



Does the stock market drive herd behavior in commodity futures markets?



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ABSTRACT

This paper contributes to the debate on commodity financialization by extending tests of herd behavior to commodity futures markets. Utilizing a regime-switching model, we test the presence of herd behavior in a number of commodity sectors including energy, metals, grains and livestock during the low and high market volatility states. We find significant evidence of herd behavior in grains only during the high volatility state. We also find that large price movements in the energy and metal sectors significantly contribute to herd behavior in the market for grains. Finally, we find no significant effect of the stock market on herd behavior in the commodity futures market. Our findings in general do not support the much debated commodity financialization hypothesis.

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1. Introduction

Speculation in commodity markets has been the source of heated discussions among policy makers as well as in the media. Particularly, the 2008 boom in the prices of a wide range of commodities has focused policy makers' attention to the role of financial investors' activities in commodity markets. Echoing George Soros' statements in a testimony before the U.S. Senate Commerce Committee Oversight Hearing on FTC Advanced Rulemaking on Oil Market Manipulation,¹ Gilbert (2009) suggests that a new class of investors that has emerged in financial markets regards commodities as an asset class, comparable to stocks, bonds, real estate, and emerging market assets. Gilbert (2009) further notes that these investors take positions on commodities as a group in order to capture profits and/or reduce portfolio risks which would not be possible to achieve using traditional assets. Amazingly, at the peak of the commodity market boom in 2008, commodity fund investors, including hedge funds like Soros Fund Management, con-

trolled a record 4.51 billion bushels of corn, wheat and soybeans through the futures markets of Chicago Board of Trade, equal to half the amount held in U.S. silos on March 1, 2008.² In a testimony before the U.S. Senate Committee of Homeland Security and Government Affairs, Michael W. Masters, a portfolio manager and partner at the Masters Capital Management, LLC stated³:

“... You have asked the question “Are institutional investors contributing to food and energy price inflation?” And my unequivocal answer is YES.”

In his testimony before the U.S. Senate Commerce Committee, George Soros also stated that commodity investment, as a new venue for institutional investors, had become “the elephant in the room” and as a result, investment in these assets might exaggerate price rises. Although the role of institutional investors in the commodity price boom experienced during the 2007/2008 period is debatable, it is worth noting that the commodity market in general experienced a dramatic increase in open interest, i.e. the total number of outstanding contracts held by market participants, particularly after 2003. Sari,

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¹ Soros, G. (2008), Testimony before the U.S. Senate Commerce Committee Oversight Hearing on FTC Advanced Rulemaking on Oil Market Manipulation, Washington D.C., 4 June 2008.

² Wilson, J. (2008), “Wall Street Grain Hoarding Brings Farmers, Consumers Near Ruin,” Bloomberg (April 28, 2008).

³ Masters, M.W. (2008), Testimony before the U.S. Senate Committee of Homeland Security and Government Affairs, Washington, DC, 20 May 2008.

Hammoudeh, Chang, and McAleer (2012) suggest that increasing open interest implies a flow of new funds into the marketplace which can be associated with an up-trending or bull market. In fact, Falkowski (2011) notes a Commodity Futures Trading Commission (CFTC) staff report stating that the total value of various commodity index related instruments purchased by institutional investors increased from an estimated \$15bn in 2003 to at least \$200bn in mid-2008. To this end, one might argue that the dramatic increase in the flow of funds into commodity markets and the growing influence of financial investors in these markets, hence the term commodity financialization, is partly driven by herd behavior among market participants looking for improved returns from commodity investments.⁴ Studies including Bikhchandani, Hirshleifer, and Welch (1992), Nofsinger and Sias (1999) and Blasco, Corredor, and Ferreruela (2012) suggest that herd behavior can drive security prices away from equilibrium values supported by fundamentals and drive volatility in the market. Therefore, it can be argued that herd behavior in the commodity market may have played a role in the price boom experienced during the second half of 2000s.

A number of studies on financial markets have suggested that herd formation among large institutional investors may destabilize market prices and create excess volatility (Dennis & Strickland, 2002; Gabaix, Gopikerishman, Plerou, & Stanley, 2006; Luo, 2003). Therefore, it is possible to argue that herd behavior in the commodity market, possibly driven by financial investors moving funds in and out of commodities, is a contributing factor behind the booms and busts observed in a wide range of commodities. In fact, in a recent study, Hache and Lantz (2013) examine the transaction volume for the NYMEX (New York Mercantile Exchange) and WTI (West Texas Intermediate) contracts and conclude that the behavior of non-commercial players may have played a destabilizing role in the petroleum market, driving the market into what they term as the 'crisis' state.

