Financialization and Speculators Risk Premia in Commodity Futures Markets

Revoredo-Giha, C; Carter, Colin

Print publication: 01/07/2024

Document Version
Publisher's PDF, also known as Version of record

COMMODITY INSIGHTS

DIGEST

SUMMER 2024

RESEARCH DIGEST ARTICLES

"FINANCIALIZATION AND SPECULATORS RISK PREMIA IN COMMODITY FUTURES MARKETS"

**BY COLIN A. CARTER, Ph.D., PROFESSOR,
DEPARTMENT OF AGRICULTURAL & RESOURCE ECONOMICS
AND GIANNINI FOUNDATION OF AGRICULTURAL ECONOMICS,
UNIVERSITY OF CALIFORNIA, DAVIS, U.S.A.; and**

**CESAR REVOREDO-GIHA, Ph.D., PROFESSOR,
DEPARTMENT OF RURAL ECONOMY,
ENVIRONMENT AND SOCIETY, SCOTLAND'S RURAL COLLEGE
(SRUC), U.K.**

Financialization and Speculators Risk Premia in Commodity Futures Markets

Colin A. Carter, Ph.D.
Professor, Department of Agricultural & Resource Economics and Giannini Foundation of Agricultural Economics, University of California, Davis, U.S.A.

Cesar Revoredo-Giha, Ph.D.
Professor, Department of Rural Economy, Environment and Society, Scotland's Rural College (SRUC), U.K.

Published in *International Review of Financial Analysis* and Available at: https://doi.org/10.1016/j.irfa.2023.102691.

J.M. Keynes coined the term normal backwardation, a situation where a futures price for a particular expiry month is less than the expected spot price for that month. He argued hedgers pay speculators a risk premium, giving rise to normal backwardation. We study the behaviour of commodity futures before and since financialization of the markets, which started about 20 years ago. We find the poor returns to managed futures in recent years are likely due to the impact of financialization and the associated outside money suppressing the futures risk premium.

Introduction

J.M. Keynes introduced the term normal backwardation to describe the situation where a futures price for a particular expiry month is below the expected spot price for that month, arising because hedgers pay speculators a risk premium. The existence and size of a risk premium in futures markets has been controversial since the famous Telser-Cootner debate in the late 1950s and early 1960s.

More recently, the impact of the rising presence of non-commercial players on commodity prices has been dubbed the "financialization of commodity markets." In fact, many of the ''outside'' investors hold commodities through commodity futures indices such as the S&P Goldman Sachs Commodity Index, and the Bloomberg Commodity Index. They also invest in Over-the-Counter swaps and Exchange Traded Funds linked to commodity indices. Index speculators are thought to be one of the largest participants in several commodity futures markets today, and nearly all of them are based on passive, long-only commodity futures positions. Pension and hedge funds have joined this group of large commodity speculators.

The question we address in this paper is whether financialization of futures has impacted futures market risk premia. Previous studies have addressed a similar question. For instance, Hamilton and Wu (2015) found that commodity index-fund investing had no measurable effect on commodity futures prices. Similar results were obtained by Main *et al*. (2018). However, neither of the aforementioned studies used a portfolio framework, which is a major drawback because most investors assess the risk and return of any single asset in the context of a portfolio. In addition, these previous papers failed to control for changing speculative positions, something that was recognized by Carter, Rausser, and Schmitz (1983)–hereafter CRS. Therefore, in this paper we use a portfolio model and control for weekly changes in speculative positions.

Data and Empirical Methods

Our data set consists of weekly observations for 11 commodity futures contracts over the period from January 1986 to July 2019 and was sourced from cmdty by Barchart. Each futures contract with a specific delivery month over this period was included in the dataset. For instance, corn futures have five different delivery months (March, May, July, September, and December). Our dataset consisted of each of the March corn contracts over the 1986 to 2019 period, each of the May corn futures contracts, and so on.

We defined the net market position of large speculators as Z_t = (non-commercial longs)/(non-commercial longs + non-commercial shorts) using data from the Commodity Futures Trading Commission's Commitment of Traders (COT) weekly reports: January 1986–July 2019. When $Z_t = 0.5$ speculators are neither long nor short on net; when $Z_t > 0.5$ speculators are net long; and when $Z_t < 0.5$ speculators are net short. Therefore, Z_t represents the percentage of reporting speculators that were net long and lies in the interval between zero and one.

The empirical work used the CRS model, which is an improved version of the capital asset pricing model (CAPM) model. In contrast with the CAPM model, the CRS model considers the parameters to be stochastic and affected by net speculative positions. The estimated model for each commodity is presented in (1), where * indicates those parameters are functions, j the contract and t the time period:

$$R_{jt} = \alpha^* + \beta^* x_{jt} + \epsilon_{jt} \tag{1}$$

The coefficients α^* and β^* are defined as in equations (2) and (3).

$$\alpha^* = \alpha + \delta Z_t + e_{jt} \tag{2}$$
$$\beta^* = \beta + \gamma Z_t + v_{jt} \tag{3}$$

where e_{jt} and v_{jt} are error terms. The x_{jt} variable represents first differences of the natural logarithms of the market index (the S&P 500 equity and Bloomberg commodity indices weighted equally) [1] minus the ninety-day Treasury Bill rate converted to a weekly interest rate.

