



Responsible investment in commodities

The issues at stake and a potential role for
institutional investors

January 2011

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Report author: Ivo Knoepfel, PhD, CIIA
onValues Investment Strategies and Research

Zurich, January 2011

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Acknowledgements

We are indebted to the many people that through their insights and feedbacks contributed to this report. Our thanks go to the experts that participated in the interview round, including Marcel Jeucken and Frans de Wit (PGGM), Martijn Huijnen (SPF Beheer), Kris Douma and Faryda Lindeman (Mn-Services), Mark Taylor (Unilever), Nancy Roman (UN World Food Program), Jason Clay (WWF US), Tom Rotherham (Hermes), James Davis and Deborah Ng (Ontario Teachers Pension Plan), Helene Winch (BT Pension Scheme), Luke Chandler (Rabobank), Rob Lake, Olav Houben and Donui Agbokou (APG AM), Anne-Maree O'Connor (NZ Superannuation Fund), Karina Litvack (F&C), Andreas Holzer and Gabriella Ries (Bank Sarasin), Sybille Borner (SAM), Shane Chaplin (GES). Special thanks go to Beat Zaugg (Ecofin), David Imbert and Boris Janezic (onValues) for their contribution to appendix 3, Peter Zollinger (SustainAbility), Rolf Hässler (oekom Research) and Gavin Power (UN Global Compact) for their careful review of the draft version of the report.

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Abstract

This report summarises findings from a research project focussing on the environmental, social and governance (ESG) issues involved in different types of commodities investments. It shows that the issues at stake and available mitigation/management options for institutional investors vary greatly between investments in commodity derivatives, in physical commodities, in real productive assets or in the equity of public companies.

The report lists a series of possible actions for responsible investors (investors with a long-term view aiming to consider material ESG issues in the management of their investments and in their ownership strategies). It also highlights areas for further research and engagement by investors.

1. Introduction

This report summarises preliminary results from a project by onValues in collaboration with the UN-backed Principles for Responsible Investment (PRI) Secretariat, the UN Global Compact Secretariat and the Swiss Federal Department of Foreign Affairs focussing on environmental, social and governance (ESG) issues related to investments in commodities. It explores the role played by institutional investors in this field and outlines a series of recommendations for responsible investors.¹

The findings in this report are based on a range of interviews with pension funds, asset managers, investment researchers, governmental and non-governmental organisations involved in the field, and on the review of the available investment research and academic literature.² We identified different motives for investors to consider ESG issues when managing their commodities investments:

- Long-term environmental and social trends such as the scarcity of finite resources, climate change, and changes in demographics and lifestyles will influence future price levels and investment returns and create new investment opportunities and risks
- A wide range of ESG issues involved in the production and trade of commodities, e.g. local pollution and human rights issues, can translate into investment and reputational risks for investors
- At a more 'systemic' level, concerns about the role played by investors in commodity markets could lead to new regulations impacting available investment opportunities and returns.

Because of their positive contribution to risk-adjusted returns and portfolio diversification, commodities investments are expected to grow considerably in the coming years. According to Barclays Capital, around \$320 billion of institutional and retail money is now invested in commodities, compared to only \$6 billion a decade ago. An additional \$60-100 billion is estimated to be invested through hedge funds. These figures could more than double in the

¹ We use the term 'responsible investor' for institutional investors that take a long-term view in managing their assets and are convinced that ESG issues can affect the performance of their investment portfolios and therefore need to be taken into account in investment management and ownership policies and practices.

² See the appendices 4, 5 and 6

coming years given that many asset owners and managers are now allocating up to 5% of their portfolios to commodities from previously very low levels.

While the concept of responsible investing is well developed for some asset classes, including public equities, fixed-income, real estate and private equity,³ the debate around what it means to be a responsible investor in commodities has just begun. With our research we wish to contribute to the quality of the debate and to highlighting the issues at stake, without pretending to have conclusive answers for all the questions raised. Additional engagement with investors and stakeholders is planned in the coming months to validate the findings of this report.

An important distinction needs to be made between different types of commodity investments:

- Investments in commodity derivatives, mostly futures (which can be traded on exchanges or over-the-counter). These investments can be implemented through index tracking funds, hedge funds and other strategies.
- Investments in physical commodities. Traditionally, these were limited to gold and other precious metals (silver, platinum, palladium etc.). A new range of physically-backed exchange traded funds and structured products will make it easier in the future to invest also in physical copper, tin, zinc, aluminium, lead etc.
- Investments in real productive assets, such as forest and agricultural land, mines etc.
- Investments in the equity of public companies that own productive assets (typically in the extractive industries and the pulp and paper industry).

The ESG issues at stake and potential responses by investors vary widely depending on the type of investment, as we show in the next sections summarising our findings for different investment types.

We distinguish between ESG issues directly related with the production of a commodity⁴ and issues of a more indirect nature, such as the potential influence of investors on price levels and volatility.

³ Especially thanks to the work of the PRI initiative, representing investors with assets in excess of US\$ 22 trillion, see www.unpri.org

⁴ An overview of these issues is presented in the appendix 2

2. Investments in commodity derivatives

Investing in commodity derivatives is the main way in which institutional investors seek exposure to commodities.⁵ The most frequently used derivatives are futures. Investments are often implemented through index tracking funds, hedge funds and other active strategies. The most important terms and investment approaches in this field are explained in the box on the next page.

Financial investors usually sell back ('settle') their derivative contracts before expiry to other counterparties and therefore avoid holding the physical commodity⁶. Over the long-term, they therefore have no effect on production levels and related ESG issues. Over shorter timeframes, though, they can trigger an additional demand and influence spot prices. This can happen through two mechanisms. On the one hand, rapid investment inflow in derivative markets, as currently observed, needs to be backed by larger physical inventories at exchanges and in other parts of the market, thus leading to a small additional physical demand. It can also influence the behaviour of commercial market actors (e.g. leading them to delay production or to hoard commodities), thereby indirectly influencing short-term price movements.

How big that influence is, is a matter of heated debate. Since the large oil and food price spikes observed in 2007/2008, financial investors are under the suspicion of having contributed substantially to price volatility and are therefore seen as being co-responsible for food shortages in several developing countries. After approval of the Dodd-Frank Act, US regulators are about to introduce mandatory position limits on trading in energy, metals and agricultural commodities to limit the influence of speculators. Similar measures are planned in the EU and speculation in commodity markets will have a prominent place on the agenda of the G20 in the coming months.

Our review of the available academic and applied research⁷ shows that *historically* the influence of financial investors on prices has been small. Research by Goldman Sachs, for example, indicates that speculators contributed about \$9.50 to the oil-price spike of 2008. Research recently published by the OECD shows no substantial difference in volatility between agricultural commodities traded on exchanges and those that are not.

⁵ See appendix 1 for an introduction to commodity derivatives investments

⁶ With the exception of hedge funds and commodity trading advisers, that will sometimes demand delivery of physical commodities at the expiry of a futures contract, as was recently the case with the Armajaro hedge fund taking a big delivery of physical cocoa.

