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Price-Volume multifractal analysis of the Moroccan stock market

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Abstract:

In this paper, we analyzed price-volume multifractal cross-correlations of Moroccan Stock Exchange. We chose the period from January 1st 2000 to January 20th 2017 to investigate the multifractal behavior of price change and volume change series. Then, we used multifractal detrended cross-correlations analysis method (MF-DCCA) and multifractal detrended fluctuation analysis (MF-DFA) to analyze the series. We computed bivariate generalized Hurst exponent, Rényi exponent and spectrum of singularity for each pair of indices to measure quantitatively cross-correlations. Furthermore, we used detrended cross-correlations coefficient (DCCA) and cross-correlation test ($Q(m)$) to analyze cross-correlation quantitatively and qualitatively. By analyzing results, we found existence of price-volume multifractal cross-correlations. The spectrum width has a strong multifractal cross-correlation. We remarked that volume change series is anti-persistent when we analyzed the generalized Hurst exponent for all moments q . The cross-correlation test showed the presence of a significant cross-correlation. However, DCCA coefficient had a small positive value, which means that the level of correlation is not very significant. Finally, we analyzed sources of multifractality and their degree of contribution in the series.

Keywords: Price-volume analysis, Cross-correlation, Multifractality, MF-DFA, MF-DCCA, DCCA, cross-correlation test

JEL codes: G14, G15

1. Introduction

Recently, the study of correlations of financial series become more and more important. It allows a better understanding of markets and their relation with other series. Besides, markets show complex and dynamic fluctuations making the prediction of prices impossible. These features are the result of many complex factors as nonlinear interactions among heterogeneous agents with different time horizons, and complex events occurring in external environment. The properties observed in financial markets are assimilated to dynamics and turbulent features existing in physical mechanics [1],[2]. Then, when studying financial series of markets, we see that they contain multiscaling properties and multifractal behavior.

Multifractality is one of important concepts introduced in dynamical complex system of many fields as fluid, earthquakes, biology and finance. It is generally admitted that there are

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