Christal Lint
Director and Associate General Counsel
Legal Department

March 28, 2011

VIA E-MAIL

David Stawick
Secretary
Commodity Futures Trading Commission
Three Lafayette Center
1155 21st Street NW
Washington, DC 20581

Re: Position Limits for Derivatives (RIN 3038–AD15 and 3038 AD16) (Federal Register Vol. 76, No.17, Page 4752)

Dear Mr. David Stawick:

In addition to our comment letter dated March 28, 2011, we are submitting copies of studies and reports to be included in the Commission's official record on this important matter.

Sincerely,
/s/ Christal Lint

Enclosure

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EUROPEAN COMMISSION

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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

TACKLING THE CHALLENGES IN COMMODITY MARKETS AND ON RAW MATERIALS

1. INTRODUCTION

Commodity markets have displayed increased volatility and unprecedented movements of prices in recent years. Prices in all major commodity markets, including energy, metals and minerals, agriculture and food, increased sharply in 2007 to reach a peak in 2008, declined strongly from the second half of 2008 and have been on an increasing trend again since the summer of 2009. To varying degrees, these price swings have been reflected in consumer prices, at times leading to social unrest and deprivation.

At the heart of current developments lies a series of changes in global supply and demand patterns as well as short term shocks in key commodity and raw material markets. The years 2002 to 2008 were marked by a major surge in demand for raw materials, driven by strong global economic growth, particularly in emerging countries such as China. This increase in demand will be reinforced by the further rapid industrialisation and urbanisation in countries such as China, India and Brazil. China is already the largest consumer of metals in the world – its share of copper consumption, for example, has risen from 12% to about 40% over the last 10 years[1]. Price movements have been exacerbated by various structural problems in the supply and distribution chains of different commodities, including the availability of transport infrastructure and services. These developments occur at a time when the competitiveness of European industry requires efficient and secure access to raw materials.

In addition, markets are experiencing the growing impact of finance, with a significant increase in financial investment flows into commodity derivative markets in recent years. Between 2003 and 2008, for example, institutional investors increased their investments in commodities markets from 13 billion euro in 2003 to between 170 and 205 billion euro in 2008. While the financial crisis interrupted the upward trend, financial positions approached or even exceeded their 2008 peaks on many markets in 2010 and investment by index traders in particular has increased strongly. While the debate on the relative importance of the multiple factors influencing commodities prices is still open, it is clear that price movements across different commodity markets have become more closely related, and that commodities markets have become more closely linked to financial markets[2].

These developments have led to increased calls for policy responses to mitigate the negative effects of such movements on both producers and consumers, especially the most vulnerable ones. They have generated attention at the highest political level including the latest G20 summits.

The challenges of commodity prices and raw materials are closely intertwined and touch on policies in the areas of financial markets, development, trade, industry and external relations. The European Commission has therefore taken a number of initiatives. In 2008 it already drew attention to the strategic importance of defining policies for raw materials by launching

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1 World Metals Statistics Bureau – 2009 Yearbook.

2 CFTC "Staff report on commodity swap dealers and index traders with Commission recommendations", Washington, 2008. American Economic Review; Commission Communication COM(2008) 821 "Food prices in Europe" and its accompanying staff working document SEC(2008) 2971 "Task force on the role of speculation in agricultural commodities price movements - Is there a speculative bubble in commodity markets?".

the raw materials initiative[3]. Since then, it has taken actions within this framework to address sustainable access to raw materials both within and outside the EU, as well as on resource efficiency and recycling. It also began an in-depth reflection on commodities market in general and on food prices and security of food supply in particular[4]. In response to the financial crisis, it has launched a range of measures to improve the regulation, integrity and transparency of financial markets, and most recently it has made a proposal for the regulation of energy markets.

This Communication presents an overview of what has been achieved in each of these areas and of the steps which are planned to take the work forward. This work is part of the Europe 2020 strategy to ensure smart, sustainable and inclusive growth and is closely linked to the flagship initiative for a resource efficient Europe[5]. It will feed into the work of the G20 which agreed at the Pittsburgh summit "to improve the regulation, functioning, and transparency of financial and commodity markets to address excessive commodity price volatility"[6]. This commitment was reinforced in November 2010 by the G20 summit in Seoul which pledged to address food market volatility and excessive fossil fuel price volatility[7].

2. DEVELOPMENTS ON GLOBAL COMMODITIES MARKETS

Fundamentals, including unexpected changes in global economic conditions linked to the strong growth in demand of emerging market economies have played a key role in driving developments on commodity markets[8]. Other factors that have also played a role are supply shortfalls and monetary policy, and in recent years, various ad hoc policy interventions. Export restrictions, border measures, and shifts in storage policies had an impact on food prices in the run up to the 2008 food price crisis. Increased use of agricultural land for the production of renewable energy has strengthened the link between developments in agricultural and energy prices. Price movements have also been exacerbated by various structural problems in the supply and distribution chains of different commodities[9].

Each commodity market functions differently depending on the nature of the commodity, the needs of traders and historical developments. There is no single model for the organisation of commodity markets and hence of how prices evolve. Some commodity trading exhibits a high degree of standardisation, while on other markets the way in which trades are done may change according to the particular needs of individual market participants. Derivative markets[10] based on commodities have existed for a long time and play a role in the hedging of exposures of both producers and users of various commodities. Just as the underlying commodities can be traded in different ways, derivatives can be traded on a bilateral basis, generally called over the counter or OTC, or using organised exchanges. Additionally, the

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3 COM(2008) 699 "The raw materials initiative - meeting our critical needs for growth and jobs in Europe".

4 COM(2009) 591 "A Better Functioning Food Supply Chain in Europe" and COM(2010) 127 "An EU policy framework to assist developing countries in addressing food security challenges".

5 COM(2010) 2020 "Europe 2020", and COM(2011) 21 "A resource-efficient Europe: flagship initiative under the Europe 2020 strategy".

6 See http://www.pittsburghsummit.gov/mediacenter/129639.htm

7 See http://www.g20.org/Documents2010/11/seoulsummit_declaration.pdf

8 See for example, IOSCO, Task Force on Commodity Futures, Report to the G20. November 2010.

9 COM(2009) 591 "A Better Functioning Food Supply Chain in Europe",

10 A derivative can be defined as a financial asset, generally a contract between two or more parties, that derives its value from other assets, securities or even indices.

role of financial institutions as well as the importance of derivatives is very different from one market to another. The following sections examine specific developments on the markets for energy and agricultural commodities and the increasing interdependence of commodities and related financial markets.

2.1. Developments on the physical markets

2.1.1. Energy (oil, electricity gas)

Oil and petroleum markets are integrated, liquid and global, and are widely considered to be driven notably by economic fundamentals, but also by geopolitical considerations, the role of the Organization of the Petroleum Exporting Countries (OPEC), and by non-physical trades. There have been significant developments in terms of financial and derivative investment instruments and trading technologies. The G20 at the Seoul summit has highlighted the importance of well-functioning and transparent energy markets for economic growth. It has been working on physical market transparency, fossil fuel price volatility, and the phasing out of inefficient fossil fuel subsidies.

The gas market, which is increasingly influenced by the development of non-conventional sources, has traditionally been based on long-term over-the-counter (OTC) contracts. As a result of the proliferation of Liquefied Natural Gas (LNG), gas is also increasingly traded on a global and liquid market which is being commoditized. Electricity is the least global energy market as its transport over long distances is restricted for physical reasons of non-storability and energy loss. The geographic scope of the market is therefore smaller than for other energy commodities.

EU electricity (and gas) markets are increasingly integrated as a result of the internal market. They have seen the development of energy exchanges or other organised markets and broker facilitated OTC markets which can be used both for physical delivery and hedging. It remains the case that market prices are highly sensitive to the availability of actual and expected generation as electricity cannot be stored on an industrial scale.

2.1.2. Agriculture and security of food supply

Most agricultural commodities, in particular crops, are subject to strong seasonal production patterns, and their supply cannot always adjust rapidly to changes in prices or demand. This means that agricultural markets are characterised by a certain degree of variability. Structural factors such as demographic growth, pressure on agricultural land and the impacts of climate change may add to growing tensions on agricultural markets. However, the volatility of prices of agricultural commodities has recently increased to unprecedented levels. This is the case both on the EU and international markets, and on spot and futures markets. Within the EU, successive reforms of the Common Agricultural Policy (CAP) have significantly reduced support prices and related measures. As a result, commodity producers and traders are more exposed to market price developments and, although it is not the case in all agricultural sectors, are thus more prone to use futures markets to hedge risks. Trade in options and in over-the counter derivatives is also growing. These factors explain to some extent the increased activity on European-based exchanges and raise two issues in particular: security of food supply and the need for increased transparency on agricultural derivatives markets.

Security of food supply has been identified as one of the main drivers for future reform in the CAP[11]. A strong agricultural sector is vital for the highly competitive food industry to remain an important part of the EU economy and trade and a major contributor to international markets. This is why, in the context of the Doha Development Round the EU has agreed to an important agricultural package, conditional on reaching an ambitious, balanced and comprehensive overall agreement.

Excessive volatility of food prices affects producers and consumers alike, and has serious effects on security of food supply for food importing developing countries. During food price spikes – such as in 2007-08 - many of the poor in developing countries reduced their food intake[12]. The 2010 food price increases may lead to another increase in malnutrition, humanitarian needs and social tensions and unrest among the weaker consumers in the world. While higher global prices could stimulate agricultural production, price transmission mechanisms are often imperfect. In many developing countries, commodity markets are often disconnected from world markets or, at best, world price signals are transmitted to domestic markets with considerable lags so that a domestic supply response is often delayed.

Several analyses by the Food and Agricultural Organisation, OECD, Commission and others have focused on supply and demand developments, exacerbated by short-term economic and policy factors (including restrictions on exports) that explain part of the observed extreme price volatility, including factors specific to financial markets that may have amplified price changes. Despite remaining uncertainties, based on the outlook for agricultural commodities established by several organisations, including the latest Commission medium term projections, three conclusions are clear for agricultural commodities:

- Agricultural commodity prices are expected to stay higher than their historical averages, reversing their long-term downward trend, at least for the foreseeable future.

- Price volatility is also expected to remain high, although uncertainties with respect to its causes and duration persist.

- The level of input prices used in agriculture is also likely to remain higher than its historical trends.

The combination of the above factors implies that higher prices for agricultural commodities will not necessarily result in higher incomes for farmers, especially if their margins are squeezed by increased costs. In addition, potential problems for net food importing countries and more generally for the most vulnerable consumers are evident, stemming from price impacts on food inflation. While a certain degree of variability is an intrinsic part of agricultural markets, excessive volatility does not benefit producers neither users.

2.1.3. Raw materials

Raw materials include metallic minerals, industrial minerals, construction materials, wood, natural rubber. Unlike electricity, raw materials are traded globally. In relation to prices and markets, the key distinction is between those that are traded on stock exchanges and those that are not. For example, base metals such as aluminium, copper, lead, nickel, tin and zinc are traded on stock exchanges of which the London Metals Exchange (LME) is a global leader.

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11 COM(2010) 672 "The CAP towards 2020".

12 FAO, WFP, The State of Food Insecurity in the World, October 2010.

However, many of the EU's critical raw materials, such as cobalt, gallium, indium and rare earths, are not traded on the LME. The market for these materials is less transparent and the volumes traded are very small in comparison to other materials.

The global metal and mineral markets generally follow a cyclical pattern based on supply and demand. However, the period 2002-2008 was marked by a major rise in demand for raw materials driven by strong global economic growth, in particular in emerging countries. This was reflected in unprecedentedly high price levels. Recent trends indicate that demand for raw materials will be driven once more by the future development of emerging economies and by the rapid diffusion of key enabling technologies.

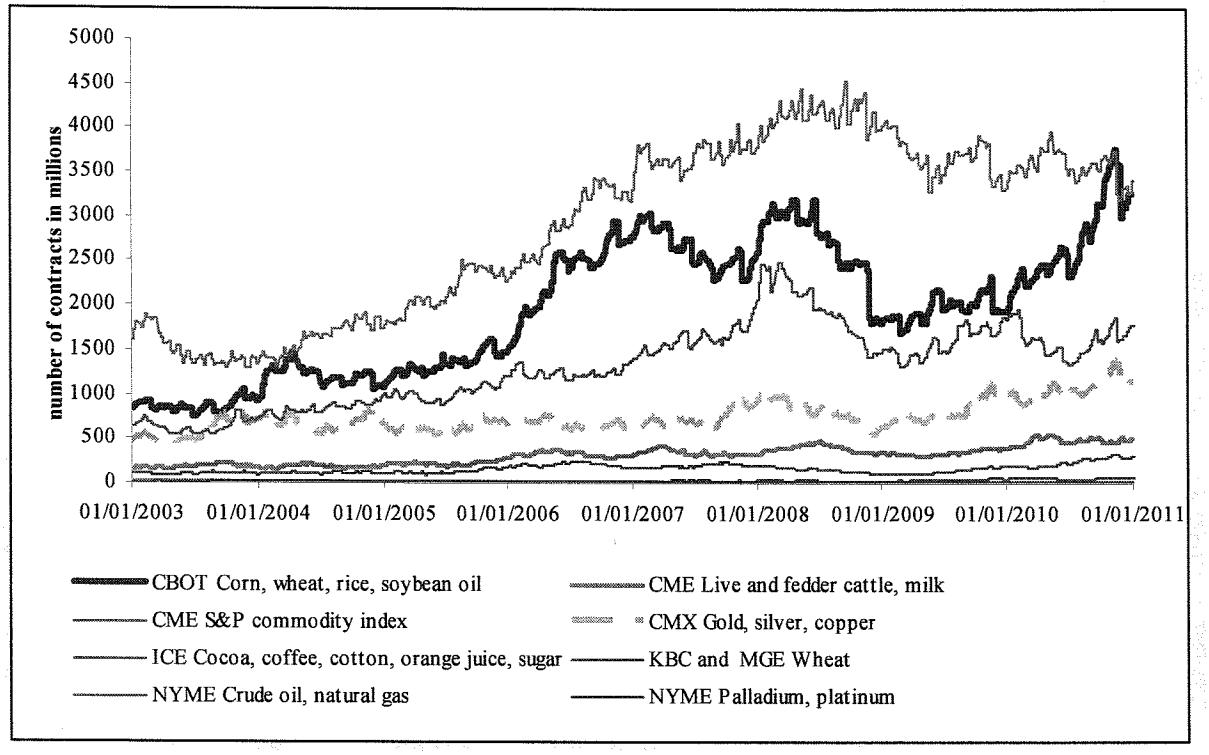
A growing concern in these markets relates to measures imposed by certain countries to ensure privileged access to raw materials for their domestic industry including through export restrictions. These measures create distortions in the global markets and uncertainties in the regular flows of commodities. Such measures may affect developed and developing countries alike as virtually no economy is self-reliant for all raw materials. Least developed countries in particular can be particularly dependent on commodity imports and therefore can be negatively affected by the absence or inadequacy of multilateral rules in some disciplines such as export duties. Furthermore, companies respond to price fluctuations in various ways, such as stockpiling, negotiating long-term contracts or price hedging in the form of futures contracts. Some of these reactions may exacerbate the tightness of supply.

2.2. Growing interdependence of commodities and related financial markets

Commodity derivatives allow producers and users to hedge the risks associated with physical production and price uncertainty. They are also increasingly seen purely as financial investments. In this context, financial investment flows into commodity derivative markets have grown significantly in recent years (see graph 1).

Commodity and financial markets are thus increasingly intertwined sharing a growing number of participants in search of risk management tools and investment opportunities. The liquidity, efficiency and accessibility of spot markets are strengthened by well-functioning derivative markets, and vice versa. Adequate and reliable information on market fundamentals such as volumes of production and consumption, network and pipeline capacity etc, as well as the amount of trading that takes place in the commodity is necessary for transparent and orderly price formation both on the spot and derivative markets. Derivative markets are however not only used by commercial companies for risk management purposes, but also by financial institutions as part of their risk allocation strategies. In addition prices of commodity futures (i.e. derivatives listed on organised trading venues) often serve as benchmarks for example influencing retail energy and food prices for EU consumers.

Graph 1: Transactions on commodity derivative markets (Total open interest of futures and options)



Source: U.S. Commodity Futures Trading Commission. (via Reuters Ecowin)

The very nature of a derivative contract is that its value depends on the value of the underlying market to which it refers. This is particularly the case where the underlying market is a physical market. The prices of commodity derivatives and underlying physical commodities are therefore interlinked. Commodity derivatives markets therefore cannot be regarded in isolation from commodity markets and vice versa.

Identifying which way causation flows in the interaction between financial and physical markets is, however, a complex issue. Establishing these correlations is complicated by the fact that not all physical markets have the same features. A variety of factors have an impact, some of which are specific to individual markets and, as a result, different market dynamics are at play in the different sectors. At this stage, assessing the exact nature and extent of the links between the price formation process on commodity markets and the growing importance of derivatives markets is made even more difficult by the lack of transparency in these markets.

While it is clear that there is a strong correlation between positions on derivative markets and spot prices, it is still difficult to assess fully the interactions and the impact of movements in the derivative markets on the volatility of the underlying physical markets. Establishing these correlations is further complicated by the fact that not all physical markets have the same features and different market dynamics are at play in the different sectors. Further work is therefore needed to deepen understanding of these developments[13].

At this stage, however, it is already clear that the degree of transparency and reporting obligations on both the underlying physical markets and the derivative markets should be enhanced. Increased transparency and easily accessible information on the physical markets

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13 Part of which is already under way (see section 3.2) in close cooperation with the relevant international counterparts, in particular the United States, with a view to ensure regulatory consistency.

will allow investors to make informed decisions, contribute to an appropriate price finding process and facilitate the identification and prevention of any abuse. But in addition, the recent price volatility has shown that for physical market actors the possibilities to hedge their price risks must be maintained, while close and efficient monitoring of market developments needs to be ensured. This is particularly important for food-importing developing countries. Additional targeted regulatory measures, such as the introduction of position limits when deemed necessary, could also be considered in this context.

3. EU POLICY RESPONSE TO DEVELOPMENTS ON COMMODITIES MARKETS

At EU level, there has been an initiative to increase oversight, integrity and transparency of trading in energy markets[14]. There have also been a number of initiatives to improve the functioning of the food chain and transparency on agricultural commodities markets. As part of the ongoing reforms of the regulatory framework for financial markets, the Commission has also identified measures to increase the integrity and transparency of commodity derivatives markets.

3.1. Physical markets

3.1.1. Energy (oil, electricity gas)

The Commission has shown its readiness to act to ensure the orderly functioning of energy markets in its proposal to establish clear rules prohibiting market abuse on wholesale electricity and gas markets backed up by an EU wide market monitoring framework and new enforcement powers for energy regulators[15]. This approach will help to ensure that the benefits of the internal market are realised for Europe's businesses and citizens, and provides a good model for how to address the challenges resulting from the growing interdependence of commodity and related financial markets. The proposed Regulation on Energy market Integrity and Transparency[16] will provide European and national authorities with the tools to identify instances of market abuse in traded wholesale markets for electricity and gas:

- The European Agency for the Cooperation of Energy Regulators (ACER) Market will be responsible for monitoring to uncover possible cases of abuse.
- Traders will be prohibited from using inside information to benefit from their transactions or manipulate the market by artificially causing prices to be higher than would be justified by the availability, production cost or capacity to store or transport energy.
- Cooperation will be enhanced between physical (ACER) and financial (ESMA) market regulators.

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14 The market in allowances within the carbon Emissions Trading System for the EU is not dealt with in this Communication as the allowances are not commodities in the generally understood sense. The Commission has produced a Communication on this issue; COM(2010) 796 "Towards an enhanced market oversight framework for the EU Emissions Trading System".