⁷ See appendix 3. A list of the reviewed literature can be found in appendix 5

Box: Key terms and definitions:

A **commodity** is a good for which there is demand, but which is supplied without qualitative differentiation across a market. It is fungible, i.e. the same no matter who produces it. One of the characteristics of a commodity good is that its price is determined as a function of its market as a whole. Well-established physical commodities have actively traded spot and derivative markets.⁸

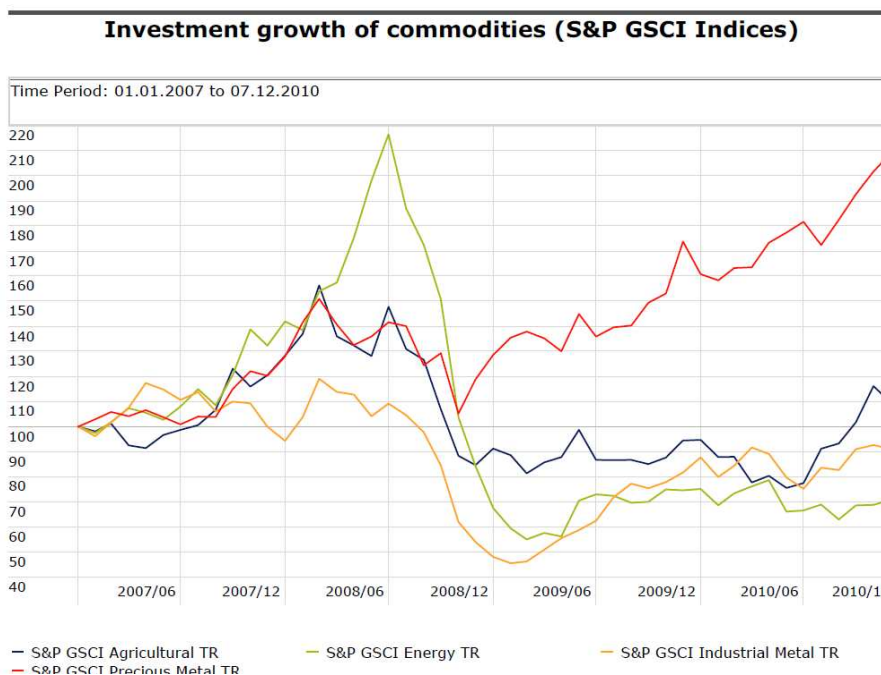
For investment purposes, commodities are usually divided into the following categories:

- Energy commodities (oil, natural gas etc.)
- Agricultural commodities (wheat, corn / maize, soybeans etc.) and livestock
- Industrial/base metals (aluminium, copper, nickel, zinc etc.)
- Precious metals (gold, palladium, platinum etc.)

Futures are standardized contracts on a futures exchange. They allow investors to buy or sell a good or financial instrument at a predefined price for a predefined amount at a specific date in the future. Futures give the holder the right and obligation to take or make delivery under the terms of the contract. Some futures are cash settled at maturity while others have physical deliveries at a predefined place. Commodity futures/forwards have been traded for more than 200 years. Merchants bade for agricultural commodities, like rice or tulip bulbs, to ensure getting a hold of these goods. So, in principle, commodity investments are nothing new.⁹

Most of the investment is made via **index funds**. Commodity index investment is typically characterized by a passive strategy designed to gain exposure to commodity price movements as part of a portfolio diversification strategy. Exposure to commodity price movements can be based on investment in a broad index of commodities, a sub-index of related commodities, or a single-commodity index. Index funds buy a forward position, then sell this as it approaches expiry, and use the proceeds from this sale to buy forward by one or two months again (a process known as ‘rolling’).¹⁰

Different standard **indices** are used by investors, including the S&P GSCI Commodity Index, the CRB Index, the Dow Jones UBS Commodity Index and the Rogers International Commodity Index. Indices are used to track the performance of different commodity markets. The example below shows that these markets are characterised by a relatively high volatility (sharp price rises and falls).



Source: Morningstar

⁸ <http://en.wikipedia.org/wiki/Commodity>

⁹ UBS: ‘Education note: How to invest in commodities’, Feb. 2009

¹⁰ UBS: ‘Education note: How to invest in commodities’, Feb. 2009

The problem with most of the research available is that it relies on historical observations dating back several years (when both investment levels and growth rates were considerably smaller than those observed today). It does not tell us much about the future. A series of trends point to a growing influence of investors on prices and volatility in the future:

- As more possibilities to trade commodities, e.g. through exchange traded funds, are made available to a wider range of investors (including less professional retail investors), the influence of momentum-driven behaviour (investors gushing in and out of markets and therefore contributing to price volatility) will grow
- Given decreasing investment returns in the main commodity markets,¹¹ investors looking for higher returns will increasingly move into ‘peripheral’, more illiquid markets where their effect on prices is likely to be much more significant in the future
- Hedge funds and commodity trading advisers could be tempted to more often ‘play the physical commodities’ (accepting physical delivery) in the future, thereby forcing exchanges and market actors to maintain higher inventory levels and thus creating an additional physical demand (with a direct impact on prices).

Responsible investors will consider these trends, review their investment strategies and introduce policies aimed at minimising their potential impact on spot prices and price volatility. Possible actions by responsible investors could include:

- Focus on a defined, passively implemented portfolio allocation to commodities that is frequently rebalanced. This has the effect that the investor is a seller of futures when prices go up (and vice-versa) which tends to stabilise prices.
- Use multiple investment channels, avoiding that single investment managers or funds attain a dominating position in the market with a higher risk of contributing to volatility
- Define reasonable performance targets for active managers to avoid them having to chase momentum and take excessive risk
- Insist on hedge fund managers being transparent about their positions and strategies
- Do not allow managers to hold positions into delivery period or take delivery so as not to affect the price-building mechanism
- Set limits on investment in smaller, more illiquid commodity markets where lack of market sophistication / liquidity coverage could lead to investors having a big influence on prices
- Be particularly careful in relation to investments in agricultural commodities, where price volatility can have severe consequences on vulnerable populations. Avoid smaller, more illiquid agricultural markets.
- Engage with investment managers, index providers, commodity futures exchanges etc. with the goal of improving governance and transparency of price discovery mechanisms in commodity markets
- Support efforts to increase transparency on speculative positions and in OTC markets.

To be mindful about market impact and spread investments over multiple investment counterparties is already common practice among large institutional investors, so some of these points might seem obvious to them. Given their size, they usually (have to) focus on the most liquid commodity markets and therefore avoid ‘exotic’ commodities and highly speculative strategies. Their investments are usually passive strategies implemented through index swaps with a large number of counterparties.

¹¹ Due to the ‘contango’ effect. The term contango is used to describe a market in which the futures price is greater than the expected future spot price. Returns from a strategy passively ‘rolling’ futures contracts will be negative if the market is persistently in contango.

Another role for responsible investors could be to engage with exchanges and other market actors with the goal of introducing standardised futures contracts that include provisions for minimum ESG quality standards,¹² but the demand for such contracts would have to be big enough to allow for an efficient and liquid market. A collaborative initiative by investors and large commercial actors could ensure the necessary demand. At the same time also an abundant supply of the commodity fulfilling the minimum ESG standards would have to be guaranteed and technical issues around certification and 'traceability' would have to be solved.

Current efforts by participants in commodity supply-chains to define global ESG standards are an important step in that direction and should therefore be supported by responsible investors. The announcement of leading food companies that they plan to source mostly 'sustainable' food commodities in the future could create the necessary demand (and supply) that, backed by investors, could lead to a break-through of new 'ESG-friendly' futures contracts.

A further role for responsible investors could be to ask index providers to develop new indices that use these new futures contracts and take into account some of the ESG issues outlined above (e.g. excluding the smaller, more illiquid markets) and then use those indices for their passive investments.

¹² In analogy to a GMO-free soy contract, that was launched in the past years in Japan.

3. Investments in physical commodities

When investors buy physical commodities (directly or indirectly through physically-backed investment products) they are directly responsible for the ESG issues related to the production and delivery of that commodity.¹³

An investor buying a ton of gold, for example, is directly responsible for the production and delivery of the gold, and the ESG issues that go with it. These can be substantial, given the environmental and social impacts of the mining, refining and transportation processes involved. Most investors are not fully aware of this and if they were, they usually would not be able to choose between different origins of the gold or to engage with gold producing companies with the goal of minimising ESG impacts, as they would be if they held the equity of those companies.

When buying physical commodities, investors also *directly* influence the price-building mechanism, contributing to higher prices and – in some instances – to higher price volatility. Gold, for which, according to the World Gold Council, investors account for more than 20% of global annual demand, is the most prominent example. A similarly important role is also played by investors in the platinum and palladium markets. A new range of physically-backed exchange traded funds and structured products will make it easier in the future to invest also in physical silver, copper, tin, zinc, aluminium, lead etc.

