crude oil, but also for maize – even when seen over longer time periods.

Fifth, and perhaps most importantly, there has been an especially close correlation between changes in oil prices and in money managers' positions since about mid-2009 (chart 5.5), when commodity prices appear to have ended their downward overshooting and started to stabilize, followed by the onset of a price surge in mid-2010. This close correlation is reflected in a correlation coefficient as high as 0.82 for crude oil for the period July 2009–June 2011 (and even 0.87 for the period December 2010–June 2011). In the last week of February 2011, the ratio of long to short positions²⁰ taken by money managers more than doubled, followed by a rally in the oil price from about \$99 per barrel to about \$106 per barrel in the first week of March 2011. Similarly, in the first two weeks of May 2011, this ratio of money managers' positions almost halved, accompanied by a drop in oil prices from about \$112 per barrel to about \$97 per barrel.²¹ While the sequence of events and the close correlation between changes in positions and prices are indicative of a price impact by money managers, a more formal testing of the direction of causality is not possible due to the shortness of the period during which these events occurred and the fact that position data are available only at weekly intervals.

Regarding copper, the long-standing correlation between money managers' net positions and prices, which can be observed for much of the period since mid-2009, appears to have broken down in late 2010–early 2011, when prices rose sharply before stabilizing at a high level while money managers' net positions remained relatively stable before dropping sharply in May 2011 (chart 5.4C). However, there is anecdotal evidence that this breakdown in the correlation is due to a new form of commodity investment by money managers, which involves holding physical copper inventories that remain unrecorded in official statistics.²² Some of those copper inventories were stocked in European warehouses but unrecorded in the London Metal Exchange's official inventory data. A large number of these warehouses have come to

There has been a close correlation between changes in oil prices and in money managers' positions since about mid-2009.

Box 5.2**THE INTERPLAY BETWEEN PHYSICAL AND FINANCIAL MARKETS^a**

Attempts to link financial investment and commodity price developments are often met with scepticism. Some critics suggest there are “logical inconsistencies” in the argument that financial investment can affect physical market prices on the grounds that financial investment only relates to futures market activity and does not concern spot market transactions.

Irwin, Sanders and Merrin (2009) and Sanders and Irwin (2010) have synthesized a number of arguments presented by the sceptics. The sceptics’ main point is that financial investors are involved only in financial transactions in futures markets. Accordingly, any causal link between their position-taking and physical market prices would be complex and unclear. In particular, they argue that financial investors hold neither physical inventories nor futures contracts up to expiration and, therefore, do not participate in the delivery process where, the sceptics claim, price discovery takes place. However, as argued by Gilbert (2010b: 409), in many markets price discovery at delivery is often the mechanism of last resort, whereas the bulk of transactions are executed at futures prices with reference to the price of nearby futures contracts (i.e. contracts that are approaching maturity). For maize, soybeans and wheat, the empirical findings in Hernandez and Torero (2010) support earlier evidence by indicating that changes in futures prices lead changes in spot prices more often than not. Regarding crude oil, the International Energy Agency (IEA, 2009: 107) describes how common trading practices cause the futures market to determine the price at which physical delivery occurs. Moreover, financial investors may not hold physical inventories themselves, but their investments bid up the prices of futures contracts, which in turn provides an incentive for others to hold inventories.

The observation that no such accumulation of inventories occurred during the commodity price hike of 2006–2008 relates to a second argument introduced by Krugman (2008) with regard to oil prices. According to him, speculative activity that drives prices above fundamental equilibrium levels will cause market imbalances and excess supply, which eventually must result in inventory accumulation. This reasoning would suggest that, since reported oil inventories did not increase, speculation cannot have played a role in causing oil prices to rise in 2008. However, Khan (2009: 5) argues that data on oil inventories are notoriously poor. Data on oil inventories are not reported by most non-OECD countries, which account for almost half of the world demand for crude oil and include very large consumers such as China, and neither is the data on oil stored in tankers, thus underestimating the inventory data reported by OECD countries. Hence, no strong inferences can be drawn from such data. More fundamentally, Krugman’s argument may take time to play out. As also argued by Gilbert (2010b: 408), rising demand for futures contracts tends to cause a price increase in long-dated futures contracts, which in turn will provide an incentive to accumulate inventories. But given the very low short-run price elasticity of commodity supply, the short-term inventory supply curve is close to vertical. As a result, only an increase in spot prices can meet the increase in demand. Over time, production and consumption will respond to

be owned by banks and trading companies. Since such inventories are either not at all or only partially reported in official inventories, it gives banks an informational advantage over other market participants regarding the “real” amount of inventories. Ownership of these warehouses also allows banks to occupy most of the suitable storage space, so that a shortage of storage facilities for owners of futures contracts makes it more difficult and expensive for

those owners to take delivery. As a result, they may prefer rolling over their contracts which they perhaps hold with the very bank that tightens the supply of suitable storage space.

There is similar anecdotal evidence which suggests that some financial institutions imported copper into China to stock in warehouses outside the reporting system. This copper was then purportedly

Box 5.2 (concluded)

the higher price, inventories will gradually accumulate and prices will decline. In the interim, however, a commodity price bubble may well occur.

Third, Irwin, Sanders and Merrin (2009) and Sanders and Irwin (2010) argue that even if financial investors had an impact on prices and drove a wedge between market prices and fundamental values, the resulting arbitrage opportunity would cause rational traders to trade against wrongly informed financial investors and bring market prices back to fundamental values. However, as mentioned earlier, there is widespread agreement that there are limits to arbitrage.

The possibility that even rational traders may feed short-term price bubbles also casts doubt on a fourth argument made by Irwin, Sanders and Merrin (2009) and Sanders and Irwin (2010), namely that there is no indication of excessive speculation. Estimating the appropriate level of speculation relative to hedging demands on the basis of positions taken by different trader categories, they argue that the level of speculation in commodity futures markets was within historical averages during the period 2006–2008. However, judging the appropriate level of speculation merely by the number of positions, rather than by the kind of information and expectations on the basis of which such positions are taken, ignores the possibility that fundamental values may not always be the only consideration, even for rational speculators. Moreover, even on the basis of such numerical comparisons, Büyüksahin and Robe (2010: 15) conclude that “[e]xcess speculation increased substantially, from about 11% in 2000 to about 40–50% in 2008.”

Fifth, focusing on index investment, Irwin, Sanders and Merrin (2009) and Sanders and Irwin (2010) argue that, if index investors in futures markets had caused the commodity price hike, the prices of commodities not included in such indexes (such as iron ore, onions and rice) should not have risen. However, Tang and Xiong (2010) suggest that different mechanisms accounted for the price increases of these two groups of commodities, and that those commodities included in indexes were affected by financial investors.

Finally, Irwin, Sanders and Merrin (2009) and Sanders and Irwin (2010) argue that if index investment affects prices, its effect should be uniform across markets for the same relative position size, and they claim that this is not the case. However, the common effect of index investment occurs simultaneously with commodity-specific supply and demand shocks. These idiosyncratic shocks may counter or reinforce the common effect, depending on commodity-specific circumstances, and may do so in varying degrees. Moreover, the size of index trader positions in a specific market does not depend on the size or the liquidity of that market, but rather on the specific composition of the index that the trader follows.

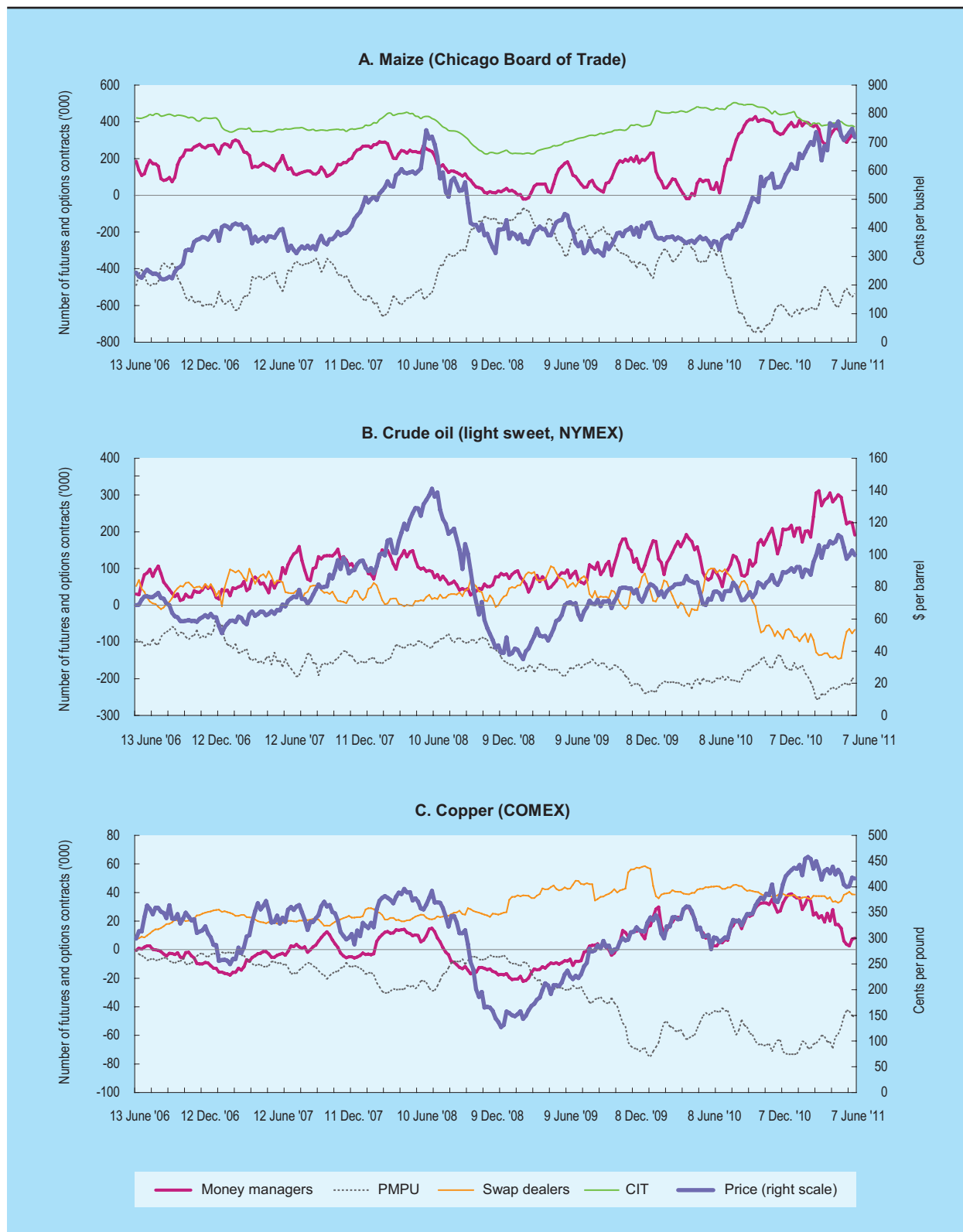
^a This text is drawn from Mayer, 2011.

