# Understanding dynamic conditional correlations between oil, natural gas and non-energy commodity futures markets

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## Executive summary

The links between energy and non-energy commodity futures markets have deepened in recent times. Theoretical and empirical analyses jointly suggest that the correlations among commodity futures, as well as the equity-commodity correlations, increase with the financialization of these commodity markets. The observed increase in correlations between commodities might thus limit the benefits of a diversification strategy from equity to commodity futures markets. Understanding the dynamics of the correlations between these markets is essential to develop accurate asset pricing models and hedging strategies, as well as to minimize the contagion risk in the occurrence of a crash in one of these markets.

Overall, the empirical evidence on the factors which influence the time-varying correlations between energy and non-energy commodities futures markets is lagging behind. The drivers of these dynamic correlation patterns are a field which is still not explored but relevant to understand whether the diversification benefits of commodities to equity market investors have weakened or not.

We provide fresh evidence to fill this gap in the literature. To the best of our knowledge, this is the first attempt to investigate these correlations within a unique framework: i.e. with a common methodology to obtain the time-varying correlations, looking at the same period of analysis and considering common explanatory variables, thus allowing a direct comparison of the results found across different groups of commodities.

First, we estimate a dynamic conditional correlation (DCC) multivariate GARCH, which allows for covariance and correlation spillovers. The analysis considers ten commodities at weekly frequency: West Texas Intermediate (WTI) crude oil and natural gas; five agricultural commodities (corn, oats, rice, soybeans, and wheat); and three metals (copper, gold, and silver), over the period spanning from 1998:w1 to 2014:w22. The correlations between energy and

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metals futures markets are larger than those between the markets for energy and agriculture commodities. The DCCs peaked around the 2008 financial crisis and subsequently decreased.

We then investigate under which circumstances energy and non-energy commodities futures markets display larger dynamic conditional correlations. We consider macroeconomic fundamentals, financial market characteristics, and speculative activity. We estimate an Autoregressive Distributed Lag (ARDL) model by means of the Pooled Mean Group (PMG) estimator, and find that macroeconomic and financial factors influence the agriculture-energy and metals-energy correlations. Speculative activity in the energy markets is significant in explaining dynamic conditional correlations with agricultural commodities, but not with metals.