This brings investors and industrial consumers into direct competition for supplies in already tight markets. The recent launch of three exchange traded products investing in copper comes as the copper industry is struggling with a major supply shortfall, as mine supply stagnates and demand from China and other emerging markets surges.¹⁴

This leads to a very fundamental question: does it make sense for long-term oriented investors to take scarce commodities away from the real economy, hoard them without any productive purpose, and run the risk of constraining economic growth and hurting equity returns which play a far greater role in their portfolios than commodities? During our interview round, several institutional investors pointed to this dilemma as being an important reason for not planning to invest in physical commodities. They also told us that excessive physical investments would undermine their credibility as long-term investors when engaging with companies.

For those investors planning to invest in physical commodities we recommend the following actions:

- Limit investments in physical commodities to commodities for which competition with industry is negligible (e.g. gold)
- Support supply-chain initiatives aimed at developing global ESG standards for the production of the main commodities¹⁵
- Support fund managers that are planning to source 'traceable' commodities from producers and suppliers that have been certified according to environmental and social

¹³ See appendices 2, 4 and 6 for an overview of the issues, feedbacks from interviews and consulted literature.

¹⁴ See The Economist, Nov. 13th 2010, 'Commodity speculators: Dr Evil, or drive!'

¹⁵ A series of ongoing initiatives includes the Roundtable on Sustainable Biofuels, the Roundtable on Responsible Soy, the Roundtable on Sustainable Palm Oil, the Better Cotton Initiative, the Forest Footprint Disclosure project and others

standards. Such examples already exist for gold and could in future emerge also for other precious metals.

4. Investments in real productive assets

Because of the diminishing returns expected for derivative investments¹⁶ and the costs and limitations involved in investing in physical commodities, some investors are increasingly considering investing in 'real assets', such as forest and farm land, mines etc. This gives them a higher degree of control over the productive asset (including the management of the ESG issues involved) and allows them to benefit from regular cash-flows from the production of commodities over a long period of time. Estimates indicate that institutional investment in forest land amounts to about US \$15 billion.¹⁷ Between US \$5 and \$15 billion is currently invested in agricultural land.¹⁸ Several of the interviewed pension funds and their managers are considering increasing their investments in this area.

The nature of the investment (owning and operating the asset directly vs. investing through a fund or a fund-of-funds to achieve greater diversification) will determine the investor's possibility to directly control the ESG performance of the underlying asset. Given the considerable investment and reputational risks involved in not properly dealing with the ESG issues of these operations,¹⁹ institutional investors will typically introduce specific ESG policies and require that their investment managers and operators have appropriate processes in place to implement them.

Responsible investors will consider the following actions in this field:

- Define a set of principles for dealing with ESG issues that will guide their investments for different types of assets (e.g. forestry, agriculture, mining etc.)
- This might include asking investment managers (internal and external) and local operators to apply existing best-practice ESG standards and guidelines, or avoiding high-risk areas or operations
- When best-practice standards and guidelines do not exist, engage with relevant stakeholders in developing such standards
- Require that investment managers (internal and external) and local operators have policies and processes in place to identify critical ESG issues and implement mitigation and management measures prior to the investment. When local communities are affected this should include a consultation process with those communities.
- Regularly monitor and review the managers' and operators' implementation of those policies and processes.

¹⁶ Due to losses caused by rolling futures contracts in a 'contango' situation

¹⁷ Watson Wyatt: 'What is? Timberland Investment', 2007

¹⁸ Reuters/Sarah McFarlane: 'Pension funds to bulk up farmland investments', 29 June 2010

¹⁹ Given the manifold environmental and human rights issues involved, for example, in mining, oil/gas production, agriculture or forestry operations

5. Investments in the equity of public companies

By investing in the equity of companies that own productive assets (e.g. paper companies with large forest holdings, mining companies, oil companies etc.), investors can also gain an indirect exposure to commodities. Approximately a fifth of global equity markets relates to extractive/resource-intensive industries. Per end of 2009, global pension funds invested approximately US \$2.6 trillion in the equity of these industries.²⁰

The risk-return profile of these investments, though, is mainly determined by their equity character and is therefore not considered an optimal way to gain exposure to commodities for portfolio diversification reasons.

For such investments, asset owners and managers have a range of established techniques for considering material ESG issues in the management of their investments and in their ownership policies and practices. Independent and sell-side research organisations provide regular analysis of ESG issues which can be used for investment management purposes. Extractive industries such as oil and mining are relatively well covered by such research, whereas the coverage of agriculture and forestry needs to be further expanded.

The same applies to ownership activities of responsible investors (engagement with companies, exercise of equity votes and collaborations with other investors), where ESG issues related to extractive industries have traditionally played an important role. Collaborative engagements by PRI signatories, for example, have covered different issues and types of companies in the past years, including:

Engagement		Commodity
Australia	A collaborative engagement helped persuade a subsidiary of Australian mining firm to invest in equipment to enable the sourcing of phosphate rock from places other than a controversial current source in an illegally occupied part of the Western Sahara.	Phosphate
Sudan	22 institutional investors visited Sudan and met with major companies, civil society representatives and officials from the Sudanese Government to encourage business activity that supports revenue transparency, peace and protection of human rights	Oil and other commodities
Dem. Republic of Congo	A group of investors initiated dialogues with 14 North American, European and Japanese consumer electronic companies to ensure that those companies are taking appropriate actions to manage the social and business risks caused by the sourcing of tin, tantalum and other minerals from the Democratic Republic of Congo. These minerals are used in products like mobile phones and laptops and in some cases are linked to armed groups responsible for human rights violations	Tin, tantalum
Burma	Since October 2009 signatories have engaged with an oil company to discuss the human rights impact of the company's pipeline operations in Burma	Oil
Uzbekistan	A coalition of 20 signatories engaged with many global companies to help end the use of forced child labour in Uzbekistan's cotton sector; the world's third biggest cotton supplier. Over 70 of the world's largest apparel brands and retailers have joined the effort.	Cotton

²⁰ Total equity investments according to Towers Watson Global Pension Assets Study 2010; share of extractive/resource-intensive industries based on onValues calculations and Morningstar/MSCI data.

Given that this is an established field, in proposing measures that responsible investors can undertake we refer to the UN-backed Principles for Responsible Investment, which highlight the following possible actions²¹:

Incorporate ESG issues into investment analysis and decision-making processes:

- Address ESG issues in investment policy statements
- Support development of ESG-related tools, metrics, and analyses
- Select (and review) external investment managers based on their capability to incorporate ESG issues in investment management

Incorporate ESG issues into ownership policies and practices:

- Develop and disclose an active ownership policy consistent with the Principles
- Exercise voting rights or monitor compliance with voting policy (if outsourced)
- Develop an engagement capability (either directly or through outsourcing)
- Participate in the development of policy, regulation, and standard setting (such as promoting and protecting shareholder rights)
- File shareholder resolutions consistent with long-term ESG considerations
- Engage with companies on ESG issues
- Participate in collaborative engagement initiatives
- Ask investment managers to undertake and report on ESG-related engagement.

²¹ Note that PRI is aspirational and that these 'possible actions' are suggested steps for implementing Principles 1 and 2.

6. Conclusions

As mentioned in the introduction, the process of understanding ESG issues related to commodities investments and developing appropriate strategies for responsible investors has just begun. With this report we hope to have contributed to the depth and breadth of the discussion.

Given that potential negative impacts of speculators in commodity markets figures high on policy makers' agendas, we were surprised by the fact that the body of academic and applied research in this field is thin and quite inconclusive. Clearly, more research is urgently needed here.

Our analysis points to several future trends that will likely increase investors' influence on commodity prices and their volatility. This increased influence risks amplifying price swings for basic commodities such as wheat and maize, with the risk of contributing to food shortages especially in developing countries. We have therefore proposed a series of measures that institutional investors can undertake to minimise such risks and contribute to innovation and better transparency in commodity derivative markets.

Investing in physical commodities has a much more direct impact on markets, creating an additional demand and leading to a series of ESG risks (including reputational risks) related to the production and trade of the commodities. Given that the origin of the commodity is usually not known and that investors cannot engage with producers on the basis of ownership rights, there are few possibilities to mitigate these risks. We have nevertheless proposed that investors support multi-stakeholder initiatives aimed at 'raising the ESG bar' across whole commodity supply-chains and support efforts aimed at sourcing 'traceable' commodities from ESG certified operations. We have also highlighted the fundamental question of whether it makes sense for responsible investors to take scarce commodities away from the real economy and run the risk of constraining economic growth and hurting equity returns.

