首 页｜期刊介绍｜编委会｜编辑部介绍｜投稿指南｜期刊订阅｜广告合作｜留言板｜联系我们｜

论文　　　　　　　　　最新目录｜下期目录｜过刊浏览｜高级检索　　　<< Previous Articles｜Next Articles >>

# 基于最小一乘准则的上证指数突变点研究

周影辉[1], 倪中新[2], 朱平芳[3]

1. 复旦大学管理学院, 上海 200433;
2. 上海大学经济学院, 上海 200444;
3. 上海社会科学院数量经济研究中心, 上海 200025

## Study of Change Points in Shanghai Composite Index Based on Least Absolute Deviation Criterion

ZHOU Ying-hui[1], NI Zhong-xin[2], ZHU Ping-fang[3]

1. School of Management, Fudan University, Shanghai 200433, China;
2. School of Economics, Shanghai University, Shanghai 200444, China;
3. Research Center of Econometrics, Shanghai Academy of Social Sciences, Shanghai 200025, China

- 摘要
- 参考文献
- 相关文章

**Download:** PDF (1185KB)　　HTML (1KB)　　**Export:** BibTeX or EndNote (RIS)　　**Supporting Info**

**摘要** 很多研究表明,上证指数序列既有结构突变的特征,也有厚尾的特征。但大部分现有的研究都没有考虑其厚尾特征对变点估计的影响。本文基于最小一乘准则提出了一个估计厚尾数据中变点的方法。模拟研究表明,当数据具有厚尾特征时,基于最小一乘准则的变点估计比基于最小二乘准则的估计有效。对上证指数的实证结果表明,基于最小一乘准则估计出的变点能更好地描述中国股票市场的结构突变特征。

关键词： 变点　厚尾分布　最小一乘准则　贝叶斯信息准则　上证指数

**Abstract** ： The series of Shanghai Composite Index not only has structural changes, but also is heavy-tailed. For example, the kurtosis of log returns of its daily closing prices from 2006/1/4 to 2011/12/31 is 5.61. It is much greater than that of the normal distribution, so the log returns data are heavy-tailed obviously. Moreover, the stock market in this period experienced the switchover from a big bull market to a big bear market, which will lead to many structural changes. However, the most existing studies did not consider the influence of the heavy-tailed feature on the estimation of change points. To solve this problem, an approach was proposed in this paper to estimate change points in heavy-tailed data based on the least absolute deviation criterion, which is more robust than least squares criterion and can fit data with heavy-tailed feature well. The results obtained from simulation studies showed that the estimates of the number and locations of change points based on the least absolute deviation criterion are more accurate than those based on least square criterion when the simulated data have heavy-tailed feature. This shows that the former is more efficient than the latter. The log returns of daily closing prices of Shanghai Composite Index from 2006/1/4 to 2011/12/31 were collected for empirical study. The empirical results indicated that the change points estimated by least absolute deviation criterion are different from those estimated by least squares criterion, and the former can describe the structural changes of Chinese stock market well. Hence, the results obtained from the simulated studies and empirical analysis show that it is necessary to consider the heavy-tailed feature in estimating structural changes when the data have heavy-tailed feature.

**作者简介**：周影辉(1980-),男(汉族),河南巩义人,复旦大学管理学院博士后,研究方向:贝叶斯计量经济学、金融计量经济学、潜变量模型及应用.

**引用本文:**

.基于最小一乘准则的上证指数突变点研究[J] 中国管理科学, 2015,V23(10): 38-46

[1]　null

[2]　Li Hu, Zou Peng, Wang Xiang, et al. A new combination sampling method for imbalanced data[C]//Sun Zengqi, Deng Zhidong. Proceedings of 2013 Chinese Intelligent Automation Conference. Beijing:Springer Berlin Heidelberg, 2013:543-554.

[3]　Bali T G, Mo Hengyang, Tang Yi. The role of autoregressive conditional skewness and kurtosis in the estimation of conditional VaR[J]. Journal of Banking and Finance, 2008,32(2):269-282.

[4] 张成思.中国通胀惯性特征与货币政策启示[J]. 经济研究, 2008, (2):33-43.

[5] 刘家国, 施高伟, 赵金楼. 企业ERP关键实施活动的强化机制[J]. 管理评论, 2013, 25(5):72-81.

[6] 叶强, 方安儒, 鲁奇, 等. 组织因素对ERP使用绩效的影响机制——基于中国数据的实证研究[J]. 管理科学学报, 2010, 13(11):77-85.

