

THE CHINESE UNIVERSITY OF HONG KONG

Department of Statistics

will present a seminar entitled

Bootstrap Estimation of Optimal Portfolios

by

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on

Tuesday, 2 March 2010
2:00pm – 3:00pm

in

Lady Shaw Building LT6
The Chinese University of Hong Kong

Abstract:

The Government Pension Investment Fund (GPIF) shall manage and invest the Reserve Funds of the Employees' Pension Insurance and the National Pension entrusted by the Minister of Health, Labour and Welfare, and shall contribute to the financial stability of both Plans by remitting profits of investment to the Special Accounts for the Government Pension Plans. Their investment method is that roughly one-year of benefit expenses will be kept at the end of the financial balancing period. This is based on the idea that benefits and burden should be rebalanced within a period of roughly 100 years (limited rebalance method).

Commissioned by GPIF, we consider an "optimality" with respect to portfolio selection as maximization of the following utility functions.

- The utility function depends on the mean and standard deviation of the reserve fund at the end of financial balancing period (e.g. 100 years).
- The utility function depends on the probability of the reserve fund at the end of the financial balancing period.
- The utility function depends on the lower partial moments of the reserve fund at the end of the financial balancing period.

The return processes of the investment assets are categorized as “short-memory” processes or “long-memory” processes. The “short-memory” assets include “Domestic bonds”, “International bonds” and “Short-term assets”. We assume that the return process follows a Conditional Heteroskedastic AutoRegressive Nonlinear (CHARN) model. The “longmemory” assets include “Domestic stocks” and “International stocks”. We assume that the return process follows a Fractional AutoRegressive Integrate Moving Average (FARIMA) model.

In this paper, assuming that observations follow the above processes, we construct bootstrap estimators of the return process by using a time dependent bootstrap procedure. Finally, we propose optimal portfolio estimators as the maximization of the above utility functions.

Biography Hiroshi Shiraishi received the B.S., M.S. and Dr. degrees in mathematical science from Waseda University, Japan, in 1998, 2004 and 2007, respectively. He joined the GE Edison Life Insurance Company, the Prudential Life Insurance Company of Japan, and the Hannover Reinsurance Company, in 1998, 2000 and 2005, respectively. He also joined the Department of Fundamental Science and Engineering, Waseda University in 2007. He is currently a Lecturer in the Laboratory of Mathematics, Jikei University School of Medicine. His research interests are econometric theory and financial engineering based on time series analysis. He is a Fellow of the Institute of Actuary of Japan (FIAJ).

Academic Work

Shiraishi, H. (2005). Statistical Estimation of Optimal Portfolios for Gaussian Dependent Returns of Assets. *Scientiae Mathematicae Japonicae*, **62**, No.3, 439-449, :e2005, 453-463.

Shiraishi, H., Taniguchi, M. (2007). Statistical Estimation of Optimal Portfolios for Locally Stationary Returns of Assets. *International Journal of Theoretical and Applied Finance*, **10**, 129-154.

Shiraishi, H., Taniguchi, M. (2008). Statistical Estimation of Optimal Portfolios for non-Gaussian Dependent Returns of Assets. *Journal of Forecasting*, **27**, 193-215.

Shiraishi, H., Taniguchi, M (2009). Statistical Estimation of Optimal Portfolios depending on Higher Order Cumulants. *Annales de l'I. S. U. P.*, 3-18.

All are Welcome