The issues at stake and strategies for managing ESG risks and opportunities related to investments in real productive assets and in the equity of public companies are clearer and better established. More work is needed, though, to establish global standards for specific commodities, industries and geographies.

Appendix 1: Investments in commodity derivatives

Investors' general inability to hold commodities physically makes it necessary for commodity investors to rely on alternatives—mostly derivatives in the form of futures contracts.²² Commodities exchanges (e.g. the Chicago Board of Trade, the London Metal Exchange etc.) play a crucial role in these markets, although Over-The-Counter (OTC) trades have considerably increased in the past years. On a commodity exchange, it is the underlying standard stated in the contract that defines the commodity, not any quality inherent in a specific producer's product.

Markets for trading commodities can be very efficient and will quickly respond to changes in supply and demand to find an equilibrium price ('price discovery mechanism'). In addition, investors can gain passive exposure to the commodity markets based on available commodity price indices.

Different standard indices are used by investors, including the S&P GSCI Commodity Index, the CRB Index, the Dow Jones UBS Commodity Index and the Rogers International Commodity Index. Indices are used to track the performance of different commodity markets. The example below shows that these markets are characterised by a relatively high volatility (sharp price rises and falls).

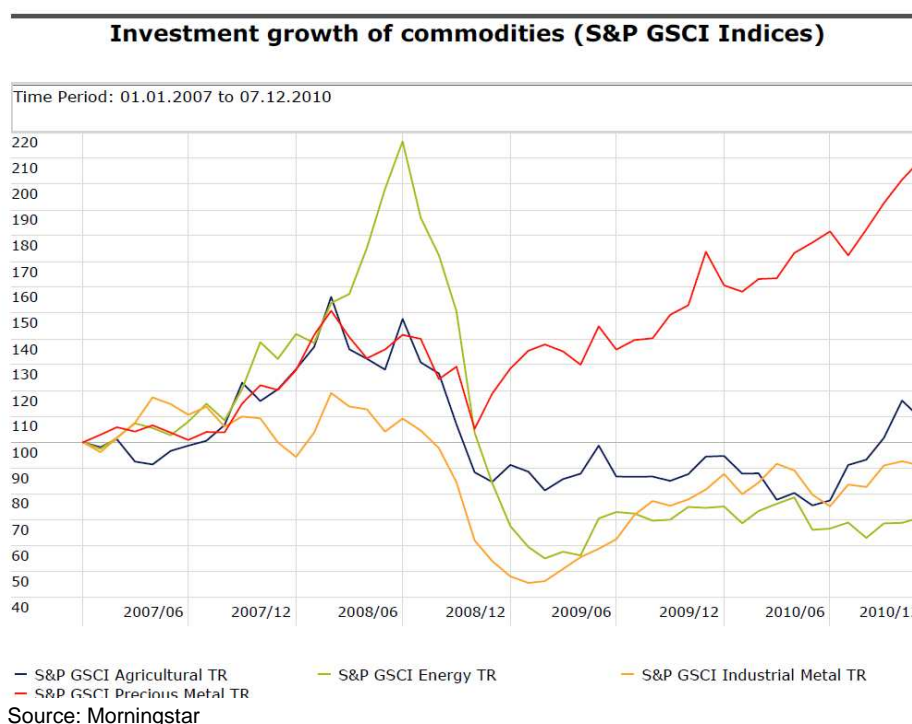


Fig. 1: Performance of S&P GSCI sub-indices.

²² Futures are standardized contracts on a futures exchange. They allow investors to buy or sell a good or financial instrument at a predefined price for a predefined amount at a specific date in the future. Futures give the holder the right and obligation to take or make delivery under the terms of the contract. Some futures are cash settled at maturity while others have physical deliveries at a predefined place. Commodity futures/forwards have been traded for more than 200 years. Merchants bade for agricultural commodities, like rice or tulip bulbs, to ensure getting a hold of these goods. So, in principle, commodity investments are nothing new. (UBS: 'Education note: How to invest in commodities', Feb. 2009)

The growth in trading activity observed in the past years has many advantages (beside some of the risks discussed in this report). Trading activity can bring liquidity where previously it had failed to develop, typically further down the curve and in less liquid contracts. The presence of funds all along the curve has enabled producers and consumers to hedge production/consumption much further into the future, thus adding security for participants and therefore for the market as a whole.²³

Size of the market and investors involved

Traditionally, institutional investors held no or only very small investments in commodities. Regulatory changes (e.g. the Glass-Steagall Act in the US), the advent of highly liquid commodity index funds, and the search of new sources of diversification and excess return by pension funds have led to a strong growth of these investments.

Leading pension funds today typically invest 1-3% of their total portfolio in commodities. Given that prevailing beliefs in the industry and investment consultants are pointing to optimal allocations in the range of 3-5%, we expect investment volumes to grow considerably in the coming years.

The main reasons for investors' growing interest in commodities are:

- The belief that a series of secular trends, including the growing scarcity of many finite resources and the growing demand by emerging markets, will lead to higher commodity prices in the future
- The fact that many commodities show a low correlation with stocks and bonds, and provide a certain hedge against inflation (see graph below)
- These two reasons combined, mean that adding commodities to a portfolio contributes to better overall risk-adjusted returns of the portfolio.

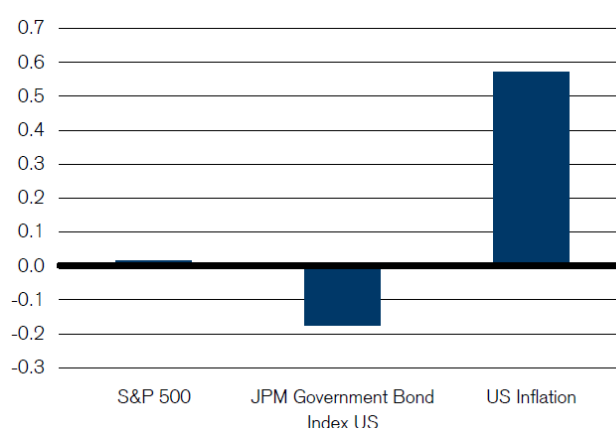


Fig. 2: Correlations of Goldman Sachs Commodity Index monthly returns with equity and bond indices, and US inflation since 1986 (Source: Credit Suisse and Bloomberg)

Most of the investment is made via index funds. Commodity index investment is typically characterized by a passive strategy designed to gain exposure to commodity price movements as part of a portfolio diversification strategy. Exposure to commodity price movements can be based on investment in a broad index of commodities, a sub-index of

²³ UK Financial Services Authority: 'Growth in commodity investment: Risks and challenges for commodity market participants', March 2007

related commodities, or a single-commodity index. Index funds buy a forward position, then sell this as it approaches expiry, and use the proceeds from this sale to buy forward by one or several months again (a process known as ‘rolling’).

The US Commodity Futures Trading Commission (CFTC) regularly reports commodity index investment data for the U.S. futures market (the world’s largest market, see next table). Data per end of Oct. 2010 points to long positions of over \$200bn in the U.S. market.