In another strand of the literature, studies including Krugman (2008), Hamilton (2009), and Kilian (2009) reject the so-called commodity financialization hypothesis and suggest that commodity price cycles are mainly driven by supply and demand balances in global markets, largely due to growth trends in emerging economies. Adding support to this view, Buyuksahin and Harris (2011) examine the trading positions of various types of traders in the crude oil market and find little evidence that financial investors' position changes cause price changes in the oil market. In a more recent study, Miffre and Brooks (2013) examine several trading strategies that are known to be used by hedge fund managers and find no significant effect of long-short speculators on volatility and cross-market correlations. Given the conflicting views in both directions, investor behavior in the commodity market and how it relates to the excessive price movements needs to be explored further.

The main goal of this paper is to contribute to the discussion on the financialization of commodities from a different angle by extending tests of herd behavior to commodity futures markets. Utilizing a methodology applied to a number of financial markets, we examine price data from energy, grains, livestock, and metals futures and test whether herd behavior is present during the low and high market volatility states. Our findings suggest the presence of herd behavior in the market for grains only with no evidence of investor herding in other commodity sectors. Herd behavior in grains is observed during the high market volatility state only. Furthermore, the results do not suggest a significant effect of stock market movements on herding in commodity markets, thus providing evidence against the commodity financialization hypothesis. On the other hand, a significant cross-market herding effect on grains

is observed from the energy and metals markets, suggesting that large price movements in energy and metals tend to contribute to herding among investors in grains futures. Our findings are robust during the post-2004 period when the commodity market experienced a large influx of financial investors driving a dramatic rise in open interest and trading volume in commodities, further supporting evidence against the commodity financialization hypothesis.

An outline of the remainder of the paper is as follows. Section 2 summarizes the literature on herd behavior. Section 3 provides the details of the testing methodology and data description. Section 4 presents the empirical results. Finally, Section 5 concludes the paper.

2. Previous studies

In early studies, intentional herding is described as a tendency for individuals to suppress their own beliefs and base their investment decisions solely on the collective actions of the market, even when they disagree with its predictions (Christie & Huang, 1995). Bikhchandani and Sharma (2001) define herding as an obvious intent by investors to ignore their personal information and copy the behavior of other investors (Bikhchandani & Sharma, 2001), leading them to trade in the same direction, thus moving in and out of markets as a group (Nofsinger & Sias, 1999). On the other hand, spurious herding occurs when investors' trading behavior is driven by common market shocks such as shocks in consumer confidence or other risk factors. Although spurious herding can be viewed as a natural outcome of efficient markets where investors collectively react to public information, intentional herding is associated with informational inefficiency as investors would be suppressing their personal information and simply copying the actions of others.

A number of studies in the literature have provided alternative explanations for why investors would display herd behavior. Studies including Shleifer and Summers (1990), Avery and Zemsky (1998) and Chari and Kehoe (2004) propose an information based theory for herding where individual investors follow the signals from the trades of more informed agents with better access to information compared to individual investors. Devenow and Welch (1996) suggest that managers in an imperfectly informed market may prefer either to 'hide in the herd' not to be evaluable, or to 'ride the herd' in order to prove quality. Other studies including Scharfstein and Stein (1990), Rajan (1994), Graham (1999), and Swank and Visser (2008) suggest that fund managers imitate others as a result of the incentives provided by the compensation scheme or in order to maintain their reputation. Nevertheless, whatever the rationale behind such behavior may be, studies including Dennis and Strickland (2002), Luo (2003), Gabaix et al. (2006) and Blasco et al. (2012) suggest that herd behavior may lead to excess volatility by leading asset prices to deviate from fundamental values.

The literature offers an extensive list of studies on herding applied to a number of different markets. A commonly used testing methodology utilizes the dispersion of asset returns in order to make inferences. In a pioneering study, Christie and Huang (1995) propose a linear model that examines the pattern of return dispersions during periods of large price movements. However, this model is later criticized by Chang, Cheng, and Khorana (2000) in that the inferences from this model can be driven by the price co-movement between the returns on individual assets and the market, rather than herd behavior. Chang et al. (2000) offer an improvement to this model by proposing a non-linear specification that controls for the co-movement in asset returns due to the market factor. Since then, the non-linear model of Chang et al. (2000) has been heavily utilized in Gleason, Mathur, and Peterson (2004) on exchange traded funds, Demiret and Kutan (2006) and Tan, Chiang, Mason, and Nelling (2008) on Chinese stocks, Demiret, Kutan, and Chen (2010) on Taiwanese stocks, Chiang and Zheng (2010) on global stock markets, and more recently Philippas, Economou, Babalos, and Kostakis (2013) on REITs and

⁴ Tang and Xiong (2012) define the financialization of commodities as the growing influence of the financial sector relative to the real sector over market prices and return dynamics in commodity markets. Similarly, Irwin and Sanders (2012) link the financialization of commodity futures markets to the increasing influence of nontraditional investors like commodity index funds, driving trading volumes and open interest in these markets.

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