

# 國立中山大學應用數學系

## 學術演講

時間：2015/3/27 (星期五) 10:10 ~ 12:00

地點：理學院四樓理 SC 4009-1 室

茶會：09:30 於理 SC 4010 室 (系辦公室)

### FASTEF: FActorisable Sparse Tail Event Functions

Wolfgang Härdle

(Joint work with Shih-Kang Chao, Ming Yuan)

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**Abstract** Reduced-rank multiple regression problems are of interest in a wide variety of science fields, for example the Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) can be estimated by this technique without specifying the factors. However, it gives little information for the conditional distributions other than the expected values. For  $\tau$  in  $(0; 1)$ , the conditional  $\tau$ -quantile functions, particularly for  $\tau$  is close to 0 or 1, are necessary in many applications, such as risk management. In the current study, the estimation of large multiple quantile regression models regularized by nuclear norm is considered. The rank is interpreted as the factors for the tail event functions and is small in the spirit of CAPM and APT. Hence, we call the estimated quantile functions as FASTEF: FActorisable Sparse Tail Event Functions. As the empirical loss function and the nuclear norm are non-smooth, an efficient algorithm which combines smoothing techniques and effective proximal gradient methods is developed, for which explicit deterministic convergence rates are derived. It is shown that the estimator enjoys nice nonasymptotic oracle properties under rank sparsity condition. The technique is applied to a multivariate variation of the famous Conditional Autoregressive Value-at-Risk (CAViaR) model of Engle and Manganelli (2004), which is called Sparse Asymmetric Conditional Value-at-Risk (SAMCVaR). With a data set consists of stock prices of global financial firms ranging over 2007-2010, the major market risk contributors and market sensitive firms are selected by our method.

### Distillation of News Flow into Analysis of Stock Reactions

Cathy Y. Chen

Chung Hua University

(Joint work with Junni L. Zhang, Wolfgang K. Härdle, and Elisabeth Bommers)

**Abstract** News carry information of market moves. The gargantuan plethora of opinions, facts and tweets on financial business offers the opportunity to test and analyze the influence of such text sources on future directions of stocks. It also creates though the necessity to distill via statistical technology the informative

elements of this prodigious and indeed colossal data source. Using mixed text sources from professional platforms, blog fora and stock message boards we distill via different lexica sentiment variables. These are employed for an analysis of stock reactions: volatility, volume and returns. An increased (negative) sentiment will influence volatility as well as volume. This influence is contingent on the lexical projection and different across GICS sectors. Based on review articles on 100 S&P 500 constituents for the period of October 20, 2009 to October 13, 2014 we project into BL, MPQA, LM lexica and use the distilled sentiment variables to forecast individual stock indicators in a panel context. Exploiting different lexical projections, and using different stock reaction indicators we aim at answering the following research questions:

- (i) Are the lexica consistent in their analytic ability to produce stock reaction indicators, including volatility, detrended log trading volume and return?
- (ii) To which degree is there an asymmetric response given the sentiment scales (positive v.s. negative)?
- (iii) Are the news of high attention firms diffusing faster and result in more timely and efficient stock reaction?
- (iv) Is there a sector specific reaction from the distilled sentiment measures?

We find there is significant incremental information in the distilled news flow. The three lexica though are not consistent in their analytic ability. Based on confidence bands an asymmetric, attention-specific and sector-specific response of stock reactions is diagnosed.

## Localizing Forward Intensities for Multi-Period Corporate Default

Dedy Dwi Prastyo

(Joint work with Wolfgang Karl Härdle)

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**Abstract** Using a local adaptive Forward Intensities Approach (FIA) we investigate multi-period corporate defaults and other delisting schemes. The proposed approach is fully data driven and is based on local adaptive estimation and the selection of optimal estimation windows. Time-dependent model parameters are derived by a sequential testing procedure that yields adapted predictions at every time point. Applying the proposed method to monthly data on 2000 U.S. public firms over a sample period from 1991 to 2011, we estimate default probabilities over various prediction horizons. The prediction performance is evaluated against the global FIA that employs all past observations. For the six months prediction horizon, the local adaptive FIA performs with the same accuracy as the benchmark. The default prediction power is improved for the longer horizon (one to three years). Our local adaptive method can be applied to any other specifications of forward intensities.

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