15 This section does not address other energy related issues such as the safety and security or the overall consistency and effectiveness of EU external energy policy. They are dealt with in the Communication Energy 2020 A strategy for competitive, sustainable and secure energy - COM(2010) 639.

16 Proposal for a Regulation of the European Parliament and of the Council on energy market integrity and transparency - COM(2010) 726, December 2010.

The Commission is committed to ensuring that transparency requirements for fundamental data in gas and electricity markets are effective and meet market needs.

3.1.2. Agriculture and security of food supply

Given that there are many causes of price volatility, there is no single and simple solution to the identified problems. This is even more the case given the specificity of agricultural production (links to security of food supply, the environment, and the latter including the dependency of agricultural production on life cycles, weather and seasons, sanitary and pest conditions) which complicates the potential impact of policy options further.

Nevertheless, one key area of work concerns improving market information. The agricultural sector benefits from a wealth of information on agricultural production, consumption and stocks from public sources (WB, FAO/OECD, USDA, EU, ABARE) or commodity bodies (especially the International Grains Council). This is in clear contrast to information in commodities such as metals, minerals and energy, where market information is proprietary and mainly available from industry. However, the quality and timeliness of information on national and regional food stocks, and on projections for food production and consumption could be improved further. The G-20 has requested the "World Bank to work with other relevant international agencies to develop measures to improve information on national and regional food stocks and food production projections" and this is work which the Commission will fully support.

Given the increasing market orientation of its Common Agricultural Policy, information and transparency on commodity market developments have become key features in efforts to ensure the proper functioning of the agri-food chain:

- Member States regularly communicate a wide range of data to the Commission which is published on the internet[17] and discussed with advisory committees of stakeholders.

- A food price monitoring tool has been set up by the Statistical Office of the Commission to increase price transparency[18] and discussions are on-going on how to improve this tool.

- The Commission services regularly produce and publish a medium-term outlook for major agricultural commodity markets[19].

The Commission has established a High Level Forum for a better functioning Food Supply Chain[20]. While it does not deal with price volatility as such, it addresses the transmission of price developments throughout the supply chain, examining business to business relations, the competitiveness of the food industry, agri-food logistics and the food price monitoring tool.

The food price spikes have highlighted the underinvestment in agriculture in many developing countries in recent decades[21]. EU development policy has recognised the need to reverse this

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17 See for instance http://ec.europa.eu/agriculture/markets/prices/monthly_en.pdf

18 See http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/methodology/prices_data_for_market_monitoring

19 http://ec.europa.eu/agriculture/publi/caprep/prospects2010/index_en.htm

20 See http://ec.europa.eu/enterprise/sectors/food/competitiveness/forum_food/index_en.htm

21 Fewer than ten African States meet the Maputo target set in 2003 of ten percent of public investment to agriculture.

trend. As indicated in the Green Paper on EU Development Policy[22], it can play an important role in reducing the impact of price volatility on the most vulnerable. The Commission has already adopted a policy framework on food security[23], indicating that the EU and Member States should contribute to improved food market functioning at global, regional and national levels, including through improved market transparency. This would entail support in developing countries to strengthen farmer's organisations, to improve price transparency, to increase agricultural productivity on a sustainable basis, and to develop and apply regulatory frameworks. Developing agricultural production will increase resilience and adaptability to food shocks.

Finally, given that unilateral actions by certain governments are also a factor that can affect physical markets and cause price volatility, there is a need for improved governance and international dialogue in this area.

3.2. Regulation of financial markets

There is a broad agreement that it is desirable to increase the integrity and transparency of commodity derivatives market. In line with G20 principles and conclusions, the Commission has launched a number of initiatives to do so:

- It has adopted a proposal for a regulation on OTC derivatives trading[24], which aims to reduce systemic risk and improve transparency for regulators in all derivatives, including commodity derivatives.

- The review of the Market Abuse Directive[25] in spring 2011 will aim to clarify what trading in commodity markets constitutes abuse, and to ensure that all venues and transactions where abusive practices can occur are properly covered under pan-EU rules.

- The review of the Packaged Retail Investment Products (PRIPS)[26] will examine the need for additional rigour and enhanced quality of information when retail investors are offered structured commodity investment products.

- The Alternative Investment Fund Management Directive[27] will increase transparency of these funds for investors and national supervisors, and give a better insight of the impact of these funds on the markets for commodity derivatives.

- The review of the Markets in Financial Instruments Directive[28] in spring 2011, will aim to improve further the transparency of trades and prices in commodity derivatives by setting conditions for when commodity derivative products should trade exclusively on organised trading venues. It will also explore the need for more systematic and detailed information on the trading activities of different types of market participants in commodity derivatives,

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22 COM(2010) 629 "EU development policy in support of inclusive growth and sustainable development. Increasing the Impact of EU development policy".

23 COM(2010) 127 – An EU Policy Framework to assist developing countries in addressing food security challenges.

24 COM(2010) 484, 15.9.2010

25 Directive 2003/6/EC (OJ L 96, 12.4.2003).

26 A public consultation on PRIPS was launched on 26th November 2010, http://ec.europa.eu/internal_market/finservices-retail/investment_products_en.htm#consultation

27 COM(2009) 207, 30.4.2009.

28 Directive 2004/39/EC (OJ L 145, 30.4.2004).

more comprehensive oversight by regulators of commodity derivative positions, including the need for imposing position limits when deemed necessary.

- Finally the creation of the European Securities Markets Authority (ESMA) will ensure consistency of technical rules applicable to these markets and be instrumental in strengthening collaboration with regulators of the underlying physical markets[29].

3.3. The interaction between physical and financial commodities markets

The measures described above will help to ensure that increasing investment flows are more transparent, are better accounted for, and are less able to distort the functioning of commodity markets. However the Commission acknowledges that a better understanding of the interaction between physical and financial commodities markets is needed. Against this background, the Commission will:

- carry out further analysis of developments on financial and physical commodities markets to improve understanding of the relationships between them, support similar efforts underway at global level (G20, IOSCO, IEA, FAO, UNCTAD, OECD, IMF etc).

- Promote further improvements in the transparency and accessibility of information on the physical commodity markets, including through the relevant regulators and institutions, to ensure the proper functioning of these markets.

4. THE EUROPEAN RAW MATERIALS INITIATIVE

Beyond developments related to price volatility and the interaction between physical and financial commodities markets, the question of physical supplies of raw materials remains essential. In 2008 the Commission launched the "Raw Materials Initiative"[30] (RMI) which established an integrated strategy to respond to the different challenges related to access to non-energy and non-agricultural raw materials.

The RMI is based on three pillars: ensuring a level playing field in access to resources in third countries; fostering sustainable supply of raw materials from European sources, and boosting resource efficiency and promoting recycling. An element of the strategy is the need for a "raw materials diplomacy" anchored in wider policies towards third countries such as promoting human rights, good governance, conflict-resolution, non-proliferation and regional stability. This section examines results to date on identifying critical raw materials, and in the areas of trade, development, research, and resource efficiency and recycling. Section 5 looks at next steps.

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29 Regulation (EU) No 1095/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority, amending Decision No 716/2009/EC and repealing Commission Decision 2009/77/EC (OJ L 331, 15.12.2010, p. 84).

30 COM(2008) 699 Communication "The raw materials initiative - meeting our critical needs for growth and jobs in Europe".

4.1. Identifying critical raw materials

The Commission has identified 14 critical raw materials at EU level (see annex), with Member States and stakeholders, and has developed a transparent, innovative and pragmatic methodological approach to defining "criticality"[31].

Critical raw materials are those which display a particularly high risk of supply shortage in the next 10 years and which are particularly important for the value chain. The supply risk is linked to the concentration of production in a handful of countries, and the low political-economic stability of some of the suppliers. This risk is in many cases compounded by low substitutability and low recycling rates. In many cases, a stable supply is important for climate policy objectives and for technological innovation. For example, rare earths are essential for high performance permanent magnets in wind turbines or electric vehicles, catalytic converters for cars, printed circuit boards, optical fibres, and high temperature superconductors. The EU is completely dependent on imports, with China accounting for 97% of world production in 2009. At the same time, no recycling or substitution processes for rare earths are currently commercially viable.

The work on identifying critical raw materials also revealed the need for better data and knowledge, and on the need to update regularly the list of raw materials to take into account market developments, technological developments (for example, lithium, hafnium and nickel), or new information on the environmental impact of a material. It further concluded that policy actions should not be limited to critical raw materials exclusively.

4.2. Implementing the EU trade strategy for raw materials

There have been a number of achievements under the trade policy chapter since 2008. An EU trade strategy for raw materials has been defined and a first annual report has been published[32]. To date the following results can be reported in the three main areas:

- the EU proposed trade disciplines on export restrictions (including bans, quotas, duties and non-automatic export licences) in all relevant negotiations, bilateral or multilateral (for example in the Free Trade Agreement with Korea and in provisions on export duties on a series of raw materials, including wood, in the context of Russia's WTO accession).

- regarding enforcement, the Commission has continued to tackle barriers primarily through dialogue, but when no progress was registered has been ready to use other tools including WTO dispute settlement.

- In terms of outreach, the Commission has addressed the raw materials issue in various bilateral dialogues and in the OECD. Following the co-organisation of a workshop dedicated to the issue at the end of 2009, the topic was put on the OECD's work programme for 2011-2012.

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31 "Critical raw materials for the EU". Report of the RMSG Ad-hoc working group on defining critical raw materials June 2010.

32 DG Trade - Raw materials policy - 2009 annual report (http://ec.europa.eu/trade/creating-opportunities/trade-topics/raw-materials/).

4.3. Development instruments

Actions have been launched under the 10th EDF mainly within the good governance approach ("strengthening states"). Projects were also financed by the EU-Africa Infrastructure Fund, through the EIB lending to mining projects or the Seventh Framework Programme for Research and Development for geological surveys. The Commission is also supporting a sound investment climate through initiatives such as country-specific technical assistance for greater revenue transparency through the Extractive Industries Transparency Initiative, and work to promote good governance in tax matters[33].

4.4. New research, innovation and skills opportunities

The EU has taken steps to improve its knowledge base on actual and future deposits of many important raw materials and to stimulate the extractive industry to deliver new products to the manufacturing industry through the Seventh Framework Programme for Research and Development. The project ProMine, launched in 2009 with a € 17 million budget, will develop the first pan-European satellite-based mineral resources database and a 4D computer modelling system to help to assess the value of European mineral resources. Funding has been provided to projects on advanced underground technologies for intelligent mining, on substitution of critical raw materials such as rare earths and platinum group metals, and on coordination of activities in Member States in the area of industrial handling of raw materials through ERA-NET. Support has been provided for the development of the bio-refinery concept, that will contribute to provide new high value added products, and the European Technology Platforms on Sustainable Mineral Resources and Forest-Based Sector Technology are important drivers of new research efforts in relation to raw materials.

The European Regional Development Fund also provides funding for research, innovation and business support measures for raw material exploration and extraction, while the Erasmus Mundus Minerals and Environmental Programme (2009-2013) supports the generation of new skills in the area of raw materials.

4.5. Guidelines on the implementation of Natura 2000 legislation

In response to concerns about how to manage the sometimes competing objectives of ensuring a high level of environmental protection in Natura 2000 areas and the development of competitive extractive activities, the Commission has developed guidelines on how to apply the Natura 2000 decision-making framework. This underlines, for example, that there is no automatic exclusion of non-energy extraction activities in or near Natura 2000 areas[34]. The Commission has also provided guidance that presents examples of good practice for exploiting wood resources while ensuring sustainable forest management[35].

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33 COM(2010) 163, "Co-operating with Developing Countries on Promoting Good Governance in Tax Matters".

34 http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

35 Good practice guidance on the sustainable mobilisation of wood in Europe. European Commission, Forest Europe, FAO 2010.

4.6. Increased resource efficiency and improved conditions for recycling

The concept of sustainable use of natural resources is increasingly being mainstreamed into EU policy initiatives to promote growth and competitiveness[36]. Member States have implemented various policies and practical instruments to improve resource efficiency. A major policy issue is the need for legal clarity for defining when reprocessed waste can be reclassified as a product. The Commission under the Waste Framework Directive is developing 'End-of-Waste' criteria for specific waste streams, and work is advancing on rules for ferrous metals and aluminium, copper, recovered paper and glass.

Since 2008, the Commission has worked to prevent illegal export, or dumping, of waste by supporting Member States in implementing the Waste Shipment Regulation. It is considering guidelines for the shipment of used and waste vehicles. Concerning the stream of waste from electrical and electronic equipment (WEEE), the Commission has proposed an ambitious new collection target which would ensure that 85% of the WEEE stream would be available for the recovery of valuable raw materials contained, instead of being lost through improper treatment. In addition it has proposed stricter rules for the categorisation for shipment of 'used' electronics and electrical goods which will require exporters of such equipment to provide proof of functionality for every item exported for re-use.

5. FUTURE ORIENTATIONS OF THE RAW MATERIALS INITIATIVE

While significant progress has been made in implementing the RMI, further improvements are necessary. An integrated approach based on the three pillars is essential, as each contributes to the objective of ensuring a fair and sustainable supply of raw materials to the EU.

5.1. Monitoring critical raw materials

Securing supplies of raw materials is essentially the task of companies and the role of public authorities is to ensure the right framework conditions to allow companies to carry out this task. The Commission intends to explore with the extractive, recycling and user industries the potential for targeted actions, notably with regard to recycling. It is also ready to examine with Member States and industry, the added value and feasibility of a possible stockpiling programme of raw materials. At EU level, the stockpiling programme for oil aims to protect public security for Member States and EU[37]. The Commission will:

- Monitor the issues of critical raw materials to indentify priority actions, and will examine this with Members States and stakeholders.

- Regularly update the list of critical raw materials at least every 3 years.

5.2. Fair and sustainable supply of raw materials from global markets (pillar 1)

The EU will actively pursue a "raw materials diplomacy" with a view to securing access to raw materials, in particular the critical ones, through strategic partnerships and policy dialogues.

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36 See COM(2011) 21 "A resource-efficient Europe: flagship initiative under the Europe 2020 strategy"

37 Council Directive 2009/119/EC of 14 September 2009.

5.2.1. Development policy and sustainable supply of raw materials

Sustainable mining can and should contribute to sustainable development. However, many developing countries – especially in Africa – have not been able to translate their resource wealth into sustainable and inclusive growth, often because of governance issues related to regulatory frameworks or taxation. Enhancing governance and transparency, as well as the trade and investment climate, in the raw materials sector, is essential for achieving inclusive growth and sustainable development in resource rich countries. The EU, through its development policies and in partnership with developing countries, can play a crucial role in creating win-win situations where both developed and developing countries benefit from the sustainable supply of raw materials, and in using domestic financial resources from the mining sector for sustainable development to support the objectives of inclusive growth and poverty reduction strategies.

The Commission will consider further these issues in the context of the Green Paper consultation process on the future of EU development policy and budget support as well as in its public consultation on country-by-country reporting[38]. The EU will encourage partner governments to develop comprehensive reform programmes that clearly identify objectives such as improving mining taxation regimes or enhancing revenue and contract transparency, or enhancing the capacity for using revenues to support development objectives. Greater transparency will help society at large and national supervisory bodies to hold governments and companies to account for revenue payments and receipts, and thus decrease fraud and corruption and ensure a more predictable trade and investment climate.

In Addis Ababa in June 2010 the Commission agreed with the African Union Commission (AUC) to establish bilateral co-operation on raw materials and development issues based on the RMI and the AUC's policy on mining and minerals, i.e. the 2009 'African Mining Vision'. This co-operation will focus on three areas: governance, investment and geological knowledge/skills. Under the Africa-EU Joint Strategy 2011-2013, agreed at the Africa-EU Summit held in November 2010, actions on raw materials are foreseen under the Trade, Regional Economic Integration and Infrastructure Partnership. The EU and its Member States will work jointly on these issues. The Commission proposes to:

- enhance European financial and political support for the Extractive Industries Transparency Initiative (EITI), and help developing countries to implement it;

- share best practice with international organisations such as the World Bank, IMF, and the African Development Bank;

- examine ways to improve transparency throughout the supply chain and tackle in co-ordination with key trade partners situations where revenues from extractive industries are used to fund wars or internal conflicts;

- promote more disclosure of financial information for the extractive industry, including the possible adoption of a country-by-country reporting requirement. The Commission will take into account progress made by the International Accounting Standards Boards on an

[38] http://ec.europa.eu/internal_market/consultations/2010/financial-reporting_en.htm

International Financing Reporting Standard for extractive industries, as well as the current status of legislation of third countries active in the region[39];

- promote the application of EU standards by EU companies operating in the developing countries and the application of the Best Available Technique Reference document and by developing a code of conduct of EU companies operating in third countries; and

- support the work by the OECD on due diligence in the mining sector;

- continue to assess - with African countries – the feasibility of assisting further co-operation between both continents' geological surveys and to promote co-operation in this area in multilateral fora such as UNESCO's Geosciences Programme.

Resource-rich developing countries often suffer from a lack of transport, energy and environmental infrastructure which limits their ability to harness their mineral wealth for the benefit of their populations.

The European Commission, the European Investment Bank (EIB), and other European development financing institutions, in co-operation with African national and regional authorities, will continue to assess how to promote the most appropriate infrastructure, and related governance issues, that can contribute to the sustainable use of the resources of these countries and facilitate raw materials supply, using respective sector dialogues to steer this process. In particular, the European Commission will assess (a) the feasibility of increasing lending (which may include grant-loan elements) to industry, including mining and refining projects and in particular post-extractive industries and (b) investigate the possibility of promoting financial instruments that reduce risk for operators on the basis of guarantees supported by EU, including by the European Development Fund. The existing EU-Africa Infrastructure Trust Fund[40] could also assist African countries in this task. .

Development policy should also target the creation of linkages from the extractive industry towards local industry, by improving the value chain and maximising diversification. Therefore, an enabling business capacity building should be fostered and trade agreements provide the necessary flexibility to achieve this aim. The EU can also help developing countries increase their geological knowledge[41] to allow them to better estimate national mineral reserves, better plan budgets based on expected revenues from these reserves and give increased bargaining power vis-à-vis mining firms.

5.2.2. Reinforcing the raw materials trade strategy

The Commission intends to reinforce the Raw Materials Trade Strategy[42] as set out in section 4.2 in line with development and good governance objectives. The Commission considers that the EU should:

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39 For example on due diligence and reporting requirements by companies which are part of the supply chain of raw materials e.g. US Dodd Frank Wall Street Reform and Consumer Protection Act.

40 The purpose of the Trust is to benefit cross-border and regional infrastructure projects in sub-Saharan Africa.

41 For example, the AEGOS project brings the EU's and Africa's geo-surveys together to improve the level and quality of resource data available for Africa.

42 DG Trade - Raw materials policy - 2009 annual report.

- continue to develop bilateral thematic raw materials dialogues with all relevant partners, and strengthen ongoing debates in pluri – and multilateral fora (including e.g. G20, UNCTAD, WTO, OECD); carry out further studies to provide a better understanding of the impact of export restrictions on raw materials markets, and foster a dialogue about their use as a policy tool.

- further embed raw materials issues, such as export restrictions and investment aspects, in ongoing and future EU trade negotiations in bilateral, plurilateral and multilateral frameworks.

- pursue the establishment of a monitoring mechanism for export restrictions that hamper the sustainable supply of raw materials, and will continue to tackle barriers distorting the raw materials or downstream markets with dialogue as the preferred approach, but using dispute settlement where justified.