Note that α^* is the expected value of the non-market component of a futures contracts' excess return, and β^* is the expected value of the systematic component of a futures contracts' excess return. Thus, the total return to holding a futures contract is made up of two components: (1) the excess return and (2) the systematic risk based on the asset's covariance with the market index. Hedging pressure can influence both return components. Replacing (2) and (3) into (1) provides the empirical model (4):

$$R_{jt} = \alpha + \beta x_{jt} + \delta Z_t + \gamma x_{jt} \cdot Z_t + \mu_{jt} \tag{4}$$

As pointed out in CRS the error term of equation (4) is heteroscedastic and a function of the nonmarket α^* and systematic β^* error terms, therefore, the equation was estimated using generalized least squares. We estimated model (4) over two different time periods: (1986–2006) and (2007–2019) to cover the before and during financialization period.

Results

The results showed that there is no clear pattern as to whether systematic risk is lower or higher after financialization across the various commodities. The γ estimates suggest that for commodities characterized by systematic risk, the degree of systematic risk may be impacted by the Z value.

Across all commodities studied, the β and γ were statistically significant coefficients and had opposite signs. Since the net long position of speculators increases with Z, this finding suggests that an increase in speculative buying would tend to reduce the systematic risk, *ceteris paribus*. In other words, increased financialization has tended to reduce the systematic risk component of futures returns.

The nonmarket rate of returns measure (α) and its systematic change associated with net speculative positions (δ), help to answer the question of whether there is a risk premium. We find that the estimated α and δ values are almost all significantly different from zero and the δ values tend to be roughly twice as large as the α values and they tend to have the opposite sign. It is also noteworthy that the estimated α and δ values are different in the two time periods.

The α and δ results provide an interesting interpretation of the Cootner hypothesis, namely, the existence of a degree of normal backwardation in the commodity futures market, given an appropriate interpretation of the net position of speculators. α^* represents the expected value of the nonmarket component of a futures contract's return, *i.e.*, the risk premium. Thus, when Z_t is equal to 0.5, the net position of speculators is neither long nor short and the nonmarket returns are near zero. When $Z_t > 0.5$, speculators are net long and the rate of return is greater than the amount predicted by the market model. Similarly, when $Z_t < 0.5$, speculators are net short, and there are negative returns in excess of the market return.

Table 1 on the next page reports estimates of the annualized non-market component of excess futures returns before and since 2007. The table shows a significant decrease in the average non-market returns to speculators after 2006 from 7.5% to 0.7%. For instance, copper returns declined from 21.8% to −2.0%. At the same time, crude oil returns declined from 15.3% to 2.7%. Live cattle was the only commodity to experience an increase in returns, from 6.2% to 9.4%. These results provide evidence supporting the view that the scale of financialization was large enough to reduce the historical risk premiums in commodity futures markets when considering several commodity markets. The lower risk premiums serve to benefit futures market hedgers.

Table 1
Annualized Excess Futures Returns Before and Since 2007

Commodities	Average Z		Annualized nonmarket futures returns at the average (%)	
	Before 2007	Since 2007	Before 2007	Since 2007
Copper	0.60	0.48	21.8	-2.0
Corn	0.62	0.65	-0.2	-8.7
Cotton	0.50	0.67	2.4	-5.6
Natural gas	0.53	0.37	12.5	-5.4
Gold	0.49	0.76	1.8	-0.9
Live cattle	0.62	0.65	6.2	9.4
Silver	0.73	0.72	11.6	0.6
Soybeans	0.62	0.67	12.5	3.3
Sugar	0.68	0.66	2.5	-16.7
Wheat	0.58	0.47	0.3	-16.4
Crude oil	0.51	0.66	15.3	2.7
Average	0.59	0.61	7.9	0.7

Conclusion

The popularization of commodities as an investment is often referred to as the financialization of commodity futures markets. In the early 2000s, investors were attracted to commodity futures as a new asset class. The investors were informed that commodities provided stock-like returns, with the added advantage of a low correlation with stocks and bonds. Hundreds of billions of dollars then flowed into the commodities market. Large institutional investors generally gained long exposure to commodities through direct holdings of futures contracts as well as the use of Over-the-Counter derivatives and swaps. The returns to this asset class initially performed well, but then peaked in about 2011. Since then, the investment benefits have not turned out as promised. For instance, $10,000 invested on August 2010 in one of the larger commodity index funds – the United States Commodity Index Fund (USCI) – was worth less than $8000 in January 2020. There has been discussion in the literature whether the scale of financialization was large enough to reduce the historical risk premiums (due to normal backwardation) in commodity futures markets. Our results for eleven commodities provide evidence supporting the view that the risk premia declined after 2007, with increased financialization.