[7] 王长峰. 研发项目过程风险管理方法综合集成问题研究[J]. 中国管理科学, 2009, 17(4):148-155. 浏览

[8] Sarychev A. An averaged regularity criterion for the group method of data handling in the problem of searching for the best regression[J]. Soviet Journal of Automation and Information Sciences c/c of Avtomatika, 1990, 23(5):24-29.

[9] Dark J G. Estimation of time varying skewness and kurtosis with an application to value at risk[J]. Studies in Nonlinear Dynamics and Econometrics, 2010,14(2):3-48.

[10] Bai Jushan. Least absolute deviation estimation of a shift[J]. Econometric Theory, 1995, 11(3):403-436.

[11] Wallace L, Keil M, Rai A. Understanding software project risk:A cluster analysis[J]. Information & Management, 2004, 42(1):115-125.

[12] Van der Putten P, De Ruiter M, Van Someren M. Coil challenge 2000 tasks and results:Predicting and explaining caravan policy ownership[J]. Working paper, Universiteit van Amsterdam, 2000.

[13] Jondeau E, Rockinger M. The impact of shocks on higher moments[J]. Journal of Financial Econometrics, 2009,7(2):77-105.

[14] Bai Jushan. Estimation of multiple-regime regressions with least absolutes deviation[J]. Journal of Statistical Planning and Inference, 1998, 74(1):103-134.

[15] Petter S, Straub D, Rai A. Specifying formative constructs in information systems research[J]. MIS Quarterly, 2007, 31(4):623-656.

[16] Fawcett T, Flach P A. A response to webb and ting's on the application of ROC analysis to predict classification performance under varying class distributions[J]. Machine Learning, 2005, 58(1):33-38.

[17] Jondeau E, Rockinger M. On the importance of time variability in higher moments for asset allocation[J]. Journal of Financial Econometrics, 2012,10(1):84-123.

[18] 庄泓刚. 基于非正态分布的动态金融波动性模型研究[D]. 天津:天津大学, 2008.

[19] Bai Jushan. Common breaks in means and variances for panel data[J]. Journal of Econometrics, 2010, 157(1):78-92.

[20] Chin W W, Marcolin B L, Newsted P R. A partial least squares latent variable modeling approach for measuring interaction effects:Results from a monte carlo simulation study and an electronic-mail emotion adoption study[J]. Information Systems Research, 2003, 14(2):189-220.

[21] Groot L, Zonneveld E. European union budget contributions and expenditures:A Lorenz Curve Approach[J]. Journal of Common Market Studies, 2013, 51(4):649-666.

[22] Leon A, Rubio G, Serna G. Autoregresive conditional volatility, skewness and kurtosis[J]. The Quarterly Review of Economics and Finance, 2005,45(4):599-618.

[23] Castle J L, Doornik J A, Hendry D F. Model selection when there are multiple breaks[J]. Journal of Econometrics, 2012, 169(2):239-246.

[24] Gefen D, Straub D. A practical guide to factorial validity using pls-graph:Tutorial and annotated example[J]. Communications of the Association for Information Systems, 2005, 16(9):91-109.

[25] 许启发. 高阶矩波动性建模及应用[J]. 数量经济技术经济研究, 2006,23(12):135-145.

[26] 许启发, 张世英. 多元条件高阶矩波动性建模[J]. 系统工程学报, 2007,22(1):1-8.

[27] 王鹏, 王建琼, 魏宇. 自回归条件方差-偏度-峰度:一个新的模型[J]. 管理科学学报, 2009,12(5):121-129.

[28] Chen Bin, Hong Yongmiao. Testing for smooth structural changes in time series models via nonparametric regression[J]. Econometrica, 2012, 80(3):1157-1183.

[29] Fornell C, Larcker D F. Evaluating structural equation models with unobservable variables and measurement error[J]. Journal of Marketing Research. 1981, 18(1):39-50.

[30] 王鹏. 基于时变高阶矩波动模型的VaR与ES度量[J]. 管理科学学报, 2013,16(2):33-45.

[31] Gabrielsen A, Zagaglia P, Kirchner A, et al. Forecasting Value-at-Risk with time-varying variance, skewness and kurtosis in an exponential weighted moving average framework[R]. Working Paper, Dipartimento Scienze Economiche,Universita'di:Bologna,2012.

[32] Chen Jie, Gupta A K. Testing and locating variance change points with application to stock prices[J]. Journal of the American Statistical Association, 1997, 92(438):739-747.

[33] Cohen J, Cohen P, West S G, et al. Applied multiple regression/correlation analysis for the behavioral sciences[M]. Mahwah, NJ:Lawrence Erlbaum Associates, 2003.

