



Diversification Benefits of Commodities: A Stochastic Dominance Efficiency Approach

Charoula Daskalaki

Department of Banking and Financial Management, University of Piraeus, Greece

George Skiadopoulos

Department of Banking and Financial Management, University of Piraeus, Greece; and School of Economics and Finance, Queen Mary, University of London, U.K.

Nikolas Topaloglou

Department of International and European Economic Studies, Athens University of Economics and Business, Greece

Available at SSRN:

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2684842

This paper revisits the question of whether it is worthwhile for investors to include commodities in their equity and bond portfolios. For this purpose, the article employs a methodology that makes fewer assumptions than the classic mean-variance optimization approach to construct optimal portfolios with and without commodities. Specifically, the paper's approach circumvents the need to (a) make assumptions on the distribution of asset returns and (b) make restrictive assumptions on investor preferences. In-sample and out-of-sample, the findings suggest that commodities provide diversification benefits, especially, for second- and third-generation commodity indices. The paper shows that commodity returns cannot be explained by the factors that drive financial asset returns, which further verifies that commodities are a unique, potentially diversifying asset class.

Introduction

The growth in commodity investments since the early 2000s is commonly attributed to the fact that commodities form an alternative asset class; their returns are expected to show small or even negative correlation with the returns of assets that belong to traditional asset classes like stocks and bonds. Therefore, the inclusion of commodities in portfolios consisting of traditional asset classes is expected to yield diversification benefits; namely, their inclusion increases expected return per unit of risk. However, there is still an ongoing debate on whether the inclusion of commodities in portfolios of traditional asset classes makes investors better off. To shed light on this debate, this paper adopts a non-parametric approach that allows for constructing portfolios without (a) having to make assumptions on asset class return distributions and without (b) having to make very restrictive assumptions on investor risk-and-reward tradeoffs.

Why the Paper's Research Question is Important

The previous literature about the diversification benefits of commodities makes strong assumptions about investors' preferences and the distributional properties of asset returns. The authors revisit this

This digest article was written by Ana-Maria Fuentes, Ph.D., Professor in Finance and Econometrics at Cass Business School, City, University of London (U.K.).



research question by employing an approach that in the main circumvents these two obstacles and requires minimal knowledge of an investor's preferences in terms of risk-and-reward tradeoffs.

Data Description

In their main study, the authors employ the S&P 500 Total Return Index, the Barclays U.S. Aggregate Bond Index and the one-month Libor rate to proxy the equity market, the bond market and the risk-free rate, respectively. To access the commodity asset class, they use a number of widely-followed first-, second- and third-generation commodity indices. This is in contrast to the previous literature that considers only first-generation commodity indices for portfolio construction purposes. Second- and third-generation commodity indices allow for both long and short positions in constituent commodity futures, and they take changes in the term structure of commodity futures into account. The authors consider the S&P Goldman Sachs Commodity Index, the Dow Jones-UBS Commodity Index (which was rebranded as the Bloomberg Commodity Index in 2014), and the Deutsche Bank Liquid Commodity Index as representatives of the first-generation indices. Similarly, the J.P. Morgan Commodity Curve Index, the Deutsche Bank Liquid Commodity Index-Optimum Yield, the Morningstar Long/Flat Commodity Index and the Morningstar Long-Only Commodity Index are considered as representatives of the second-generation indices. Finally, the Morningstar Short/Flat Commodity Index, the Morningstar Short-Only Commodity Index and the Morningstar Long/Short Commodity Index are employed to proxy the third-generation indices. The dataset spans the period from January 1990 to September 2013 with the exception of the Dow Jones-UBS Commodity Index that covers the period from January 1991 to September 2013 due to data availability constraints.

Description of Investigation

The paper starts by investigating the question whether the introduction of commodities in the investor's asset universe yields diversification benefits in-sample. To this end, they employ a statistical procedure that assesses whether an asset universe that includes commodities yields a portfolio that dominates a portfolio originated from the same asset universe without commodities. This statistical procedure is described in Scaillet and Topaloglou (2010).

Second, moving on to the out-of-sample exercise, the authors construct optimal portfolios with and without commodities at any point in time from January 2001 to December 2013 in a rolling window fashion using the same statistical procedure as in step one. The task of comparing the out-of-sample performance of the alternative optimal portfolios is based on the complex statistical approaches described in both Scaillet and Topaloglou (2010) and in DeMiguel *et al.* (2009).

Results

The main finding from both the in- and out-of-sample exercises is that the inclusion of the commodity asset class in portfolios comprising traditional asset classes makes investors better off. Moreover, the diversification benefits of commodities are more pronounced in the case where the investor accesses commodities via the second- and third-order generation commodity indices. They explain their evidence on the diversification benefits of commodities by the notion of market segmentation. More specifically,



by implementing Campbell and Hamao's (1992) test for market integration, they find that commodity portfolio returns cannot be forecasted by the same instrumental variables that predict stock and bond market returns. This suggests that commodity markets are segmented from equity and bond markets.

Endnotes

The authors of the comprehensive article were recipients of a Commodities Research Fellowship Award at the J.P. Morgan Center for Commodities. This fellowship, in turn, was generously funded by the CME Group Foundation and is further described here:

<http://business-news.ucdenver.edu/commodities-research-fellowship-award-winners-announced/>.

The author of this digest article is also a member of the Editorial Advisory Board (EAB) of the *Global Commodities Applied Research Digest (GCARD)*. The GCARD's EAB membership is listed here:

<http://jpmcc-gcard.com/editorial-advisory-board/>.

Reference

Campbell, J. and Y. Hamao, 1992, "Predictable Stock Returns in the United States and Japan: A Study of Long-Term Capital Market Integration," *Journal of Finance*, Vol. 47, No.1, March, pp. 43-69.

DeMiguel, V., Garlappi, L. and R. Uppal, 2009. "Optimal Versus Naive Diversification: How Inefficient is the 1/N Portfolio Strategy?", *Review of Financial Studies*, Vol. 22, No. 5, May, pp. 1915-1953.

Scaillet, O. and N. Topaloglou, 2010, "Testing for Stochastic Dominance Efficiency," *Journal of Business and Economic Statistics*, Vol. 28, No. 1, January, pp. 169-180.

Keywords

Alternative asset class, commodity indices, portfolio choice, stochastic dominance.