- encourage in OECD activities the inclusion of relevant non-OECD members in the work on raw materials, and explore further multilateral and plurilateral disciplines including consideration of best practices.

- use competition policy instruments to ensure that supply of raw materials is not distorted by anti-competitive agreements, mergers or unilateral actions by the companies involved.

- take forward the above mentioned actions, and further analyse priorities for raw materials in relation to third countries through autonomous measures, bilateral and multilateral frameworks and dialogue; and continue to pursue a consistent EU trade policy on these priorities.

5.3. Fostering sustainable supply within the EU (pillar 2)

The Europe 2020 Strategy underlines the need to promote technologies that increase investment in the EU's natural assets. Extractive industries fall under this category but its development is hindered by a heavy regulatory framework and competition with other land uses. Many regulatory issues in this area are the competence of Member States. The Commission therefore acts mainly as a facilitator for the exchange of best practices.

At the same time, extraction in the EU must occur in safe conditions. This is important both for the image of the sector and as a precondition for the public acceptance. The Commission considers that the following practices[43] are particularly important in promoting investment in extractive industries:

- defining a National Minerals Policy, to ensure that mineral resources are exploited in an economically viable way, harmonised with other national policies, based on sustainable development principles and including a commitment to provide an appropriate legal and information framework;

- setting up a land use planning policy for minerals that comprises a digital geological knowledge base, a transparent methodology for identifying mineral resources, long term

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[43] "Improving framework conditions for extracting minerals for the EU". Report of the RMSG Ad-hoc working group on exchanging best practices on land use planning, permitting and geological knowledge sharing. June 2010.

estimates for regional and local demand and identifying and safeguarding mineral resources (taking into account other land uses) including their protection from the effects of natural disasters;

- putting in place a process to authorise minerals exploration and extraction which is clear, understandable, provides certainty and helps to streamline the administrative process (e.g. the introduction of lead times, permit applications in parallel, and one-stop-shop).

The Commission proposes to assess with the Member States, in full respect of the subsidiarity principle, the feasibility of establishing a mechanism to monitor actions by Member States in the above area, including the development of indicators.

It is also important to further enhance the knowledge base necessary for an efficient raw materials strategy. In the short term the Commission proposes to assess with the Member States the scope for increased synergies between national geological surveys, that would allow for economies of scale, reduced costs and increased potential to engage in joint projects (e.g. harmonised minerals database, European Raw Materials Yearbook). In the medium term, any synergies should contribute to an improved European raw materials knowledge base in a co-ordinated way, in particular taking into account future opportunities within the GMES programme. For some raw materials, such as wood, the growing demand for renewable energy continues to increase competition for them. Increased demand is not always matched by a corresponding supply increase, thereby leading to higher prices.

The Commission intends to:

- promote the work of UNECE in the area of standardisation concerning reporting of reserves and resources at EU-level;

- carry out an appropriate analysis on the availability of wood and recovered paper taking into account the potential demand from both the forest based industries and the renewable energy sector (biomass);

- continue to support the creation of sectoral skills' councils at European level when an initiative comes from stakeholders such as social partners or the relevant observatories;

- Promote research and development in the raw materials value-chain including extraction, processing and substitution.

5.4. Boosting resource efficiency and promoting recycling (pillar 3)

As worldwide demand for raw materials increases, greater efforts will have to be made on recycling. Higher recycling rates will reduce the pressure on demand for primary raw materials, help to reuse valuable materials which would otherwise be wasted, and reduce energy consumption and greenhouse gas emissions from extraction and processing. In the framework of the Europe 2020 flagship initiative on resource efficiency, the Commission will present in 2011 a roadmap for a resource efficient Europe. It will set out a vision of structural and technological changes required to move to a low carbon, resource efficient and climate resilient economy by 2050 and how we can make this transition happen through policies delivering most benefits for the EU's growth, jobs and energy security.

'Urban mining', which is the process of extracting useful materials from urban waste, is one of the main sources of metals and minerals for European industry. The use of secondary raw

materials contributes to resource efficiency, to the reduction of greenhouse gas emissions and to the preservation of the environment. However, the full potential of many of these resources is not being exploited and although recycling of municipal waste in the EU has doubled in 10 years, there are large differences in the situation in the Member States. Given pressures to reduce carbon emissions, protect human health and reduce external dependence, the barriers which prevent recycling need to be further addressed. The Commission considers that these barriers fall into three broad categories: 'leakage' of waste to sub-standard treatment inside or outside the EU; obstacles to the development of the recycling industry; and inadequate innovation in recycling.

Better implementation and enforcement of existing EU waste legislation is essential for promoting a more resource-efficient Europe. The Commission proposes therefore to:

- review the Thematic Strategy on waste prevention and recycling in 2012 to develop best practices in collection and treatment of key waste streams, in particular those which contain raw materials with a negative impact on the environment. When necessary, the availability of recycling statistics will be improved;

- support research and pilot actions on resource efficiency and economic incentives for recycling or refund systems;

- carry out an an ex-post evaluation of the EU waste acquis, including an assessment of areas where legislation in the various waste streams could be aligned to improve coherence. This would include the effectiveness of deterrents and penalties for breaches of EU waste rules;

- review the action plan on sustainable consumption and production in 2012 to identify what additional initiatives are necessary in this area;

- analyse the feasibility of developing ecodesign instruments (i) to foster more efficient use of raw materials, (ii) ensure the recyclability and durability of products and (iii) promote the use of secondary raw materials in products, notably in the context of the Ecodesign Directive; and

- develop new initiatives to improve the competitiveness of EU recycling industries notably by introducing new market based instruments favouring secondary raw materials.

The problem of environmental dumping of waste products also occurs in cases of illegal shipment of waste to third countries. To further strengthen the enforcement of the Waste Shipment Regulation, the Commission proposes to:

- ensure precise and workable inspection standards for waste across the EU in 2011. This will allow for further efforts in 2012 to facilitate the control of shipments by customs authorities;

- consider using FP7 research funding to help improve technologies for detection, identification, tracking and location of illegal shipments;

- examine the feasibility of applying a global certification scheme for recycling facilities to the export of waste streams, building on environmentally-sound management criteria;

– build on IMPEL[44], work with Member States to assess the feasibility of a formal EU-level mechanism for the enforcement of the EU acquis.

5.5 Innovation: a cross-cutting issue

Raw materials are essential inputs for the competiveness of industry and for the development of many environmentally-friendly, clean-technology applications. Innovation is key to the EU's potential in this area and can play a role in addressing the challenges of the three pillars of the RMI. There is a need for innovation along the entire value chain, including extraction, sustainable processing, eco-design, recycling, new materials, substitution, resource efficiency and land use planning. The Commission will assess whether to launch an Innovation Partnership on raw materials within the Europe 2020 Flagship on Innovation Union[45].

6. WAY FORWARD

Access to commodities and raw materials is essential to maintaining the productive capacity of the economy and securing the well being of citizens. These commodities and raw materials are sourced from across the globe as well as from within Europe. The challenge is to ensure that commodity and raw materials needs are met in a way which supports wider goals for development in source countries, environmental protection, open trade and stable markets which do not pose risks to the wider economy.

Across all classes of commodities and raw materials, there has been an increase in financial activity. Ensuring that this development supports and does not undermine access to commodities and raw materials or destabilise the European economy or the economies of developing countries is therefore a key policy concern at European level and international level. These markets must continue to serve the real economy by helping price formation and allowing the hedging of market risk.

The prices of commodity derivatives and underlying physical commodities are interlinked. Their dynamics are challenging established paradigms and understanding commodity prices is becoming increasingly difficult. The integrity and transparency of commodity derivative markets needs to be enhanced and the Commission considers there is a need to promote greater understanding of these developments. For this reason, the Commission has launched several initiatives in the field of financial services, as referred to in section 3.2, and will examine the extent to which further improvements are necessary on the transparency and accessibility of information on physical commodity markets. This increased transparency of financial as well as physical trading activities should allow regulators and market participants to better understand the interaction between financial and physical commodity markets, and help to prevent abusive practices.

The Commission will also consider further policy options to strengthen security of food supply. It will feed its work on each of these issues into G20 activities this year, in particular in the light of the priority given by the French presidency to addressing commodity prices and food security.

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44 European union Network for the Implementation and Enforcement of Environmental Law

45 COM(2010)546

Given that a sustainable demand and supply of raw materials is a major on-going challenge, the Commission also intends to reinforce implementation of its raw materials initiative in an integrated strategy based on its three pillars. Furthermore, the Commission will hold regular public discussion through an annual thematic event that would promote the awareness of the challenges ahead and take stoke of the progress made.

Annex

Concentration of production of critical raw materials, and recycling and substitution rates

The 14 raw materials listed below are critical because the risks of supply shortage and their impacts on the economy are higher compared with most of the other raw materials. Their high supply risk is mainly due to the fact that a high share of the worldwide production mainly comes from a handful of countries: China (antimony, fluorspar, gallium, germanium, graphite, indium, magnesium, rare earths, tungsten), Russia (platinum group metals), the Democratic Republic of Congo (cobalt, tantalum) and Brazil (niobium and tantalum). This concentration of production is in many cases compounded by low substitutability and low recycling rates.

Raw materials	Main producers (2008, 2009)	Main sources of imports into EU (2007, or 2006)	Import dependency rate	Substitutability	Recycling rate
Antimony	China 91%	Bolivia 77%	100%	0,64	11%
	Bolivia 2%	China 15%			
	Russia 2%	Peru 6%			
	South Africa 2%				
Beryllium	USA 85%	USA, Canada, China, Brazil (*)	100%		
	China 14%				
	Mozambique 1%				
Cobalt	DRC 41%	DRC 71%	100%	0,9	16%
	Canada 11%	Russia 19%			
	Zambia 9%	Tanzania 5%			
Fluorspar	China 59%	China 27%	69%	0,9	0%
	Mexico 18%	South Africa 25%			
	Mongolia 6%	Mexico 24%			
Gallium	NA	USA, Russia (*)	(*)	0,74	0%
Germanium	China 72%	China 72%	100%	0,8	0%
	Russia 4%	USA 19%			
	USA 3%	Hong Kong 7%			
Graphite	China 72%	China 75%	95%	0,5	0%
	India 13%	Brazil 8%			NA
	Brazil 7%	Madagascar 3%			
		Canada 3%			
Indium	China 58%	China 81%	100%	0,9	0,30%
	Japan 11%	Hong Kong 4%			
	Korea 9%	USA 4%			
	Canada 9%	Singapore 4%			
Magnesium	China 56%	China 82%	100%	0,82	14%
	Turkey 12%	Israel 9%			
	Russia 7%	Norway 3%			
		Russia 3%			
Niobium	Brazil 92%	Brazil 84%	100%	0,7	11%
	Canada 7%	Canada 16%			
Platinum group metals	South Africa 79%	South Africa 60%	100%	0,75	35%
	Russia 11%	Russia 32%			
	Zimbabwe 3%	Norway 4%			

Rare earths	China 97%	China 90%	100%	0,87	1%
	India 2%	Russia 9%			
	Brazil 1%	Kazakhstan 1%			
Tantalum	Australia 48%	China 46%	100%	0,4	4%
	Brazil 16%	Japan 40%			
	Rwanda 9%	Kazakhstan 14%			
	DRC 9%				
Tungsten	China 78% (6,1)	Russia 76%	73%	0,77	37%
	Russia 5% (6,5)	Bolivia 7%			
	Canada 4%	Ruanda 13%			

(*) subject to strong fluctuations

Note: import dependence is calculated as "net imports / (net imports + production in EU)"

Source: compiled on the basis of Report "Critical raw materials for the EU" by the Ad-hoc working group on defining critical raw materials of the Raw Materials Supply Group. June 2010

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United States Government Accountability Office
Washington, DC 20548

January 30, 2009

The Honorable Collin Peterson
Chairman
Committee on Agriculture
House of Representatives

Subject: *Issues Involving the Use of the Futures Markets to Invest in Commodity Indexes*

Until mid-2008, prices for a broad range of physical commodities, from crude oil to crops such as wheat, had increased dramatically for several years—raising concerns and leading to a debate over the possible causes. Some market participants and observers have attributed the price increases to fundamental economic factors related to supply and demand. Others have suggested that the price increases resulted from speculation in the futures contracts by hedge funds and investors in commodity indexes. Like stock indexes, commodity indexes track the composite price of a basket of long futures positions in physical commodities.[1] The indexes' investment strategy is passive, remaining the same regardless of whether prices are falling, rising, or flat. Two commonly referenced commodity indexes are the Standard & Poor's Goldman Sachs Commodity Index (S&P GSCI) and Dow Jones-American International Group Commodity Index (DJ-AIGCI), which are based on a broad range of physical commodities, including energy products, agricultural products, and metals. Since around the mid-2000s, pension plans, endowments, and other institutional investors increasingly have used investments in commodity indexes to obtain exposure to commodity prices as an asset class, typically to diversify their portfolios or hedge inflation risk.[2]

Your letter asked us to examine various issues surrounding how commodity-index futures trading is addressed by various laws and regulations. Futures exchange regulations that can affect such trading include margins, or performance bonds,

[1]A futures contract is an agreement to purchase or sell a commodity for delivery in the future. A long futures position is one in which the holder has bought a futures contract and is obligated to take delivery of the commodity in the future. However, few contracts actually result in delivery, because the vast majority of contracts are offset by making an equal but opposite trade before the delivery date.

[2]Inflation risk is the risk associated with the return from an investment not covering the loss in purchasing power caused by inflation.

which are deposits that futures traders make with their broker to ensure that they can meet the financial obligations associated with their futures positions. To prevent excessive speculation that could cause unwarranted changes in futures prices, the Commodity Futures Trading Commission (CFTC) and futures exchanges place limits on the size of futures positions—the number of contracts—that a trader may hold. In agreement with your office, this report addresses

- whether the federal law governing futures trading prohibits investors from using the futures markets to gain an exposure to commodity indexes,
- whether the federal law governing pension plans prohibits them from investing in commodities through the futures markets,
- how margins have affected the ability of investors to obtain exposures to commodity indexes, and
- how position limits have affected the ability of investors to obtain exposures to commodity indexes.

In addition, we agreed with your office to review recent studies analyzing the effect of commodity index futures trading on commodity prices.

On December 16, 2008, we briefed your office on the results of this work. This letter summarizes the briefing. The enclosures contain the full briefing, including our scope and methodology, and a bibliography of the studies we reviewed. In response to questions asked during the briefing, we have added information to the enclosed briefing slides to provide additional details on the percentage of total outstanding futures positions accounted for by index traders, the scope and nature of contract position limit exemptions, and the scope of the federal law covering pension funds.

We conducted this performance audit from September 2008 through January 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Since around mid-2000s, institutional and retail investment in commodities has grown significantly. However, determining the actual amount of such investment is difficult, in part because no comprehensive data are available on all such investments. Based on recently collected data, CFTC estimated that the aggregate net amount of all commodity index trading (combined over-the-counter (OTC) and exchange-traded derivatives) was $200 billion as of June 30, 2008, of which $161

billion was tied to commodities traded on U.S. futures markets and the remainder was tied to commodities traded on foreign futures markets.

To gain exposure to a commodity index, investors can take a direct approach by taking long positions in the individual futures contracts making up the index. Investors also can take long positions in futures contracts linked to a commodity index, such as futures on the S&P GCSI or DJ-AIGCI. Some investors may find the direct approach to be difficult, however, because of the need to roll over their futures positions periodically.[3] As an alternative, investors can gain exposure to a commodity index by using a swap dealer (e.g., large bank) to enter into an over-the-counter (OTC) swap linked to an index.[4] In addition, investors can gain exposure to a commodity index by investing in other vehicles that track a commodity index, such as a commodity pool, mutual fund, or exchange-traded fund or note.

To regulate commodity futures and option markets in the United States, Congress created CFTC as an independent agency in 1974. Under the Commodity Exchange Act (CEA), the primary mission of CFTC includes fostering open, competitive, and financially sound futures markets and protecting market users and the public from fraud, manipulation, and abusive practices related to the sale of commodity futures and options.[5] This mission is achieved through a regulatory scheme that is based on federal oversight of industry self-regulation. Prompted partly by the growth of the OTC derivatives markets, the Commodity Futures Modernization Act of 2000 amended CEA to provide, among other things, for regulated markets and markets largely exempt from regulation. The regulated markets include futures exchanges that have self-regulatory surveillance and monitoring responsibilities as self-regulatory organizations and also are subject to oversight by CFTC.

Summary

Although the use of the futures markets by institutional investors to gain long-term exposure to commodities represents a new type of speculation, the CEA—the law governing futures trading—does not prohibit this activity. Futures markets historically have been used by commercial firms to manage price risk and speculators to profit from price movements. In a regulatory response to some funds that sought approval to conduct investing in commodity indexes, CFTC staff noted that the use of the futures markets by funds to provide their investors with a commodity-index exposure represented a legitimate and potentially useful investment strategy.

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[3]Unlike a passive portfolio of stocks, a passive futures portfolio requires regular transactions because futures contracts expire. For example, in the case of the S&P GSCI, futures contracts near to expiration are rolled forward (i.e., exchanged for futures contracts with the next applicable expiration date) at the beginning of their expiration months.

[4]For example, under a typical commodity index swap, the investor agrees to pay the Treasury bill rate, plus a management fee, to a swap dealer, and the dealer agrees to pay the total return of a specified commodity index, such as the S&P GSCI or DJ-AIGCI, to the investor.

[5]See section 3 of the Commodity Exchange Act, 7 U.S.C. § 5 (2004).

Under the federal law governing private pension plans—the Employee Retirement Income Security Act (ERISA)—such plans may invest in commodity indexes using futures contracts or other derivatives but must determine that such investments are, among other things, prudent. Although ERISA does not prohibit pension plans from investing in futures, it sets certain minimum standards for pension plans sponsored by private employers.[6] A 1996 opinion issued by the Department of Labor recognized that derivatives might be a useful tool for managing a variety of risks and broadening investment alternatives in a plan's portfolio. But the opinion also noted that investments in certain derivatives might require a higher degree of sophistication and understanding on the part of plan fiduciaries than other investments.

Commodity index investors generally have not been directly subject to futures margins (or performance bonds), because they primarily have used OTC swaps, not futures contracts, to obtain their exposure. Instead, the swap dealers that provide commodity index exposures to investors through swaps are subject to futures margins if they use exchange-traded futures to hedge their risk exposure from these swaps. Moreover, such dealers may have entered into other OTC transactions that offset their index exposures and, as a result, may not use futures to hedge their index exposures in full. Futures exchanges, not CFTC, generally set margins, which are based on the price volatility of the underlying commodity of a futures contract and typically are small relative to a contract's market value. Both the buyer and seller of a futures contract post margin, which serves to ensure that they can meet their contractual obligations; moreover, futures margin is not an extension of credit. If margin requirements on index-related futures were increased, two of the largest swap dealers told us that the cost of providing investors with commodity index exposures using OTC swaps would increase and might lead investors to use alternatives to OTC swaps, such as commodity index funds. They also said that once institutional investors have decided to allocate a portion of their portfolios to commodities, they will choose the most efficient way to do so. According to the market participants we spoke with, imposing higher margins on index-related futures positions also could raise challenges. For example, swap dealers use futures to hedge their net exposure—the residual risk remaining after a dealer internally nets OTC swaps with offsetting exposures—and may not be able to untangle and identify the futures positions that are attributable specifically to commodity index swaps.

