系统工程理论与实践
Systems Engineering - Theory & Practice
邮发代号: 2-305
ISSN 1000-6788
CN 11-2267/N

系统工程理论实践 » 2012, Vol. 32 » Issue (4): 713-720 DOI:

基于隐马尔科夫模型的中国股票信息探测

黄晓彬, 王春峰, 房振明, 熊春连

天津大学 管理与经济学部, 天津 300072

Detecting Chinese stock information based on hidden Markov model

HUANG Xiao-bin, WANG Chun-feng, FANG Zhen-ming, XIONG Chun-lian

College of Management and Economics, Tianjin University, Tianjin 300072, China

- 摘要
- 参考文献
- 相关文章

全文: PDF (KB) HTML (KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 应用隐马尔科夫模型对不可观测的股票信息状态建模, 并构建信息状态转移概率矩阵刻画信息状态在时间维度上的动态关联性. 基于5分钟分时高频数据, 利用贝叶斯推断与马尔科夫链蒙特卡洛模拟(MCMC)的方法估计了上证指数、上证50样本股2010年 8月的信息状态与信息强度. 通过实证验证了模型具有较好的信息识别能力, 且发现了中国股票市场信息效应具有聚集性的特点. 通过信息状态转移概率矩阵, 推测出:在我国股票市场, 一个信息经过100分钟能融入市场的概率是99%.

关键词: 隐马尔科夫模型 信息状态 信息强度 贝叶斯推断 信息效应聚集性

Abstract: The unobservable state of stock information was modeled based on Hidden Markov Model, and a transition probabilities matrix of information state was built to describe the dynamic association properties in temporal dimension. Based on 5-minutes high frequency trading data and using Bayesian inference and MCMC sampling, the information state and strength of Shanghai Stock Index and sample stocks of SSE 50 in August 2010 were estimated. Empirical results prove the model has effective ability to identify information, and show that the information effects have characteristics of aggregation in Chinese stock market. On the base of the estimated transition probabilities matrix of information state, it is surmised that the probability that an item of information was absorbed by the market after 100 minutes is 99% in Chinese stock market.

Key words: hidden Markov model information state information strength Bayesian inference information effect clustering

收稿日期: 2011-01-21;

基金资助:国家自然科学基金(70771076)

服务
- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- E-mail Alert
- RSS

作者相关文章
- 黄晓彬
- 王春峰
- 房振明
- 熊春连

引用本文:

黄晓彬,王春峰,房振明等. 基于隐马尔科夫模型的中国股票信息探测[J]. 系统工程理论实践, 2012, 32(4): 713-720.

HUANG Xiao-bin,WANG Chun-feng,FANG Zhen-ming et al. Detecting Chinese stock information based on hidden Markov model[J]. Systems Engineering - Theory & Practice, 2012, 32(4): 713-720.

[1] Easley D, Kiefer N M, O'Hara M, et al. Liquidity, information, and infrequently traded stocks[J]. The Journal of Finance, 1996, 51(4): 1405-1436.

[2] Handa P, Schwartz R, Tiwari A. Quote setting and price formation in an order driven market[J]. Journal of Financial Markets, 2003, 6(4): 461-489.

[3] Bagehot W. The only game in town[J]. Financial Analysts Journal, 1971, 51(1): 1965-1974.

[4] Stoll H R. Inferring the components of the bid-ask spread: Theory and empirical tests[J]. Journal of Finance, 1989, 44(1): 115-134.

[5] Chiang R, Venkatesh P C. Insider holdings and perceptions of information asymmetry: A note[J]. The Journal of Finance, 1988, 43(4): 1041-1048.

[6] Roll R. A simple implicit measure of the effective bid-ask spread in an efficient market [J]. The Journal of Finance, 1984, 39(4): 1127-1139.

[7] Hasbrouck J. Trades, quotes, inventories, and information[J]. Journal of Financial Economics, 1988, 22(2): 229-252.

[8] Harrisa L, Hasbrouck J. Market vs. limit orders: The superdot evidence on order submission strategy[J]. Journal of Financial and Quantitative Analysis, 1996, 31(2): 213-231.

[9] Huang R D, Stoll H R. Market microstructure and stock return predictions[J]. Review of Financial Studies, 1994, 7(1): 179-213.

[10] Glosten L R, Harris L E. Estimating the components of the bid/ask spread[J]. Journal of Financial Economics, 1988, 21(1): 123-142.

[11] Lin J, Sanger G C, Booth G G. Trade size and components of the bid-ask spread[J]. Review of Financial Studies, 1995, 8(4): 1153-1183.

[12] Madhavan A, Richardson M, Roomans M. Why do security prices change? A transaction-level analysis of NYSE stocks[J]. Review of Financial Studies, 1997, 10(4): 1035-1064.

[13] Huang R D, Stoll H R. The components of the bid-ask spread: A general approach[J]. Review of Financial Studies, 1997, 10(4): 995-1034.

[14] Easley D, Kiefer N M, O'Hara M. The information content of the trading process[J]. Journal of Empirical Finance, 1997, 4(2/3): 159-186.

[15] Easley D, O'Hara M, Paperman J. Financial analysts and information-based trade[J]. Journal of Financial Markets, 1998, 1(2): 175-201.

[16] Weigend A S, Gershenfeld N A. Time series prediction: Forecasting the future and understanding the past[C]// the NATO Advanced Research Workshop on Comparative Time Series Analysis, Santa Fe, New Mexico: Addison-Wesley, 1994.

[17] Hassan M R, Nath B. Stock market forecasting using hidden Markov model: A new approach[C]// Intelligent Systems Design and Applications in ISDA'05, 2005: 192-196.

[18] Ihler A, Hutchins J, Smyth P. Learning to detect events with Markov-modulated Poisson processes[J]. ACM Transactions on Knowledge Discovery from Data, 2007, 1(3): 13.

[19] Scott S L. Bayesian methods for hidden Markov models: Recursive computing in the 21st century[J]. Journal of the American Statistical Association, 2002, 97(457): 337-351.

[20] Geman S, Geman D. Stochastic relaxation, gibbs distributions, and the Bayesian restoration of images[J]. Pattern Analysis and Machine Intelligence, IEEE Transactions on PAMI, 1984, 6(6): 721-741.

[21] Gelfand A E, Smith A F M. Sampling-based approaches to calculating marginal densities[J]. Journal of the American Statistical Association, 1990, 85(410): 398-409.

[22] Ihler A, Hutchins J, Smyth P. Adaptive event detection with time-varying poisson processes[C]// 12th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, Philadelphia, USA: ACM, 2006.

[23] Scott S L. A Bayesian paradigm for designing intrusion detection systems[J]. Computational Statistics and Data Analysis, 2004, 45 (1): 69-83.

[24] Nyholm K. Inferring the private information content of trades: A regime-switching approach[J]. Journal of Applied Econometrics, 2003, 18(4): 457-470.

[1] 靳小超;刘晓东;贺 波. **基于信息距离的运输网络再路由策略**[J]. 系统工程理论实践, 2010, 30(4): 758-762.

[2] 刘利平;马义中. **多变量过程的边界调整策略**[J]. 系统工程理论实践, 2010, 30(3): 538-542.

地址：北京中关村东路55号 100190 电话：010-62541828 Email：xtll@chinajournal.net.cn