



# Financialization of metal markets: Does futures trading influence spot prices and volatility?



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## ABSTRACT

The emerging financialization of commodity markets over the last decades has led to an intense public and scientific debate about commodity investing and its implications. Although metal commodities are indispensable to industry and the economy, the influence of financialization on metal spot prices and in particular on respective volatility has been insufficiently studied. Therefore, we attempt to contribute to existing literature by examining potential effects of the lead-lag relationship on futures trading activity of commercial and non-commercial market participants and cash prices and volatility for the major metal commodities: copper, gold, silver, platinum, and palladium. After analyzing Commitment of Traders (COT) reports from the U.S. Commodity Futures Trading Commission (CFTC) over a timeframe from January 1993 to December 2013, bi-directional Granger-causality tests and an EGARCH volatility analysis show that there is hardly any influence of trading activity driving metal spot prices in the long-term, but rather driving volatility to some extent. We find indications of price and volatility influencing effects of trading activity within sub-samples, such as phases of booms and crises. Contrary to public perception, commercial and long positions affect price levels and volatility far more than activities of non-commercial traders. However, for the reverse direction there is strong evidence that commodity prices and volatility drive trading positions.

## 1. Introduction

For more than a century, commodity futures trading has been an essential part of our multilateral trading system. As early as 1848, the first futures exchange was established as the Chicago Board of Trade (CBOT). However, the 21st century has witnessed a significant change in the market environment of commodity markets. Triggered by important studies from Greer (2000) or Gorton and Rouwenhorst (2006), which in the context of modern portfolio theory have strengthened the perception of diversification properties of commodities, a remarkable increase in the popularity of commodity investing can be observed. Moreover, not only large financial institutions but also more and more retail investors have been attracted by newly created financial products, such as commodity linked notes (CLNs), to participate in price development of individual commodities or commodity indices. As a consequence, the structure and composition of markets through increasing liberalization and access to international financial markets has changed over the past two decades. The sum of these phenomena, and in particular rapidly growing investments in commodity markets thus causing an enormous inflow of institutional funds

into commodity futures markets, are often nowadays designated as “financialization of commodity markets”.

According to estimations from the U.S. Commodity Futures Trading Commission (CFTC) (CFTC, 2008), investment inflows to commodity futures indices increased from \$13 billion in 2003 to about \$260 billion by the middle of 2008. Due to coincidentally occurring price increases and levels of volatility within major commodity markets, many market participants and policy-makers have ascribed this unusual behavior of commodity prices to commodity investing and particularly speculation. The issue is addressed by many scientific studies using the CFTC Commitments of Traders reports (COT), which in their aggregated form distinguish between at least two types of traders within the futures market: Commercial and non-commercial traders. Commercial traders primarily use commodity contracts to hedge themselves against price and volatility risks. These traders are for the most part companies, depending on the particular commodity. In contrast, non-commercial traders focus on investment opportunities within commodity markets without any hedging aspects (e.g. Szado, 2011). Such players are typically index funds- or investment managers, often defined as “speculators”, who operate primarily in future markets by

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taking long-positions (Tang and Xiong, 2012), as they are not interested in any physical commodity delivery, but rather in achieving positive returns from these investments or to diversify their portfolio. Another consideration, and one which is occasionally overlooked in current discussion, is the fact that investments in commodity derivatives in general has risen sharply. Not only non-commercial investors are more active in these markets; commercial traders, such as commodity-producing and -processing companies as well as intermediaries, have increased their number of positions in the futures market to hedge against price and volatility risks in the spot market. However, commercial positions are often not considered in current literature, as related studies focus solely on non-commercial or index related positions (see Bohl, 2012; Gilbert, 2010a or Mayer, 2012).

The discussion about potential effects of financialization on commodity markets, which is comprehensively reviewed by Fattouh et al. (2013) for oil markets, raises the general question of the functioning and interaction of spot and futures markets. In the current discussion, it is often argued that financialization affects price building in physical spot markets along the following causal chain: Increased futures trading (particularly of financial investors) leads to changes in future prices, which in turn indirectly affect prices and volatility in underlying commodity spot markets. This causality is attributable to three potential channels (Cheng and Xiong, 2014). First, according to the theory of storage, spot and future prices are linked through a process of arbitrage, which involves simultaneous buying and selling of a commodity in different markets – resulting in a risk-free transaction. The intensity and speed of this price adjustment is determined by interest rates, inventory costs, and the nature of storage itself. The second channel addresses the risk sharing mechanism in futures markets. Commodity producers, typically net short, are subject to strong hedging pressure (Keynes, 1923; Hicks, 1939), as there are usually fewer participants willing to take related long-positions. Therefore, a balanced risk premium for taking long positions exists, which directly links future and spot prices. Thirdly, following the theory of asymmetry of information within markets, future prices should react faster to new information serving as a signal for spot price development. Information imbalance between parties in future and spot markets is substantiated by the fact that futures markets show far less friction than spot markets (e.g. transaction costs). Thus, potentially better informed (speculative) traders in futures markets may accelerate the price discovery mechanism, which is accompanied by an increase in volatility; ergo, new information concerning fundamentals will be factored more rapidly. All three channels involve an impact on both direct prices and volatility. In addition, concerning volatility, Brunetti et al. (2011) and others note that increased participation of non-commercial traders generates further liquidity in the market, which in turn reduces volatility and enables market forces to correct irrational prices.