used as collateral to speculate in other markets, or to re-export to countries that host London Metal Exchange licensed warehouses, or, in the case of some Chinese enterprises, to finance corporate development. According to these sources, securing bank loans by borrowing against copper as collateral is cheaper than conventional borrowing because the monetary tightening measures taken by the Bank of China at that time only affected non-collateralized

lending.²³ Tying up physical copper inventories in warehouse financing arrangements signals market tightness and supports prices, especially when those inventories are not entered into official inventory statistics. If this anecdotal evidence is accurate, it could also explain why China’s copper imports remained high even during the run-up to the price peak in February 2011. Moreover, it would illustrate how schemes operated by financial investors can distort

Chart 5.4

PRICES AND NET LONG FINANCIAL POSITIONS, BY TRADER CATEGORY, SELECTED COMMODITIES, JUNE 2006–JUNE 2011

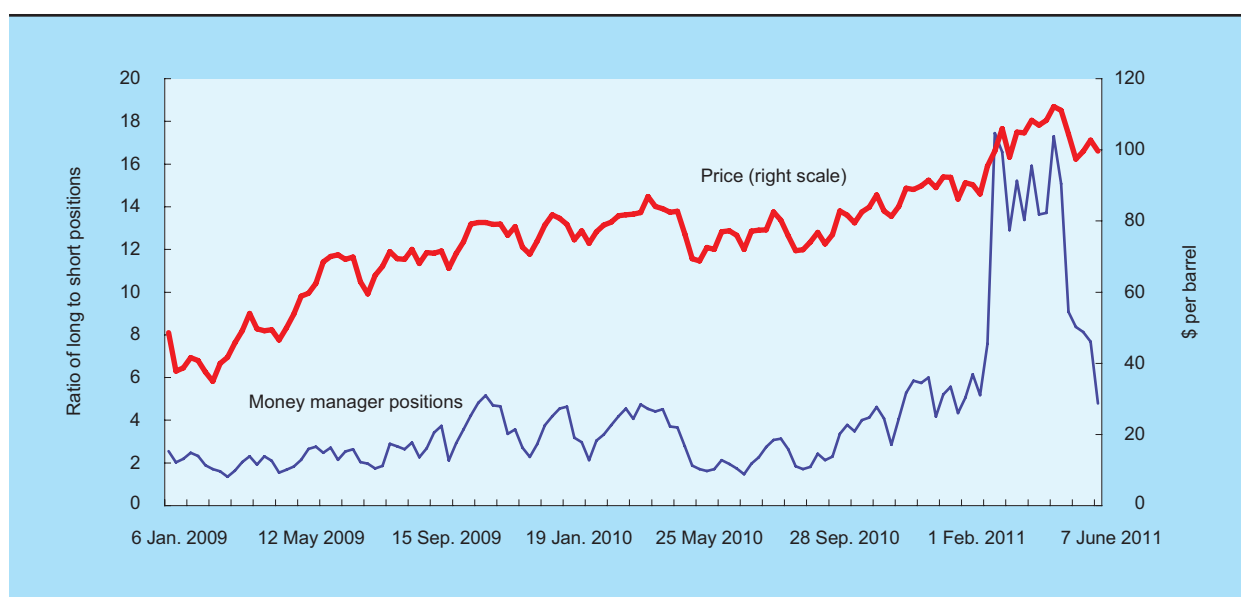


Source: UNCTAD secretariat calculations, based on CFTC, *Commitment of Traders*; and Bloomberg.

Note: CIT = commodity index traders; PMPU = producers, merchants, processors, users.

Chart 5.5

MONEY MANAGER POSITIONS AND CRUDE OIL PRICES, JANUARY 2009–JUNE 2011



Source: UNCTAD secretariat calculations, based on CFTC, *Commitment of Traders*; and Bloomberg.

data which, in principle, are expected to reflect only market fundamentals. By doing so, such schemes further contribute to difficulties in disentangling the price effects of changes in market fundamentals and in financial investments.

2. Price effects of financial investors across different asset markets

As mentioned earlier, financial investors have sought to diversify their portfolios by investing in commodities as part of a broader strategy aimed at reducing their concentration on equities, bonds and currencies. This change in strategy is based on historical evidence which suggests that the broader portfolio composition improves risk-return performance. Using data for the period 1959–2004, Gorton and Rouwenhorst (2006: 1) argue that “the risk premium on commodity futures is essentially the same as equities, [whereas] commodity futures returns are negatively correlated with equity returns and bond returns. The negative correlation between commodity futures and the other asset classes is due,

in significant part, to different behavior over the business cycle.”²⁴

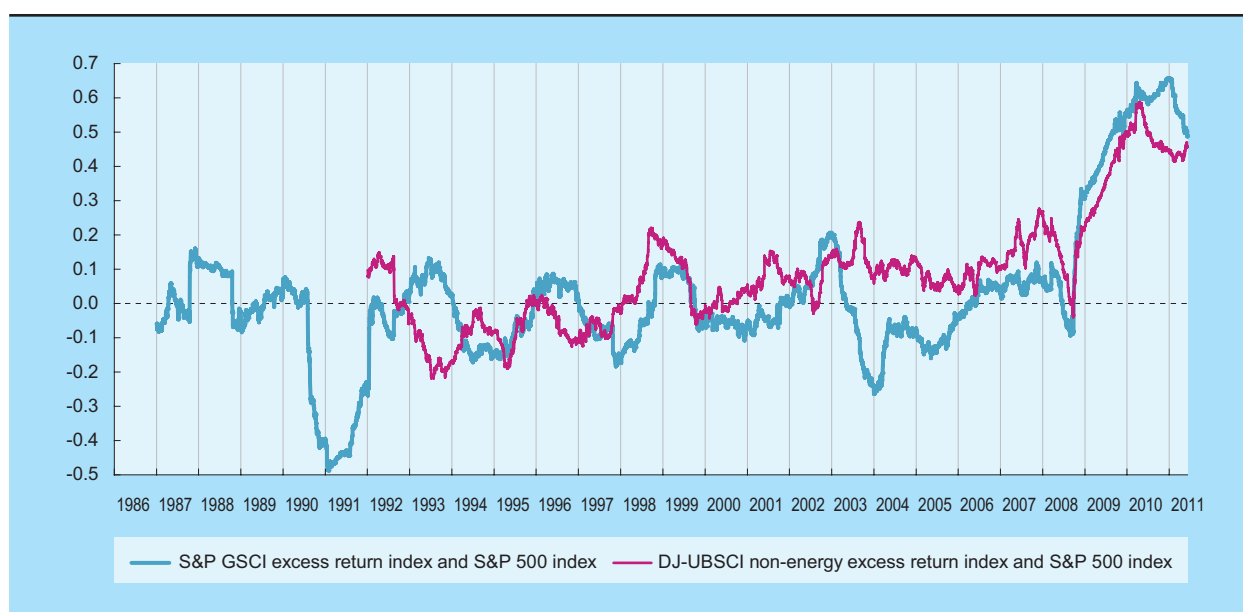
(a) Price developments on commodity and equity markets

Recent evidence suggests that adding commodity futures to their portfolios no longer helps investors hedge against equity market risk. The process of deleveraging that began with the onset of the current crisis in mid-2008 and affected all asset markets resulted in a strongly positive correlation between the returns on commodity futures and those on equity investments (chart 5.6).

From the evidence related to broad-based investment in commodities, reflected in chart 5.6, it would seem that this positive correlation emerged only in the run-up to the current financial crisis, and that it became accentuated only in its aftermath. However, it is well known that the greatest benefits from investing in commodity futures are derived from diversifying across not only different commodity categories but also individual commodities (Erb and Harvey, 2006; Basu and Gavin, 2011). Because the

Chart 5.6

CORRELATION BETWEEN COMMODITY AND EQUITY INDEXES, 1986–2011



Source: UNCTAD secretariat calculations, based on Bloomberg.

Note: The data reflect one-year rolling correlations of returns on the respective indexes on a daily basis.

S&P GSCI (chart 5.6), is heavily weighted in energy, it is possible that the evolution of this correlation during the early 2000s, and especially its strongly negative numbers in 2003, was strongly influenced by events in energy markets, and especially by the war in Iraq in 2003. Thus it is useful to examine the correlation between returns on non-energy commodity futures and equity investments. That correlation began to rise already in the early 2000s, well before the onset of the current crisis, as reflected in chart 5.6.²⁵ This evidence supports findings by Tang and Xiong (2010) that “the introduction of index trading led to a rise in the correlation among the individual commodities included in an index, thus reducing or even eliminating the gains to diversification within individual index funds” (Basu and Gavin, 2011: 46). But it also shows that the crisis-related deleveraging process implied a further shift, and gave rise to a strongly positive correlation between returns on commodity futures and equity investments.

A tightening of monetary conditions is unlikely to eliminate the financialization of commodity markets.

The positive correlation between returns on investment in commodity futures and in equity reached a peak in late 2010–early 2011. This positive correlation is largely attributed to the second round of monetary easing initiated by the United States Federal Reserve in the third quarter of 2010.²⁶ Based on this perception, it is widely believed that a tightening of the United States monetary stance could go a long way towards increasing the cost of funding that underlies financial investments and that has led to an inflation of asset prices across financial markets. However, the fact that there have been two shifts, rather than just one, in the correlation between returns on commodity investment and equity investment (as shown in chart 5.6), indicates that monetary easing may only have accentuated cross-market correlations. By the same token, a tightening of monetary conditions would merely have eliminated the source of the second shift in the cross-market correlation, but it is unlikely to have eliminated the financialization

of commodity markets altogether and brought cross-market correlations back to where they were at the end of the 1990s.

(b) *Commodity markets and world business cycles*

The most recent decline in world industrial output is known to have been by far the strongest of all downward cycles in the past 35 years. The sharp drop of 12 per cent from the peak makes other recessions seem like mild slowdowns in comparison (chart 5.7). However, in spite of the very low utilization of global industrial capacities at the beginning of 2009, the upward pressure on prices in commodity markets was much stronger when compared with similar positions of earlier business cycles – a development often overlooked by observers. Anticipation of recovery by the financial markets seems to have played a disproportionately significant role in this current bout of commodity price inflation.