Similarly, index investors largely have not been restricted by contract position limits that are used to prevent excessive speculation in the futures markets. Such investors primarily have obtained their index exposures through OTC swaps that are not subject to futures speculative position limits. Further, swap dealers have

[6]Among other things, ERISA (1) requires plans to provide information to participants and the federal government about the plan, (2) sets minimum standards regarding who may participate and when they may participate, (3) sets responsibility standards and requires accountability for people who run or provide investment advice to plans, (4) guarantees payment of certain benefits if a defined benefit plan is terminated without sufficient assets to pay accumulated benefits, and (5) gives the Secretary of Labor the authority to bring legal actions to enforce title I of ERISA.

received exemptions from CFTC that allow them to hold index-related futures positions in excess of speculative position limits.[7] Position limits prohibit traders from holding a futures position above a specified limit, unless the traders have received an exemption. With an exemption, a swap dealer can enable an investor to use an OTC swap to take a position that is greater than the level the investor would be permitted to take if the position were held solely in the futures market. The swap dealer can, then, take a futures position in excess of a position limit to hedge its exposure from the OTC swap. In a September 2008 report, CFTC noted that the mix of commercial and noncommercial activity by swap dealers called into question whether the swap dealers should receive hedge exemptions from position limits for some of their activity. In that regard, the CFTC Commission instructed the agency's staff to develop a proposed rulemaking that would address whether the swap dealers should receive a more limited exemption. CFTC staff told us that the Commission has not set a time frame for issuing the proposal.

Although not included in the enclosed briefing slides, we also are providing information on the results of our review of studies analyzing the impact that index traders and other futures speculators have had on commodity prices. Through our literature search, we identified eight empirical studies and three qualitative studies. (See the bibliography for a list of the studies we reviewed.) Unlike the empirical studies, the qualitative studies do not use experimental or statistical controls to evaluate the causal relationship between speculative trading and commodity prices and, thus, do not provide a systematic way to assess the empirical veracity of the causal relationship. Importantly, the eight empirical studies we reviewed generally found limited statistical evidence of a causal relationship between speculation in the futures markets and changes in commodity prices—regardless of whether the studies focused on index traders, specifically, or speculators, generally. Four of the studies used CFTC's publicly available Commitments of Traders (COT) data in their analysis, and their findings should not be viewed as definitive because of limitations in that data. For example, the public COT data are issued weekly, and analyses using such data could miss the effect of daily or intraday changes in futures positions on prices. Also, these data generally aggregate positions held by different groups of traders and, thus, do not allow the effect of individual trader group positions on prices to be assessed. Two of the studies we reviewed involved CFTC staff and used non-public COT data that included positions reported more frequently and separated positions held by different trader groups.[8] However, similar to the studies that used the public COT data, the studies using the non-public data also found limited evidence that speculation was affecting commodity prices. In addition, all of the empirical studies we reviewed generally employed statistical techniques that were designed to detect a very weak or even spurious

[7]CFTC speculative position limits apply only to certain "designated" agricultural commodities listed in CFTC Regulation 150.2. CFTC regulations list certain types of positions that may be exempted from (and thus may exceed) these speculative position limits. The exemptions include bona fide hedging transactions or positions.

[8]These studies, while not addressing all the data limitations, provide for a better evaluation of the causal relationship between positions and commodity prices.

causal relationship between futures speculators and commodity prices. As result, the fact that the studies generally did not find statistical evidence of such a relationship appears to suggest that such trading is not significantly affecting commodity prices at the weekly or daily frequency.

Agency Comments

We provided a draft of this letter and the attached briefing to CFTC for comment. CFTC provided technical comments, which we incorporated as appropriate.

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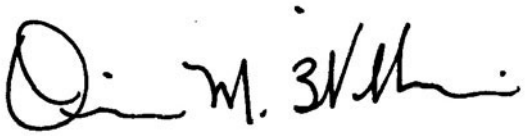
As we agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 30 days from the date of this letter. At that time, we will provide copies of this report to interested congressional committees. We also are sending a copy of this report to the Acting Chairman of CFTC. In addition, this report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512- 8678 or williamso@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in enclosure II.

Sincerely yours,



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Director, Financial Markets and Community Investment

Briefing to the Staff of the House Committee on Agriculture

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Briefing to Staff of the House Committee on Agriculture

Issues Involving the Use of the Futures Markets to Invest in Commodity Indexes

December 16, 2008
(with subsequent additions after that date)

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Briefing Outline

- Objectives, scope, and methodology
- Background
- Summary
- Investments in Commodity Indexes under The Commodity Exchange Act (CEA)
- Investment in Commodity Indexes under The Employee Retirement Income Security Act (ERISA)
- Margins and index investors
- Position limits and index investors
- Appendix I: Position limits and accountability levels
- Appendix 2: Net long positions held by index traders

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Objectives, Scope, and Methodology

- Our objectives were to examine
  - whether the CEA prohibits investors from using the futures markets to gain an exposure to commodity indexes,
  - whether ERISA prohibits pension plans from investing in commodities through the futures markets,
  - how margins have affected the ability of investors to obtain exposures to commodity indexes, and
  - how position limits have affected the ability of investors to obtain exposures to commodity indexes.
- To accomplish our objectives, we
  - reviewed sections of the CEA and CFTC regulations, including proposed rules and comment letters; exchange rules on position limits and margins (performance bonds); and congressional testimonies, studies, and other material by CFTC, academics, GAO, and others about the futures markets;

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Objectives, Scope, and Methodology

- Reviewed sections of ERISA; an opinion of the Department of Labor's (DOL) Employee Benefits Security Administration, which is responsible for enforcing certain ERISA provisions, on the use of derivatives by pension plans; and congressional testimonies, GAO reports, and other material on investment in commodity indexes by pension funds;
- interviewed CFTC staff, as well as officials representing two swap dealers, an asset management firm, three futures exchanges, and an industry trade association;
- analyzed CFTC's Commitments of Traders (COT) and supplemental reports to develop summary information about the futures positions, or contracts, held by index traders,
- assessed the reliability of the CFTC data and determined the data were sufficient for our purposes; and
- reviewed and analyzed data on publicly traded index funds, including their public filings, and the investment policies and holdings of three pension plans.

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Background

- Investing in commodities by institutions has become more popular since the mid-2000s but has been common since the 1970s.
  - Pension plans, endowments, foundations, and other institutional investors generally have invested in commodities to diversify their portfolios and hedge inflation risk.
  - Investors have gained commodity exposure through commodity indexes, which measure the returns on a basket of various commodity futures contracts.
  - Two common commodity indexes are the S&P Goldman Sachs Commodity Index (S&P GSCI) and Dow Jones-AIG Commodity Index (DJ-AIGCI).
- Investors can invest in commodity indexes by
  - taking long positions in individual futures contracts that make up an index or futures contracts linked to an index,
  - entering into an over-the-counter (OTC) swap linked to an index, or
  - investing in a vehicle that tracks an index, such as a commodity pool, mutual fund, or exchange-traded fund or note.

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Background

- CFTC recently estimated that the net notional value of the portion of commodity index trading tied to the U.S. futures markets was $161 billion as of June 30, 2008.
- The U.S. futures markets are regulated under the CEA by CFTC.
  - The CEA's primary objectives include preventing manipulation, abusive trading practices, and fraud.
  - The CEA authorizes CFTC to oversee futures exchanges (called designated contract markets) and other entities. Our discussion focuses solely on futures contracts traded on designated contract markets.

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Summary

- Using futures markets to make long-term investments in commodity indexes represents a new type of speculation but is not prohibited under the CEA.
- Under ERISA, pension plans may invest in commodity indexes using futures contracts or other derivatives but must determine that such investments are, among other things, prudent.
- Index investors generally have not been directly subject to margins, because they have used primarily OTC swaps, not futures contracts, to obtain their exposure. Two swap dealers told us that increasing margins on index-related futures positions would increase the cost of swaps but might not cause investors to significantly reduce their index exposure.
- Index investors generally have not been restricted by position limits, because (1) they have obtained their index exposures primarily through OTC swaps not subject to position limits, and (2) swap dealers have received exemptions from CFTC that allow them to hold index-related futures positions in excess of the position limits. CFTC is currently deciding whether it should limit the exemptions.

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The CEA Does Not Prohibit the Use of the Futures Markets for Index Investing

- Futures markets historically have been used by commercial firms to manage price risk and speculators to profit from price movements.
  - Futures markets serve a public interest by providing price discovery and risk-shifting.
  - The proper and efficient functioning of the futures markets requires participation by speculators and hedgers.
  - CFTC has adopted regulations designed to prevent excessive speculation and operates various programs to monitor the markets for manipulation and protect the economic functions of the markets.
- However, the use of the futures markets by pension funds and other institutional investors to gain long-term exposure to commodity indexes as an asset class represents a new type of speculation.
  - CFTC staff told us that the use of the futures markets for index trading does not violate any provisions of the CEA or CFTC regulations.
  - In two regulatory letters issued in 2006, CFTC staff stated that the use of the futures markets by funds to provide their investors with a commodity-index exposure represented a legitimate and potentially useful investment strategy.

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ERISA Does Not Prohibit Pension Plans from Investing in the Futures Markets

- Investment decisions of private sector pension plans must comply with ERISA.
- Under ERISA, a fiduciary must observe a prudent man standard of care and, among other things,
  - act solely in the interest of the plan participants and beneficiaries and in accordance with plan documents;
  - invest and administer the plan with the care, skill, and diligence of a prudent man with knowledge of such matters; and
  - diversify plan investments to minimize the risk of large losses.
- Under ERISA, the prudence of any investment is considered in the context of the total plan portfolio. Thus, a relatively risky investment may be considered prudent if it is part of a broader strategy to balance the risk and expected return to the portfolio.
- Public sector pension plans must follow requirements established for them under applicable state law. While states generally have adopted standards similar to the ERISA prudent man standard, specific provisions of law and regulation vary from state to state.

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ERISA Does Not Prohibit Pension Plans from Investing in the Futures Markets

- In 1996, a DOL official issued an opinion on the use of derivatives by pension plans under ERISA.
  - Under the DOL opinion, derivatives were defined to include futures contracts and OTC swaps. The opinion also covered plan investments in pooled funds that used derivatives.
  - According to the DOL opinion, derivative investments are subject to the fiduciary responsibility rules in the same manner as are any other plan investments. Thus, plan fiduciaries must determine that a derivatives investment is, among other things, prudent and made solely in the interest of the plan's participants and beneficiaries.
- The DOL opinion recognized that derivatives may be a useful tool for managing a variety of risks and for broadening investment alternatives in a plan's portfolio but noted that investments in certain derivatives may require a higher degree of sophistication and understanding on the part of plan fiduciaries than other investments.
- Under ERISA, a plan participant or beneficiary may bring civil action in court to get, among other things, appropriate relief from a breach of fiduciary duty.

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Margins Generally Have Not Limited Investors' Ability to Gain Index Exposure

- CEA generally does not grant CFTC authority to establish margins (also called performance bonds) for futures contracts.
- Futures exchanges set margins for their futures contracts.
  - To enter into a futures contract, both traders (buyer and seller) must post a margin deposit with their broker, which is intended to serve as a performance bond and ensure that they can meet the financial obligations associated with their positions. Unlike securities margins, futures margins are not extensions of credit.
  - Futures margins typically are based on the price volatility of the underlying commodity of a futures contract and vary across contracts.
  - Each futures exchange has a clearing house that is the counterparty to every futures trade.
  - The margining system and clearing house help to protect and maintain the financial integrity of futures markets.
- CFTC data and other evidence indicate that index investors have gained their index exposure primarily through OTC swaps and index funds and, as a result, have not been directly subject to margins.

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Margins Generally Have Not Limited Investors' Ability to Gain Index Exposure

- Some index investors obtain their exposure through index funds, such as commodity pools, exchange-traded funds, or mutual funds. In turn, such funds may use futures, OTC swaps, or other products to obtain their exposure.
- Our analysis of two periods of CFTC's COT data shows that swap dealers generally hold the majority of the index-related futures positions, indicating that index investors primarily use OTC swaps to obtain their exposure. Dealers then use futures to hedge their exposure.
- For example, in 10 of the 12 futures covered by CFTC's September 23, 2008 data, swap dealers accounted for 80 percent or more of the total net long futures positions, or contracts, held by index traders.

Exchange and contract	Percent of total net long index-related positions, or contracts, held by		Number of net long index-related positions, or contracts, held by		Percent of total long positions held by index traders
	Dealers	Funds	Dealers	Funds	
CBOT – soybean oil	97%	3%	66,374	2,127	24%
ICE US – cotton	92	8	82,328	7,030	27
ICE US – coffee	90	10	46,913	4,998	31
CME – lean hogs	85	15	83,465	14,209	45
CBOT – soybeans	84	16	113,065	21,543	28
ICE US – sugar	84	16	257,587	49,844	37
CBOT – wheat	83	17	137,699	27,985	47
CME – live cattle	83	17	109,285	23,137	46
ICE US – cocoa	82	18	17,965	3,845	18
CBOT – corn	82	18	261,364	56,563	22

Source: GAO analysis of CFTC data.

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Margins Generally Have Not Limited Investors' Ability to Gain Index Exposure

- Increasing margins would increase the costs of trading futures for swap dealers and other index traders. But it might not cause institutional investors to significantly reduce their index exposures and lead to a reduction in the number of index-related futures positions.
  - Officials at two swap dealers told us that higher margins would increase their hedging cost and thus the cost of swaps. They said investors might use alternatives to swaps, depending on the cost-impact of higher margins. If institutional investors decided to allocate a portion of their portfolios to commodities, they would find the most efficient way to do so.
  - Officials at an asset management firm told us they created funds that use futures contracts to track indexes for institutional investors and that the funds held collateral equal to the notional value of their futures positions. Thus, an increase in margins would not have a significant effect on the cost for the funds.
  - An exchange official said that index funds generally were not leveraged and were in the best position to meet a margin increase. A margin increase would impose no cost on such funds, because they hold fully collateralized accounts on behalf of their clients.

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Margins Generally Have Not Limited Investors' Ability to Gain Index Exposure

- Imposing higher margins on index-related futures positions could raise challenges.
  - Swap dealers use futures contracts to hedge their net exposure and may not be able to untangle and identify the futures positions that are attributable specifically to commodity index swaps.
  - Officials from a swap dealer told us that imposing separate margins on index-related futures positions could prevent dealers from internally netting transactions, potentially reducing market liquidity and increasing costs for other market participants.
  - Officials from another dealer told us that using margins by exchanges as a tool to moderate participation in the futures markets, instead of solely to protect the markets' financial integrity, could be problematic. If market liquidity was low, an exchange could have an incentive to lower margins to increase market liquidity at the expense of protecting the market's financial integrity.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

- Limiting the size of positions that traders may hold in the futures markets is one method regulators use to prevent excessive speculation that could cause unwarranted changes in futures prices.
  - CFTC is authorized to fix limits on trading that may be done or positions that may be held on any exchange as necessary to diminish, eliminate, or prevent excessive speculation.
  - Position limits prohibit a trader from holding a futures position above a specified level, unless the trader has received an exemption. Exceeding a position limit without an exemption is a violation.
  - CFTC has set federal speculative position limits on nine agricultural commodities.
  - Exchanges have adopted position limits or position accountability rules for other commodities subject to CFTC oversight.
    - A position accountability rule sets a position level that triggers additional attention by an exchange. When a trader's position reaches or exceeds the accountability level, the trader is required to provide information to the exchange at its request.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

  - Holding a position that exceeds a position accountability level is not a violation. But the exchange may direct a trader to limit or reduce a position, and the trader's refusal to do so would be a violation.
  - Exchanges may use accountability levels in lieu of position limits for contracts on financial instruments, intangible commodities, or certain tangible commodities that have large open interest, high daily trading volumes, and liquid cash markets.
- CFTC and exchanges may grant exemptions to parties who can show that their futures positions are bona fide hedges.
  - Before 1974, the hedging definition applied only to agricultural commodities. When CFTC was created and the definition of "commodity" under the CEA was expanded, Congress was concerned that the definition would fail to address developing risk-shifting needs. It repealed the definition and gave CFTC the authority to define bona fide hedging.
  - Under CFTC regulations, no transactions or positions will be classified as bona fide hedging unless their purpose is to offset price risks incidental to commercial cash or spot operations and they are established and liquidated in an orderly manner.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

- Position limits generally have not limited the level of commodity exposure that index investors may add to their portfolios.
  - The S&P GSCI and DJ-AIGCI collectively include 26 futures contracts, which are traded on six U.S. and two U.K. futures exchanges.
  - None of the contracts traded on the U.K. exchanges are subject to position limits or accountability levels.
  - All of the contracts traded on the U.S. exchanges are subject to position limits or accountability levels that apply to a single month or all months combined. (See app. I for additional information.)

- Examples of position limits or accountability levels include the following.

Exchange and contract	Position limit or accountability level	
	Single month	All months
CBOT – corn	13,500	22,000
CME – feeder cattle	1,500	none
COMEX – copper	5,000	5,000
ICE US – cotton	3,500	5,000
KCBOT – wheat	5,000	6,500
NYMEX – heating oil	5,000	7,000

Source: Exchange rules.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

  - The level of exposure to the S&P GSCI or DJ-AIGCI that an index investor could take on using futures contracts would be limited by the applicable position limits if the investor could not qualify for a hedge exemption.
  - However, index investors can use OTC swaps, which are not subject to position limits, to take on a commodity exposure greater than the level permitted for futures contracts.
  - CFTC staff recently reported that 18 index traders appeared to have an aggregate position in futures contracts and OTC derivatives that would have been above a position limit or exchange accountability level if all the positions were on-exchange.
- Swap dealers have qualified for hedge exemptions from position limits, helping them to provide index exposures to investors through swaps.
  - In 1991, CFTC granted a hedge exemption to a swap dealer that planned to provide a pension fund with an index exposure through an OTC swap and then use futures contracts to hedge its exposure. Because the futures positions the dealer would have to establish would have been greater than the position limits, it needed a hedge exemption.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

- CFTC has granted hedge exemptions to 13 swap dealers for corn, cotton, soybeans, wheat, soybean oil, and soybean meal.[1] In its September 2008 report, CFTC staff identified 16 dealers as having significant commodity index swap business and 13 dealers that held sizeable futures positions but were not known to be engaged in significant commodity index swaps.
  - The exemptions apply to a specific firm and set the maximum level of futures positions that the firm may hold with respect to one or more specified commodities.
  - Firms receiving a hedge exemption are not required to make additional filings, unless requested by CFTC or they exceed their specified levels.
- CFTC has subjected the exemptions to conditions to protect the marketplace from potential ill effects, including that
  - the futures positions must offset specific price risk;
  - the futures positions passively track a commodity index;
  - the notional value of the futures positions cannot exceed the dollar value of the underlying risk; and
  - the futures positions cannot be carried into the spot month.

[1] The exemptions were granted by CFTC staff pursant to delegated authority under CFTC regulations and bind the Commission and its staff with respect to the specific fact situation and persons addressed by the letter.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

- To help two index funds use the futures markets to provide investors with an index exposure, CFTC staff provided the funds with relief from certain position limits under no-action letters issued in 2006.
  - Unlike the swap dealers, the index funds sought to use futures contracts to track a commodity index for their investors, not to hedge risk from a swap. As a result, CFTC staff did not believe that the index funds qualified for a hedge exemption.
  - Because the index fund futures positions represented a legitimate and potentially useful investment strategy, CFTC staff granted the funds no-action relief from position limits, subject to conditions similar to the ones imposed in the swap dealer exemptions.
- Like CFTC, the exchanges have provided hedge exemptions or other relief from exchange-set position limits.
  - The Chicago Board of Trade has issued index-hedge exemptions to 15 dealers and 5 risk-management exemptions to 2 index funds.
  - The Chicago Mercantile Exchange has issued index-hedge or risk-management exemptions to 13 entities.
  - The Commodity Exchange has issued 6 exemptions to 4 dealers.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

- Our analysis of two periods of CFTC's COT data indicates that swap dealers, on average, held positions in several agricultural futures markets in excess of position limits or accountability levels but that index funds, on average, did not. (See app. II for additional information.)
  - Because CFTC has granted hedge exemptions to swap dealers to manage price risk, the dealers are allowed to hold positions in excess of position limits.
  - We analyzed CFTC data covering January 26, 2006, and September 23, 2008.
- The average sizes of net long positions, or contracts, held by index traders on September 23, 2008, were as follows.