The frequently mentioned term ‘Masters Hypothesis’, introduced by Irwin and Sanders (2012a), goes beyond the introduced mechanisms in this context. Michael Masters,<sup>1</sup> in his testimonies before the CFTC and the US Senate, assigns massive buy-side demand originating from commodity index investments within future markets as major driver of physical spot price distortions (e.g., Masters, 2008, 2009, Masters and White, 2008). His statement has become one of the most cited in the public, as well as the scientific debate concerning the effects of commodity trading. However, its general applicability is debatable, as it is based on a simple comparison between trading volumes and price development, mainly in agricultural and energy markets. Moreover, Masters theory requires a strong contango (see Tilton et al., 2011, Gulley and Tilton, 2014). However, the oil market was in backwardation for most of the period referred to by Masters. Moreover, this potential effect is often designated as a ‘speculative bubble’. This line of

argument, however, contradicts the assumption of a perfectly competitive market, in which no participant can directly influence the price of a product itself.

However, there are potential alternatives for the actions of market participants, which could completely exhaust the aforementioned channels presented by Cheng and Xiong (2014). For instance, an increase in long demand leads to an increase in risk premiums. Consequently, commercial hedgers may respond by adjusting their hedging activity, resulting in an increased demand for short contracts. Finally, this might drive future prices back to the original level. Hence, in this case there is no overall influence on spot prices. The same applies to the channel of the theory of storage: Accordingly, rising long futures demand and thus increasing futures prices need not necessarily lead to an adjustment of the convenience yield and simultaneously of inventories and spot prices. If there is no adjustment of the convenience yield in this chain, there is no complementary influence on spot prices. Concerning information asymmetry, the question is whether and to what extent futures market participants follow prices and volatility of spot markets. Moreover, it is unclear whether the reaction of commercial traders dominates, as participants in spot markets are supposedly better informed. Lastly, potential effects on volatility could oppose each other, as in the case of ‘momentum’ traders, who boost highs and lows, thus generating increasing volatility.

To summarize, trading behavior – both speculation and hedging – may or may not influence price building in the spot market, cash prices, and volatility through the presented channels. Though intensively debated on a theoretical level, the topic of financialization’s impacts in general still suffers from a lack of consensus of opinion. Currently, empirical investigations aim to shed more light on this issue.

Regarding soft commodities, especially the increasing prices for corn, soya, or wheat and the consequences for emerging nations have been analyzed by different authors and institutions (e.g. Gilbert, 2010a; Sanders and Irwin, 2010). Financialization in the market for energy commodities, like gas and oil, is important for a number of industries and, for instance, has been illuminated by Sanders et al. (2004). Another important group of commodities – metals – differs greatly in fundamental characteristics like suitability for storage, market conditions, or recyclability from other groups of commodities. This storability of metals can induce lower price volatility in general by buffering supply and demand shocks and enabling arbitrage opportunities. Smaller metal markets, for instance in comparison to energy or agricultural markets, are generally considered suitable for financial investors.

Although a large number of key current and future industries depend on these fundamental raw materials, to the best of our knowledge hardly any research on financialization and its implications in metal markets exists, except for some publications that selectively consider single or a small group of metals within small time frames (see for instance Gilbert, 2010a or Mayer, 2012). Summarizing the above, recent studies reveal an ambiguity of results due to the use of different methods, varying time periods, and heterogeneous commodities. As a result, metal commodities lack sufficient investigation in this respect.

Therefore, this study is necessary because it investigates potential effects of financialization on the total set of CFTC metals, copper, gold, silver, platinum, and palladium, from an overall perspective by the lead-lag relationship between futures trading activity, actual spot prices, and volatility as well. We further contribute to existing literature by extending examination of financialization to the full and pure set of aggregated trading activity indicators of the CFTC, including commercials and non-commercials, which encompasses the longest available timeframe and both directions by the established framework of the Granger-causality analysis. Lastly, we extend the volatility examination by a supplemental EGARCH analysis.

The paper is structured as follows. Section 2 reviews the existing approaches identifying relationships among financialization, commodity prices, and volatility. Section 3 introduces design details and data of

<sup>1</sup> Michael Masters is a portfolio manager and CEO of ‘Masters Capital Management LLC’.

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