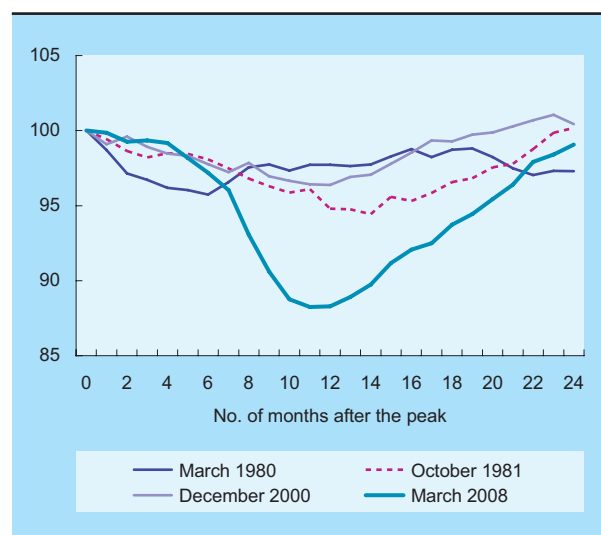
The strong impact of financial investors on prices, which may be considered “the new normal of commodity price determination”, affects the global business cycle in a profound way. Commodity price inflation inhibits a smooth recovery to the extent that it provokes a premature tightening of monetary policy. Indeed, it has played an important role in the tightening of Chinese and Indian monetary policies since early 2010, and in the first interest rate hike since the beginning of the crisis by the European Central Bank (ECB) in April 2011.

To illustrate this “new normal”, it is useful to compare four global business cycles that have occurred since the mid-1970s.²⁷ Global economic activity may be assumed to be reflected in the monthly time series of world industrial production published by the Netherlands Bureau for Economic Policy Analysis (CPB).²⁸ The periods of recessionary troughs can be identified by applying the method proposed by Bry and Boschan (1971) in BUSY, the European Commission’s software package. It shows four recessions for the period 1975–2010, with peaks in March 1980, October 1981, December 2000 and March 2008, and respective troughs in September 1980, December 1982, December 2001 and February 2009. To illustrate the cyclical response of financial markets, the series for industrial production were normalized by their respective troughs.

Chart 5.7

DYNAMICS OF WORLD INDUSTRIAL PRODUCTION AFTER THE PEAKS OF FOUR BUSINESS CYCLES

(Index numbers, peak = 100)



Source: UNCTAD secretariat calculations, based on data from the CPB Netherlands Bureau of Economic Policy Analysis; and OECD.

Note: The dates in the legend refer to the peak of each business cycle.

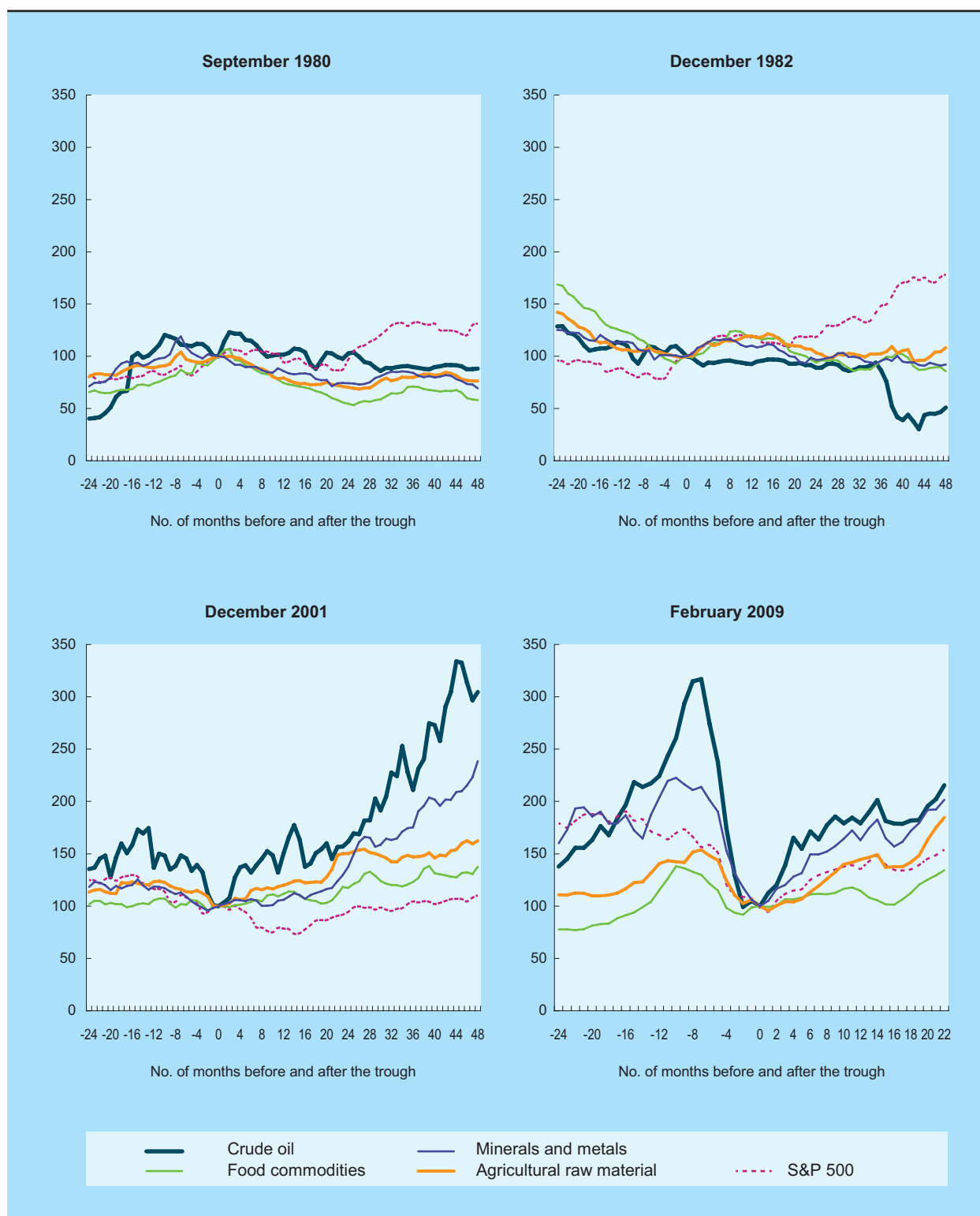
A comparison of the business cycles shows that commodity prices and equity prices moved in opposite directions during the previous identified business cycles (chart 5.8). In contrast, there has been a remarkable synchronization of equity price and commodity price movements in the most recent cycle.

This finding supports the results obtained by the International Monetary Fund (IMF, 2010: 31–33) in a similar exercise for developed economies. In interpreting the results, the IMF warns against considering the increased synchronization of commodity and equity prices as evidence of the financialization of commodity markets, and affirms that “increased co-movement, however, likely reflects the sensitivity of both markets to broader economic developments” (IMF, 2010: 33). However, such an interpretation neglects to take into account the low level of capacity utilization in the wake of the “Great Recession” of 2008 and 2009. Low capacity utilization, in principle, implies a low level of industrial use of commodities, and thus a low level of demand for commodities by their largest consumers. Under such circumstances,

Chart 5.8

EVOLUTION OF COMMODITY AND EQUITY PRICES BEFORE AND AFTER TROUGHS OF SELECTED BUSINESS CYCLES

(Index numbers; business cycle trough = 100)



Source: UNCTAD secretariat calculations, based on Bloomberg; and UNCTADstat.

Note: The dates refer to the corresponding troughs in the business cycle.

steadily rising prices of commodities, even ahead of the rebound of stock market indices, appear to be related more to an anticipation of a future revival of demand than to actually rising demand. The most plausible explanation for such price behaviour is financialization, which eventually, in 2008, led to an overshooting of commodity prices in both directions over their fundamental levels.

The fact that monetary policy reacts to price pressure stemming from rising commodity prices, rather than to bottlenecks in industrial production, points to a worrying aspect of the impact of financialization that has so far been underestimated, namely its

capacity to inflict damage on the real economy as a result of sending the wrong signals for macroeconomic management.²⁹ This is an important reason why more effective regulation of commodity markets is necessary so as to restore an environment of sound price signals and efficient allocation of resources in today's modern market economies.

(c) Price developments on commodity and currency markets

The greater positive correlation between returns on commodity futures and investments in other asset classes is not limited to equity markets; it also appears to have emerged, perhaps even more strongly, with respect to

currency markets. It is common knowledge that dollar-denominated commodity prices often move in the opposite direction to the dollar exchange rate. This is because a lower value of the dollar makes commodities cheaper in non-dollar consuming areas, thereby increasing incentives to consume, while it reduces the revenues of producers in non-dollar areas, thereby decreasing incentives to produce (*TDR 2008*). This mechanism may well explain part of the increased negative correlation between returns on the S&P GSCI excess return index and the dollar exchange-rate index, which began in the early

2000s (chart 5.9). Indeed, this is consistent with the growing demand for commodities from emerging economies in a period of dollar depreciation, as noted by Tang and Xiong (2010: 11). However, the abrupt character and sizeable size of this shift, the fact that it occurred in 2002–2003 and that another similar shift occurred in the wake of the current crisis suggest that other factors have contributed to this development.

An additional factor is most probably the emergence of the dollar as a funding currency of carry-trade speculation.³⁰ In 2002–2004 (i.e. when the financialization of commodity trading began), there was a substantial

change in the correlation between returns on commodity futures and the exchange rates of currency pairs that have been popular with carry-trade speculators (as shown in chart 5.9 for a number of selected currency pairs). This positive correlation clearly increased in the run-up to the peak in commodity prices in 2008, became fairly strong after the onset of the current crisis when there was a general process of deleveraging across different asset classes, and was further accentuated following the adoption of the second round of monetary easing by the United States Federal Reserve in the second half of 2010. However, since May 2011, when the Federal Reserve announced that it would not extend this second round beyond the month of June, these correlations have

declined, returning to levels that existed prior to monetary easing. This evidence reinforces the point made above, that the effect of phasing out monetary easing in the United States on cross-market correlations of returns on financial investment merely led to a return to the situation that prevailed prior to the onset of the financial crisis but it is unlikely to have eliminated the

price effects of the financialization of commodity trading altogether.

