Center for the Study of Finance and Insurance
Osaka University

Annual Report

Apr. 2012 – Mar. 2013

C S F I
Center for the Study of Finance and Insurance

大阪大学金融・保険教育研究センター

平成二十四年度活動報告書

Contents

1 The Proposal of the CSFI

We intend to develop a new academic graduate program in finance and insurance blending in social and natural science fields.

In recent years, the need to maintain a pension system and asset management operations which are consistent with our aging society and its declining birth-rate, has been widely recognized, as has the need to establish a global-standard risk management system. For these reasons, it has become necessary to develop, establish and promote scientific methodologies with economic logic, around asset management and risk control, suitable for use by individuals, companies, local or central government. In relation to such methodologies, a new branch of learning called "Financial Engineering" (Mathematical Finance/ Quantitative Finance) has been introduced as an interdisciplinary area integrating monetary economics, probability theory, stochastic process theory, statistics and operations research etc.

In fact, in the financial business world, various derivative products have already been designed and developed based on theories constructed in recent years by this new interdisciplinary study, and they have been traded in the market or exchanged by cross trading at a fair price. Those products are already widely used for risk-management. Finance/Financial Engineering and Acturial/Pension Mathematics share the common feature of providing methodologies for quantifying immediate risks to control or hedge against those risks, although the risk categories covered by the two fields differ. Accordingly, the growing awareness that research and education in those disciplines should be integrated has been increasingly supported by specialists such as researchers and business practitioners.

Relaxation of various regulations has removed the institutional boundaries between a bank, security funds and insurance groups, resulting in financial conglomeratization. Therefore, it is necessary to integrate Acturial/Pension Mathematics and Finance/Financial Engineering in order to carry out research and education. For this reason, the Osaka University established the Center for the Study of Finance and Insurance (CSFI) to develop and implement the interdisciplinary academic program by integrating social and natural science with Acturial/Pension Mathematics and Finance/Financial Engineering. The Center's establishment is also in line with the strategy and practicality of the Science and Technology Policy using the concepts of integration of "Natural Science" and "Humanities/Social Science", and Science and Technology as it applies to society, that are proclaimed in the fundamental principles of the Japanese Government's Science and Technology Basic Plan. In addition, in the designing of financial products such as derivatives and insurance/pensions systems, our society needs to thoroughly understand the roles of the financial system (financial market/policy), economic activities and roles of insurance/pension systems at each stage of the human life cycle. The CSFI aims to develop and provide the education to respond to these requirements. The CSFI wishes to contribute to creating a safe society and achieving financial security throughout the human life span in our aging society with its declining birth-rate.

2 Features of the CSFI

The CSFI will develop a new academic program blending the social and natural science fields in co-operation with four graduate schools of the Osaka University and the financial business world to provide the new finance and insurance education.

