[*THE DEPENDENCE BETWEEN COMMODITY SPOT-FUTURES MARKETS: HOW CAN INVESTORS MAKE PROFIT ? A COPULA APPROACH*]

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Overview

This paper investigates the dependency between different commodities spot and futures prices using a strong dependency approach – the copula analysis. Our paper is considered the first to use this methodology to study this issue. The dataset is daily and covers the period between 1995 and 2016 of 9 different commodities. Our results are interesting for investors and policy makers, especially, from a diversification point of view. We consider energy, precious metals and agriculture commodities. The behavior of their spot-futures returns during markets' booms and busts is identified due to upper and lower tail dependence analysis. These findings help investors to take the optimal decision especially in market extreme volatilities. Our findings highlight the symmetric and asymmetric dependency between commodity spot and futures prices. Our results show that the dependencies between commodity spot and futures prices are different during extreme movements; it depends on the nature of the commodity.

This paper is organized as follow; first, I introduce the literature review. Second, I develop theories and stylized facts. Third, I present the methodology, the data and the empirical analysis. Fourth I investigate the results and I analyse the findings with their economic interpretations and implications and finally I conclude.

Methods

Copula Approach: AR-GARCH COPULA (Normal Copula, Frank Copula, Gumbel Copula and Clayton Copula)

Results

According to maximum likelihood indices, Clayton Copula is the best to model the dependence between the majorities of commodities spot and futures returns.

All the copula dependency parameters are significant for all the commodities.

All the commodities spot and futures prices are highly dependent in calm periods.

Clayton Copula is the most appropriate: almost all the dependencies are asymmetric.

Tail dependencies are different according to the type of the commodity.

The dependence probability is remarkably lager than the independency probability + asymmetric dependency in Upper and lower tail for each commodity depending on its storage process.

Conclusions

The Copula approach is capable to examine the degree of dependency between time series, modeling an efficient method to create distributions that clarify correlated multivariate data. By constructing joint distributions, we choose the most famous Archimedean and elliptical copulas to investigate our issue. Besides, Copulas are able to capture the dependence in the tail distribution; Upper tail and lower tail, who are very helpful to understand and quantify the tendency of a market in both periods of crashes and

booms. Furthermore, Copulas are able to differ between symmetric and asymmetric structure of extreme values of dependence between variables.

Using this methodology, this paper investigates the co-movements between different commodities futures and spot returns. The economic implications and the meaning of the role of the commodity spot-futures prices relationship in crush periods, constitutes the main limitation of the literature that we estimate to ameliorate. In this regard, we answer the following major research questions: What is the relationship between spot and futures markets when both are in a very good condition? What is their relationship when both markets are in a very bad condition? Finally, how do they differ in good and bad conditions?

Our main contribution was applying this approach to investigate commodity markets. The results depend on the commodity category; dependency behavior is linked to the storage process of the commodity. The behavior of spot market and futures market is similar especially in market extreme volatilities. This strong causality explains the short and long term dependency between commodities spot and futures returns. Our findings are important to investors in term of hedging strategies. Policy makers should take into consideration these results to take the optimal decision especially in dynamic periods such as crisis.

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