[34] Polanski A, Stoja E. Incorporating higher moments into Value-at-Risk forecasting[J]. Journal of Forecasting, 2010,29(6):523-535.

[35] Chow G C. Tests of equality between sets of coefficients in two linear regressions[J]. Econometrica, 1960, 28(3):591-605.

[36] Niguez T, Perote J. Forecasting heavy-tailed densities with positive edgeworth and gram Charlier expansions[J]. Oxford Bulletin of Economics and Statistics, 2012,74(4):600-627.

[37] Geweke J, Jiang Yu. Inference and prediction in a multiple-structural-break model[J]. Journal of Econometrics, 2011, 163(2):172-185.

[38] Lanne M, Pentti S. Modeling conditional skewness in stock returns[J]. The European Journal of Finance, 2007,13(8):691-704.

[39] Hall A R, Han S, Boldea O. Inference regarding multiple structural changes in linear models with endogenous regressors[J]. Journal of Econometrics, 2012, 170(2):281-302.

[40] Ergun A T, Jun J. Time-varying higher-order conditional moments and forecasting intraday VaR and Expected Shortfall[J]. The Quarterly

Review of Economics and Finance, 2010b,50(3):264-272.

[41] Killick R, Fearnhead P, Eckley I A. Optimal detection of change points with a linear computational cost[J]. Journal of the American Statistical Association, 2012, 107(500):1590-1598.

[42] Gerlach R, Lu Zudi, Huang Hai. Exponentially smoothing the Skewed Laplace distribution for Value-at-Risk forecasting[J]. Journal of Forecasting, 2013,32(6):534-550.

[43] Yan Jun. Asymmetry, fat-tail, and autoregressive conditional density in financial return data with systems of frequency curves[R]. Working Paper, University of Lowa,2005.

[44] Koop G, Potter S M. Estimation and forecasting in models with multiple breaks[J].The Review of Economic Studies, 2007, 74(3):763-789

[45] 蒋翠侠. 基于JSU分布的广义自回归条件密度建模及应用[J]. 数量经济技术经济研究, 2008,25(8):137-150.

[46] 蒋翠侠, 张世英. 金融高阶矩风险溢出效应研究[J]. 中国管理科学,2009, 17(1):17-28. 浏览

[47] Maheu J M, Song Yong. A new structural break model, with an application to Canadian inflation forecasting[J]. International Journal of Forecasting, 2014, 30(1):144-160.

[48] Feunou B, Jahan-Parvar M R, Tedongap R. Which parametric model for conditional skewness?[J]. The European Journal of Finance,2014, (ahead-of-print):1-35.

[49] Pesaran M H, Pettenuzzo D, Timmermann A. Forecasting time series subject to multiple structural breaks[J]. The Review of Economic Studies, 2006, 73(4):1057-1084.

[50] Wilhelmsson A. Density forecasting with time varying higher moments:A model confidence set approach[J]. Journal of Forecasting, 2013,32(1):19-31.

[51] Schwarz G. Estimating the dimension of a model[J]. The Annals of Statistics, 1978, 6(2):461-464.

[52] Engle R F. Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation[J]. Econometrica:Journal of the Econometric Society,1982, 50(4):987-1007.

[53] Wang Jiahui, Zivot E. A Bayesian time series model of multiple structural changes in level, trend, and variance[J]. Journal of Business & Economic Statistics, 2000, 18(3):374-386.

[54] Bollerslev T. Generalized autoregressive conditional heteroskedasticity[J]. Journal of Econometrics, 1986,31(3):307-327.

[55] Yang T Y, Kuo L. Bayesian binary segmentation procedure for a Poisson process with multiple change points[J]. Journal of Computational and Graphical Statistics, 2001, 10(4):772-785.

[1] 王维国, 王霞.基于贝叶斯推断的上证指数突变点研究[J]. 中国管理科学, 2009,17(3): 8-17

[2] 叶五一, 缪柏其.基于Copula变点检测的美国次级债金融危机传染分析[J]. 中国管理科学, 2009,17(3): 1-7

[3] 雷鸣, 谭常春, 缪柏其.运用生存分析与变点理论对上证指数的研究[J]. 中国管理科学, 2007,15(5): 1-8

[4] 董大勇, 史本山, 曾召友.展望理论的权重函数与证券收益率分布[J]. 中国管理科学, 2005,(1): 24-29

[5] 董晓波.非线性单主元企业组织规模发展的突变点判定[J]. 中国管理科学, 2004,(4): 80-84

[6] 王锦功, 于维生.线性回归模型变点估计的动态规划方法[J]. 中国管理科学, 1996,(1): 59-63