Endnote

1 We tested the robustness of the results to different combinations of weights for the S&P 500 equity and Bloomberg commodity indices, by computing the correlation of different weights. If we consider the series used for the estimation (50/50), the correlations with (90/10) is 0.9924 and with (75/25) is 0.9960. We therefore conclude that the results are robust to the choice of weights.

References

Carter, C. A., Rausser, G. C. and A. Schmitz, 1983, "Efficient Asset Portfolios and the Theory of Normal Backwardation," *Journal of Political Economy*, Vol. 91, No. 2, April, pp. 319-331.

Hamilton, J. D. and Wu, J. C., 2015, "Effects of Index-Fund Investing on Commodity Futures Prices," *International Economic Review*, Vol. 56, No. 1, February, pp. 187-205.

Main, S., Irwin, S. H., Sanders, D. R. and A. Smith, 2018, "Financialization and the Returns to Commodity Investments," *Journal of Commodity Markets*, Vol. 10, June, pp. 22-28.

Author Biographies

COLIN A. CARTER, Ph.D.
Department of Agricultural & Resource Economics and Giannini Foundation of Agricultural Economics, University of California, Davis, U.S.A.

Colin Carter is Distinguished Professor of Agricultural and Resource Economics at the University of California, Davis, where he served as Department Chair from 1998 to 2001. For nine years, he was Director of the Giannini Foundation of Agricultural Economics at the University of California. Dr. Carter's fields of interest include commodity markets and international trade. He has published roughly 180 academic publications on topics including international trade, agricultural policy, futures and commodity markets, the economics of China's agriculture, and the economics of biotechnology adoption in agriculture. Dr. Carter was elected a Fellow of the Agricultural & Applied Economics Association (AAEA) in 2000 in recognition for his many contributions to the field of agricultural economics.

CESAR REVOREDO-GIHA, Ph.D.
Department of Rural Economy, Environment and Society, Scotland's Rural College (SRUC), Edinburgh, U.K.

Cesar Revoredo-Giha is a Professor in the Department of Rural Economy, Environment and Society at Scotland's Rural College (SRUC). He also leads the Food Marketing Research Team at SRUC. He received his Ph.D. in Agricultural and Resource Economics from the University of California, Davis in 2001. He also holds a Master of Arts in Economics from Georgetown University, and a Licentiatura (a professional degree) in Social Sciences with mention in Economics from the Pontificia Universidad Católica del Peru. His areas of research are within Food Economics (*e.g.*, economic analysis of food supply chains). His research has been published in journals such as *Oxford Economic Papers*, *Energy Economics*, the *American Journal of Agricultural Economics*, the *European Review of Agricultural Economics,* and *Food Policy*. He is a member of the steering committees of: *Eurochoices* (joint outreach journal of the Agricultural Economics Society and European Association of Agricultural Economists) and *Supply Chain Management.*

COMMODITY INSIGHTS
DIGEST

Commodity Insights Digest (CID) is a publication of Bayes Business School – City, University of London (U.K.), in association with Chicago-based Premia Research LLC (U.S.A.). The digest is co-edited by Ana-Maria Fuertes, Ph.D. in International Finance, and Hilary Till, M.Sc. in Statistics.

CID seeks to foster knowledge transfer between academics and practitioners by publishing:

- Scholarly research digest articles;
- Practitioner insights and interviews;
- Articles on economic history; and
- Book reviews.

Contributors to *CID* include (a) scholars seeking to enhance the impact of their research by delving into the practical implications of their theoretical or empirical studies; (b) consultants reporting on challenges faced by commodity market participants; and (c) industry economists providing analyses on their areas of market expertise.

Bayes Business School – City, University of London is a world-leading provider of education and cutting-edge research. Bayes' unique location enables strong links with industry in the City of London.

The Summer 2024 *CID* cover image is cropped from the following artwork, whose complete image is above. Poster for the London Midland & Scottish (LMS) Railway: Royal Highlander Approaches Aberdeen. Artist: Norman Wilkinson, R.I., about 1927. On the left side of the text are the letters "LMS" with the company crest on the other side. Printed by McCorquodale and Company Limited. Credit © National Railway Museum/Science Museum Group (U.K.). ■

BAYES BUSINESS SCHOOL
CITY, UNIVERSITY OF LONDON

Physical Address
Bayes Business School
106 Bunhill Row
London, EC1Y 8TZ
United Kingdom

Website
bayes-cid.com

Contact
To submit articles, authors can contact the editors via editors@bayes-cid.com

City is a member institution of the University of London

UNIVERSITY OF LONDON