Exchange and contract	Average size of net long index-related position held by		Position limit or accountability level	
	Funds (contracts)	Dealers (contracts)	Single month	All months
CBOT – corn	4,714	18,669	13,500	22,000
CBOT – soybeans	1,958	8,076	6,500	10,000
CBOT – soybean oil	452	4,741	5,000	6,500
CBOT – wheat	2,544	9,836	5,000	6,500
CME – feeder cattle	585	138	1,500	None
CME – lean hogs	1,421	5,564	4,100	None
CME – live cattle	2,103	7,286	5,400	None
ICE US – coffee	417	3,351	5,000	5,000
ICE US – cocoa	481	1,283	6,000	6,000
ICE US – cotton	703	5,881	3,500	5,000
ICE US – sugar	4,984	18,399	10,000	15,000
KCBOT – wheat	1,133	1,092	5,000	6,500

Source: GAO analysis of CFTC data and exchange rules

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

- Without their hedge exemptions, swap dealers would have been prevented from holding positions in excess of the position limits, as some currently do.
- According to officials from a swap dealer, position limits can restrict the extent to which the firm can meet the needs of its clients and grow its business by limiting the level of futures positions it can hold at a particular time.
- Officials from another dealer told us position limits can make it more challenging for the firm to hedge its exposures but have not prevented it from growing its business. They said that the firm would use OTC derivatives or other options to hedge whenever it could not use futures because of position limits.

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Position Limits Generally Have Not Limited Investors' Ability to Gain Index Exposure

- CFTC recently has issued several proposals to change hedge exemptions for index traders.
  - In November 2007, CFTC proposed rules to create a new exemption from position limits for index funds and investors using futures to diversify risk. In June 2008, CFTC withdrew the proposal, in part to determine whether further consensus among the affected parties should be sought.
  - In a September 2008 report, CFTC noted that the mix of activity by swap dealers called into question whether they should receive hedge exemptions for some of their activity. CFTC recommended, as a matter of regulatory consistency and fairness, that its staff consider replacing the hedge exemption with a limited risk-management exemption.
  - CFTC staff told us that the agency plans to issue an advanced notice of proposed rulemaking on the hedge exemptions but has not set a time frame for doing so.
  - Officials from a swap dealer told us that if dealers were required to hold fewer futures positions, the flow of swap business would be redistributed but the related futures positions would not be reduced.

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Appendix I: Position Limits and Accountability Levels for U.S. Futures Contracts Included in the S&P GSCI and DJ-AIGCI

Exchange	Commodity	Position Limits		Accountability Levels	
		Single Month	All Months	Single Month	All Months
Chicago Board of Trade	Corn	13,500	22,000	None	None
Chicago Board of Trade	Soybean oil	5,000	6,500	None	None
Chicago Board of Trade	Soybeans	6,500	10,000	None	None
Chicago Board of Trade	Wheat	5,000	6,500	None	None
Chicago Mercantile Exchange	Feeder cattle	1,500	None	None	None
Chicago Mercantile Exchange	Lean hogs	4,100	None	None	None
Chicago Mercantile Exchange	Live cattle	5,400	None	None	None
Commodity Exchange	Copper	None	None	5,000	5,000
Commodity Exchange	Gold	None	None	6,000	6,000
Commodity Exchange	Silver	None	None	6,000	6,000
ICE-US	Cocoa	None	None	6,000	6,000
ICE-US	Coffee	None	None	5,000	5,000
ICE-US	Cotton	3,500	5,000	None	None
ICE-US	Sugar	None	None	10,000	15,000
Kansas City Board of Trade	Wheat	5,000	6,500	None	None
New York Mercantile Exchange	Heating oil	None	None	5,000	7,000
New York Mercantile Exchange	Natural gas	None	None	6,000	12,000
New York Mercantile Exchange	RBOB oil	None	None	5,000	7,000
New York Mercantile Exchange	WTI crude oil	None	None	10,000	20,000

Source: Exchange rules.
Note: All of the above U.S. futures exchanges have position limits for the spot month, but these limits are not included in the table because index traders generally do not hold such positions.

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Appendix II: Net Long Positions Held by Index Traders

Net Long Positions Held by Index Traders on September 23, 2008

Exchange	Commodity	Net long index-related futures contracts held by: Funds	Net long index-related futures contracts held by: Dealers	Number of funds	Number of Dealers	Average size of the net long position held by: Funds	Average size of the net long position held by: Dealers	Position limits or Accountability Level: Single Month	Position limits or Accountability Level: All Months
Chicago Board of Trade	Corn	56,563	261,364	12	14	4,714	18,669	13,500	22,000
Chicago Board of Trade	Soybeans	21,543	113,065	11	14	1,958	8,076	6,500	10,000
Chicago Board of Trade	Soybean oil	1,807	66,374	4	14	452	4,741	5,000	6,500
Chicago Board of Trade	Wheat	27,985	137,699	11	14	2,544	9,836	5,000	6,500
Chicago Mercantile Exchange	Feeder cattle	4,097	1,791	7	13	585	138	1,500	None
Chicago Mercantile Exchange	Lean hogs	14,209	83,465	10	15	1,421	5,564	4,100	None
Chicago Mercantile Exchange	Live cattle	23,137	109,285	11	15	2,103	7,286	5,400	None
ICE US	Coffee	4,998	46,913	12	14	417	3,351	5,000	5,000
ICE US	Cocoa	3,845	17,965	8	14	481	1,283	6,000	6,000
ICE US	Cotton	7,030	82,328	10	14	703	5,881	3,500	5,000
ICE US	Sugar	49,844	257,587	10	14	4,984	18,399	10,000	15,000
Kansas City Board of Trade	Wheat	7,930	15,293	7	14	1,133	1,092	5,000	6,500

Source: GAO analysis of CFTC data and exchange rules.

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Appendix II: Net Long Positions Held by Index Traders

Net Long Positions Held by Index Traders on January 26, 2006

Exchange	Commodity	Net long index-related futures contracts held by		Number of funds	Number of Dealers	Average size of the net long position held by		Position limits or Accountability Level	
		Funds	Dealers			Funds	Dealers	Single Month	All Months
Chicago Board of Trade	Corn	32,847	387,631	13	13	2,527	29,818	13,500	22,000
Chicago Board of Trade	Soybeans	11,893	115,151	11	13	1,081	8,858	6,500	10,000
Chicago Board of Trade	Soybean oil	4,045	63,260	4	13	1,011	4,866	5,000	6,500
Chicago Board of Trade	Wheat	19,706	179,093	13	13	1,516	13,776	5,000	6,500
Chicago Mercantile Exchange	Feeder cattle	2,922	4,457	6	10	487	446	1,500	None
Chicago Mercantile Exchange	Live cattle	14,981	79,112	12	13	1,248	6,086	5,400	None
Chicago Mercantile Exchange	Lean hogs	10,309	72,036	10	13	1,031	5,541	4,100	None
ICE US	Coffee	4,178	32,097	10	13	418	2,469	5,000	5,000
ICE US	Cocoa	4,708	8,020	6	12	785	668	6,000	6,000
ICE US	Cotton	7,079	74,446	9	13	787	5,727	3,500	5,000
ICE US	Sugar	20,068	133,588	7	13	2,867	10,276	10,000	15,000
Kansas City Board of Trade	Wheat	3,955	26,404	3	10	1,318	2,640	5,000	6,500

Source: GAO analysis of CFTC data and exchange rules.

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GAO Contact and Staff Acknowledgments

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Staff Acknowledgments

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Selected Bibliography

Our review of the recent literature focused on empirical studies analyzing the causal relationship between speculative futures trader positions and commodity prices in the United States. Because we were interested primarily in commodity index trader positions, we focused on studies completed after 2003, given that commodity index investment began to increase around mid-2000s and data on commodity index futures positions only became publicly available in early 2007. We also list qualitative studies, which did not evaluate causal claims in a systematic way (i.e., through the use of experimental or statistical controls).

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Does Speculation Affect Spot Price Levels? The Case of Metals with and without Futures Markets

George M. Korniotis

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Does Speculation Affect Spot Price Levels?

The Case of Metals with and without Futures Markets

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Washington DC

Abstract: This paper finds no evidence that speculative activity in futures markets for industrial metals caused higher spot prices in recent years. The empirical analysis focuses on industrial metals with and without futures contracts and is organized around two key themes. First, I show that the comovement between metals with and without futures contracts has not weakened in recent years as speculative activity has risen. Specifically, the annual and quarterly price growth rates of the two metal categories have been positively correlated with their growth rates experiencing a structural shift by the end of 2002. This comovement is driven by economic fundamentals because world GDP growth is strongly correlated with metal price growth, especially after 2002. The structural change in 2002 is also consistent with supply and demand information found in industry newsletters. In the second set of results, I focus more directly on financial speculation and spot price inflation. I use the S&P Goldman-Sachs Commodity Index returns to proxy for the volume of speculative activity and I show that these returns are unrelated to metal prices. The final test follows storage models, which suggest that speculation can affect spot markets only if it leads to physical hoarding. Focusing on metals with established futures markets, I find no evidence of physical hoarding because inventory growth is found to be negatively correlated with price growth rates.

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1. Introduction

The role of financial speculators in the market place has been debated by academics and practitioners since the inception of futures markets. Following the seminal work of Kaldor (1939), the literature has primarily focused on whether speculative activity in the futures markets stabilizes (i.e. reduces the variance) of commodity spot prices. Part of the literature finds that the introduction of futures contracts destabilizes the spot market (Finglewski (1981), Simpson (1985), Hart and Kreps (1986), Newbury (1987), Stein (1987)). On the other extreme, Cox (1976), Turnovsky (1983), and Turnovsky and Campbell (1985) support the view that speculation is welfare improving because it reduces the variability of spot prices.

In the midst of this debate, the issue of whether speculation has a direct effect on the level of spot prices has been ignored. Recently however, commodity prices and speculative activity rose dramatically. Buyuksahin, Haigh, and Robe (2008) report that by 1999 about 5 billion dollars were invested in vehicles tracking the Standards and Poor Goldman Sachs Commodity Index (SPGSCI). By the third quarter of 2008, the investments linked to five prominent commodity indices, including the SPGSCI, rose to 140 billion. The increased participation of financial investors in the futures markets has sparked a debate on whether speculation led to the spike in commodity spot prices for some agricultural and energy products.[1]

Financial investors did not only seek exposure to agricultural and energy product prices because many financial investors participated in the futures markets through commodity index funds. Such funds hold futures in a variety of products because they track commodity indices like the SPGSCI.[2] Therefore, if the trading activities of financial investors caused spot price appreciation, they should have affected the prices of most products in the index funds. In this

[1] This highly publicized debate has been the topic of a hearing in front of the U.S. Senate Committee on Homeland Security and Governmental Affairs. The hearing took place on May 20, 2008 and its title was "Financial Speculation in Commodity Markets: Are Institutional Investors and Hedge Funds Contributing to Food and Energy Price Inflation?"

[2] Currently, the SPGSCI contains 24 commodities from all commodity sectors: six energy products, five industrial metals, eight agricultural products, three livestock products and two precious metals.

study, I take up this issue and investigate the potential impact of speculation on commodity spot prices of metals, a prominent category in commodity index funds. Metals offer a unique "natural" experiment because there are metals with established futures contracts (which are included in commodity funds) and metals with no futures contracts (and thus not included in commodity funds).

My analysis offers a comparison between the spot (cash) prices across industrial metals with and without futures contracts and it is organized around two key themes. To begin with, industrial metals are primarily used in the manufacturing sector in a complementary fashion. For example, they are typically used in the form of alloys.[3] Being complements to one another implies that their spot prices should be positively correlated. Therefore, if speculative activity in the futures markets were directly affecting the physical markets of the traded metals (i.e. the metals for which there are futures contracts available), then the positive correlation between the price changes of traded and non-traded commodities should weaken. Based on this prediction, the first set of empirical findings investigates the comovement between traded and non-traded metals.

I test the comovement hypothesis by studying the time patterns of metals with and without futures contracts. Over the period 1991 to 2008, I find that the correlation of metal price growth rates was consistently positive and did not decrease after 2000. I also show that the prices for metals with and without futures contracts increased substantially after 2002. The 2002 rise in prices is economically and statistically significant according to the structural break statistical tests developed by Andrews and Ploberger (1994).[4]

To understand the causes behind the comovement and upward shift in prices after 2002, I study the potential role of supply and demand factors in two ways. First, I use the world GDP growth rate to capture world economic activity. I find that world growth rate is positively correlated with metal price growth. Also, similar to metal price growth rates, world growth

[3] For an extensive discussion on alloys see "Constitution of Binary Alloys," 1958, McGraw-Hill.
[4] A recent study by Deutsche Bank (2008) also finds that traded and non-traded commodities experienced a dramatic price hike after 2000.

started to steadily rise after 2002. Therefore, accounting for world growth reduces the statistical significance of the structural break in metal spot prices.

Second, I study the supply and demand information that was available to the metals markets from September 1, 2003 to April 1, 2004. During this six month period all metal prices rose. I use the search engine Factiva to identify reports from industry newsletters with information on metal production, inventories, demand, etc. I use the number of reports as my information proxy. I find that for both traded and non-traded metals, the price-increasing news reports (i.e., news related to disruption of production, rising production costs, etc.), outnumber price-decreasing news reports (i.e. news related to increase in inventories, drop in consumption, etc). Thus, fundamental information about the metal markets could explain the acceleration of metal prices after 2002.

The previous findings demonstrate that the complementary relationship between traded and non-traded metal remained strong even after 2002 when speculative activity rose. Next, I study the link between speculation in futures markets and spot price appreciation more directly. For this test, I focus on the S&P Goldman-Sachs Commodity Index (SPGSCI). The SPGSCI is a weighted average of many commodity spot prices. It is tracked by many financial instruments and its returns are representative of the earrings related to investing in commodity futures contracts.

Ideally, I would like to examine if the volume in SPGSCI related instruments (measured by net open interest) had any impact on metal prices. Unfortunately, the public open interest data provided by the Commodity Futures Trading Commission (CFTC) are very limited. With this limited data, I show that the realized returns of the SPGSCI (which are available for all the years in my sample) are positively related to the net open interest of the SPGSCI contract traded on the Chicago Mercantile Exchange (CME). This is a reasonable finding because high returns from investing in the futures markets should attract more financial investors in the futures markets. Using the realized returns as a proxy for volume, I show that the SPGSCI

return is unrelated to the price appreciation of metals. On the one hand, it cannot explain the shift in prices in 2002, and in general, it is not correlated to metal price growth rates.

The final test relies on implications related to no-arbitrage/storage models of commodity prices (Pindyck (2001)). In these models, speculative activity in the futures market can affect spot market price if it causes hoarding of inventories from the physical market, i.e. suppliers of commodities restrict supply to the physical markets and enter into futures contracts with speculators. In the presence of physical hoarding, contrary to standard supply and demand models, inventory formation is associated with spot price appreciation. To test the latter hypothesis, I focus on metals with futures markets. I proxy for their inventory changes with the growth of world-wide commercial stocks reported in the World Metals Statistics Yearbook. My analysis finds no evidence of physical hoarding. In particular, inventory growth is negatively correlated with price growth. Also, this negative relationship is present even after 2002.

Overall, the current paper is among the first to show that the run up in spot metal prices after 2003 is related to economic fundamentals and not to speculation by financial investors. The evidence relies on several empirical findings. First, consistent with the fact that non-precious metals are used in a complementary fashion, I find that their price growth rates are positively correlated. Their comovement is also magnified by a common structural break at the beginning of 2003. The structural break is related to supply and demand factors and it occurred around the same time as the acceleration in world economic activity. In addition, the return to the SPGSCI, a proxy for the volume in speculative activity in the futures markets, is unrelated to metal price growth rates. Finally, consistent with storage models, the negative relationship between inventory growth and price growth of trade metals has not been affected by speculation.

Beyond the contribution to the debate on speculation, the paper makes several important contributions to the literature on commodity prices. To begin with, it complements the existing studies on futures markets. It shows that speculation does not affect the level of spot

prices because there is no evidence of physical hoarding. In addition, the evidence supports the predictions of various storage models. For instance, consistent with Turnovsky (1983) and Chari, Jagannathan and Jones (1990), I find that traded metals exhibit lower variability and spot price appreciation compared to non-traded metals.

The rest of the paper is organized as follows. Section 2 describes the commodity price data. Section 3 presents graphical evidence on the behavior of the spot price growth rate indices for traded and non-traded commodities. It also deals with the statistical significance of the structural break in the price growth series. Section 4 tests whether this break can be explained by economic (supply and demand) fundamentals. Section 5 looks into the relationship between metal prices, the return of the SPGSCI, and inventory growth. Finally, Section 6 provides a short literature review and Section 7 concludes the discussion.

2. Data and Methodology

My empirical analysis focuses on quarterly and annual price growth rates which are based on daily spot price data I obtained from Bloomberg. I supplement the Bloomberg data with data from the website of the U.S. Geological Survey.[5] Specifically, I collect data on non-precious metals. The class of traded metals (i.e. commodities with established futures markets) includes copper, aluminum, lead, nickel, tin, and zinc. I choose the latter five commodities because they have standardized and widely traded contracts on either the Chicago Mercantile Exchange (CME) or the London Metal Exchange (LME).[6] The class of non-traded commodities (i.e. commodities without any futures markets) includes steel, manganese, cadmium, cobalt, tungsten, rhodium, ruthenium, and molybdenum.[7] These commodities are truly non-traded because there no futures contracts for them on the organized exchanges.

[5] These data can be found at http://www.usgs.gov.
[6] On the LME there are futures contracts on copper, aluminum, lead, nickel, tin, and zinc. On the CME there are futures contracts for copper and aluminum.
[7] The LME started a futures contract for steel at the second quarter of 2008. Moreover, it announced that contracts for cobalt and molybdenum will become available at some point in the second quarter of 2009.

Moreover, they cannot be indirectly traded because futures contracts on their alloys are also not available.[8]

The paper examines industrial metals because there are sufficient commodities in *both* the traded and non-traded classes to allow a meaningful comparison of the two commodity classes. This is not the case for other commodity classes like the agricultural products; in this instance most of them have established futures markets. Apart from data constraints, non-precious metals are typically used in tandem. Therefore, they are complementary goods and their prices should move together. I use this prediction to test whether speculation has affected this fundamental complementary relationship.

Apart from using the growth rates of individual metals, the comparison between the traded and non-traded metals uses growth rate indices. The index for each commodity class uses daily spot prices and it is calculated in three steps. First, I calculate the quarterly (annual) price at quarter (year) t of commodity i, ($P_{t,i}$) by a time-series average of all available daily prices in quarter (year) t. Second, I compute the quarterly (annual) price growth rate, $dP_{t,i}$, using the difference in natural logarithms, $[ln(P_{t,i}) - ln(P_{t-1,i})]$, which is multiplied by a 100. Third, I obtain the value of the growth rate index at t using the simple (not weighted) cross-sectional average of $dP_{t,i}$ across the commodities in either the traded and non-traded class.

