



Demystifying Commodity Futures in China

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Amid an increasingly liberalized economy and substantial growth in investor interest, the authors examine systematic investment strategies in the Chinese commodity futures market. In light of unique institutional settings, their results indicate that momentum and term structure strategies generate statistically significant profits across the futures curve in the most liquid markets and randomly selected sectors. The observed profits are not subsumed by market risks, transaction costs and data snooping. Instead, the authors argue that liquidity, anchoring and regulation-induced "limits-to-arbitrage" provide a partial explanation. In addition, the paper presents a head-to-head comparison of the important institutional settings with the U.S. market.

Introduction

This paper devotes considerable effort to address the question: can alternative risk premia strategies generate statistically significant profits in Chinese commodity futures? The literature on commodity risk premia has seen substantial developments in the past decade. Studies have identified various risk premia that provide investors with distinct sources of returns in commodity futures. Despite being one of the fastest-growing markets globally, the literature on Chinese commodity futures appears to be in its infancy. Contrasting with the U.S., the authors first provide a comprehensive overview of the institutional background in Chinese futures markets. In the presence of barriers-to-entry, excessive speculation and strict position limits, they examine 12 systematic long-short strategies in a broad sample of 30 commodities traded across all major exchanges in China. Furthermore, a comparative analysis is conducted based on a matched sample of U.S. and Chinese commodities.

Why the Paper's Research Questions are Important

China's socialist market economy has spurred unprecedented economic growth over the past decades. To fuel the continuous expansion of the world's second largest economy, China's colossal demand for commodities is quietly changing the balance of the global commodities trade. From 2001 to 2010, the trading volume of Chinese commodity futures soared from a mere 3 trillion to 227 trillion RMB. Products such as soybean meal and steel rebar have now become the world's most actively traded instruments. Consequently, the once extraneous market is beginning to show signs of influence on the pricing of global commodities. As Chinese authorities continue to open up the economy and the access to its capital markets, this paper makes a timely contribution to both the academic literature as well as the investment management industry. The paper addresses the debate on commodities risk premia by

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conducting tests in a segmented market, where the price discovery mechanism likely differs from a developed futures market such as the U.S., due to unique institutional settings. For practitioners, by “demystifying” the commodity futures market in China, this paper highlights the potential trading opportunities, particularly for commodity trading advisors and hedge funds seeking diversification.



Dr. John Hua Fan, Ph.D., Senior Lecturer in Finance at Griffith Business School (Australia), presenting at the JPMCC's 3rd Annual International Commodities Symposium, which was held at the University of Colorado Denver Business School in August 2019.

Data Description

The data employed in the paper are obtained from Datastream International. The dataset consists of 30 commodities covering grains, oilseeds, industrials, metals and energy sectors, traded on the Dalian (DCE), Shanghai (SHFE) and Zhengzhou (ZCE) exchanges, respectively. The raw dataset contains more than 4,000 individual contracts and maturities spanning from 1993 to 2017. The cleaning process results in a final sample from February 2004 onwards. Investors are assumed to hold the m^{th} (where $m = 1, 2, 3, 4$) nearest contracts until the last trading day of the month prior to expiration. For the matched sample, data on 14 U.S. commodities are obtained from the Commodity Research Bureau (CRB). Furthermore, position data are obtained from the CFTC's Commitments of Traders report. For macroeconomic and financial variables, the authors employ the RMB effective exchange rate, unexpected inflation and industrial production, the CSI 300 Index and Barclays China Aggregate Bond Index from Bloomberg.



Methodology

The authors evaluate 12 systematic long-short strategies designed to exploit information on the term structure (Gorton, Hayashi and Rouwenhorst, 2013), hedging pressure (Garcia, Leuthold and Zapata, 1986; Basu and Miffre, 2013), cross-sectional and time-series momentum (Miffre and Rallis, 2007; Moskowitz, Ooi and Pedersen, 2012), volatility (Szymanowska, de Roon, Nijman and van den Goorbergh, 2014), open interest (Hong and Yogo, 2012), liquidity (Marshall, Nguyen and Visaltanachoti, 2012; Szymanowska *et al.*, 2014), exchange rate and inflation (Erb and Harvey, 2006), skewness (Fernandez-Perez, Frijns, Fuertes and Miffre, 2018) and value (Asness, Moskowitz and Pedersen, 2013).

