The Quarterly Review of Economics and Finance 58 (2015) 128–142

Contents lists available at ScienceDirect

The Quarterly Review of Economics and Finance

journal homepage: www.elsevier.com/locate/qref

The linkage between aggregate investor sentiment and metal futures returns: A nonlinear approach

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ARTICLE INFO

Article history:
Received 26 January 2014
Received in revised form
15 December 2014
Accepted 14 February 2015
Available online 3 March 2015

JEL classification:
G11
G12
G13
G14

Keywords:
Metal futures
Investor sentiment
VAR-GARCH-M
Markov regime-switching

ABSTRACT

This paper examines the relationship between aggregate stock market sentiment and metal futures returns. Overall, metal futures have higher returns when investor sentiment is pessimistic rather than optimistic. Further analysis indicates that metal futures returns exhibit asymmetric responses to positive and negative investor sentiment shocks. Temporary and reactive demand shocks and flight to quality concerns may partially explain this asymmetry. In addition, there exists a negative predictive relationship between investor sentiment and metal futures returns, which remains persistent even after controlling for liquidity and open interest. Moreover, this predictive effect of sentiment on metal futures returns is magnified when there is high conditional volatility.

1. Introduction

For the past several years there has been widespread interest in the literature regarding investor sentiment. Initial studies focused on the equity market where it was found that the cross-sectional returns of stocks are influenced by aggregate investor sentiment (Baker & Wurgler, 2006; Brown & Cliff, 2004). A similar relationship has also been documented between investor sentiment and corporate bond yield spreads (Nayak, 2010). Han (2008) analyzed the impact of investor sentiment on the options market. The paper found that the S&P 500 index option volatility smile is flatter/steeper and the risk-neutral skewness of monthly index return is less/more negative when market sentiment becomes more bullish/bearish. Further, these robust relations are not explainable using rational perfect-market-based option pricing models.

As for futures, past literature has tended to focus on the impact of investor sentiment on the index futures market. Simon and Wiggins (2001) investigate the predictive power of market-based sentiment measures (i.e. volatility index, put-call ratio, and trading index) for subsequent returns on the S&P 500 futures contract over various horizons. Their results show that these sentiment measures have both statistically and economically significant forecasting power. Wang (2003) examines whether actual trader positioned based sentiment index is useful for predicting returns in the S&P 500 index futures market. The study shows that large speculator sentiment is a price continuation indicator, while large hedger sentiment is a contrarian indicator. Further, small trader sentiment has little predicting power in the futures market movements. Kurov (2008) argues that traders in index futures market are positive feedback traders. The traders buy when price increases and sell when price declines. In addition, positive feedback trading appears to be more active in periods of high investor sentiment. The paper's findings are consistent with the notion that feedback trading is driven by noisy traders' expectations; thus suggesting that order flow in index futures markets is less informative when optimistic sentiment is pervasive. The study points out that sentiment driven trading increases market liquidity.

This paper, in contrast to the previous literature, examines the linkage between aggregate stock market sentiment and the returns on metals futures. Three important questions are

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http://dx.doi.org/10.1016/j.qref.2015.02.008
1062-9769/

addressed regarding this examination. First, whether aggregate investor sentiment from the equity market impacts the metal futures markets. Second, whether this impact is symmetric. Third, whether this impact varies with time.

The answers to these questions are important for several reasons. First metal futures, as a subcategory of commodity futures, are one of the most important components of alternative asset class. With the recent increase in equity volatility, investments in commodities and commodity futures have gained significant attention from investors. The returns of commodity futures investments are uncorrelated with the returns of traditional assets such as bonds and stocks, thus providing investors with a significant opportunity to reduce risk associated with traditional investment portfolios. This diversification benefit, together with the presence of an active commodity futures markets, has contributed to considerable growth in the investment of commodity futures over the last two decades. Investigation of cross-market investor sentiment thus has profound implications in terms of both asset valuation and trading strategy.

Second, different from other types of commodity futures, metal futures have a long history of being popular with investors due to their ability to hedge against both price and volatility risk. Metals, given their dual use as both industry and precious metals, serve a very different role from other commodities. Metals offer valuable diversification to investors as a hedge against inflation, serve as a store of value or safe haven during times of market turmoil, and have a wide range of industrial and manufacturing applications. Therefore, given that metal futures represent a unique instrument, the empirical findings regarding aggregate investor sentiment may have different implications for the metal futures market.

Third, this study is comprehensive in scope in that it not only analyzes whether the cross-market investor sentiment impacts on the metals futures returns, but also whether this impact is symmetric. Moreover, it also analyzes whether this impact changes across time and the potential cause for this differential impact.