The time period of the study is from 1991 to 2008 for the annual data. I choose this period because the daily price data for almost all non-traded commodities have many missing values prior to 1991. Because of missing values in the case of ruthenium, the quarterly data cover the 1992(Q4) to 2008(Q4) period. I do not use monthly or daily data because there are many missing values for the non-traded metals. Therefore, monthly and daily growth rates cannot be meaningfully computed.

[8] It is possible that there are private futures contracts traded in the over-the-counter (OTC) market for the commodities with no established futures contracts. Because most speculative activity is related to instruments that track indices of traded commodities, ignoring private deals on non-traded commodities should not affect my analysis.

To set the stage for the main empirical analysis, I present simple descriptive statistics for the individual metals and their indices in Table 1. I find that over the full sample period both traded and non-trade metals experienced price inflation. However, the price of non-traded ones rose substantially more. For example, the average annual growth rate for traded is 4.2% while for the non-traded is 7.2%. Moreover, the standard deviation of most non-traded metals is higher than most traded ones. These results are consistent with the model of Turnovsky (1983) and the baseline model of Chari, Jagannathan and Jones (1990).

3. Comovement across Non-Precious Metals

Using the metal price growth rates, I develop my empirical analysis around two themes. First, starting with this section, I study the comovement between traded and non-traded metals. In the second set of tests, I focus more directly on the potential link between speculation and spot prices.

3.1 Economic Intuition

In this section, I develop and test my first hypothesis, which is based on the intuition from no arbitrage/storage models. In these models, financial investors can affect spot price levels if their behavior prompts producers and storers of goods to hoard supply from the physical markets.[9] Assume that rising speculative activity in the futures markets leads to an increase in today's futures contract price, $F_{t,T}$, where T is the delivery day. Responding to high futures prices, stores enter into futures contract with financial investors. Because storers sell their goods for futures delivery, inventory levels rise and the supply of goods to the physical markets declines. Physical hoarding then leads to higher spot prices. At the delivery date, T,

[9] This analysis follows, among others, Fama and French (1988), Bailey and Chan (1993), Pindyck (2001), and Nielsen and Schwartz, (2004).

the futures price further increases as it converges to the new high spot price.[10] Thus, physical hoarding implies a positive relationship between inventory growth and spot price inflation.[11]

Directly testing the above scenario is very difficult. It requires a great deal of precise trading and inventory data. Because commodity markets are international and trading takes place on regulated and unregulated markets (for example, over-the-counter markets) it is impossible to gather all the relevant data. Moreover, in the case of inventories, it is not clear what the appropriate definition of inventory is. Probably, inventory numbers should include commodities in storage and account for reserves in the ground. But the latter component cannot be measured precisely.

3.2 Traded and Non-Traded Metals

In this paper, I sidestep the aforementioned data difficulties by offering a comparison between traded and non-traded metals. To begin with, because non-precious industrial metals are complementary goods, their prices should be positively correlated. If speculative activity in the futures markets induces storers and producers to increase their inventories of traded goods, the complementary relationship between traded and non-traded industrial metals should weaken. This would imply that the positive correlation across their price growth rates should fall.

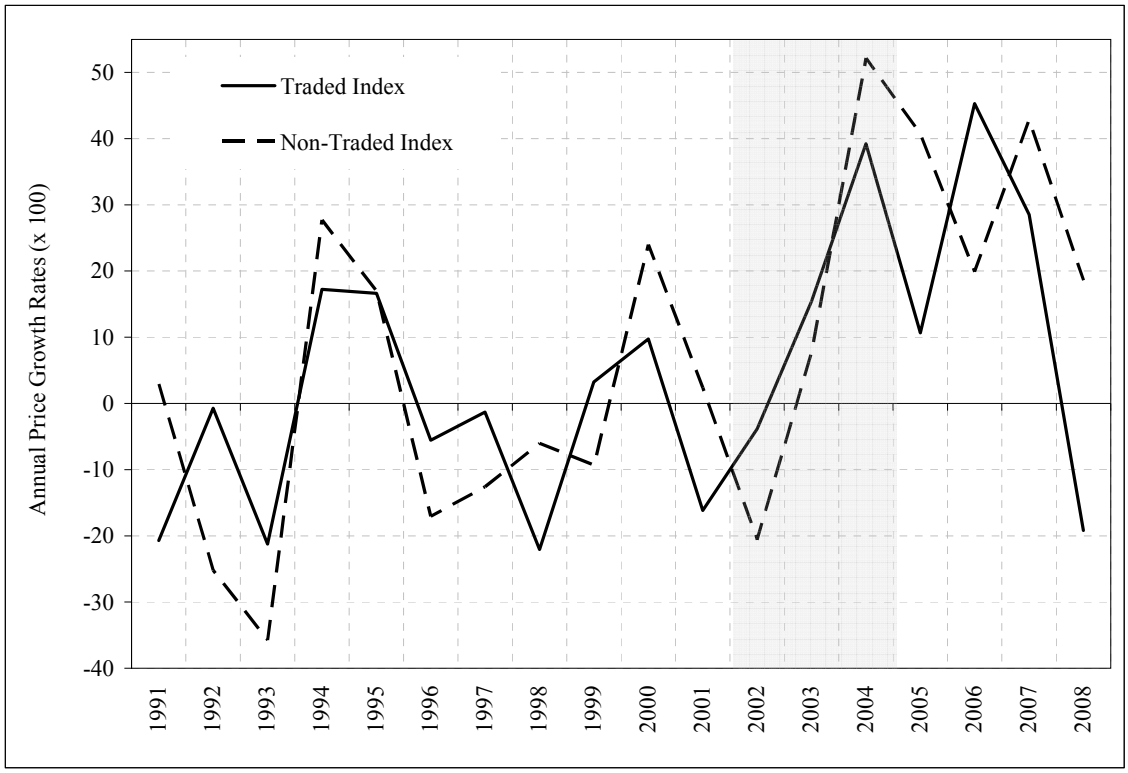
For example, take the case of the aluminum-manganese (Al-Mn) alloy.[12] Assume that speculative activity in aluminum futures contracts has lead to physical hoarding of aluminum from the aluminum cash markets. The declining supply of aluminum raises the spot price of aluminum and its alloys. Because the Al-Mn alloy is now more expensive, its demand falls, which reduces the demand for manganese (the non-traded component of the alloy). Manganese becomes cheaper and, all else equal, its spot price is now negatively correlated with the spot price of aluminum.

[10] The convergence of the futures and spot prices upon delivery, know as the convergence property, follows from the no-arbitrage assumption.
[11] Samuelson (1966) was among the first to make this argument in his classic work on intertemporal price equilibria.
[12] For more information on this alloy, see "Constitution of Binary Alloys," 1958, McGraw-Hill, pages 110-114

This intuition gives rise to my first hypothesis:

> **Hypothesis 1:** *If the participation of financial investors in futures markets affects the spot market, then the complementary (positive) relationship across traded and non-traded industrial metals should weaken.*

Figure 1: Annual Growth Rates



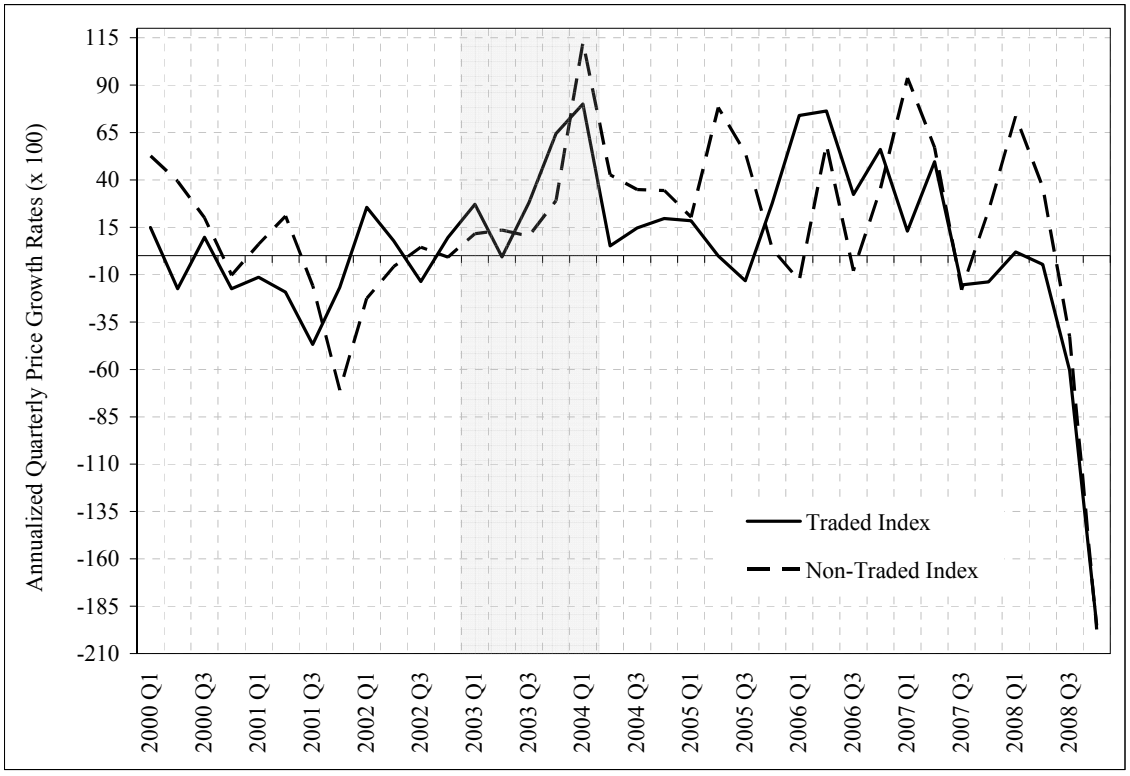
The figure depicts the time-series for the growth rates of spot price indices for traded and non-traded metals. The growth rates are calculated at the annual frequency. All growth rates are multiplied by a hundred. The shaded area highlights the period during which spot metal prices increase considerably.

3.2 Time Patterns of Traded and Non-Traded Metals

Next, I test Hypothesis 1, which implies that the correlation between traded and non-traded metals should fall due to speculative activity in the futures markets. I use graphical evidence and simple descriptive statistics. The annual and quarterly time-series of the traded and non-traded growth rate indices are presented in Figures 1 and 2 respectively. Figure 3 presents

rolling correlations between the indices and the individual metals. Finally, Table 1 reports descriptive statistics for the two indices and their individual components.

Figure 2: Annualized Quarterly Growth Rates

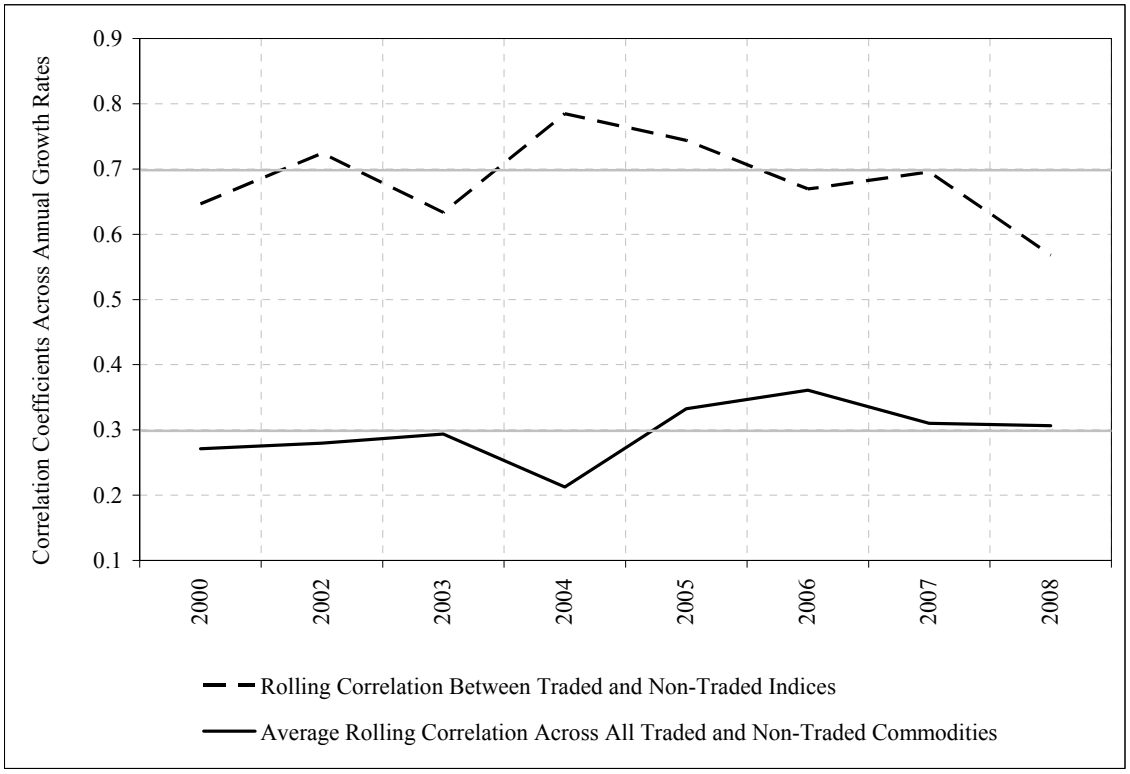


The figure depicts the time-series for the growth rates of price indices for traded and non-traded metals. The growth rates are quarterly and they are annualized (i.e. multiplied by four). All growth rates are multiplied by a hundred. The shaded area highlights the period during which spot metal prices increase considerably.

Inconsistent with Hypothesis 1, I find that traded and non-traded metals move in tandem even in recent years. For example, both traded and non-traded metals appreciated around 2003 and then depreciated in 2008. See Figures 1 and 2. Moreover, the correlation between the metal categories has been positive and stable. For example, as depicted in Figure 3, over 2000 to 2008 the annual rolling correlation between the traded and non-traded growth rate indices has been stable and always close to 0.70. Similarly, the average of the rolling correlations between each traded metal growth rate with each non-traded metal remained close to its

average value of 0.30. The positive and stable correlation across the price growth rates is consistent with the fact that industrial metals are complementary goods.

Figure 3: Rolling Correlations



The figure depicts the time-series for the rolling correlations between the growth rates of spot price indices for traded and non-traded metals. It also includes the average of the rolling correlations between each traded metal with each non-traded metal. The growth rates are calculated at the annual frequency. The rolling correlation in year *t* uses data from (*t* – 9) to *t*.

3.2 Common Appreciation in Prices

Apart from the comovement across the price growth rates, the other salient feature in Figures 1 and 2 is that the level of the traded and non-traded indices rose significantly after 2003. For example, as shown in Table 1, over the 1991 to 2002 period the mean annual growth rate of the traded and non-traded indices was -3.7% and -4.4%, respectively. However, after 2002 the level of these mean growth rates rose dramatically. The traded index grew by 11.9% and the non-traded index grew 22.7%. See Table 1 for these descriptive statistics. Moreover, the

structural break in the indices is not driven by a subset of metals as all metals exhibited a dramatic price appreciation after the end of 2002. As shown in Table 1, the shift in prices is present across all metals.

The structural break in both the traded and non-traded metals reinforces the fact that these industrial metals are complementary to one another. More importantly, their complementary relationship is strong even in recent years when financial investors have become an important investor category in commodity futures markets. It is also interesting that non-traded metals have experienced a more dramatic price appreciation compared to traded metals. By and large, the aforementioned findings do not support Hypothesis 1 and the conjecture that the participation of financial investors in the futures markets has affected the level of spot metal prices.

3.3 Formal Structural Break Tests

The previous section provided simple graphical evidence for a structural break in the growth rates of metals around the 2002 to 2003 period. In this section, I formally test the structural break using the two metal growth rate indices. First, I follow Andrews (1993) and estimate the date of the break points. Then, following Andrews and Ploberger (1994), and Hansen (1997), I test whether the break points are statistically significant. I conduct this analysis for both the annual and the quarterly growth rate indices and report the results in Table 2. Because of the dramatic drop in commodity prices in 2008, I also consider the case in which the 2008 data is excluded for the sample period.

First, in Panel A for Table 2, I report the tests with 2008 data being included in the sample. In the case of the annual data, the estimated break date is 2002 for the index of traded metals and 2003 for the index of non-traded metals. Moreover, according to the ExpF and AveF tests by Andrews and Ploberger (1994), the change in the mean of the indices on the estimated break dates are statistically significant. Specifically, their p-values, which are computed as in Hansen (1997), are always less than 0.07. In the case of the quarterly data, the estimated break date for the traded index is at the fourth quarter of 2001 and for the non-traded index is at the

fourth quarter of 2002. However, only the shift in the mean value of the non-traded index is statistically significant.

The weak statistical significance of the structural break in the case of quarterly growth rates might be related to the fact that in the fourth quarter of 2008 metal prices plummeted. As depicted in Figure 2, the growth rate of the traded and non-traded index in the third quarter of 2008 was -0.61% and -0.43%, respectively. These growth rates fell dramatically in the fourth quarter of 2008; they both came very close to -2%. It is therefore possible that this decline in the growth rates is biasing the structural break tests.

Next, I exclude 2008 and re-run the structural break tests. As reported in Table 2, Panel B, the evidence in favor of a break becomes stronger and the results with annual data are now aligned with those with quarterly data. For example, in the case of the annual data, the estimated break date is again 2002 for the index of traded metals and 2003 for the index of non-traded metals. In the case of the quarterly data, the estimated break date for the traded index is fourth quarter of 2002 and for the non-traded index is third quarter of 2003. Finally, the shift in the mean value of the growth rate indices is statistically significant across both indices and data frequencies.

Overall, the formal structural break tests echo the graphical evidence in Figures 1 and 2. They show that in the beginning of 2003 metals with and without established futures market underwent a common structural break. The break roughly happened in the same period, which is consistent with the two metal classes being complementary to each other.

3.4 Panel Regression Analysis

In this Section, I further explore the structural break finding and I estimate a series of panel regressions. The panel regressions are estimated by pooling the annual and annualized quarterly spot price growth rates of the *individual* commodities instead of the growth rates of indices. I use the individual commodity data to exploit all their time-series and cross-sectional variation. This approach is more efficient than estimating the panel regressions with the

growth rates of the indices because the indices smooth out cross-sectional differences within the traded and non-traded commodity classes.

In the case of the annual growth rates, $dP_{t,i}$, I estimate two panel regressions. The regressions include a series of dummy variables, which are designed to test whether there are differences between the levels of price growth rates before and after 2002. The regression models are:

(a) $dP_{t,i} = \alpha_1 D_{02} + \alpha_2 D_{03} + \beta_1 dP_{t-1,i}$,

(b) $dP_{t,i} = \alpha_3(D_{TR} \times D_{02}) + \alpha_4(D_{TR} \times D_{03}) + \alpha_5(D_{NTR} \times D_{02}) + \alpha_6(D_{NTR} \times D_{03}) + \beta_2 dP_{t-1,i}$.

Above, D_{TR} is a dummy variable that takes the value of one if commodity *i* is traded, and zero otherwise. Similarly, D_{NTR} is a dummy variable that takes the value of one if commodity *i* is not traded, and zero otherwise. D_{02} (D_{03}) is a dummy variable that takes the value of one if year *t* is prior (after) to 2003, and zero otherwise. I use the coefficient estimates from the regression models to test for the structural break in 2002. In particular, I test whether the differences $(\alpha_2 - \alpha_1)$, $(\alpha_4 - \alpha_3)$ and $(\alpha_6 - \alpha_5)$ are statistically different from zero.

In the case of quarterly data, I estimate regressions similar to regressions (a) and (b) above. However, the quarterly regressions include seasonal dummy variables for quarters 1 to 3. The time period for annual data is 1992 to 2008 and for quarterly data is 1993(Q1) to 2008(Q4).