In finance and actuarial science education, it is necessary to provide an academic program which is well balanced between both social/institutional aspects and mathematical/technological aspects. This is because in designing and developing financial/insurance/pension systems and products, it is essential to have not only advanced mathematical and technological knowledge, but also correct understanding of the economic meanings/roles of such systems and products in a complex society. Conversely, even if some people are only able to understand the economic meanings/roles, these people may fail to utilize the right application, analysis and development, unless they understand the advanced mathematical theories which are necessary for designing/developing them properly. Therefore, it is necessary to train professionals who have adequate mathematical/technological as well as social/institutional knowledge. A unique feature of the CSFI is the development of new educational programs integrated in both science and humanities fields, to provide the human resources which are urgently needed in today's society.
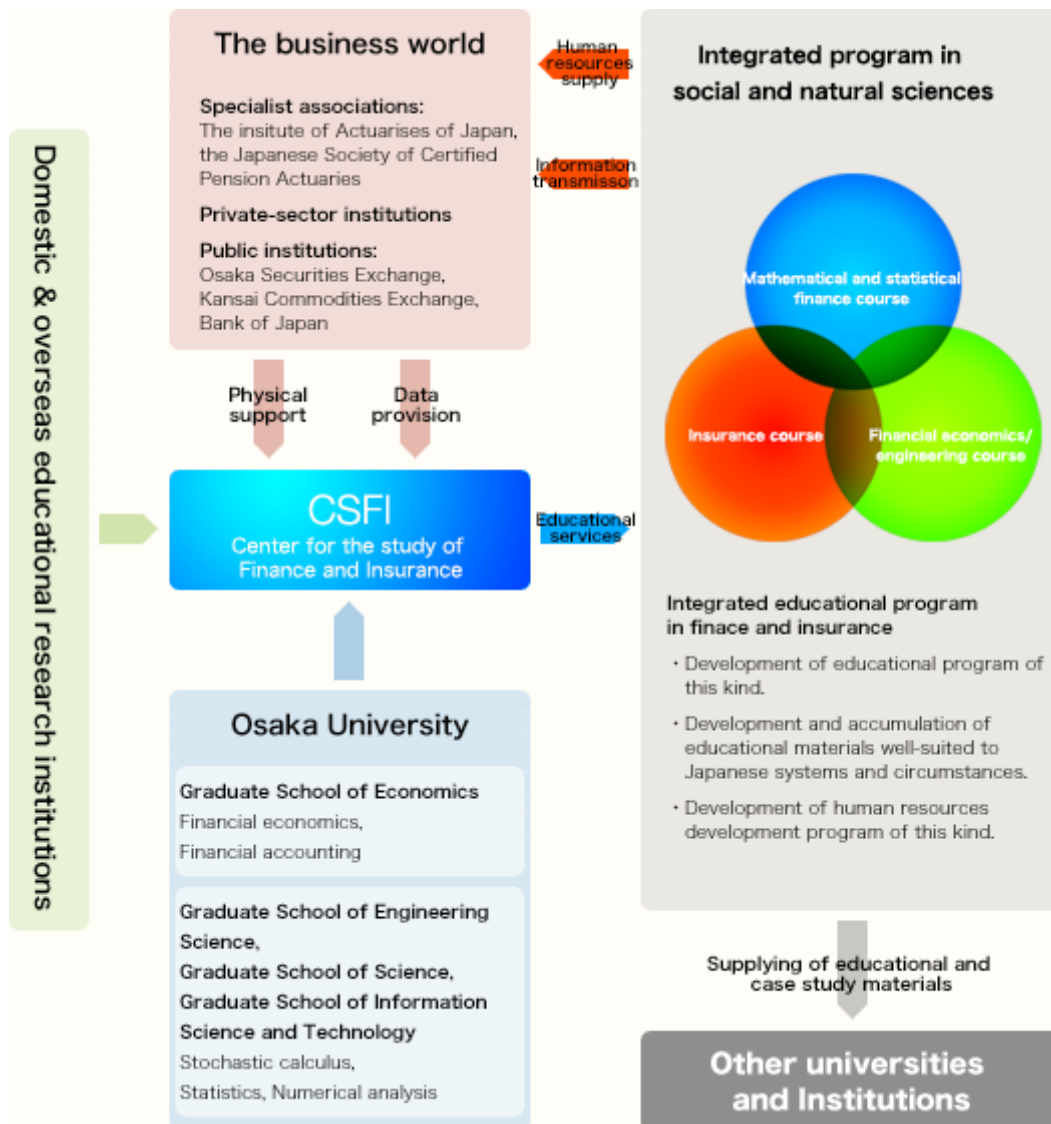
Another remarkable feature of the CSFI is that it takes into consideration not only financial economics, financial engineering and mathematical finance but also actuarial mathematics. The Osaka University has many professors in the fields of probability theory, stochastic calculus, statistics and monetary economics. Since 1999, a number of professors in these fields have formed a group called "Finance Theory and Applications" (FTA), and have carried out education and research activities with the co-operation of its members. On the basis of those activities, the CSFI is developing a new and unique integrated program of socio-natural science and teaching materials by organizing a multi-disciplinary faculty embracing science, engineering sciences, information science and economics to devise a new educational system. In addition, since the CSFI's research fields are closely related to the financial business world, professionals in business practice are invited to join the teaching team and practical business education is introduced to the educational program.

3 New Effort of the CSFI

Development of Research/Education Program for Software Innovation Leading

Since April 2011, the CSFI has worked on the ``Development of Research/Education Program for Software Innovation Leading" in partnership with Graduate School of Information Science and Technology, Osaka University, and GRACE Center, National Institute of Informatics (NII). This is a human resource development program on the software technology, a core of information and communication technology (ICT) which can be an infrastructure for an advanced information society in the future, with the support from the Ministry of Education, Culture, Sports, Science and Technology. This program is aimed at developing and disseminating an advanced software technology through the software design technology by conducting research/education programs based on university-industry collaboration and integration of fields.

