

Title: Analysis of a Multi-Factor Model for Commodities Futures

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Abstract:

This study is devoted to the analysis of the dynamics of futures prices associated to five commodities in the energy market. For a strictly increasing sequence of maturity dates, let $F(t, T_i)$ denote the futures prices of the underlying commodity. As in Cortazar, G. and Schwartz, C. (1994) we assume that the dynamics is governed by a Multi-Factor Model. We apply standard statistical methods to calibrate our model.

More precisely, the Principal Component Analysis (PCA) is applied to calibrate the correlation factors. A rolling PCA is used to verify the stability of our results. We perform a calibration that involves the implied volatility. Using a model of constant volatility on any interval, we obtain results consistent with Samuelson [1965] hypothesis. The numerical analysis for pricing options produces satisfactory results.