(\$ in billions)			
U.S. Futures Market ⁽¹⁾ (Notional Value > \$0.5 billion) ⁽²⁾	Long	Short	Net
Cocoa	\$1.2	-\$0.5	\$0.7
Coffee	5.6	-1.4	4.2
Copper	8.2	-1.8	6.4
Corn	18.4	-5.5	12.9
Cotton	6.5	-2.1	4.4
Feeder Cattle	0.7	-0.2	0.5
Gold	17.5	-3.8	13.6
Heating Oil	8.5	-1.9	6.6
Lean Hogs	3.5	-0.9	2.6
Live Cattle	7.4	-2.0	5.4
Natural Gas	15.7	-2.8	12.9
RBOB Unleaded Gas	8.4	-1.5	6.9
Silver	5.6	-0.9	4.7
Soybean Oil	4.1	-1.1	2.9
Soybeans	16.6	-5.2	11.4
Sugar	9.2	-3.0	6.2
Wheat (CBOT)	13.6	-5.4	8.2
Wheat (KCBT)	1.8	-0.6	1.2
WTI Crude Oil	52.0	-14.6	37.4
Subtotal (>0.5 billion US\$)	204.6	-55.3	149.2
Subtotal (<0.5 billion US\$)	1.9	-0.3	1.5
Total Notional US Mkts	206.4	-55.7	150.8
Total Not'l Non-US Mkts	48.2	-11.6	36.6
Total All Markets	\$254.7	-\$67.3	\$187.4

Source: CFTC. Data as of 30 October 2010

(1) Each listed U.S. futures market includes index investment for all futures and OTC markets related to or referenced to that U.S. futures market. For example, the U.S. market listed as “WTI Crude Oil” includes (with the NYMEX’s Light “Sweet” crude oil futures market) investments held in the NYMEX “Crude Oil Financial” market and the ICE Futures-Europe WTI Light Sweet crude oil market, because both of those contracts’ settlement prices are determined by reference to the NYMEX Light “Sweet” crude oil futures contract.

(2) US Futures Markets with greater than 0.5 billion US dollars in reported net index investment notional value at the end of at least one of the past four quarters.

Table 1: Index investment data according to www.cftc.gov

In addition to index investing, a wide range of active commodity investment approaches exist, typically implemented by hedge funds, commodity trading advisers or in-house teams at pension funds.

Hedge funds and commodity trading advisers represent the most speculative part of the commodity investing world. They actively bet on falling or rising prices over the short- to mid-term. Given their opacity it is not clear how much is invested in hedge fund commodity

strategies. Estimates vary widely from \$40 billion to \$100 billion. Commodity trading advisers are estimated to manage up to US \$40 billion.²⁴

Pension funds are among the world's largest investors in commodities. Leading funds typically invest between 3% and a maximum of 7% of their total assets in commodities. A majority of this money will be invested in indexed strategies, with a smaller share going to hedge funds and other active strategies. Currently, the total assets of global pension funds stand at about US \$23 trillion, of which at least US \$100 billion are estimated to be invested in commodities.²⁵

Traditionally, high net-worth individuals and their intermediaries have also allocated significant portions of their wealth—typically between 3-7%—to commodities. The advent of Exchange Traded Funds (ETFs) has also boosted investments among retail investors.

²⁴ UK Financial Services Authority: 'Growth in commodity investment: Risks and challenges for commodity market participants', March 2007

²⁵ Estimate based on total assets reported by Towers Watson Global Pension Assets Study 2010; share of commodities according to FSA, March 2007

Appendix 2: ESG issues related to the production of commodities

Key issues, initiatives and voluntary standards

The production and trade of commodities involves a broad range of environmental, social and governance issues.

For a country, the discovery of new oil fields or mineral reserves entails both *opportunities* (for economic growth and social development) and *risks* (of an economic, social and environmental nature). A lot has been written about the so-called 'resource curse' of large natural resource endowments. International organisations such as the World Bank group, international financing institutions, governments, non-governmental organisations (NGOs) and the industry are all working to support developing countries in turning this 'curse' into an opportunity.

The industry's International Council on Mining & Metals, for example, has launched a multi-year Resource Endowment initiative with the goal of identifying the factors that have allowed some countries to benefit from their substantial resource endowments through economic growth and poverty reduction and to determine some of the practical steps that can be taken by companies, governments, local communities and aid agencies to strengthen these positive factors where they are lacking (<http://www.icmm.com/page/1409/our-work/work-programs/articles/resource-endowment-initiative>).

Initiatives such as the Extractive Industries Transparency Initiative (EITI) aim to strengthen governance by improving transparency and accountability in the extractives sector. EITI is a coalition of governments, companies, civil society groups, investors and international organisations supporting improved governance in resource-rich countries through the verification and full publication of company payments and government revenues from oil, gas and mining.

Given that a large share of commodities is produced in developing countries with relatively weak regulatory frameworks, voluntary commitments and standards of producers, traders and investors are of great importance.

Different environmental and/or social standards or guidelines exist for certain types of commodities and activities, including those of the Forest Stewardship Council, the Marine Stewardship Council, the Equator Principles, Social Accountability International, the Rainforest Alliance, several fair trade and organic agriculture standards etc. In addition, a range of multi-stakeholder initiatives are developing best-practice principles in a range of areas, including the Roundtable on Sustainable Biofuels, the Roundtable on Responsible Soy, the Roundtable on Sustainable Palm Oil, the Better Cotton Initiative, the Forest Footprint Disclosure project and others. Initiatives such as the Sustainable Commodity Initiative (IISD), the Trade Standards Practitioners Network and the ISEAL Alliance support the development of environmental and social production and trade standards.

The challenge of these initiatives is that they need to bring together a broad range of stakeholders along the whole supply chain of a commodity in order to be successful, as shown for the example of palm oil in the following figure.



Fig. 3: Stakeholders involved in the Roundtable on Sustainable Palm Oil. Source: www.rspo.org

Overview of key environmental and social issues for different commodities

As part of our project we have reviewed a large body of literature (see appendix 6) and interviewed sustainability experts (see appendix 4) with the goal of identifying the main environmental and social issues related to the production of different types of commodities. The result of this work is summarised in the table below. It is not meant to be exhaustive, but simply to provide an initial overview of the main issues.

Class	Commodity	Environmental issues	Social issues	Mitigating factors
Energy	Crude oil and derivatives	<ul style="list-style-type: none"> Greenhouse gas (GHG) emissions Biodiversity impacts Toxic emissions to air, water, soil Site waste management Oil spills Production from oil sands 	<ul style="list-style-type: none"> Human rights issues (including issues related to supply chains/ contractors and conflict areas) Occupational health & safety Impacts on local communities/ indigenous people Lack of skilled employees Corruption and bribery 	
	Natural Gas	<ul style="list-style-type: none"> GHG emissions/ gas leakage Biodiversity impacts Toxic emissions to air, water, soil Site waste management Drilling in permafrost areas 	<ul style="list-style-type: none"> Human rights issues (supply chain, conflict zones) Occ. health & safety Impacts on communities/ indigenous people Lack of skilled employees Corruption and bribery 	
Industrial metals	Aluminium	<ul style="list-style-type: none"> GHG emissions (coal) High energy intensity Mine waste management Biodiversity protection 	<ul style="list-style-type: none"> Occ. health & safety/AIDS Impacts on communities/ indigenous people Mine closure impacts Human rights issues 	<ul style="list-style-type: none"> High recycling and reusability rates