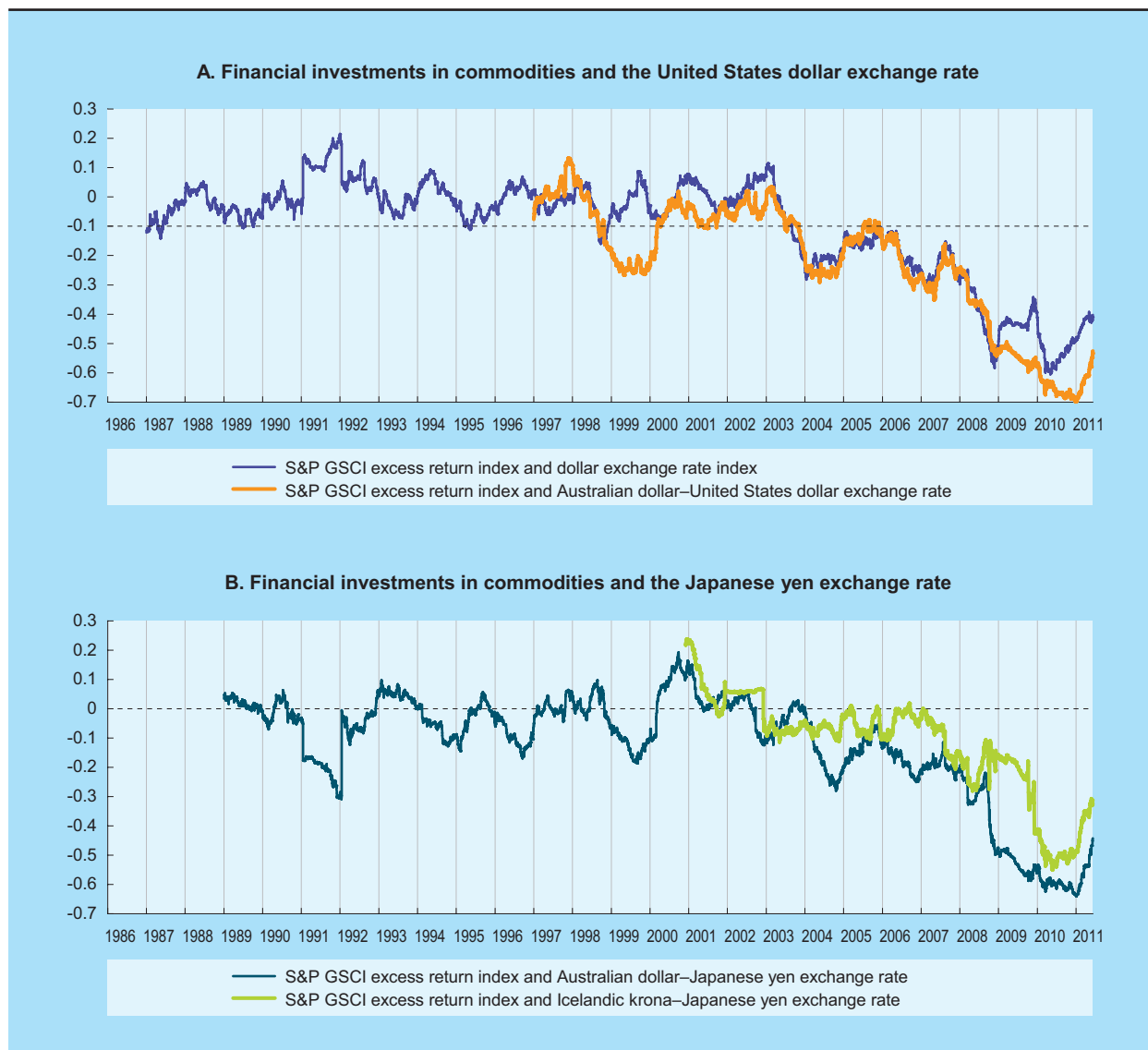
Taken together, the above evidence for the past two decades indicates that, relative to the historic importance of strategic portfolio diversification considerations, the search for higher yields has come to

Monetary policy reacting to price pressure stemming from rising commodity prices points to a worrying aspect of the impact of financialization that has so far been underestimated ...

... namely its capacity to inflict damage on the real economy as a result of sending the wrong signals for macroeconomic management.

Chart 5.9

**CORRELATION BETWEEN FINANCIAL INVESTMENTS IN COMMODITIES
AND SELECTED EXCHANGE RATES, JANUARY 1986–JUNE 2011**



Source: UNCTAD secretariat calculations, based on Bloomberg.

Note: The data reflect one-year rolling return correlations on a daily basis.

play an even greater role for financial investors in commodities. Given the historic diversification and hedging characteristics of financial investment in commodities, this search for higher yields through such investment may have been based on the illusion that it offered risk-free profit maximization. The recognition that the diversification benefit of commodity investment may have been overestimated could limit the amount of broad-based index investment in

commodities. However, it could also increase the attractiveness of more targeted investment, such as through indexes limited to specific categories of commodities or even individual commodities. The recent increase in popularity of exchange-traded products, many of which are related to indexes that replicate the return on selected commodities, may indicate that financial investors are not yet ready to turn their back on commodities as an asset class.

E. Policy considerations and recommendations

Over the past decade or so, commodity price developments have been associated with marked shifts in supply-demand balances. For many commodities, demand has grown faster than supply resulting in declining stocks, especially of food commodities. In such a situation, any sudden increase in demand or major shortfall in supply – or both – rapidly leads to significant price increases. This is of particular significance for food commodities because of the immediate economic and social impacts of food price hikes on the most vulnerable populations. Hence, emergency food reserves need to be established or rebuilt to an adequate level in order to moderate the impact of temporary shortages, and be rapidly available to provide emergency food relief to the most vulnerable at times of food crisis.

Increased private and public investment aimed at higher production and productivity is a key element in any long-term solution to redressing the decline in commodity supply-demand balances. This will require the provision of more official development assistance to agriculture in developing countries. At the same time, it is necessary to provide incentives to increase production and productivity, particularly in food commodities in these countries. The incentives could include a reduction of trade barriers and domestic support measures in developed countries.

Apart from emergency measures designed to assist the most vulnerable and the long-term measures designed to tackle excessive commodity price volatility on the supply side, there is also a need to find ways of making commodity markets less prone to behavioural overshooting increasingly brought about by the financialization of those markets. For this, it is necessary to consider how the functioning of commodity futures exchanges and off-exchange OTC trading could be improved in a way that would

enable those trading venues to better fulfil their role of providing reliable price signals to commodity producers and consumers, or at least prevent them from sending the wrong signals. Accordingly, the remainder of this section examines: (i) how information and transparency in physical commodity markets could be improved; (ii) how transparency in commodity futures exchanges and OTC markets could be improved; (iii) the need for tighter regulation of financial investors; and (iv) the need for broader policy measures, including schemes designed to avert or deflate speculative bubbles.

1. *Improving transparency in physical commodity markets*

Greater transparency in physical markets would enable the provision of more timely and accurate information about commodities, such as spare capacity and global stock holdings for oil, and for agricultural commodities, areas under plantation, expected harvests, stocks and short-term demand forecast. This would allow commercial market participants to more easily assess current and future fundamental supply and demand relationships. Insufficient availability of such information, at present, makes it difficult for commercial participants to determine whether a specific price signal relates to changes in fundamentals or to financial market events. This lacuna also facilitates the intentional introduction of misinformation, such as “research-based” price forecasts by big banks that have taken financial positions in commodity markets, and therefore could potentially reap financial benefits if those forecasts turned out to be accurate. Overall, the availability of high-quality and consolidated, timely information on fundamental

supply and demand relationships in physical markets would reduce uncertainty, and thus the risk of market participants engaging in herd behaviour.

To achieve greater transparency in physical markets, there needs to be better producer-consumer dialogue and improved data collection, analysis and dissemination. Oil-market participants benefit from the JODI Oil World Database, which covers production, demand, refinery intake and output, imports, exports, closing stock levels and stock change (see also box 5.3). While this initiative has greatly improved transparency in the oil market, several gaps remain. For example, the data are published

at monthly intervals and therefore do not provide adequate information about short-term events on which active financial investment strategies are based. Perhaps more importantly, the database does not include information on spare capacity. As pointed out by Kaufmann (2011), it was the lack of information on spare capacity in non-OPEC oil-producing countries that caused the sudden slowdown in the growth rate of non-OPEC crude oil supply after 2004, which caught market participants by surprise and ignited a sudden increase in oil prices. Also, the database does not include information on oil bunkered in cargo vessels, which is often owned by the private sector, so that associated information is commercially sensitive and remains undisclosed. Collecting and publishing this information in aggregate form in such a way that its proprietary character would not be jeopardized would be an important step towards greater transparency, and could help prevent sharp, short-term price changes.

There is even less transparency in the physical market for agricultural commodities. While information is available from various sources, the capacity of countries and international organizations to produce consistent, accurate and timely agricultural market data and analysis remains weak. Indeed, extreme weather events in both 2007–2008 and 2010 took the international community by surprise. The resulting increased uncertainty may well have induced

Apart from emergency measures to assist the most vulnerable and long-term measures to increase investment ...

... there is also a need to improve market transparency, tighten regulation of financial investors and consider schemes designed to avert or deflate speculative bubbles.

misinformed, panic-driven price surges and triggered increased speculative investment that amplified the price increases.

Perhaps the major gap in transparency in the physical market for agriculture is the paucity of information on stocks. There are multiple reasons for this, a major one being that a significant proportion of stocks is now held privately, which makes such information commercially sensitive. As a result, stock data published by international organizations are an estimated residual of data on production, consumption and trade. Enhanced international cooperation could improve

transparency by ensuring public availability of reliable information on global stocks. The JODI oil database could serve as a model for such an initiative, as outlined in the proposal to the Agricultural Market Information System (AMIS) put forward by the inter-agency report on agricultural price volatility prepared for the French Presidency of the G-20 (FAO et al., 2011).

2. Improving transparency in commodity futures exchanges and OTC markets

The ability of regulators to understand what is moving prices and to intervene effectively depends upon their ability to understand the market and to collect the required data. However, at present, comprehensive data are not available, particularly for off-exchange derivatives trading. While traders on OTC markets benefit from the information that traders on organized futures exchanges provide for price discovery, they do not provide comparable information of their own.

As expressed in paragraph 13 of the Leaders' Statement of the G-20 Summit in Pittsburgh in September 2009, as well as in the conclusions of the G-20 Task Force on Commodity Futures Markets

Box 5.3

SOURCES OF INFORMATION ON COMMODITY MARKET FUNDAMENTALS^a

Different types of commodity market information are available, including: (i) raw data from databases that cover prices, production, consumption, stocks and trade; (ii) processed data based on analyses of market trends and monitoring of the current situation; and (iii) forecasts or projections of the short- medium- and long-term evolution of market fundamentals. The frequency of such information varies widely, depending on the data source, and can range from daily to annual. However, most publicly available information from official sources is based on monthly data.

There is ample information on physical commodity markets, but it is not easy to obtain in a systematic way. A number of sources provide the same information, but in different formats. It therefore takes time and expertise to find out which are the most useful, relevant and reliable sources of information required for a specific commodity. Even from a single source the multiplicity of information can make it rather cumbersome to access the relevant information. The various sources of information include official sources, such as international organizations and study groups, organizations specializing in specific commodities or groups of commodities, and governments of countries which are key players in the commodity markets, such as Australia and the United States, as well as private sources. In many cases, even from official sources, information is not publicly available and can be accessed only against payment.