The regressions are estimated with OLS and the estimation results are reported in Table 3. The results with annual growth rates are in columns 1 and 2, while the results with quarterly data are in columns 3 and 4. The quarterly growth rates are annualized (i.e. multiplied by four) before the estimation.

3.5 Estimation Results

In the first set of regressions, columns 1 and 3, I examine whether the mean spot price growth rates rise after the end of 2002. Consistent with the Andrews and Ploberger (1994) tests, I find that after 2002 the growth rates across *all* commodities increase and the difference between

the post- and pre-2003 periods are statistically significant. In particular, the difference between the coefficient estimates on the D_{02} and D_{03} dummy variables (D_{03} - D_{02}) is 0.28 (t-statistic = 5.38) and 0.09 (t-statistic = 1.91) for annual and quarterly data, respectively. Thus, both traded and non-traded commodities underwent a structural change at the end of 2002.

As shown in Table 1, the growth rate increase from 2003 and onwards is higher for non-traded than for traded commodities. To further examine this observation, in regression 2 and 4, I include interaction terms of the D_{TR} and D_{NTR} dummy variables with the structural break D_{02} and D_{03} dummy variables.

The results from regressions 2 and 4 confirm the finding from Table 1. In the case of annual growth rates, even if the difference between the interaction terms ($D_{TR} \times D_{03}$) and ($D_{TR} \times D_{02}$) is statistically significant (difference = 0.20, t-statistic = 2.66), it is smaller in magnitude than the difference between ($D_{NTR} \times D_{03}$) and ($D_{NTR} \times D_{02}$) (difference = 0.34, t-statistic = 5.01). Similarly, in the case of quarterly data, the difference between the interaction terms ($D_{TR} \times D_{03}$) and ($D_{TR} \times D_{02}$) is smaller (difference = 0.05, t-statistic = 0.69) than the difference between ($D_{NTR} \times D_{03}$) and ($D_{NTR} \times D_{02}$) (difference = 0.12, t-statistic = 1.97)

In general, the panel regression analysis confirms that the prices of traded and non-traded metals move in tandem with both metal categories experiencing a structural break. Consequently, the participation of financial investors in the futures markets of the traded metals has not broken the complementary relationship between traded and non-traded metals. Moreover, the fact that non-traded metals experience a much higher price appreciation than traded ones after 2002 casts further doubt that speculators are the cause of the spike in commodity prices. In all, there is again no evidence to support Hypothesis 1.

4. Economic Fundamentals and Metal Prices

The previous analysis has established the comovement of metal prices. In this section, I take a closer look at metal markets and examine whether the patterns in metal price growth rates are related to economic fundamentals. I approach this question in two distinct ways. First, I account for the level of world economic activity to test Hypothesis 2:

> **Hypothesis 2:** *If supply and demand factors drive metal spot prices, world economic activity should be correlated to the price growth rate of metals.*

Second, I collect news reports from industry newsletters. My goal is to compute a proxy for the fundamental information (i.e. information related to supply and demand factors) that was when metal prices started to appreciate. With the information proxy, I test the following hypothesis:

> **Hypothesis 3:** *If supply and demand factors drive metal spot prices, price increasing news should outnumber price decreasing news during the onset of the metal price inflation in 2003.*

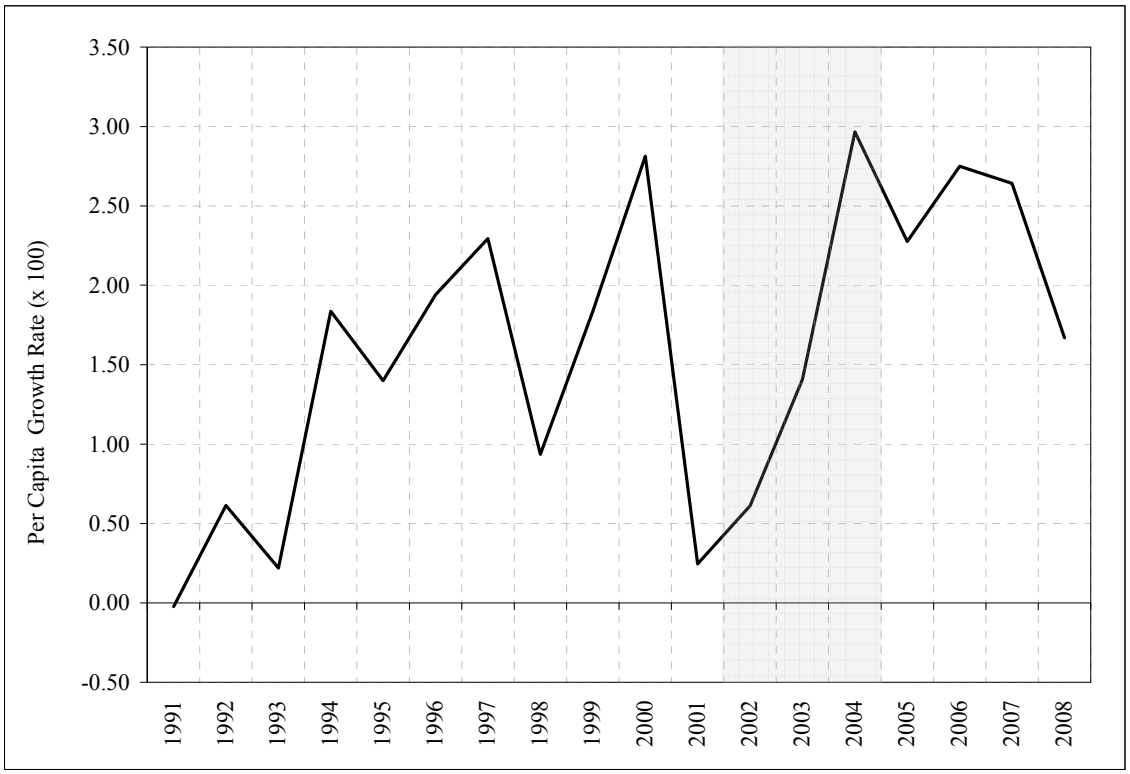
4.1 Accounting for World Economic Activity

The commodity markets are international markets and thus are affected by changes in the world economy. I proxy for world economic activity using the world per capita GDP growth published by the World Bank in the World Development Indicators (WDI).

As depicted in Figure 4, world per capita growth was about 0.6% in 2002. This percentage rose to 1.4% in 2003 and it has been about 2.3% over the 2003 to 2008 period. The rise in world economic activity in 2003 coincides with the structural break in metal spot price growth rates detected at the beginning of 2003. It is therefore very likely that the appreciation of commodity prices is related to economic fundamentals.

Next, I formally test Hypothesis 2 by adding world per capita GDP growth in the annual regressions in Table 3.[13] The new regression results are reported in Table 4 and they are divided into two groups. In the first set of regressions (1 and 2), world growth is added to the control variables to test the significance of world economic activity across the whole sample period. The second set of regressions (3 and 4) examines whether the correlation between metal price growth rates and world economic activity changes from 2003 onwards. In particular, in regressions 3 and 4 the control variables include the interaction terms of world per capita GDP growth with the D_{02} and D_{03} dummy variables.

Figure 4: Annual Per Capita World GDP Growth Rate, 1991 - 2008



The figure depicts world per capita GDP growth (%). The data are from the World Bank. The growth rate for 2008 is the projection by the World Bank. The shaded area highlights the period during which spot commodity prices increase considerably.

[13] The world GDP growth is not available at the quarterly frequency and I therefore only consider the annual regressions in this section.

The results from Regressions 1 and 2 demonstrate that world per capita GDP growth is an important determinant of the price growth of metals. To begin with, its coefficient estimates are significant and positive. For example, in Regression 1 the coefficient estimate and t-statistic on world growth is 0.14 and 4.73, respectively. Moreover, in the presence of world growth the evidence for the structural break in the price growth rates weakens. In Regression 1, the estimate (t-statistic) on the D_{03} dummy variable becomes negative and equal to -0.08 (0.99). In the absence of world growth, it was 0.24 and its t-statistic was 5.75. See Table 3, Regression 1. Similarly, the difference between D_{03} and D_{02} becomes 0.15 (it is 0.28 in Table 3, Regression 1) and its t-statistic drops to 2.57 (from 5.38 in Table 3, Regression 1).

The previous results provide supporting evidence for Hypothesis 2, which posits that fundamental factors drive metal prices. I further test Hypothesis 2 by testing whether the strength of the relationship changes before and after 2002, the year of the structural break**.** The findings in Regressions 3 and 4 show that the coefficient estimates on the interaction terms of world growth with the D_{02} and D_{03} dummy variables are always significant. For example, in Regression 2, the estimate (t-statistic) on the D_{02} interaction term is 0.12 (3.48), while the estimate on the D_{03} interaction term is 0.24 (3.62).

Interestingly, world growth is more correlated with metal price growth rates after 2002, since the estimate on the D_{03} interaction term is double the estimate on the D_{02} interaction term. Also, when we allow for a structural break in the coefficient on world per capita GDP growth, the shift in the means of the price growth rates are no longer statistically significant. Such a result indicates that the dramatic rise in metal prices at the end of 2002 must be related to fundamental supply and demand factors.

4.2 Supply and Demand Information

The inclusion of world GDP in the panel models demonstrates that a substantial component of the variation in metal prices can be explained by world economic activity. Next, I test Hypothesis 3 and collect news reports from Factiva to compute a proxy for the type of information that was available to market participants. In particular, I focus on industry

newsletters, like Platt's Metal Week, to ensure that the articles I identify provide specialized information for the metals' market. For feasibility, I focus on the period from September 01, 2003 to April 01, 2004. During this 6-month period all metal prices were rising.

For each metal, I execute two searches. The first search is designed to capture news reports that should be related to prices increasing. This search identifies reports that include phrases about a) rising demand or consumption of a metal, b) decline in inventories, or production, or reserves, or supply for a metal. For example, in the case of zinc, I search for articles that includes phrases like "disruption in production of zinc" and "inventories of zinc have been declining."

The second search is designed to capture news reports that should be related to prices declining. This search identifies reports that include phrases about a) declining demand or consumption of a metal, b) increase in inventories, or production, or reserves, or supply for a metal. For instance, in the case of tin, I search for reports including phrases like "demand for tin has been decreasing," "tin production rose."[14] I conjecture that the number of news reports generated by each search is a proxy of the market perception about the state of supply/demand fundamentals.

The results of the Factiva searches are reported in Table 5. First, we see that there are more news reports for traded than for non-traded metals. Moreover, consistent with Hypothesis 3, the price increasing news reports outnumber the price decreasing ones. For example, in the case of copper, there are 32 more news report related to the price of copper rising. Overall, the Factiva news reports support Hypothesis 3 and the argument that metal prices respond to fundamental news in the metal markets.

In general, the panel regressions and the Factiva news reports indicate that the prices of traded and non-traded metals are driven by economic fundamentals. Their reliance on common supply and demand forces implies that their prices should be positively correlated. Such

[14] The exact code used for the news searches is available from the author upon request.

comovement is also consistent with the fact that industrial metals are used as complementary goods in the manufacturing sector.

5. Does Commodity Index Trading Affect Commodity Cash Prices?

The findings presented thus far support the view that the patterns in metal prices are primarily driven by economic fundamentals. In this Section, I test the potential role of speculation in futures markets on spot commodity markets more directly. This analysis is organized around three themes. First, I show that the earnings from investing in futures contracts can proxy for the volume of speculative activity in the futures markets. Second, I examine whether the volume proxy is related to metal spot prices. Finally, I focus on traded metals and test if the relationship between inventory changes and price growth rates has changed after 2002.

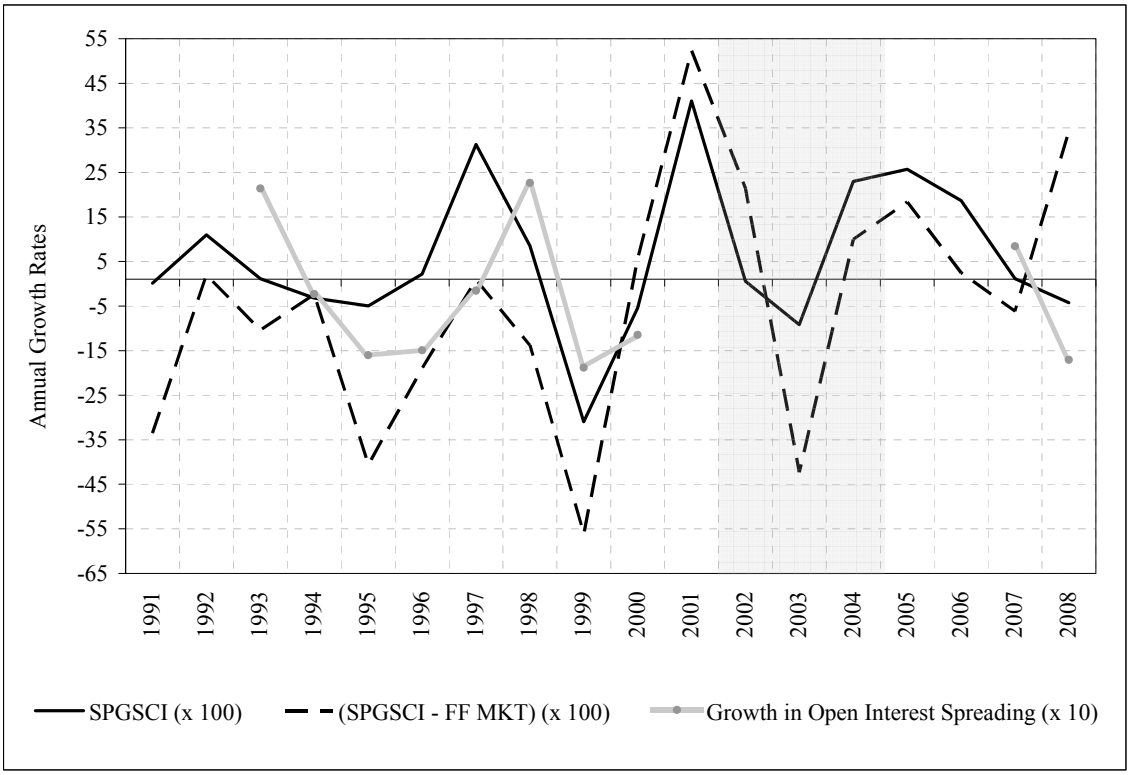
5.1 S&P Gold-Sachs Commodity Index

Financial investors can gain exposure to commodity price changes by investing in the futures markets. The most typical investment strategy has been to invest in products that track commodity indices like the S&P Goldman-Sachs Commodity Index (SPGSCI). The SPGSCI represents an unleveraged, long-only investment in a broad array of commodity futures. An investor can implement the index with SPGSCI instruments, like the SPGSCI futures contract traded on the Chicago Mercantile Exchange (CME).

I use the SPGSCI total return data to proxy for returns representative of investments in U.S. commodities and I test the following hypothesis:

> **Hypothesis 4:** *Speculative activity in futures markets rises when the returns from investing in futures contracts are high. Thus, if speculation in futures markets is driving commodity spot prices, there should be a positive relation between the total return of investing in futures contracts and commodity spot prices.*

Figure 5: Annual Growth Rates, 1991 - 2008



The figure depicts three annual rates. First, the rate of return of the SPGSCI is calculated from daily total return data from Bloomberg. Second, the excess rate of return is the difference between the SPGSCI rate of return and the CRSP value-weighted market return CRSP (FF MKT). Third, the growth in open interest spreading variable is the growth of net positions of all non-commercial traders reporting to the CFTC. This variable is only available from 1993 to 2000 and 2007 to 2008. Because the growth in open interest spreading is very volatile, for easy visualization, the first two variables are multiplied by a hundred and the last one by ten. The shaded area highlights the period during which spot metal prices increase considerably.

5.2 The Volume-Return Correlation

To test Hypothesis 4, I collect daily price data for the SPGSCI total return index from Bloomberg. I average all the price data within a year to compute an annual price index, P_t. I calculate the annual rate of return as $100 \times ln(P_t / P_{t-1})$. For robustness, I also calculate an excess SPGSCI return. It is given by the difference between the SPGSCI annual return and the CRSP value-weighted index of all stocks listed on CRSP. The CRSP index is from the web site of Kenneth French.[15]

[15] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

The return data are a good proxy for the variation in financial investor participation (volume) in the futures markets. I establish the volume-return connection using open interest data for the SPGSCI futures contract traded on the Chicago Mercantile Exchange. I obtain the open interest data from the CFTC Commitments of Traders Reports.[16] From these reports, I collect the variable called "non-commercial positions-spreading," which aggregates the net (long – short) positions of each non-commercial trader reporting to the CFTC. I focus on the non-commercial category because it includes financial investors like hedge funds.[17]

The non-commercial positions-spreading variable for the SPGSCI futures contract is only available from 1992 to 2000 and 2006 to 2008. I average the reported weekly data within each year and I compute an annual spreading variable. Then, I compute its growth rate to capture the variation in financial investor participation in the futures markets.

The open interest growth rate is depicted in Figure 5 together with the rate of return and excess return of the SPGSCI. The figure shows that there is a positive relationship between open interest growth and returns. In untabulated results, I find that the correlation between the SPGSCI total rate of return and the growth of the open interest by non-commercial traders is positive (0.43). The correlation with the excess return is also positive (0.13). Thus, the returns for the SPGSCI are a reasonable volume proxy in the futures markets.

5.3 SPGSCI Returns and Spot Metal Prices

Unfortunately, the open interest data are not available from 2001 to 2005, the period containing the structural break in metal prices. Therefore, I proxy for the volume of speculative activity in the futures markets using the SPGSCI returns.

The SPGSCI rate and excess return are plotted in Figure 5. The plot shows that the SPGCI return is highly volatile; its minimum value is -31% and its maximum value is 41%. The excess return is even more volatile; its minimum value is -56% and its maximum value is

[16] Open interest data are a good proxy of the intensity of participation because they measure the total number of futures contracts long or short in a delivery month or market that has been entered into and not yet liquidated by an offsetting transaction or fulfilled by delivery

[17] For more details see www.cftc.gov/marketreports/commitmentsoftraders/index.htm

52%. Nevertheless, the average returns between 2002 and 2007 have been high and around 10%. Gorton and Rouwenhorst (2006) also find that by 2004 an equal-weighted return index of commodity futures earned about 9% more than the respective commodity spot price index.

The graphical evidence in Figure 5 suggests that Hypothesis 4 is not supported by the data. As we see in the figure, the SPGSCI rate and excess return are not consistently rising during the period 2002 to 2004. Unlike the metal price growth rates, there does not appear to be a structural break in the two return series.

I complement the graphical evidence and formally test Hypothesis 4 by including the SPGSCI rate and excess return in the panel regressions from Section 4. The goal of the regression analysis is to test whether the SPGSCI returns can explain the structural break at the end of 2002. I report the new regressions in Table 6. Regressions 1 and 2 include SPGSCI rate of return and Regressions 3 and 4 include SPGSCI excess return over the CRSP return.

The regression results in Table 6 strongly reject Hypothesis 4. To begin with, the rate and excess return of the SPGSCI have no explanatory power for the metal price growth rates. For instance, in Regression 1 its t-statistic is only 0.85. In untabulated results, I estimate regressions in which I constrain the SPGSCI return to only affect the traded metals. I find that even in these regressions the speculative activity proxy has no impact on spot price growth rates.

Apart from being insignificant, the inclusion of the SPGSCI returns in Regressions 3 and 4 does not weaken the importance of world growth for metal prices. In the case of Regression 3, the estimate on the world growth and D_{02} interaction term is positive (= 0.12) with a high t-statistic (= 3.48). Similarly, the estimate on the world growth and D_{03} interaction term is 0.24 and its t-statistic is 3.62.