Class	Commodity	Environmental issues	Social issues	Mitigating factors
			(suppliers&contractors, conflict zones) • Corruption and bribery	
	Copper	<ul style="list-style-type: none"> • Mine waste management • Water, soil contamination • Biodiversity protection • GHG emissions • Issues related to artisanal/small-scale mining 	<ul style="list-style-type: none"> • Occ. health & safety/AIDS • Impacts on communities/ indigenous people • Mine closure impacts • Human rights issues (suppliers & contractors, conflict zones) • Corruption and bribery 	<ul style="list-style-type: none"> • High recycling and reusability rates • Contribution to energy efficiency
Agri commodities	Wheat	<ul style="list-style-type: none"> • Water use • Agriculture chemicals emissions • Biodiversity impacts, deforestation/GHG emissions • Risks related to GMO use • Issues related to intensive production, monocultures 	<ul style="list-style-type: none"> • Impacts of high/volatile prices on food security • Impacts of intensive land use on communities/ indigenous people • Occ. health & safety • Human/labour rights issues • Forced labour 	<ul style="list-style-type: none"> • Main employer in developing countries • Can drive development / avoid migration
	Corn	<ul style="list-style-type: none"> • Water use • Agriculture chemicals emissions • Biodiversity impacts, deforestation/GHG emissions • Risks related to GMO use • Issues related to intensive production, monocultures 	<ul style="list-style-type: none"> • Impacts of high/volatile prices on food security • Impacts of intensive land use on communities/ indigenous people • Occ. health & safety • Human/labour rights issues • Forced labour 	<ul style="list-style-type: none"> • Main employer in developing countries • Can drive development / avoid migration
	Soybeans and derivatives	<ul style="list-style-type: none"> • Water use • Agriculture chemicals emissions • Biodiversity impacts, deforestation/GHG emissions • Risks related to GMO use • Issues related to intensive production, monocultures 	<ul style="list-style-type: none"> • Impacts of intensive land use on communities/ indigenous people • Occ. health & safety • Human/labour rights issues • Forced labour 	<ul style="list-style-type: none"> • Main employer in developing countries • Can drive development / avoid migration
Pre-precious metals	Gold	<ul style="list-style-type: none"> • Mine waste management • Water, soil contamination • Biodiversity protection • GHG emissions • Artisanal/small-scale mining 	<ul style="list-style-type: none"> • Occ. health & safety/AIDS • Impacts on communities/ indigenous people • Mine closure impacts • Human rights issues (incl. suppliers& contractors) • Business in conflict zones • Corruption and bribery 	<ul style="list-style-type: none"> • High recycling and reusability rates
	Platinum and Palladium	<ul style="list-style-type: none"> • Mine waste management • Water, soil contamination • Biodiversity protection • GHG emissions • Artisanal/small-scale mining 	<ul style="list-style-type: none"> • Occ. health & safety/AIDS • Impacts on communities/ indigenous people • Mine closure impacts • Human rights issues (incl. suppliers& contractors) • Business in conflict zones • Corruption and bribery 	<ul style="list-style-type: none"> • High recycling and reusability rates

Table 2: Key environmental and social issues for different commodities

Additional insights from expert interviews

Our interview with representatives of several investment research institutions, governmental and non-governmental organisations with specialist ESG know-how in the area of commodities led to a series of additional insights that we summarise here:

- Generally, responsible investors have a good understanding of the environmental issues involved in the production of commodities and have started to include these issues in their investment management and active ownership programmes (proxy voting and shareholder engagement). More attention needs to be devoted in the future to social issues (labour and human rights, contractors and suppliers, business in conflict zones, impacts on indigenous communities) and to governance issues (government relations, transparency and accountability, impacts on regional/national development, avoiding corruption & bribery)
- In assessing the use of different commodities, investors should:
 - Consider risks related to commodities sourced from conflict affected areas
 - Distinguish between renewable and non-renewable resources and take into account the scarcity of finite resources (e.g. lifetime of proven reserves)
 - Take into account the positive contribution to sustainable development of certain commodities (e.g. as input material to clean technology applications)
- On average, if the production of a commodity is concentrated in the hands of larger international companies and takes place in countries with high governance standards, the ESG situation can be expected to be more favourable than for commodities whose production is scattered across many countries and includes small-scale/artisanal production facilities.
- Investors in real assets (e.g. mines, farms) need to look closely at the very local level when assessing ESG risks (e.g. local conflicts, specific human rights issues) and not rely only on regional information. At the same time, potential impacts on regional/national development must also be taken into account.

Independent investment research organisations (e.g. oekom, GES, EIRIS, RiskMetrics), asset managers (e.g. F&C, Hermes, Sarasin) and broker research organisations (e.g. Citigroup, Goldman Sachs) are developing analytical tools and/or have published research on environmental and social issues related to commodities production.

Leading asset owners (e.g. several pension fund signatories of the Principles for Responsible Investment) have in the past included environmental and social issues relevant to extractive industries in their active equity ownership programs (proxy voting and active engagement with companies).

Our interviews with investors have shown that environmental issues related to the mining sector—and secondary effects on the health and livelihood of local populations—are among investors' main concerns. Less frequently do investors focus on 'pure' social or governance-related issues, such as child labour or corruption and bribery.

Asset owners' increasing involvement in initiatives specifically looking at supply-chains of commodities (e.g. roundtables on Sustainable Biofuels, Sustainable Palm Oil, Forest Footprint Disclosure project and others), as opposed to focussing on extractive industries or companies alone, show a new awareness for the importance of looking at whole supply-chains when engaging with companies or managing risks across the whole investment portfolio.

Efforts aimed at improving environmental and social standards for whole supply-chains are also a way of contributing to a better 'ESG footprint' of standardised commodities used in futures markets or by index funds.

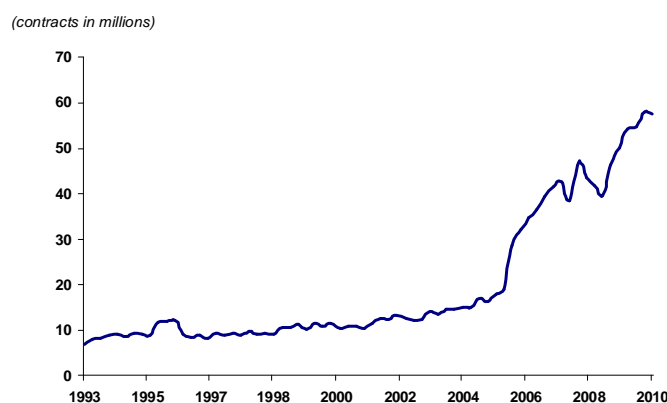
From this we have derived the following recommendations for investors:

- Pay special attention to human rights issues and to risks related to commodities sourced from conflict affected areas
- Take into account the scarcity of commodities sourced from finite resources
- When assessing the impact of project, do not look at the local situation only but at potential impacts at the regional/national level
- Participate in multi-stakeholder initiatives aimed at improving environmental and social standards for whole commodity supply chains. These strategic engagements contribute to 'raising the ESG bar' also in standardised commodities markets, where the provenience of the commodities cannot be traced back and an active engagement with single producers is not possible.

Appendix 3: Potential impact of investors on commodity prices

The degree to which growing financial investments could have an impact on commodity spot prices and price volatility is a matter of heated debate. In an attempt to shed some light on the issue, we have extensively reviewed the available academic and applied literature (see appendix 5 for the list of reviewed studies).

Trading activity on exchanges has grown exponentially in the past years (as shown by the next graph). While this benefits market participants (increased liquidity), it also fuels concerns over the influence that financial investors could have on markets.



Source: BIS Quarterly Review, December 2010, table 23B

Fig. 4: Number of Futures and Options Contracts Outstanding on Commodity Exchanges.

As a starting point for our research we compiled data on the size of commodity index investments and compared it with annual production volumes for the most important commodities (see the next table). In the case of gold, silver, platinum and palladium (all precious metals) the estimated ratio of global index investments to global production is substantial. For these commodities, investors can be expected to play an important role in driving prices (also because a large part is physically backed).

(\$ in billions)	Share of US ETF Market	Estimated ⁽¹⁾ Global Index Investment Value	Global Value of Commodities Produced Annually	Ratio of Index Investments to Global Commodity Production
Gold	61.3%	\$114.8	\$101.6	113.0%
Silver	11.1%	20.9	19.6	106.7%
Platinum / Palladium	1.7%	3.1	15.1	20.9%
Soybeans and Oil	1.2%	2.3	147.5	1.6%
Natural Gas	3.6%	6.8	487.6	1.4%
Aluminium	0.6%	1.2	90.7	1.3%
Copper	0.9%	1.8	139.0	1.3%
Corn	1.1%	2.0	176.0	1.1%
Wheat	1.0%	1.9	186.2	1.0%
Crude Oil and Products	13.3%	25.0	2'750.5	0.9%
Other ⁽²⁾	4.1%	7.7	524.0	1.5%
	100.0%	\$187.4	4'637.7	4.0%

Sources: etfdb.com, CFTC, US Geological Survey, FAOSTAT, CIA World Factbook, UN, onValues analysis. Data as of 8 December 2010

(1) Value of total global index investment (from CFTC) distributed proportionally by share of US ETFs to individual commodities

(2) Other category includes: cocoa, cotton, coffee, lead, lean hogs, live cattle, sugar, nickel, zinc, etc.