For agricultural commodities, the Food and Agriculture Organization of the United Nations (FAO) is the main international source for data, market analysis and monitoring of market fundamentals. The FAO publishes data at different frequencies for various agricultural commodities, most of which can be accessed on the Internet from its World Food Situation portal. Moreover, a national source, the United States Department of Agriculture (USDA), is among the most comprehensive sources of information on global agricultural markets. Its information is particularly important because the United States is a major producing country for a number of agricultural commodities such as cotton, maize, wheat and soybeans. Therefore, information about changes in estimations on crops in that country can have a strong impact on global markets. The Comité du Commerce des céréales, aliments du bétail, oléagineux, huile d'olive, huiles et graisses et agrofournitures (COCERAL) publishes forecasts for grain and oilseed crops for the countries of the European Union (EU).

Regarding crude oil, the most comprehensive source of data on production, demand, refinery intake and output, imports, exports, closing stock levels and stock changes is the Joint Organisations Data Initiative (JODI). This initiative comprises seven partner organizations: Asia-Pacific Economic Cooperation (APEC), EUROSTAT, the International Energy Agency (IEA), the International Energy Forum (IEF), the Latin American Energy Organization (OLADE), the Organization of the Petroleum Exporting Countries (OPEC) and the United Nations Statistics Division (UNSD). More than 90 countries, representing about 90 per cent of global oil supply and demand, participate in JODI. The JODI Oil World Database is freely accessible and is updated monthly. Information on the major energy-consuming countries is available through the *Oil Market Report* online service of the IEA, which provides a monthly assessment of supply, demand, stocks, prices and refinery activity. On the supply side, OPEC's *Monthly Oil Market Report* covers major issues affecting the world oil market, the outlook for crude oil market developments for the coming year, and a detailed analysis of key developments impacting oil market trends in world oil demand, supply and the oil market balance. At the national level, the United States Energy Information Administration provides a variety of data and analyses on the situation in United States and global energy markets, at different time frequencies. In the private sector, the widely used, publicly available annual *Statistical Review of World Energy* produced by British Petroleum provides objective data about world energy, markets and trends. In addition, Cambridge Energy Research Associates (IHS CERA) is a leading adviser to different clients, including international energy companies, governments, financial institutions and technology providers. It delivers critical knowledge and independent analyses on energy markets, geopolitics, industry trends and strategy.

Platts is a leading global provider of energy information, and among the foremost sources of benchmark price assessments in the physical energy markets. Argus publishes a full range of business intelligence reports, market assessments and special studies on all aspects of energy, transport and emissions markets. Commodity forecasts are also offered by companies specializing in market intelligence, such as the Economist Intelligence Unit, Business Monitor International and LMC International (agricultural commodities). In addition, the Working Group on Commodity Prices of the Association of European Business Cycle Institutes (AIECE) publishes a *World Commodity Prices* report twice a year, with price forecasts for two years.

This brief review shows that there is an abundance of data sources concerning the fundamentals of physical commodity markets. Nevertheless, a number of information gaps exist, and there are many areas in which the transparency of physical commodity markets could be improved, as mentioned in the main text.

^a This box is based on Fajames, 2011.

(IOSCO, 2010), transparency on OTC markets could be improved by registering contracts in a trade repository (see also the annex to this chapter).³¹ This would be important especially for non-standardized, illiquid contracts where counterparty risk involves end-users of derivatives who hedge commercial risk in commodities. While such data would need to remain confidential, their availability to regulators would reduce the risk of market abuse. The rules proposed by the European Commission (EC, 2010), which, *inter alia*, envisage central clearing requirements for standardized contracts, including those involving index funds, would also help improve transparency and reduce counterparty risk. In order to capture contracts that are primarily used for speculation rather than for hedging commodity-related commercial risk, the requirements should exempt contracts relating to transactions that are intended to be physically settled.³²

Significantly more information is available for trading on commodity futures exchanges, especially in the United States (as discussed in UNCTAD, 2011) where a substantial proportion of commodity futures trading is executed. However, on European exchanges, at present only very limited data are available for exchange trading. Therefore, transparency could be considerably improved if the European exchanges adopted reporting requirements and published aggregate position data similar to the weekly Commitment of Traders (COT) reports published by the CFTC. In addition to such aggregate data, detailed data should be made available to market authorities for transactions on exchanges, OTC markets and the related physical markets. Market authorities in different jurisdictions should cooperate and share such data.

3. Tighter regulation of financial investors

Regulation of commodity exchanges needs to find a reasonable balance between imposing overly restrictive limits on speculative position-holdings and having overly lax surveillance and regulation. Being too restrictive could impair the hedging and price discovery functions of commodity exchanges. On the other hand, if surveillance and regulation are not strict enough, prices could move away from levels warranted by fundamental supply and demand conditions, and would thus equally impair the basic

functions of the exchanges. However, finding such a compromise has become increasingly difficult. Financial investors are increasingly engaging in physical market transactions (such as by owning warehouse inventories or even agricultural land) and physical traders are also taking financial positions more frequently, so that the difference between these two types of traders is becoming blurred.

Tighter regulation of financial investors would make it easier for regulators to intervene when they detect irregularities. In addition, similar regulations should be adopted across commodity exchanges and across countries in order to avoid regulatory migration. In this sense, regulations relating to the major commodity exchanges in Europe need to catch up with those in the United States, but both need to be stricter. Tighter regulation could include four measures:

- One measure could be the imposition of limits on the positions taken by individual market participants and those taken by market participants in the same commodity but at different trading venues.³³ Exemptions from position limits should not be granted to hedge financial risk, as is currently the case in the United States, where swap dealer exemptions (which also apply to commodity index funds) are granted with regard to positions on some agricultural commodities. The issue of position limits is currently under discussion in both the EU (EC, 2010) and the United States (for details, see the annex to this chapter). Regulatory measures relating to positions for energy commodities, especially those taken by hedge funds, are equally relevant for agricultural commodities. This is because it has been shown that hedge funds drive the correlation between equity and commodity markets, and that food prices have become more closely tied to energy prices (Büyüksahin and Robe, 2010; Tang and Xiong, 2010). However, since the limited availability of data at present makes it difficult to determine what levels would be appropriate for position limits, the introduction of such limits may take a long time. As an interim step, the introduction of position points could be considered. A trader reaching a position point would be obliged to provide further data, on the basis of which regulators would decide whether or not action is needed (Chilton, 2011).

The imposition of position limits on commodity futures exchanges and OTC markets may facilitate the role of derivatives markets in price discovery. This is because they would not only limit the size of individual financial positions, but also reduce market concentration by ensuring broad-based market participation by diverse traders with supposedly different sources of information and different views on the market. As such, position limits would increase the informational content of trading.

Position limits would apply only to financial firms but not to so-called “bona fide hedgers” that are end-users of derivatives contracts or that offer those contracts as risk-management tools to customers that have a physical exposure to commodity prices in their business operations. Making this distinction requires defining how to separate bona fide hedgers from other market participants, which poses difficult problems.³⁴ It is also often argued that position limits are relatively easy to circumvent (see box 5.2).

Position limits would apply only to financial firms but not to end-users of derivatives contracts.

Perhaps the greatest shortcoming of position limits is that they are unlikely to be effective when traders engage in herd behaviour. In such a situation, the herding traders combined, but none of them individually, would be able to drive price bubbles. Thus, only position limits imposed on specific categories of market participants (such as money managers) could overcome this problem.

- A second measure could be the application of the Volcker rule (which prohibits banks from engaging in proprietary trading) to commodity markets. At present, banks that are involved in the hedging transactions of their clients have insider information about commercially based market sentiment. This amounts to a conflict of interest, as they can use this information to bet against their customers. Moreover, their position-taking may provide false signals to other market participants and, given the size of some of these banks, move prices away from levels normally determined by fundamentals, in addition to provoking price volatility.

- Third, a similar rule could be applied to physical traders, prohibiting them from taking financial positions and betting on outcomes that they are able to influence due to their strong economic position in the physical markets.³⁵

- Fourth, a transaction tax or a requirement to hold positions for a minimum amount of time (say a few seconds) could be established to slow down financial investors’ activities, especially those related to high-frequency trading (HFT).³⁶ Since market participants engaged in HFT usually close their positions by the end of a trading day, they are not a reliable counterparty to hedgers that seek to transfer risk. Moreover, given that they base their position-taking on the evolution of market prices, rather than on information on

underlying fundamentals, their trading adds no information. It is therefore doubtful that HFT makes any contribution to commodity exchanges’ traditional roles of price discovery and risk transfer, or, indeed, that it has any economic and social utility. HFT has attracted considerable attention following allegations that it caused the so-called “flash

crash” on United States equity markets on 6 May 2010. Some observers have also blamed HFT trading for the increase in price volatility on sugar markets between November 2010 and February 2011.³⁷ A transaction tax or a requirement for cash deposits applied more broadly to all financial investors would make position-taking more expensive the more it is leveraged (i.e. debt-financed). It would thus have similar effects as position limits, but would also pose similar definitional problems.

4. Schemes for dealing with speculative bubbles

In the past, international commodity agreements that included provisions relating to internationally held buffer stocks and/or supply controls were often used to stabilize prices. It is commonly believed that these mechanisms were not very successful in reducing price volatility. They were more effective

in moderating downward price movements than price surges. When there is a price surge, a buffer stock agency can only release to the market what it has previously bought, and once its stock is exhausted there are no further means to curb price increases. Mostly for these reasons, international buffer stock mechanisms either collapsed or were replaced by agreements whose main role was to provide market information (Gilbert, 2011).

A major problem for any price stabilization mechanism is that of being able to determine an equilibrium price and establish when market prices have moved away from their equilibrium. It is generally argued that, since a buffer stock agency cannot possibly have more and better information than market participants, there is a high risk of market interventions doing more harm than good (see, for example, Wright, 2009). The virtual reserve and intervention mechanism proposed by von Braun and Torero (2008) and Martins-Filho, Yao and Torero (2011) offers one possibility of circumventing this problem.³⁸ These authors propose an econometric model that would identify when observed price changes are abnormally high relative to a predefined parameter, such as a 5 per cent probability that a price change of such size will occur. The occurrence of such an event would signal abnormal market developments to traders and regulators. Therefore, this scheme would not need to define an equilibrium price. Traders may react to the signal itself, which would render an intervention by authorities unnecessary. The authors suggest that if traders would not react to restore price volatility to a more normal range, an autonomous technical committee could intervene by taking short positions in futures contracts (i.e. promises to sell the commodity at a specified price at a specified date) with a view to reducing extreme price volatility. The fact that these interventions would occur in the futures markets, rather than in the physical market, implies that the agency would not incur any significant storage costs.³⁹

This proposed virtual intervention mechanism would require adoption of an additional, somewhat heavy technical apparatus, the functioning of which would not be materially different from margin calls that commodity exchanges impose on a fairly routine

basis.⁴⁰ At the Chicago Mercantile Exchange (CME), for example, the risk-management and compliance unit in charge of market surveillance determines margins according to quantitative factors, such as rising price volatility, and qualitative factors such as seasonality and relevant news events. Reliance on observable factors, such as price volatility exceeding predefined limits, makes changes in margin requirements largely predictable (i.e. the signals that margin calls emit to markets are similar to those implied by the virtual intervention mechanism). While margin requirements are designed to ensure that exchanges have sufficient capital to cover the expected losses caused by trader defaults, changing margin requirements can have significant impacts on position-taking and prices. For example, the series of increases in margin requirements for silver and oil most probably played an important role in the commodity price correction in early May 2011.