4 Organization Diagram

The CSFI faculty consists of the following:

1. Faculties jointly appointed by four graduate schools (Graduate Schools of Engineering Science, Economics, Science and Information Science and Technology)
2. Specially appointed domestic and overseas faculties
3. Temporary faculties within associated institutions
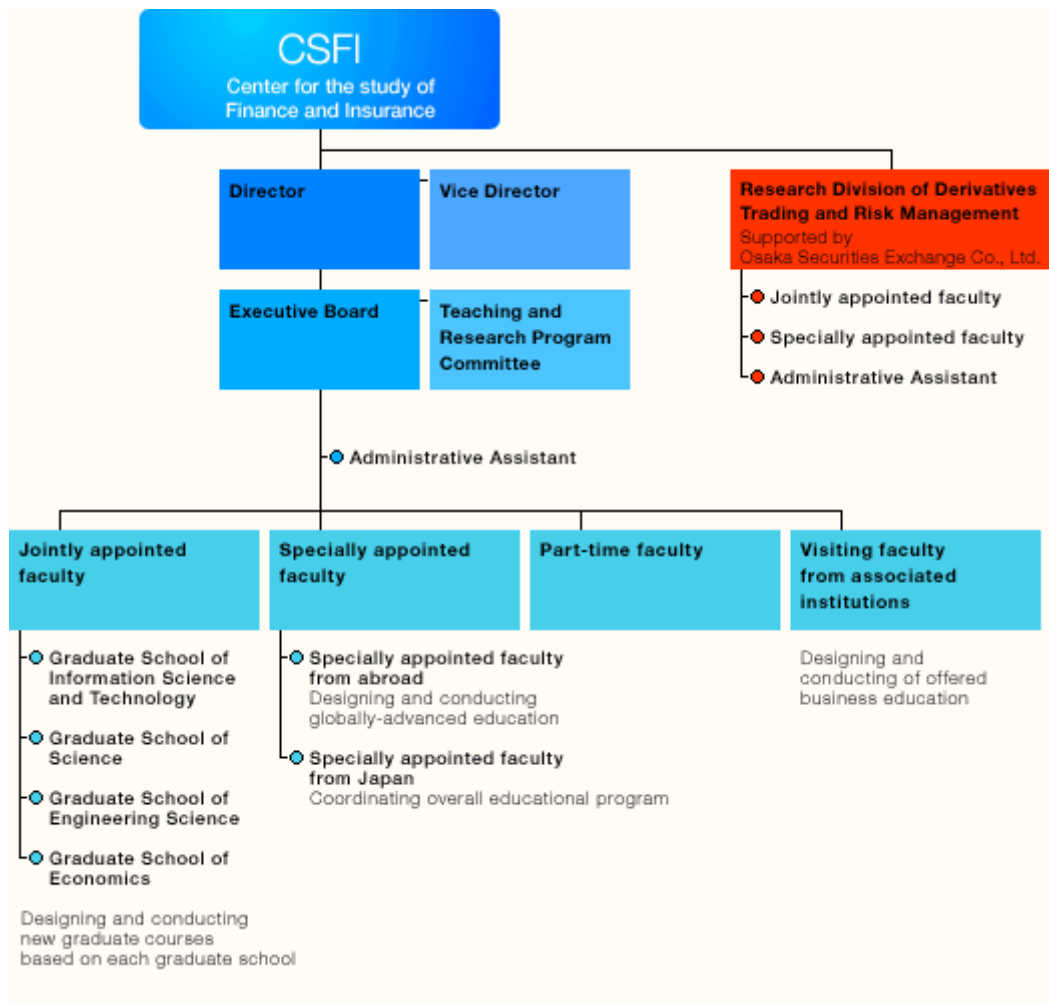
5 Faculty

The faculty members in various fields provide lectures based on the CSFI's interdisciplinary program.

Director

Kosuke OYA (since August 2012)
Jointly Appointed Professor
Teaching Staff of Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.
Professor, Graduate School of Economics

Masamitsu OHNISHI (until July 2012)
Jointly Appointed Professor
Professor, Graduate School of Economics

Vice Director

Masayuki UCHIDA (since August 2012)
Jointly Appointed Professor
Professor, Graduate School of Engineering Science

Hiroshi SUGITA (until July 2012)
Jointly Appointed Professor
Professor, Graduate School of Science

Specially appointed faculty

Hideo NAGAI
Specially Appointed Professor
Faculty member of Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.
Professor, Faculty of Engineering Science, Kansai University

Kazuhiko NISHINA
Specially Appointed Professor
Faculty member of Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.
Professor, Department of Economics, Meiji Gakuin University

Nabil MAGHREBI
Specially Appointed Professor
Faculty member of Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.
Professor, Graduate School of Economics, Wakayama University

Isao ISHIDA
Associate Professor of Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.