In regards to investor sentiment, one can think of two distinct channels in which investor sentiment could potentially impact or predict the returns of metal futures. In the first channel, investors are driven by flight to quality concerns during times of pessimism or uncertainty within the equity markets (Baur & Lucey, 2010[1]; Chan, Treepongkaruna, Brooks, & Gray, 2011[2]). In the past, periods of over-optimistic or over-bullish sentiment propelled the prices of stocks to levels not justified by their fundamental value. This irrational exuberance would push equity prices higher and higher-rising across the board even for companies earning little profit. Eventually, equity prices would reach some unprecedented evaluation and then inevitably crash.

During such times of rising market risk the demand for precious metals will increase if the returns on equity do not adequately compensate for their risk. Precious metals such as gold and platinum are often viewed as a store of value. As such, many investors have come to view precious metals as a form of portfolio insurance (Batten, Ciner, & Lucey, 2010; Baur & McDermott, 2010; Hillier, Draper, & Faff, 2006). In essence, investors view precious metal futures as a safe haven when there are systematic financial concerns.

In the second channel, investors are driven by temporary and reactive demand shocks (Elder, Miao, & Ramchander, 2012[3]; Radetzki, 2006[4]). During times of rampant optimism, investors and firms react to optimistic sentiment shocks (i.e. positive sentiment shocks) as a wave temporarily increasing demand for metal related products, thus increasing the demand for metal. This increase in demand tends to primarily affect metals with industrial applications, causing a firm who uses these metals to have both its costs and uncertainty to increase. The demand shock inevitably places pressure on the firm to either hedge or stockpile metals, thereby increasing the returns on metal futures. Conversely, when investor sentiment turns pessimistic, demand suddenly decreases causing metal returns to decrease. Further, during times of business booms and pervasive optimism, inflation will generally rise; therefore, the demand for precious metals tends to increase due to an increased need for hedging inflation.

The main difference between the two channels, regarding investor sentiment's impact on metal futures, lies in the following: First, the driving force for investor sentiment in the first channel is investor's desire to shift away from more risky assets to less risky assets (i.e. shift in risk preference). Precious metals, in particular gold, are the most well know example as a safe haven for investors. However for the second channel, the impact of sentiment on metal futures is driven by shifts in demand, rather than shifts in risk preference. Second, for the first channel, flight to quality mainly plays an important role during times of crisis; hence, the effect of investor sentiment is asymmetric and magnified during bad times. However, for the second channel investor sentiment impacts metal futures in both good and bad times. Third, for the first channel, flight to quality mainly is associated with precious metals' safe haven property. There is little association with metals whose main purpose is industrial application. On the contrary, for the second channel, both precious metals and industry metals are impacted. This is because all precious metals have industrial application.

Indeed, it is important to understand that these five metals cannot always be placed into a single category. For example, gold and platinum, both of which are commonly noted as stores of value (and thus viewed as precious metals), also have industrial applications. Furthermore, silver, which is largely an industrial metal, can be considered a precious metal.[5] Even so, silver's dual use, along with its demand-supply characteristics, causes silver prices to move in different directions than gold prices. Due to silver's higher positive correlation with economic growth many investors use silver as either a means to profit from economic growth or as a hedge against growth-induced inflation. As for copper, whose industrial applications include electrical wiring, plumbing, and industrial machinery, it has long been used as a leading indicator for economic growth. Large sustained price increases have often been correlated with recovery from economic recessions.

In summary, industry metals are heavily impacted by supply and demand. This is because these metals are primarily used by commercial hedgers. The relationship between supply and demand and industry metals is confirmed by the impulse response function analysis. In the impulse response analysis, a positive sentiment shock suggests higher demand for these metal futures and higher returns on the futures.[6] Negative sentiment suggests decreases in demand for these metal futures, thus leading to lower returns on

[1] Baur and Lucey (2010) find that gold is a hedge against stocks on average and a safe haven in extreme market conditions.

[2] Chan et al. (2011) find that during tranquil times investors prefer equity to gold. During crisis times, however, investors exhibit flight to quality.

[3] Elder et al. (2012) finds that unexpected improvements in the economy tend to have a positive impact on copper.

[4] Radetzki (2006) finds that the third commodity boom examined in the paper, which ran from 2003 to 2006, was triggered by a demand shock. Oil and copper were cited as evidence.

[5] Hammoudeh and Yuan (2008) note silver is both a precious and industrial metal. In fact, they refer to it as being in-between.

[6] Roache and Rossi (2010) find that most metal futures have clear and positive sensitivity to good news. However, gold futures tend to be more influenced by bad news than good news due to their safe haven properties. Elder et al. (2012) also