International commodity agreements were not very successful in reducing price volatility.

One problem with margin calls is that the implied increase in trading costs can force small traders to close their positions, while larger traders may be better able to pay up and maintain

at least some of their positions. Thus small commercial users may be disproportionately affected by margin calls. Another problem is that margin calls follow a microprudential regulatory perspective: they protect the respective exchange against default but do not take into account their impacts on positions and prices which may cause a wave of deleveraging and unintended ripple effects across asset markets.⁴¹

This problem could be resolved if market authorities in charge of surveillance were mandated to intervene directly in exchange trading on an *occasional* basis by buying or selling derivatives contracts with a view to deflating price bubbles.⁴² Such intervention could be considered a measure of last resort to address the occurrence of speculative bubbles if reforms aimed at achieving greater market transparency and tighter market regulation, outlined above, were either not in place or proved ineffective (for example, because of definitional problems). It could also be deployed if a possible use of margin calls (which would need to be better coordinated across exchanges) to deal with price bubbles were judged as having strongly adverse impacts on the participation of small commercial users of commodity

exchanges and as posing serious risks of unintended ripple effects. While most of the trigger mechanism could be rules-based, and therefore predictable, such intervention would necessarily have some judgemental components. This is because one source of commodity price bubbles is the increased impact on commodity markets of the evolution of other asset markets, which is due to the financialization of commodity trading, and because a speculative bubble may occur gradually rather than as a result of a sudden, abnormally high price hike. If this raises doubts about the ability of market authorities or government agencies to understand and follow the market, there is no reason for those doubts, because there is no reason why their understanding should be any different from that of other market participants; in markets

As a measure of last resort to avert or deflate speculative bubbles, market authorities in charge of surveillance could be mandated to intervene directly in exchange trading on an occasional basis by buying or selling derivatives contracts.

that are prone to herd behaviour, they all have access to similar information, as discussed in section C above. Contrary to the other market participants, such an intervening authority or agency would have no incentive to engage in any of the forms of intentional herd behaviour discussed in section C.2 above. Rather, it could break the informational cascades that underlie herd behaviour by announcing when, in its view, prices are far out of line with fundamentals.⁴³ Hence, as in the case of currency markets – and, recently, the bond markets – it should be possible for market authorities or another agency to undertake occasional targeted interventions in asset markets by acting as market maker or as the one institution that is able to shock the market once it becomes evident that it has gone into an overshooting mode. ■

Notes

- 1 The degree of processing of final consumption goods also affects price transmission. A lack of domestic infrastructure and generally undeveloped or inefficient market structures can also significantly obstruct price transmission due to high transport and transactions costs.
- 2 Commodity derivatives include futures and options contracts traded on organized exchanges, as well as forward, options and swaps contracts traded on OTC markets. A derivative is a financial asset, generally a contract between two or more parties, whose value is dependent upon or derived from one or more underlying assets, such as a commodity futures contract or a commodity index.
- 3 These empirical findings went counter to those of, for example IMF (2008), Kilian and Hicks (2009), Irwin and Sanders (2010) and Sanders and Irwin (2010), but more recent academic papers and analysis are increasingly supporting the view that financial investors affect commodity prices (see, for example Büyüksahin and Robe, 2010; Gilbert, 2010a; Tang and Xiong, 2010; Kaufmann, 2011; and Singleton, 2011).
- 4 This is evidenced by the frequently quoted examples of commodity price bubbles created by financial investors, including the tulip mania in Holland in the 1630s, the Mississippi Bubble in France and the South Sea Bubble in England in the early 1700s (Garber, 1990).
- 5 For a detailed discussion on the evolution of position limit exemptions for commodity index traders, see United States Senate, 2011: 82–83.
- 6 Notional amount refers to the value of the underlying commodity. However, since traders in derivatives markets do not own or purchase the underlying

- commodity, notional value is merely a reference point based on underlying prices.
- 7 For further discussion, see UNCTAD, 2011.
 - 8 Noise traders may be defined as investors who take trading decisions without the use of fundamental data. They generally have poor timing, follow trends, and over-react to good and bad news.
 - 9 Experimental evidence on persistent judgemental errors in decision-making abounds (see, for example, Ariely, 2010).
 - 10 High-frequency trading (HFT) is a technologically advanced method of conducting algorithmic trading at ultra-high speed. Contrary to other types of algorithmic trading, which focus on price levels and maintain positions over a period of time, HFT traders attempt to benefit from price volatility and usually close out their positions by the end of a trading day. HFT has attracted considerable attention following allegations that it caused the so-called “flash crash” on United States equity markets on 6 May 2010. Some observers have also blamed algorithmic trading for the increase in price volatility on sugar markets since November 2010 (“High-speed trading blamed for sugar rises”, *Financial Times*, 8 February 2011).
 - 11 According to the EMH investment theory, it is impossible to “beat the market” because equity market efficiency causes existing equity prices to always incorporate and reflect all relevant information. The theory states that equities always trade at their fair value on stock exchanges, making it impossible for investors to either purchase undervalued equities or sell equities at inflated prices. As such, it should be impossible to outperform the overall market through expert equity selection or market timing, and the only way an investor could possibly obtain higher returns is by purchasing riskier investments.
 - 12 Similar mechanisms apply when investors follow the advice of analysts who overweigh public information and underweigh their own private information in their messages. Conformity to other analysts’ messages increases investment in the recommended asset and the associated return. This in turn improves the analysts’ reputations.
 - 13 Casual observation suggests that reports on livestock and agricultural crops by the United States Department of Agriculture (USDA) have significant price effects.
 - 14 Price predictions can have a significant impact if they originate from a reputed source. For example, Arjun Murti, a Goldman Sachs analyst, gained considerable fame between 2004 and 2008 when his successive predictions of ever higher oil prices appeared to be vindicated by market developments. According to media reports, other investors questioned whether Goldman Sachs’ own traders were benefiting from these predictions, but the bank’s chief executive denied such accusations (“An oracle of oil predicts \$200-a-barrel crude”, *New York Times*, 21 May 2008).
 - 15 While the “true number” is necessarily hypothetical, frequent disclosure of disaggregated data on positions taken by different trader categories in futures exchanges and OTC markets could be valuable in this context.
 - 16 Phillips and Yu (2010) suggest that this problem can be solved by using an information criterion, rather than the beginning of the data series, to determine the date of the first observation.
 - 17 Data on these categories have been available only since September 2009 when the CFTC started to publish *Disaggregated Commitment of Traders* (DCOT) reports. The discussion in this section ignores “non-reporting traders” (i.e. smaller traders who are not obliged to report their positions) as well as “other reporting traders” (i.e. every reporting trader that is not placed in one of the three categories mentioned in the text). Positions of the latter category are usually negligible but may at times become more important, such as in cocoa, cotton and soybeans in early 2011. For a further discussion of these trader categories and the evolution of position data reporting by the CFTC, see UNCTAD, 2011: 18–19.
 - 18 This is a crude approximation. In fact, the index trader category of the *Supplementary Commodity Index Traders* (CIT) reports does not coincide with the swap dealer category in the *Disaggregated Commitment of Traders* (DCOT) reports. This is because the swap dealer category of the DCOT reports includes swap dealers who do not have commodity-index-related positions, and therefore are not included in the index trader category of the CIT reports. Also, the index trader category of the CIT reports includes pension and other investment funds that place their index investments directly into the futures markets rather than going through a swap dealer; these traders are classified as managed money or other reportables in the DCOT reports (see also Irwin and Sanders, 2010).
 - 19 For the sake of simplicity, these charts show the net positions of only three trader categories. Both charts omit the category “other reporting traders”. The chart for maize also omits the “swap dealer” category, whose positions correspond closely to those of the “commodity index traders” (CITs). Given that no data for CITs are available for crude oil, the respective graph shows only the swap dealer category. However, it should be noted that, contrary to agricultural commodities, for energy commodities such as crude oil, the positions taken by swap dealers and CITs may differ significantly. This is because swap dealers operating in agricultural markets undertake only a few transactions that are not related to index investments. On the other hand, swap dealers in energy markets conduct a substantial