Table 3: Ratio of global index investments to global production for selected commodities

For other commodities, the ratios of global index investments to global production are in the range of 1-2%, which would intuitively not point to a large influence of investors on the price building mechanism. But this view is too simplistic.

Through their investments, financial investors can amplify fundamental price signals in the market and can influence the behaviour of commercial investors, as was pointed out also by several experts during our interview round. The influence of financial investors can be bigger than what is suggested by the simple ratios calculated in the table above.

The UK Financial Services Authority has described this accurately in a March 2007 report: 'During the roll periods there are many trying to roll around the same months, so they need an equal number of counterparties heading in the opposite direction; as counterparties dry up, future prices will rise, and 'spot' prices will fall. Participants admit that the effect of \$55+ billion of investment cannot be ignored and will have some effect on price. But gauging the extent of this effect is very difficult; such a significant roll of futures contracts will cause a move in the market, but only in the short term – the roll will only affect markets in the week of the roll, and markets tend to correct afterwards'.

Review of the literature

The academic literature that we have reviewed is inconclusive. Of the thirteen studies reviewed, seven find little evidence that index investors have impacted commodity prices, six point to a certain influence of index investors on prices.

In a recent study commissioned by the OECD,²⁶ Irwin and Sanders confirm this picture: '[...] Some studies find evidence that commodity index funds have impacted commodity futures prices (Gilbert, 2009; Einloth, 2009; Tang and Xiong, 2010).[...] A number of studies find little evidence of a relationship between index fund positions and movements in commodity futures prices (Stoll and Whaley, 2009; Buyuksahin and Harris, 2009; Sanders and Irwin, 2010a, 2010b; Aulerich, Irwin, and Garcia, 2010)'. Based on their own research indicating little evidence of a relationship, Irwin and Sanders conclude that: 'In sum, our results tilt the weight of the evidence even further in favour of the argument that index funds did not cause a bubble in commodity futures prices'.

Appraisal

Besides being inconclusive, the body of research is still very thin and patchy. More research is clearly needed. Another weakness is the fact that the research relies on historical observations dating back several years (when both investment levels and growth rates were considerably smaller than those observed today). It does not tell us much about the future. Several trends could in future amplify the influence of financial investors on commodity markets:

- As more possibilities to trade commodities, e.g. through exchange traded funds, are made available to a wider range of investors (including less professional retail investors), the influence of momentum-driven behaviour (investors gushing in and out of markets and therefore contributing to price volatility) will grow
- Given decreasing investment returns in the main commodity markets, investors looking for higher returns will increasingly move into 'peripheral', more illiquid markets where their effect on prices is likely to be much more significant in the future

²⁶ Scott H. Irwin, Dwight R. Sanders: "The Impact of Index and Swap Funds on Commodity Futures Markets", OECD Food, Agriculture and Fisheries Working Papers No. 27, 2010

- Hedge funds and commodity trading advisers could be tempted to more often ‘play the physical commodities’ (accepting physical delivery) in the future, thereby forcing exchanges and market actors to maintain higher inventory levels and thus creating an additional demand (with a direct impact on prices)
- Central banks are currently stacking up their commodities investments (oil, gold) to diversify away from paper money which could further strengthen the effects described above.

Future research will also have to look in greater depth at specific commodities given that the influence of index traders on prices will probably vary from commodity to commodity. The next graph, for example, shows that the share of total long open interest held by index traders varies greatly between commodities.

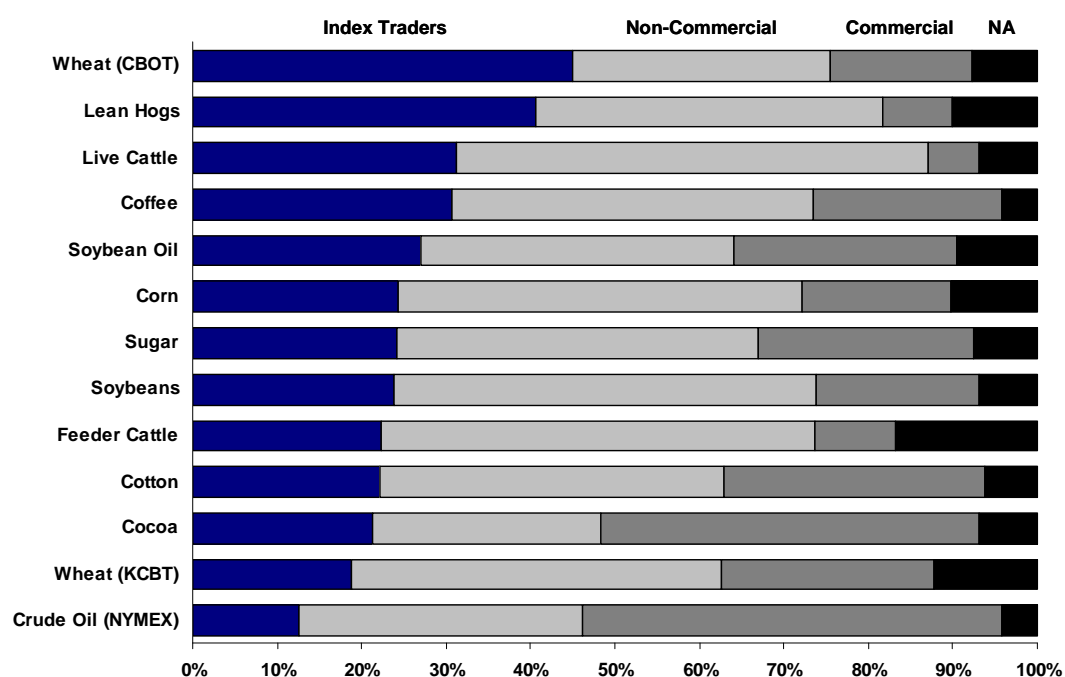


Fig. 5: Percentage of total long open interest held by commodity trader types (source: CFTC data)

Appendix 4: Insights from interviews with selected investors and stakeholders

To better understand the positions of leading investors and stakeholders active in the commodities investment space and the ESG issues attached to it, we interviewed a series of institutions with specific know-how in the field.

Depending on the institution, we focussed more on questions relating to the role and responsibility of investors, to identifying the key ESG issues, or to understanding the challenges related to agricultural commodities investing. Participants were senior-level managers with a good understanding of the issues involved.

Representatives of the following institutions were interviewed in the period between March and December 2010:

- APG All Pensions Group
- Bank Sarasin
- BT Pension Fund
- F&C
- GES
- Hermes Fund Managers
- Mn-Services
- Ontario Teachers' Pension Plan
- PGGM
- Rabobank International
- Sustainable Asset Management
- SPF Beheer
- Unilever
- UN World Food Program
- World Wildlife Fund (WWF) US.

We would like to summarise here the most important lessons-learned from the interviews:

- Generally, interviewed investors believe that their responsibility for ESG issues is mainly related to investments in physical commodities, real assets and equity of extractive/resource-intensive companies. They do not see themselves as being primary actors in futures markets and question the notion of responsibility for those markets.
- Most investors and other stakeholders agree that growing investments in commodity futures could lead to higher price volatility. Growing investment volumes can 'amplify' signals such as production shortages and changes in inventories and lead to higher volatility. The main contribution to volatility comes from highly speculative investors, such as hedge funds.
- Also, commercial investors (i.e. traders and manufacturers) increasingly contribute to short-term price volatility through very active, speculative strategies – they also bear responsibility for volatility
- Some interviewees explicitly said that pension funds with a 'long-only' allocation to commodities futures (e.g. implemented through exchange-traded-funds tracking broad commodity indexes) are not problematic in this regard.
- Many investors are considering increasing their allocation to commodities futures, typically from the current 1-3% to 4-5% of total portfolio. Especially large and sophisticated investors are aware of the limits of futures markets in terms of liquidity and

efficiency and are therefore interested in building up an exposure to ‘real assets’, including forests, agricultural land and productive facilities (mines, farms etc.).