Kazutoshi YAMAZAKI
Assistant Professor of CSFI

Takayuki FUJII
Assistant Professor of CSFI (CREST) (until November 2012)

Teppei OGIHARA
Assistant Professor of CSFI (CREST) (since July 2012)

Jointly appointed faculty: Graduate School of Engineering Science

Yutaka KANO
Professor, Graduate School of Engineering Science

Hidetoshi SHIMODAIRA
Professor, Graduate School of Engineering Science

Jun SEKINE
Professor, Graduate School of Engineering Science

Hidehiro KAISE
Associate Professor, Graduate School of Engineering Science

Etsuo KUMAGAI
Associate Professor, Graduate School of Engineering Science

Yasutaka SHIMIZU
Associate Professor, Graduate School of Engineering Science

Takashi KATO
Assistant Professor, Graduate School of Engineering Science

Jointly appointed faculty: Graduate School of Economics

Wataru OHTA
Teaching Staff of Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.
Professor, Graduate School of Economics

Shinji TAKAGI
Professor, Graduate School of Economics

Hisashi TANIZAKI
Professor, Graduate School of Economics

Yoshiro TSUTSUI
Professor, Graduate School of Economics

Yuichi FUKUTA
Teaching Staff of Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.
Professor, Graduate School of Economics

Tatsushi YAMAMOTO
Professor, Graduate School of Economics

Atsushi SHIIBA
Associate Professor, Graduate School of Economics

Yoshiyuki TAKEUCHI
Associate Professor, Graduate School of Economics

Michi NISHIHARA
Associate Professor, Graduate School of Economics

Risa SAI
Lecturer of Graduate School of Economics

Jointly appointed faculty: Graduate School of Science

Takehiko MORITA
Professor, Graduate School of Science

Masaaki FUKASAWA
Associate Professor, Graduate School of Science

Jointly appointed faculty:
Graduate School of Information Science and Technology

Etsuro DATE
Professor, Graduate School of Information Science and Technology

Shunji UMETANI
Associate Professor of Graduate School of Information Science and Technology

Koji OKUHARA
Associate Professor of Graduate School of Information Science and Technology

Visiting and Part-time faculty

Kimiaki AONUMA
Visiting Professor
Bank of Tokyo-Mitsubishi UFJ

Yoshihiko UCHIDA
Visiting Professor
Institute for Monetary and Economic Studies, Bank of Japan

Miyoshi YUASA
Visiting Professor
Sumitomo Life Insurance Company

Shojiro MANABE
Professor, Institute for Higher Education Research and Practice
Osaka University

Jun ASANO
Part-time Lecturer
Sumitomo Life Insurance Company

Hiroshi ISHIJIMA
Part-time Lecturer
Associate Professor, Chuo Graduate School of International Accounting, Chuo University

Akira KONISHI
Part-time Lecturer
Sumitomo Mitsui Trust Bank, Limited

Itsushi KOMATSU
Part-time Lecturer
Resona Bank, Limited.

Toru NAKAI
Part-time Lecturer
Professor, Faculty of Education, Chiba University

Mitsuru HATA
Part-time Lecturer
National Federation of Workers and Consumers Insurance Cooperatives

Yosuke FUJISAWA
Part-time Lecturer
LIFENET INSURANCE COMPANY

Toshihiro HORII
Part-time Lecturer
Daido Life Insurance Company

Muneyuki YAMAUCHI
Part-time Lecturer
Nippon Life Insurance Company

Administrative assistant

Yasue MIMURO

Megumi UDA

6 Advisory Board

The CSFI invites researchers who specialize in advanced education and researchers who are important in the fields related to Financial Economics, Mathematical Finance, Financial Engineering and Actuarial Mathematics to seek its advice regarding educational curriculum and research.

Bensoussan, Alain   Professor of the University of Texas at Dallas (Director of ICDRiA)
A world authority on Stochastic control theory. Alain serves on the Editorial Board of many academic journals as well as on the Advisory Board of Mathematical Finance. He is the author of many works and articles such as Applications des Inequations Variationnelles en Controle Stochastique. He was consecutively filled various posts such as the president of Le Centre national d'Etudes Spatiales, L'Institut National de Recherche en Informatique Enautomatique. Recipient of the "Von Humboldt award" and "Legion d'Honneur award".