- amount of non-index-related transactions, which is the very reason why the CFTC has excluded energy commodities from its CIT reports. The CFTC (2008) estimates that in 2007–2008, less than half of the swap dealers' long positions in crude oil futures were linked to index fund positions. This may also explain why swap dealers' positions in crude oil have been significantly more volatile than those in agricultural commodities.
- 20 A high or increasing ratio of long to short positions may be considered an indication of herding by investors betting on rising prices, as it indicates that an increasing proportion of those investors are taking long positions. Since crude-oil markets were highly liquid over the period February–May 2011, the observed changes in position ratios cannot be attributed to statistical effects caused by low market participation.
- 21 The short-lived rebound in oil prices in the last week of May was preceded by a threefold increase in the ratio of long to short positions taken by money managers in the Intercontinental Exchange, which trades a similar WTI-contract as NYMEX but with a generally smaller market turnover.
- 22 For a good summary of this evidence, see “Bubble Trouble” on the BBC World Service, at: <http://www.bbc.co.uk/programmes/p00gsmdd>. Further anecdotal evidence is available in Thomson Reuters' *Metals Insider* of 27 April 2001, at: <https://customers.reuters.com/community/newsletters/metals/MetalsInsider20110427.pdf>, as well as in many blog entries on <http://ftalphaville.ft.com>.
- 23 The Chinese Government tightened the rules concerning such financial deals in April, resulting in declining copper inventories and prices, as discussed by Weiss, “China and copper – A dangerous carry trade”, 16 May 2011, at: http://www.cnbc.com/id/43045324/China_and_Copper_A_Dangerous_Carry_Trade.
- 24 As discussed in more detail by Basu and Gavin (2011: 44–46) on the basis of additional empirical evidence, Gorton and Rouwenhorst (2006) found a statistically significant negative correlation between returns on equities and commodity futures only for longer periods, such as five years. For short periods it was nearly zero, and for periods up to one year it was negative but not statistically significant.
- 25 Statistical tests indicate that the shift in the mean of the correlation following the bursting of the equity market bubble in 2000 is strongly significant even if the post-crisis period is excluded. The evidence is qualitatively similar, though numerically less strong, if the S&P GSCI non-energy index is used instead of the non-energy index of the Dow Jones-UBS Commodity Index (DJ-UBSCI).
- 26 A recent econometric study (Anzuini, Lombardo and Pagano, 2010) on the impact of monetary conditions on commodity prices examined three direct channels (as opposed to indirect channels, such as global aggregate demand, expected inflation and a depreciation of the dollar) through which a decline in short-term interest rates could lead to higher commodity prices: (i) an increase in demand, given that lower interest rates reduce the opportunity costs of carrying inventories; (ii) a decrease in supply, given that low interest rates reduce the incentive to extract exhaustible resources; and (iii) an increase in financial investors' positions in commodity markets, given that lower interest rates reduce the carrying cost (caused, for example, by leveraging) of speculative positions. These authors found that “the impact of monetary policy on commodity prices is rather limited, though statistically significant” (Anzuini, Lombardo and Pagano, 2010: 5). They also found that among the three direct channels, financial positions had by far the largest price impact. However, these authors did not test for the price impact of unconventional monetary policy measures that were adopted in 2010–2011, especially by the United States Federal Reserve. These measures were characterized by the continuation of very low short-term interest rates and an easing of monetary and financial conditions. The latter was implemented by communicating the intention to maintain low policy interest rates and by purchasing financial assets on a large scale. These policies may have raised inflation expectations and lowered long-term interest rates. As a result, it is possible that the effect of the post-crisis monetary policy on commodity prices may have been somewhat stronger. However, to date no quantitative assessments of such potential effects are available. A study by Kawamoto et al. (2011) comes closest to such a quantitative assessment. On the assumption that unconventional monetary easing made financial investors relatively confident that no unexpected hike in interest rates would occur any time soon, these authors proxy the impact of unconventional monetary easing on commodity prices by an increase in financial investors' risk appetite, as measured by rising equity prices. In terms of policy implications, however, it would appear inappropriate to use monetary policy as an instrument to contain this “search for yield” by financial investors. Regulatory measures – and more targeted schemes such as those discussed in section E of this chapter – are perhaps more appropriate instruments to address potential asset price bubbles.
- 27 In the early 1990s, many countries in the world experienced recessions, but these recessions did not occur simultaneously. In Germany, for example, the boom after reunification delayed the cyclical downturn. For this reason no recession is identified for the world as a whole.
- 28 Given that these time series begin only in 1991, for the period 1975–1991 a proxy series was constructed

- on the basis of the growth rates of the industrial production series of the Organisation for Economic Co-operation and Development (OECD) for all its member States. OECD industrial production and world industrial production show fairly similar dynamics in the early 1990s – that is, before the strong growth of the emerging economies unsettled this relationship.
- 29 It should be noted that even if such imported price pressure was based on fundamental factors, a tightening of monetary policy would not be the right policy response as it would imply reacting to a supply-side shock by a policy measure that addresses demand.
- 30 Carry-trade speculation is a strategy whereby an investor sells a currency that yields a relatively low interest rate (i.e. the so-called “funding currency”) and uses those funds to purchase short-term assets denominated in a different currency that yields a higher interest rate.
- 31 For details on how planned rule-making in the United States is expected to deal with this issue, see Dodd-Frank Act 2010, sections 727 and 763, as well as Gensler, 2010.
- 32 Such exemptions are envisaged in the Dodd-Frank Act 2010, section 721.
- 33 The Stop Excessive Energy Speculation Act of 2008 that Senators Lieberman and Collins brought before the United States Senate on 25 July 2008 proposed that position limits on traders in energy derivatives markets be set in the aggregate, rather than on an exchange-by-exchange basis. However, the bill did not get a sufficient number of favourable votes for its supporters to invoke cloture (for details, see: <http://ecip.loc.gov/cgi-bin/bdquery/z?d110:SN03268:@@L&summ2=m&>). As explained by Greenberger (2009), aggregate position limits would apply to the “corporate control entity under which physical futures trading is done” and traders under that entity could operate within those limits at their discretion in any regulated or unregulated futures exchange or OTC market, so that the regulatory nature of the trading venue would become irrelevant.
- 34 Those opposed to position limits often argue that large institutional investors (such as pension funds that have traditionally taken passive broad-based index positions) that are not bona fide hedgers provide market liquidity, thereby reducing the dependence of bona fide hedgers on small-scale speculators as their counterparties which would make hedging more difficult and expensive. However, while it may be true, in principle, that the presence of more and larger traders makes it easier to find a counterparty, the price discovery function of derivatives markets requires positions to be taken on the basis of market fundamentals. This is not the case for institutional investors who usually invest in commodities for portfolio diversification reasons.
- 35 For a recent example, see the Glencore case that was widely discussed in the media, such as by Blas and Farchy, 2011.
- 36 HFT is a technologically advanced method of conducting algorithmic trading at ultra-high speed.
- 37 See: *Financial Times*, “High-speed trading blamed for sugar rises”, 8 February 2011.
- 38 Another proposal is for a multi-tier transaction tax system for commodity derivatives markets. Under this scheme, a transaction tax surcharge of increasing scale would be levied as soon as prices started to move beyond the price band defined on the basis of commodity market fundamentals (Nissanke, 2010).
- 39 The facility would nonetheless require funds to purchase the futures contracts. The authors propose that these funds be provided by the group of countries participating in the virtual reserve and intervention scheme.
- 40 Parts of this and the following paragraph draw on *The Wall Street Journal*, CORRECT: Margin increases didn’t cause silver slide - CME Clearing Executive, 6 May 2011, available at: <http://online.wsj.com/article/BT-CO-20110506-714080.html>; Pirrong C, No margin for error, 9 May 2011, available at: <http://streetwiseprofessor.com/?p=5114>; and Leff J and Gibbons R, Analysis—Commodity price margins: Art, science or politics? 12 May 2011, available at: <http://www.reuters.com/article/2011/05/12/us-exchange-margin-idUSTRE74BON320110512>.
- 41 A further problem is that margin requirements are set by exchanges, which means that both the level of margin requirements and the timing of margin calls may differ across exchanges. This may create uncertainty among market participants.
- 42 The costs of such interventions could probably be easily funded from the proposed transaction tax on HFT, mentioned above. An alternative could be to apply additional capital requirements for financial investors, but this would again raise definitional problems as to how to distinguish purely commercial from financial market participants.
- 43 With regard to judging when such an occasional intervention should actually occur, it may be useful to draw another parallel with currency-market interventions. As expressed many years ago by Emminger (1982: 16–17), a former president of the Deutsche Bundesbank, who could hardly be considered as entertaining anti-market sentiments: “I wholeheartedly agree that the monetary authorities have no way of knowing exactly what is the ‘right’ exchange rate. But *in most cases one can recognize when an exchange rate is very much out of line, is destabilizing and distorting, and is likely to turn round again*” (emphasis in original).

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Annex to chapter V**REFORM OF COMMODITY DERIVATIVES
MARKET REGULATIONS**

The extreme commodity price movements that occurred around the outbreak of the financial crisis in 2007–2008 spurred an intense debate about the need for making appropriate changes in commodity market rules and their enforcement. In particular, the breadth of deleveraging that accompanied the commodity price collapse in 2008 illustrated the extent to which prices on global asset markets, including those for commodities, have become interlinked, as asset price fluctuations are an integral part of financial institutions' risk exposure.

Policymakers and regulatory authorities recognized that reform of commodity market regulations needs to be part of broader financial market reforms. The reforms aim at increasing transparency and the effectiveness of regulation in reducing financial risks, as well as ensuring greater harmonization of rules applied in different jurisdictions in order to avoid regulatory arbitrage (i.e. a shift of trading activities towards locations where regulation is perceived to be less restrictive).

This annex provides a brief overview of reform proposals elaborated by specifically mandated bodies at the international level, as well as by policymakers and regulators in the United States and the EU (i.e. where the major commodity futures markets are

located). These proposals are based on the recognition that the use of complex derivative instruments in often opaque trading environments played a major role in triggering the crisis and its subsequent spread across asset markets. With respect to commodity markets, the three major areas for reform concern: (i) improving transparency in derivatives trading; (ii) extending regulation from exchange venues to OTC markets; and (iii) imposing limits on the size of positions held by market participants.

No attempt is made here to evaluate the various legislative proposals.¹ However, it is clear that their implementation and enforcement would involve substantial changes in commodity trading rules and practices. This would most probably help reduce the vulnerability of commodity price formation to undue impacts from financial investors' activities. It would also address more long-term concerns relating to market transparency, price volatility and contagion across asset markets resulting from financial investors' risk exposure. However, the time-consuming process of consultations with market participants to fully draft the rules, and the substantial funding required to finalize and implement the proposed regulatory reforms may explain why few, if any, of them have been enacted and implemented so far.

The international agenda

The international agenda for financial reform adopted a number of subjects directly focusing on financial markets in the aftermath of the Asian financial crisis in 1997–1998. Following the outbreak of the current financial crisis, this agenda has been broadened to cover other areas as well, including commodities. The G-8 Meeting of Finance Ministers in Osaka in June 2008 expressed concern over the functioning of certain commodity derivatives markets, and called for an examination of the functioning and regulation of those markets.² In response, in September 2008 the International Organization of Securities Commissions (IOSCO) established the Task Force on Commodity Futures Markets, jointly chaired by the CFTC and the United Kingdom's Financial Services Authority. The Task Force has given particular emphasis to oil, owing to the concern over price volatility in energy markets during 2008 expressed by the G-20 leaders at their meetings in Pittsburgh (United States) in September 2009 and Seoul (Republic of Korea) in November 2010.³ The G-20 Pittsburgh Communiqué also called for all standardized OTC derivatives to be centrally cleared and, where appropriate, to be traded on exchanges or electronic trading platforms by the end of 2012. The G-20 Seoul Declaration requested the Task Force to report by April 2011 to the Financial Stability Board (FSB) and to provide recommendations to improve the transparency and overall functioning of commodity derivatives markets. The G-20 has also mandated the FSB to coordinate the design and implementation of the various facets of the international financial reform agenda, and to consider the appropriate next steps to be taken.⁴

In its first report, published in March 2009, the IOSCO Task Force: (i) reviewed existing studies on the issue of price volatility and financial investment in commodity markets and “saw no evidence to suggest that [financial investors in commodity futures markets] or any other particular class of investors’

activity alone were responsible for the volatility of commodity markets” (IOSCO, 2011: 6); (ii) recommended closer monitoring of commodity derivatives markets, as price discovery in these markets was of critical importance for the world economy; and (iii) recognizing the complexity and often opacity of factors that drive price discovery on commodity derivatives markets, called on governments to ensure greater transparency of commodity trading with a view to enabling “a more comprehensive understanding of the interaction between financial and non-financial participation in commodity derivatives and related physical commodity markets that affect price formation” (IOSCO, 2011: 8).