Several interviewees pointed to the important role played by other stakeholders involved in commodities markets:

- Regulators, such as the CFTC in the US, and exchanges play a crucial role in ensuring that speculative investors do not impair the primary role of futures markets – to provide producers with cost-efficient hedges against price fluctuations
- Regulators have a considerable responsibility in reducing/controlling speculation also in spot markets (e.g. oligopolies), which is often the bigger problem than speculation in futures markets
- Producers, traders and manufacturers are the primary actors in these markets and their strategic and tactical positioning has a direct influence on how the markets develop.

On the role of investors in agricultural commodities

Some of the interviews focussed specifically on the potential impact of investors and other stakeholders on *agricultural commodities markets*:

- Most interviewees agreed that factors such as energy prices, biofuels policies, dietary changes, climate change have played a far greater role than speculation in leading to the price spikes observed in the past years
- Interviewees coincided in their view that non-commercial investors typically do not have a directional impact on agriculture futures markets, while nevertheless influencing price volatility
- One interviewee suggested that large pension funds should directly approach leading traders and food companies to coordinate measures aimed at mitigating price volatility
- Generally, interviewees stressed the societal value of functioning futures markets, allowing farmers to hedge risks and access capital and credit.
- The hypothesis that higher agricultural commodities prices have beneficial side-effects, such as leading to more capital available for much-needed infrastructure investments or to higher average farmer incomes was not generally supported.
- One interviewee stressed the fact that leading food companies are committing to increasingly shift to certified, “sustainable” sources of agricultural commodities. This will require large investments over time. The question of where the needed capital will come from is yet unsolved. There is huge scope for new structured finance deals where financial investors can get involved together with food companies. Such deals need to be structured, packaged and promoted by banks (both multi-laterals, such as IFC) and pure-play commercial banks.
- Some of the interviewees stressed the importance of investors adhering to generally accepted practices and safeguards when buying agricultural land. The controversially debated “land grabbing” issue has the potential to damage investors’ reputation.

On the potential contribution of investors to more sustainable futures markets

The ‘fungibility’ of traded commodities (i.e. once commodities enter global trade markets no differentiation of the source and ESG-‘footprint’ of commodities is possible anymore²⁷) is a

²⁷ On a commodity exchange, it is the underlying standard stated in the contract that defines the commodity, not any quality inherent in a specific producer's product

challenge for responsible investors.²⁸ Commodities exchanges play a crucial role here, by specifying minimum quality standards for commodities that are codified in futures contracts. Would globally accepted environmental and social standards for the production and trade of commodities exist, it is conceivable that these could be included in standardised futures contracts. Responsible investors should therefore actively support the adoption of voluntary commitments and agreements, as a first step toward establishing globally accepted standards that can then be reflected in futures contracts.

Another route that investors could pursue is to support the introduction of new 'ESG-friendly' standardised commodities (e.g. 'fair trade' cotton as specified by an underlying standard), but the demand for such commodities would have to be big enough to allow for an efficient and liquid market. For certain commodities, if support from a large-enough group of investors, traders, manufacturers and commodity exchanges could be found, such an option is not unrealistic. Take the example of palm oil, which a growing number of large food manufacturers and traders are committing to source exclusively from 'sustainable' production in the future. The step towards a globally accepted minimal environmental standard, which could then be reflected in futures contracts, is not that big anymore.

²⁸ There is an analogy here with the challenge faced by 'universal equity owners' (very large investors investing passively in broad markets) who see their role in raising the 'ESG bar' across whole sectors and economies, because of the impossibility of differentiating between single securities

Appendix 5: Reviewed literature on the potential impact of investors on commodity prices and price volatility

Energy commodities:

H. Till: 'Has there been excessive speculation in the US oil futures market?', Edhec Risk Institute, November 2009

N. Amenc, B. Maffei, H. Till: 'Oil prices: the true role of speculation', Edhec Risk Institute, November 2008

P. Davidson: 'Crude oil prices: "market fundamentals" or speculation?', Challenge Magazine, July/August 2008

U. Triulzi, R. L. D'Ecclesia, C. Bencivenga: 'Does speculation drive oil prices?', University of Rome, 2009

R. J. Weiner: 'Speculation and oil price volatility', George Washington University, April 2009

Agricultural commodities:

Scott H. Irwin, Dwight R. Sanders: 'The Impact of Index and Swap Funds on Commodity Futures Markets', OECD Food, Agriculture and Fisheries Working Papers No. 27, 2010

D. R. Sanders, S. H. Irwin, R. P. Merrin: 'The adequacy of speculation in agricultural futures markets: too much of a good thing?', University of Illinois, June 2008

UN Food and Agriculture Organization: 'Soaring Food Prices: facts, perspectives, impacts and actions required', June 2008

Peter Wahl: 'Food speculation: the main factor of the price bubble in 2008', WEED (World Economy, Ecology & Development), 2008

UNCTAD: 'The Global Economic Crisis: Systemic Failures and Multilateral Remedies', 2009

B. Cooke, M. Robles: 'Recent food prices movements: a time series analysis', The International Food Policy Research Institute (IFPRI), December 2009

E. Plincke et al.: 'Rohstoffe – als Investment noch zu verantworten?', Bank Sarasin, June 2008

Metals:

G. M. Kornitos: 'Does speculation affect spot price levels? The case of metals with and without futures markets', Finance and Economics Discussion Series (FEDS), May 2009

Appendix 6: Reviewed literature on ESG issues related to the production and trade of commodities

Precious metals:

J. Leyland: 'A touch of gold: gold mining's importance to lower-income countries', World Gold Council, May 2005

M. Upton: 'Safeguarding workplace and community health: how gold mining companies are fighting HIV/AIDS, tuberculosis and malaria', World Gold Council, December 2008

M. Upton: 'The golden building block: gold mining and the transformation of developing economies', World Gold Council, September 2009

Oekom Research: 'Oekom commodity ESG screening: gold', July 2009

Agriculture:

J. Currie, J. Gutman, A. Nathan, R. Zhang: 'Food, feed and fuel: an outlook on the agriculture, livestock and biofuel markets', Goldman Sachs, March 2007

A. Clay, S. Tickell: 'Knaves turned honest: can 21st century finance sustain 21st century agriculture?', Food Ethics Council, March 2010

M. Fox, S. Forrst, A. Ling, M. Lynch: 'Global food & beverages: integrating ESG', Goldman Sachs, February 2007

G. Rijk, M. Gulpers, R. Klijn, E. Schrauwen: 'Food & beverages – climate change: food versus fuel', ING Wholesale Banking, December 2006

Energy:

International Petroleum Industry Environmental Conservation Association (IPIECA) and International Association of Oil & Gas Producers (OGP): 'The oil and gas industry from Rio to Johannesburg and beyond: contributing to sustainable development', 2002

S. Voisin, C. Lamotte: 'Carbon impact on the oil & gas sector', Cheuvreux, October 2006

C. Meade, D. Morrow, D. Sasrean, S. Viets: 'Integrated oil & gas: sector report', Innovest Strategic Value Advisors, October 2006

S. Forrest, A. Ling, M. Lanstone, J. Weghorn: 'Enhanced energy ESG framework', Goldman Sachs, October 2006

B. P. Dell, N. McMahon, A. Goller, S. Gruber: 'Bernstein energy: an energy or environmental problem? The impact of CO2 regulation on oil demand and alternative plays', Bernstein Research, February 2007

A. Potter: 'Targeting the oil sands', UBS Investment Research, March 2007

B. Singer, M. Lapidés, M. Molnar, C. Berwick: 'Energy Carbonomics: investment framework for gas, power, coal', Goldman Sachs, April 2007

Metals & Mining:

H. Jansen, M. Tyrrell, A. Heap: 'Towards sustainable mining', Citigroup, March 2006

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A. Ling, S. Forrest, P. Mallin-Jones, S. Feilhauer: 'Global mining and steel: integrating ESG', Goldman Sachs, July 2006

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No Dirty Gold: 'Dirty metals: mining, communities and the environment', Earthworks and Oxfam America, 2004

EITI: 'Advancing the EITI in the mining sector: a consultation with stakeholders', 2009

No Dirty Gold: 'Golden rules: making the case for responsible mining', Earthworks and Oxfam America, 2006