Accepted Manuscript

The multi-scale high-order statistical moments of financial time series

Jun Jiang, Pengjian Shang, Zuoquan Zhang, Xuemei Li

PII: S0378-4371(18)31044-6
DOI: https://doi.org/10.1016/j.physa.2018.08.101
Reference: PHYSA 19987

To appear in: *Physica A*

Received date : 31 January 2018
Revised date : 28 March 2018

Please cite this article as:, The multi-scale high-order statistical moments of financial time series, *Physica A* (2018), https://doi.org/10.1016/j.physa.2018.08.101

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

*Manuscript
Click here to view linked References

ACCEPTED MANUSCRIPT

Available online at www.sciencedirect.com

ScienceDirect

00 (2018) 1–18

Journal Logo

The multi-scale high-order statistical moments of financial time series

Jun Jiang[a], Pengjian Shang[a,*], Zuoquan Zhang[a], Xuemei Li[b]

[a]*Department of Mathematics, Beijing Jiaotong University, No.3 of Shangyuan Residence Haidian District, Beijing 100044, PR China*
[b]*School of Economics and Management, Beijing Jiaotong University, No.3 of Shangyuan Residence Haidian District, Beijing 100044, PR China*

HIGHLIGHTS

- A new high-order statistical moment is proposed based on multi-scale (MSHOM).
- Two improved methods are proposed to widen extent of applications.
- The analytic properties of the MSHOM method are presented in detail.
- Simulation results show the stability and precision of the MSHOM method.
- Benefits of MSHOM and G-MSHOM are shown using US and Chinese stock markets data.

Abstract

A new high-order statistical moment based on multi-scale (MSHOM) is proposed for researching traditional statistics in this paper. In addition, the indispensable theoretical basis and derivation are illustrated in detail. With the help of three simulated time series, two kinds of situations of MSHOM analysis are mainly discussed in this work. One is accomplished by Gaussian white noise (GWN) and the other is fulfilled with Logistic map and autoregressive fractionally integrated moving-average (ARFIMA). Due to the insufficient performance of MSHOM, we propose an improved MSHOM, which is called MSHOM with control (C-MSHOM). Meanwhile, its performance is tested by the data of US and Chinese stock markets. However, C-MSHOM also brings an extra preprocess stage of data and the uncertainty of selection. To solve these problems, a more generic method, that is, generalized multi-scale high-order moments (G-MSHOM) is given in this paper.

Keywords: Multi-scale, High-order statistical moments, Simulated time series, Financial time series

1. Introduction

With the development of computer technology, it is increasingly crucial to establish data processing [1–3] due to its broad applications. Meanwhile, data description using traditional statistics attracts more and more attention. When dealing with the collection, analysis, interpretation, presentation, and organization of data, the use of statistical techniques is inevitable. In data analysis, there are two main statistical methods, that is, descriptive statistics and

*Corresponding author
Email address: pjshang@bjtu.edu.cn (Pengjian Shang)

Download English Version:

https://daneshyari.com/en/article/7374476

Download Persian Version:

https://daneshyari.com/article/7374476

Daneshyari.com