Taken together, the results in Table 6 strongly reject Hypothesis 4. They suggest that financial investor participation in the futures markets, proxied by the SPGSCI returns, is not related to

the price appreciation of metals after 2002. Moreover, the failure to find supporting evidence for Hypothesis 4 reinforces the evidence for Hypotheses 2 and 3.

5.4 Inventory Formation and Price Inflation

The economic theory behind storage models suggests that the only way speculation in the futures markets can affect spot commodity prices is by leading to physical hoarding. If that were the case, inventory growth and price growth would be positively correlated. All else equal, if speculation is irrelevant these growth rates should be negatively correlated. This intuition gives rise to my final hypothesis:

> **Hypothesis 5:** *If speculative activity in futures markets affects the spot commodity prices, then the negative relationship between inventory formation and spot price changes should weaken.*

The discussion in Section 3.1 argued that data limitations are a major hurdle in testing Hypothesis 5. Nevertheless, given the importance of inventory fluctuations in no-arbitrage/storage models, I use the available inventory data to test Hypothesis 5. Specifically, I focus on traded metals because data on world inventories of non-traded metals are not consistently collected. The inventory data are from the 2005 and 2008 World Metals Statistics Yearbooks published by the World Bureau of Metal Statistics. The data are annual, they cover the period from 1995 to 2007, and they refer to world total commercial stocks. With the annual growth rates of the commercial stocks, I estimate panel regressions, which I report in Table 7.

In Regressions 1 and 2, the inventory growth rate is included in the set of explanatory variables. I find that conditional on lag price growth and world per capita GDP growth, the coefficient estimates on the inventory growth rate are negative and significant. Therefore, inventory growth is related to metal prices decreasing, a prediction of standard supply and demand models with no physical hoarding. Next, in Regressions 3 and 4, I test whether price growth responds differently to inventory growth before and after 2002. Specifically, I include

in the regression interaction terms of inventory growth with the D_{02} and D_{03} dummy variables. The interaction terms have negative coefficient estimates and their magnitudes are very similar. Moreover, they are statistically insignificant. Therefore, there is no supporting evidence that the relationship between inventories and metal prices has changed after 2002, the year when prices spiked.

Overall, the evidence in Table 7 does not support Hypothesis 5. My findings suggest that fluctuations in supply and demand in physical markets (as captured by inventory fluctuations) are driving the prices of traded metals. Even if the inventory data are not free of measurement errors, it is important that their growth rate is negatively correlated with the price growth rates.

6. Related Research

In this section, I survey the recent literature on speculation. Because the debate about speculation leading to spot price inflation is a recent one, there are relatively few studies on the issue. These studies nevertheless find no convincing evidence that speculation in the futures markets has led to spot price inflation. Next, I review some academic studies as well as reports from regulatory agencies.

One of the salient findings of the paper is that at the end of 2002 the prices of both traded and non-traded metals have been rising substantially. Haigh, Hranaiova, and Oswald (2005) also find that the initial appreciation in most commodity spot prices started in 2002. These authors note that spot price changes have led to changes in investor interest and not the other way around. Brunetti and Buyuksahin (2009) also show that speculative activity did not anticipate price changes. Moreover, they use detailed data on open interest and find that speculative activity in the futures market did not destabilize these markets.

My empirical results rely on long term price changes, which are captured by annual price growth rates, and show that economic fundamentals are driving these long term growth rates. Domaski and Heath (2007) argue that in the short term it is possible that financial investors can indirectly affect inventory decisions through future prices. To the extent that taking long positions in futures markets leads to higher futures prices, the value of holding inventory for future delivery increases. Under this scenario, storers might be tempted to increase inventory levels in the short term.

In the long term, however, inventory decisions should be primarily driven by factors affecting the real supply and demand of the underlying goods. Currently, there is no direct evidence that storers and producers have been ignoring supply and demand factors and have been accumulating inventories betting on the prediction that futures prices will continue to appreciate. To the contrary, the evidence in Section 5.4 suggests that storers and producers have been making inventory decisions based on supply and demand conditions in the physical commodity markets.

Even if there is no relationship between investor participation in futures markets and spot (physical) prices, Haigh, Harris, Overdahl, and Robe (2007) find that speculation has affected the futures markets themselves. In particular, they focus on the New York Mercantile Exchange's WTI sweet crude oil futures. They show that the prices of one-year and two-year futures have become cointegrated with the price of near-month futures, for the first time ever, since mid-2004.

In a related study, Buyuksahin, Haigh, and Robe (2008) investigate the comovement of commodity and equity investment returns. They use the Standard and Poor's S&P 500 return and the SPGSCI total return to proxy for the representative performance in U.S. equities and commodities. They find that the correlation between the two return indices has been very stable in the last fifteen years.

Finally, due to the public attention drawn to commodity markets, the International Organization of Securities Commissions (IOSCO) set up a Task Force to investigate the role of speculation by financial investors in the futures market. The Task Force reviewed recent reports from various international agencies. Consistent with my findings, the Final Report (March 2009) concluded that economic fundamentals, rather than speculative activity, are the most plausible cause for the recent price appreciation in commodity prices.[18]

One report cited by the IOSCO is a Staff report by the CFTC.[19] It publishes the results of the June 2008 special call for data from over-the-counter (OTC) swap and commodity index markets. Evidence in the study shows that during December 31, 2007 to June 30, 2008, the behavior of crude oil prices and speculative activity were negatively correlated. During this period, while crude oil prices were increasing, speculative activity by commodity index traders reflected a net decline of futures equivalent contracts.

7. Conclusion

Do financial investors affect the physical commodity markets through their participation in the futures markets? To answer this question, I study industrial metals with and without futures markets. My empirical analysis evolves around two themes: comovement of metal prices and more direct tests of the impact of speculation on spot markets.

The comovement hypothesis is motivated from the fact that industrial metals are typically used by the manufacturing sector in a complementary fashion. Therefore, if supply and demand forces are the primary driver of their price changes, their long-term price patterns should move in tandem. Using annual and quarterly price growth rates for the period 1991 to 2008, I find that traded and non-traded metals are positively correlated. Moreover, both metal classes experience a structural change by the end of 2002.

[18] The IOSCO report is at www.iosco.org/library/pubdocs/pdf/IOSCOPD285.pdf.
[19] See www.cftc.gov/stellent/groups/public/@newsroom/documents/file/cftcstaffreportonswapdealers09.pdf.

The comovement across industrial metals is also supported by additional evidence. To begin with, I find that all metal prices are correlated to world per capita GDP growth, which can explain the shift in metal prices after 2002. Also, using news report, I assess the type of supply and demand information that was available about non-precious metals during the onset of metal price appreciation. I find that price increasing news reports outnumber price declining news reports.

The first set of tests suggests that fundamental information is driving metal prices. The remaining tests confirm this conclusion by finding no direct link between speculation and spot prices. First, I show that the total return of the SPGSCI, a proxy for the intensity of speculative activity in the futures markets, has no explanatory power for metal price growth rates. Finally, I search for evidence of physical hoarding by focusing on the relationship between traded metals and inventory levels. In line with my previous finding, inventory growth is negatively correlated with price growth rates suggesting that storers were not accumulating stocks due to high futures prices.

Taken together, the results indicate that in recent years the relationship between futures and physical commodity markets for industrial metals was not disturbed by financial investors. Instead, commodity spot prices changes are driven by world economy activity and financial investors are merely responding to these price changes. This conclusion is strongly confirmed by the economic developments in 2008. As shown in Figure 4, world fundamentals worsened in 2008 with world per capita GDP growth falling to 1.7%. The slow down in world economic activity reduced the demand for metals and their price plummeted. For example, the price growth rate of traded metals fell by 19.18%. See Figure 1. In response, as depicted in Figure 5, speculative activity in the futures market declined with the net open interest for the SPGSCI futures contract falling by 171%.

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Table 1: Descriptive Statistics for Price Growth Rates

	Annual Growth Rates						Annualized Quarterly Growth Rates					
	1991 - 2008		1991 - 2002		2003 - 2008		1992 - 2008		1992 - 2002		2003 - 2008	
	Avg	STDV	Avg	STDV	Avg	STDV	Avg	STDV	Avg	STDV	Avg	STDV
Traded												
Copper	5.3	0.2	-4.5	0.2	24.9	0.2	2.8	0.6	-4.6	0.4	15.5	0.8
Aluminum	2.5	0.2	-1.6	0.2	10.7	0.1	2.1	0.4	0.4	0.3	5.1	0.4
Lead	5.2	0.3	-4.9	0.2	25.5	0.3	4.2	0.5	-3.7	0.3	17.7	0.7
Nickel	4.8	0.3	-2.3	0.3	18.9	0.4	2.5	0.7	-0.2	0.5	7.1	0.9
Tin	6.1	0.2	-3.5	0.1	25.3	0.3	4.0	0.4	-4.6	0.3	18.9	0.6
Zinc	1.1	0.3	-5.6	0.2	14.6	0.5	-0.8	0.5	-5.5	0.4	7.2	0.7
Traded Index	4.2	0.2	-3.7	0.1	20.0	0.2	2.5	0.4	-3.0	0.3	11.9	0.6
Non-Exchange Traded												
Steel	6.8	0.2	-2.3	0.2	25.1	0.3	5.3	0.7	0.4	0.4	13.7	1.0
Manganese	7.0	0.4	-5.7	0.1	32.6	0.6	9.2	0.6	-5.4	0.2	34.1	0.9
Cadmium	2.4	0.6	-13.1	0.6	33.4	0.5	5.4	1.0	-1.8	1.0	17.7	1.1
Cobalt	7.5	0.4	-2.9	0.4	28.4	0.4	0.9	0.8	-11.2	0.6	21.7	0.9
Tungsten	7.8	0.3	-1.1	0.3	25.6	0.4	9.2	0.6	-0.9	0.5	26.6	0.7
Rhodium	3.4	0.5	-12.4	0.5	34.8	0.5	-2.0	1.1	-12.4	0.9	15.7	1.3
Ruthenium	9.2	0.6	0.7	0.5	26.3	0.8	11.6	1.0	5.0	0.8	22.8	1.2
Molybdenum	13.2	0.5	1.7	0.4	36.3	0.5	13.0	1.0	3.5	1.0	29.3	0.9
Non-Traded Index	7.2	0.3	-4.4	0.2	30.3	0.2	6.6	0.5	-2.8	0.3	22.7	0.6

The table reports descriptive statistics for the growth rates of spot price indices for traded and non-traded metals as well as individual metals. The sample averages are denoted by "Avg" and the sample standard deviations by "STDV". The annual data cover the 1991 to 2008 period. The quarterly data cover the 1992(Q4) to 2008(Q4) period. The quarterly growth rates are annualized (i.e., multiplied by four). All growth rates are multiplied by a hundred.

Table 2: Structural Break Tests

Panel A: Full Sample	**Annual Data**			**Annualized Quarterly Data**		
	Date	ExpF	AveF	Date	ExpF	AveF
Index of Traded	2002	1.786	3.105	2001 (Q4)	0.582	1.005
		0.067	0.054		0.338	0.325
Index Non-Traded	2003	3.054	5.244	2002 (Q4)	1.488	2.521
		0.014	0.010		0.095	0.084
Panel B: Excluding 2008	**Annual Data**			**Annualized Quarterly Data**		
	Date	ExpF	AveF	Date	ExpF	AveF
Index of Traded	2002	3.128	4.768	2002 (Q4)	5.124	8.016
		0.013	0.015		0.001	0.001
Index Non-Traded	2003	2.893	4.622	2003 (Q3)	4.946	7.870
		0.017	0.017		0.001	0.001

The table reports structural break tests. The date of the break (reported underneath the column titled "Date") is the date in which the Andrews' (1993) F-test of no break is maximized. The ExpF and AveF columns report two tests of structural break following Andrews and Ploberger (1994). Underneath the test statistics (reported in smaller font) are their p-values computed as in Hansen (1997). In Panel A, the sample period includes 2008, and in Panel B, 2008 is excluded from the analysis.

Table 3: Panel OLS Regressions

	Annual Regressions		Quarterly Regressions	
	(1)	(2)	(3)	(4)
	Panel A: Coefficient Estimates and T-Statistics			
D_{02}	-0.04		0.20	
	-1.24		4.10	
D_{03}	0.24		0.29	
	5.76		5.38	
$D_{TR} \times D_{02}$		-0.02		0.20
		-0.44		3.42
$D_{TR} \times D_{03}$		0.18		0.25
		2.99		3.65
$D_{NTR} \times D_{02}$		-0.05		0.20
		-1.26		3.63
$D_{NTR} \times D_{03}$		0.29		0.32
		5.28		5.11
Adjusted R-squared	0.13	0.13	0.14	0.14
	Panel B: Difference Between Estimates			
$D_{03} - D_{02}$	0.28		0.09	
	5.38		1.91	
$(D_{TR} \times D_{03}) - (D_{TR} \times D_{02})$		0.20		0.05
		2.66		0.69
$(D_{NTR} \times D_{03}) - (D_{NTR} \times D_{02})$		0.34		0.12
		5.01		1.97

The table reports OLS coefficient estimates and t-statistics (beneath the estimates and in smaller font) in Panel A. Panel B reports the difference between estimates and their t-statistics (beneath the differences and in smaller font). The sample periods are 1992 to 2008 and 1993(Q1) to 2008(Q4) for annual and quarterly data, respectively. To conserve space, I omit the coefficient estimates of the lagged spot price growth rates (included in regressions 1 to 3) and of the seasonal dummy variables (included in regressions 4 to 6). The quarterly growth rates are annualized.

Table 4: Panel OLS Regressions with Annual Price Growth Rates

	(1)	(2)	(3)	(4)
	Panel A: Coefficient Estimates and T-Statistics			
D_{02}	-0.22		-0.19	
	-4.62		-3.65	
D_{03}	-0.08		-0.30	
	-0.99		-1.93	
D_{TR} x D_{02}		-0.21		-0.18
		-3.57		-2.85
D_{TR} x D_{03}		-0.14		-0.36
		-1.52		-2.23
D_{NTR} x D_{02}		-0.24		-0.20
		-4.38		-3.54
D_{NTR} x D_{03}		-0.03		-0.25
		-0.40		-1.62
(World GDP Growth)$_t$	0.14	0.14		
	4.73	4.73		
(World GDP Growth)$_t$ x D_{02}			0.12	0.12
			3.48	3.48
(World GDP Growth)$_t$ x D_{03}			0.24	0.24
			3.62	3.62
Adjusted R-squared	0.20	0.20	0.21	0.21
	Panel B: Difference Between Estimates			
D_{03} - D_{02}	0.15		-0.11	
	2.57		-0.66	
(D_{TR} x D_{03}) - (D_{TR} x D_{02})		0.07		-0.18
		0.91		-1.06
(D_{NTR} x D_{03}) - (D_{NTR} x D_{02})		0.20		-0.05
		2.90		-0.30

The table reports OLS estimates and t-statistics (beneath the estimates and in smaller font) in Panel A. Panel B reports the difference between estimates and their t-statistics (beneath the differences and in smaller font). The time period for the regressions is 1991 to 2008. To conserve space, I omit the coefficient estimates on the lagged spot price growth. world growth is given by world per capita GDP growth published n the World Development Indicators (WDI).

Table 5: Factiva News Reports

	Price Increasing News	Price Decreasing News	Net
Traded			
Copper	39	7	32
Aluminum	18	9	9
Lead	10	5	5
Nickel	19	7	12
Tin	18	5	13
Zinc	23	1	22
Non-Exchange Traded			
Steel	17	5	12
Manganese	5	0	5
Cadmium	3	2	1
Cobalt	5	3	2
Tungsten	4	0	4
Rhodium	4	2	2
Ruthenium	4	0	4
Molybdenum	16	9	7

The table reports the number of news reports in industry newsletters that included news related to metal prices increasing and metal prices decreasing. The news reports are identified using the search engine Factiva over the period from September 1, 2003 to April 1, 2004. The column "Net" reports the difference between price increasing and price decreasing news.

Table 6: Panel OLS Regressions with Annual Price Growth Rates

	(1)	(2)	(3)	(4)
	Panel A: Coefficient Estimates and T-Statistics			
$D_{TR} \times D_{02}$	-0.02	-0.19	-0.03	-0.17
	-0.51	-2.78	-0.66	-2.83
$D_{TR} \times D_{03}$	0.17	-0.33	0.18	-0.36
	2.58	-1.94	2.82	-2.22
$D_{NTR} \times D_{02}$	-0.05	-0.21	-0.06	-0.20
	-1.35	-3.39	-1.49	-3.52
$D_{NTR} \times D_{03}$	0.27	-0.23	0.28	-0.26
	4.67	-1.36	5.05	-1.61
$dP_{t-1,i}$	0.06	0.06	0.07	0.05
	0.96	0.88	1.09	0.82
Rate of Return $(GSCI)_t$	0.12	-0.07		
	0.85	-0.42		
Excess Rate of Return $(GSCI)_t$			-0.0011	0.0001
			-0.94	0.08
$(\text{World GDP Growth})_t \times D_{02}$		0.13		0.12
		3.09		3.44
$(\text{World GDP Growth})_t \times D_{03}$		0.23		0.24
		3.41		3.59
	Panel B: Difference Between Estimates			
$(D_{TR} \times D_{03}) - (D_{TR} \times D_{02})$	0.19	-0.15	0.21	-0.18
	2.44	-0.76	2.70	-1.06
$(D_{NTR} \times D_{03}) - (D_{NTR} \times D_{02})$	0.32	-0.02	0.34	-0.05
	4.68	-0.08	5.04	-0.31

The table reports OLS estimates and t-statistics (beneath the estimates and in smaller font) in Panel A. Panel B reports the difference between estimates and their t-statistics (beneath the differences and in smaller font). The time period for the regressions is 1991 to 2008. To conserve space, I omit the coefficient estimates on the lagged spot price growth. The annual rate of return of the SPGSCI is calculated from the daily total return on the index obtained from Bloomberg. The excess rate of return is the difference between the SPGSCI rate of return and the CRSP value-weighted return of all stocks on CRSP. World growth is given by world per capita GDP growth published in the World Development Indicators (WDI).

Table 7: Panel OLS Regressions with Annual Growth Rates

	(1)	(2)	(3)	(4)
Intercept	-0.15		-0.15	
	-2.96		-2.76	
D_{02}		-0.15		-0.15
		-2.71		-2.47
D_{03}		-0.17		-0.17
		-1.23		-1.22
$dP_{t-1,i}$	-0.22	-0.22	-0.22	-0.22
	-2.03	-2.02	-2.00	-1.99
$(\text{World GDP Growth})_t \times D_{02}$	0.07	0.07	0.07	0.07
	2.34	2.17	2.18	1.97
$(\text{World GDP Growth})_t \times D_{03}$	0.19	0.20	0.19	0.20
	6.59	3.36	6.52	3.31
$(\text{Inventory Growth})_t$	-0.23	-0.23		
	-2.19	-2.17		
$(\text{Inventory Growth})_t \times D_{02}$			-0.24	-0.24
			-1.53	-1.51
$(\text{Inventory Growth})_t \times D_{03}$			-0.22	-0.21
			-1.57	-1.54
Adjusted R-squared	0.58	0.57	0.57	0.57

The table reports OLS estimates and t-statistics (beneath the estimates and in smaller font). The time period for the regressions is 1997 to 2007. I only use data on metals with established futures markets. World growth is given by world per capita GDP growth published in the World Development Indicators (WDI). Inventory growth is the growth rate of total commercial stocks for the World Bureau of Metal Statistics.