For each strategy, commodities are sorted into quartiles based on the respective signal. The strategy then takes long and short positions in commodities within the highest and lowest quartiles. The long-short portfolios are equally weighted and rebalanced monthly. For risk-adjusted performance, the authors employ standard market risk metrics (Moskowitz *et al.*, 2012), commodity-specific risk metrics (Bakshi, Gao and Rossi, 2019), behavioral measures (Bianchi, Drew and Fan, 2016) and liquidity risk factors (Amihud, 2002).

Results

The analysis of the institutional settings reveals three distinct characteristics. First, the market is dominated by the presence of individual investors, who account for more than 95% of the total trading accounts by 2017. Second, the nearest-to-delivery contracts are subject to strict regulatory constraints and, therefore, are not the most liquid contracts. Instead, the 3rd nearest contracts exhibit the highest trading volume on average. Third, non-Chinese investors without the (RMB) Qualified Institutional Investors (RQFII) quotas are restricted from trading the vast majority of the commodities (at the time when the digest article was written.) However, this is changing rapidly, as the recently launched crude oil contract on the Shanghai International Energy Exchange (INE), and the recently prescribed PTA (on ZCE) and iron ore contracts (on DCE) are now open for overseas investors.

The paper presents several empirical findings. First, long-only investments in the Chinese commodity futures market fail to generate statistically significant profits, where certain sectors in fact report significant losses during the sample period. These results are robust to time and sector specifications or weighting schemes employed. The authors posit that the poor performance of the broad market explains the absence of investment vehicles in China. Second, among the 12 long-short strategies examined, term structure and momentum yield statistically significant economic profits, robust across the futures curve, in most liquid markets and randomly selected sectors. Using the 3rd nearest contracts (i.e., the most liquid market on average), the momentum strategy delivers 16.71% per annum on average, whereas the term structure strategy generates 13.79% and the hedging pressure strategy reports 8.11%. The authors argue that due to the position limits on the nearest contracts, the profitability on the front contracts is likely “inflated” by the regulation-induced limits-to-arbitrage, as implementing such strategies on thinly traded contracts is difficult.

Third, the authors demonstrate that long-short strategies offer promising diversification benefits for stocks and bonds in China. The hedging pressure and momentum strategies report negative (-0.17) and



low (0.04) correlations with the CSI 300 Index. These findings remain consistent after time-varying correlations and different market conditions are considered. Lastly, in a matched sample of U.S. and Chinese commodities, their results suggest the two markets are not homogeneous and are likely driven by different pricing dynamics. They state that such comparison is necessary because more than half of the 30 commodities sampled are not listed on U.S. exchanges. Furthermore, the authors confirm the recent deterioration of momentum profits and the persistence of the hedging/speculative pressure and value strategies in the U.S. Finally, regression analyses reveal that the profits documented cannot be explained by commodity-specific risk factors, standard risk adjustments and market sentiment measures. However, liquidity risk and anchoring bias provide a partial explanation for some observed profits.

Conclusion

In summary, this article points to the conclusion that profitable trading opportunities exist in the emerging commodity futures markets of China. Evidence of market segmentation does not prevent the profitability of systematic investment strategies. In the presence of strict position limits and excessive speculation, momentum and term structure strategies consistently deliver strong risk-adjusted performance. This paper is of particular interests to global asset managers seeking portfolio diversification. A string of new policies introduced in 2019 signals the Chinese government's commitment to further open up the economy and reduce market access restrictions on foreign investors. Significant foreign investment flows into Chinese futures should help further boost the liquidity and efficiency in these markets.

Endnote

Dr. Fan presented on this topic at the JPMCC's 3rd Annual International Commodities Symposium during the "Commodity Derivatives Trading and Financialization" session on August 12, 2019. The symposium, in turn, was organized by Professor Jian Yang, Ph.D., CFA, the J.P. Morgan Endowed Chair and JPMCC Research Director at the University of Colorado Denver Business School.

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Keywords

China, RQFII, commodity futures, position limits, momentum, term structure, hedging pressure, open interest, liquidity, diversification, limits-to-arbitrage.