Subsequent reports to the G-20 summits in September 2009, and June and November 2010 surveyed the degree of compliance by Task Force members with the recommendations of the March 2009 report, and found a high degree of compliance. Its November 2010 report, which was considered at the G-20 summit in Seoul, also: (i) indicated its intention to work towards the creation of a trade repository for financial oil contracts;⁵ (ii) requested an international energy markets agency to examine the impact of published cash market price assessments on related commodity futures; (iii) encouraged the International Swaps and Derivatives Association (ISDA) initiative to establish an OTC derivatives trade repository; and (iv) called for further disclosure of aggregated open interest information from exchange trading, as well as for greater availability of data from physical markets, including through a more detailed study on the impact of oil price reporting agencies.

In its April 2011 report, IOSCO (2011: 6) acknowledged “that commodity futures markets can experience periods of significant volatility and that improvements should be made to the functioning of these markets.” It indicated an extension of its focus

beyond oil derivatives markets to include agricultural derivatives markets. Its aim is to provide comprehensive policy recommendations, while keeping in mind commodity-specific issues, in order to improve the supervision of commodity derivatives markets. The emphasis will be on proposals to improve market transparency, oversight and surveillance of market abuse in all commodity markets, where necessary.

IOSCO (2011) encouraged other relevant organizations to work towards improving transparency in physical commodity markets. The Task Force also recommended that it be given the mandate to work on commodity derivatives markets on a permanent basis. It intends to finalize and submit a full set of recommendations to the meeting of G-20 Finance Ministers in October 2011.

Regulatory initiatives in the United States

The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act for short), signed into law on 21 July 2010, is the regulatory response of the United States to the financial meltdown of 2008. The Act's overall objective is to improve market transparency and reduce the risk of systemic default. It extends regulation beyond futures exchanges to include swaps by generally requiring: (i) swaps to be subject to clearing and exchange-like trading; and (ii) dealers and major participants that trade swaps to be subject to capital and margin requirements (Greenberger, 2011: 152). Dodd-Frank is limited to swaps and its rules do not pertain to other derivatives, such as forward contracts or exchange-traded futures and options contracts.

The main part of Dodd-Frank that addresses commodities is Title VII, which deals with regulation of OTC derivatives. It stipulates four main requirements, that: (i) all "swap dealers" and "major swap participants" register with the appropriate regulators; (ii) all standardized swap transactions go through central clearinghouses; (iii) all cleared swaps be traded on an exchange venue or other regulated trading platforms; and (iv) all cleared and uncleared swap trading be reported in real time to a swap data repository or the CFTC in order for regulators to have information on the risk exposures of firms and counterparties. Before any proposed rule can be adopted and implemented, many of the terms used in the regulatory proposals require precise definitions (see Gensler 2010, for the

main ones). A crucial definition concerns the end-user exemption that will exempt eligible swap users from clearing requirements.⁶ It is envisaged that in order to benefit from the exemption, swap users will not be financial entities, must use the swap to hedge or mitigate commercial risk and must notify the regulators as to how they plan to meet their financial obligations with respect to non-cleared swaps.⁷

In addition to these four items, Title VII also provides for the establishment of position limits on individual contracts and aggregate limits on positions on the same underlying commodity taken across different trading venues,⁸ as well as the so-called "push-out rule" and the Volcker rule (Greenberger, 2011: 154–155). The push-out rule prohibits access to federal banking resources by any bank that operates as a swap dealer in commodity derivatives transactions. Thus it encourages banks to sell off their commodity-based swap divisions. The Volcker rule aims to limit banks' risk-taking, and prohibits banks from engaging in proprietary trading (i.e. trading for their own benefit, rather than on behalf of their customers) or acquiring or retaining an interest in hedge funds or private equity funds. Thus it encourages banks to move these activities to other smaller and less systemically risky entities.

The Dodd-Frank Act establishes a sequence of deadlines by which the new rules should be finalized with the overall objective of completing rule-making

by July 2011. However, several deadlines have been missed due to the workload on CFTC staff caused by the immense number of rules to be drafted and comments on these drafts to be considered, as well as the difficulties in reaching consensus on a wide range of

regulatory issues. At the time of writing (early June 2011) it was clear that the original timetable would not be met, and it was generally considered unlikely that the proposed Act would be implemented in its original form.

Regulatory initiatives in the European Union

In the EU, reform of the OTC derivatives market combines introducing the European Market Infrastructure Regulation (EMIR) with reviews of the Market Abuse Directive (MAD) and the Markets in Financial Instruments Directive (MiFID). The EU is also considering additional measures for commodity derivatives markets. The reform process has resulted in the creation of the European Securities and Markets Authority (ESMA) with a view to ensuring consistency of the technical rules and coordination in the implementation and enforcement of rules across EU member States.⁹

Given that regulators in the United States and the EU strive towards regulatory convergence in order to prevent regulatory arbitrage, the proposals put forward by the European Commission (EC) are very similar to those elaborated by the CFTC.¹⁰ The EC's proposal for regulation of OTC derivatives trading (EC, 2010) requires all standardized swaps to be cleared by a central counterparty, except for swaps used by non-financial institutions whose derivative positions do not exceed a certain threshold. It also requires all cleared and non-cleared OTC derivatives contracts that exceed an "information threshold" to be reported to a trade repository. The thresholds are determined on the basis of the systemic relevance of the associated positions. The main objective of the MiFID review is to achieve greater transparency. It aims to achieve this by requiring derivatives to be traded on exchanges, when appropriate, and by exercising stronger oversight over positions, including through the potential introduction of position limits to combat market manipulation and excessive price

volatility. As outlined by the EC (2010), an additional measure for commodity derivatives would require all commodity derivatives exchanges in the EU to report positions by trader categories. These additional reporting requirements would also cover OTC derivatives whose aggregate positions will already have been made publicly available by the trade repositories.¹¹ Taken together, Dodd-Frank and the EC proposals are similar in terms of establishing trade repositories that run common reporting frameworks, trading of standardized OTC derivatives on regulated trading venues, and centralized clearing of standardized OTC derivatives. They differ in that contrary to the rules outlined in Dodd-Frank, the EC's proposals do not include a push-out rule or the Volcker rule.¹²

The EC's proposals were discussed and amended by the Economic and Monetary Committee (ECON) of the European Parliament, which approved the draft regulation on 24 May 2011. However, a number of contentious issues remain unresolved (e.g. the treatment of pension schemes¹³ and certain aspects of reporting retroactively that might be needed to apply clearing obligations). The draft regulation was to be submitted to the European Parliament for approval in July 2011 to enable negotiations to proceed with EU member States thereafter. The new rules are expected to enter into force in early 2013.

Taken together, the international agenda as well as the initiatives taken in the United States and the EU are largely a response to the fact that the financial crisis started in developed countries and to concerns relating to these countries' regulatory

regimes. Developing countries have a stake in the success of the reforms undertaken by developed countries, as the cross-border impact of the financial crisis affected their levels of economic activity, asset prices and capital movements. However, the crisis

and the subsequent regulatory response are also likely to have changed the general attitude towards the costs and benefits of regulation, and this could affect the design of financial policy and regulation in all countries, including developing countries. ■

Notes

- 1 For an assessment of the United States' Dodd-Frank Act, see, for example, Adjemian and Plato, 2010; and for an assessment of the European Commission's Review of Markets in Financial Instruments Directive (MiFID review), see, for example, Suppan, 2011.
- 2 Statement of the G-8 Finance Ministers Meeting, Osaka (Japan), 14 June 2008, available at: http://www.mof.go.jp/english/international_policy/convention/summit/cy2008/su080614.htm.
- 3 The G-20 Pittsburgh Communiqué is available at: http://www.g20.org/Documents/pittsburgh_summit_leaders_statement_250909.pdf; the G-20 Seoul Declaration is available at: http://www.g20.org/Documents2010/11/seoulsummit_declaration.pdf.
- 4 The FSB was established in April 2009, following the G-20 summit in London, as an extension of the Financial Stability Forum (FSF). The latter was founded in 1999 by the G-7 Finance Ministers and Central Bank Governors. This extension involved, *inter alia*, an expansion of membership to include several developing countries (Argentina, Brazil, China, India, Indonesia, Mexico, the Republic of Korea, the Russian Federation, Saudi Arabia, South Africa and Turkey). The FSB's mandate is to address vulnerabilities, and to develop and implement strong regulatory, supervisory and other policies in the interest of financial stability. Its secretariat is located in Basel, Switzerland, and hosted by the Bank for International Settlements. For further information, see the FSB's website at: financialstabilityboard.org.
- 5 Trade repositories create centralized databases and provide a structure for market participants to report transaction information in line with applicable regulatory requirements.
- 6 As pointed out by Greenberger (2009) in connection with rules for agricultural swaps, it is important to bear in mind that the Commodity Exchange Act (section 3) requires regulatory authorities to give priority to the price discovery needs and trading practices of bona fide hedgers over other commodity market participants. The term "bona fide hedgers" refers to market participants that have an interest in the physical commodity and use swap contracts to manage commercial risk, as opposed to those (such as index traders) that hedge financial risk.
- 7 In a sense, this would reverse the swap dealer exemption that had been introduced by the Commodity Futures Modernization Act of 2000, as discussed in *TDR 2009: 76–77*.
- 8 The CFTC's proposed rule was published on 26 January 2011, see *Federal Speculative Position Limits for Referenced Energy Contracts and Associated Regulations. Proposed Rule*. Federal Register, Vol. 76, No. 17, available at: <http://www.cftc.gov/ucm/groups/public/@lrfederalregister/documents/file/2011-1154a.pdf>.
- 9 ESMA was established on 24 November 2010 by regulation (EU) No 1095/2010 of the EP and the Council. (see: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:331:0084:0119:EN:PDF>).
- 10 For an assessment of differences and possibilities for further convergence, see European Parliament, 2011.
- 11 See: http://ec.europa.eu/commission_2010-2014/barnier/headlines/speeches/2010/09/20100920_en.htm.
- 12 There is also some divergence in terms of the order in which the various rules are to be introduced, as explained by Gensler, 2010.
- 13 According to media reports, pension funds are to be granted a temporary reprieve and will not be required to have their OTC derivatives trading cleared through central clearing houses until at least 2015 (Ellen Kelleher, "Brussels hands EU pension funds OTC reprieve", *The Financial Times*, 6 June 2011).

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