Blinder, Alan   Gordon S. Rentschler Memorial Professor of Economics, Princeton University
A world authority on fiscal and monetary policy. The author of 'Economics: Principles and Policy', and also achieved many research results. Alan served as a member of the Council of Economic Advisors for the Clinton Government in USA and Deputy Chairman of FRB. A president of the Center for Economic Policy Studies of the Princeton University. Recipient of the "Adam Smith" Award.

Carmona, Rene   Paul Wythes '55 Professor of Engineering and Finance, Princeton University
A world authority on a stochastic process theory. Interested in Financial engineering, stochastic partial differential equation and signal processing, etc. Engaged in numerous advanced researches.

Hamada, Koichi   Professor Emeritus, Yale University
A world authority on international finance theory. The author of "Macro Economics and Japanese Economics". Special Advisor to the Cabinet since December 2012. The first president of Japan Law and Economics Association. Served as a president of the Japanese Economic Association.

Myers, Stewart   Gordon Y. Billiard Professor of Finance.   MIT Sloan School of Management
A world authority on a corporate finance theory. The author of the great classic "Principles of Corporate Finance" which went through nine editions. The president of the American Finance Association and the chairman of CERF (Cambridge Endowment for Research in Finance).

Webb, David   Professor of Finance, London School of Economics
A world authority on financial economics. Interested in information economy and corporate finance. The leader of Financial Markets Group (FMG) of the London School of Economics (LSE), which is the world research organization of financial economics.

7 Co-operating Affiliates and Related Organizations

Listings of co-operating affiliates and related organizations

Special Affiliate

Sumitomo Mitsui Banking Corporation

Co-operating Affiliates

Osaka Securities Exchange

Osaka Dojima Commodity Exchange (Kansai Commodities Exchange changed its name in Feb. 2013)

SUMITOMO LIFE INSURANCE COMPANY

DAIDO LIFE INSURANCE COMPANY

NLI Research Institute

IBM Japan, Ltd.

Research Institute of Capital Formation, Development Bank of Japan

Institute for Monetary and Economic Studies, Bank of Japan

Nomura Securities Co., Ltd.

Quantitative Research Department, Nomura Securities Co., Ltd.

Mitsubishi UFJ Trust Investment Technology Institute Co., Ltd.

Related Academic Societies

Nippon Finance Association

Japanese Association of Financial Econometrics and Engineering

The Japanese Association of Risk, Insurance and Pensions

The Operations Research Society of Japan

The Japan Society for Industrial and Applied Mathematics

Japan Statistical Society

Related Associations

The Japanese Society of Certified Pension Actuaries

The Institute of Actuaries of Japan

The Security Analysts Association of Japan

Japan Association for Financial Planners

Japan Securities Investment Advisers Association

8 The Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd.

The Research Division trains staff to have advanced and expert knowledge and skills in derivatives trading and risk management.   It also carries out advanced research.

The CSFI launched the Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange Co., Ltd. in June 2007.   The details are outlined below. Please, refer to the web site (http://www.ose.or.jp/) for details of the Osaka Securities Exchange.

It is essential that graduate schools update and advance their educational content by continually adopting advanced study results. Therefore, it is necessary to carry out education and research that reflects leading-edge research by inviting leading national and overseas researchers. At the same time, it is also necessary to offer a place where researchers from Japan and overseas, and business practitioners from official and private financial institutes, can meet together and host seminars and symposiums to exchange information on latest research trends and requests from business practitioners. Such co-operation among industry and universities is expected to generate feedback effects between the academics and business practice to contribute to business practitioners improving their knowledge and skills, as well as to academics for the advancement of their study. By extension, it would also contribute to actual financial systems for their stability and efficiency. Based on the concept stated above, the Research Division has been established by the Osaka Securities Exchanges at the CSFI.

Educational System
The Research Division trains staff to have advanced and expert knowledge and skills in derivatives trading and risk management for academic and practical purposes as well as carrying out advanced research. The Research Division offers course subjects to working adults from various official and private financial institutes as well as students of graduate schools of the Osaka University, as one of their goals is to directly or indirectly affect the actual economic system. Also, research guidance, seminars and symposiums are scheduled to be held. The aim of the Research Division is as follows:

- To provide lectures on derivatives trading and risk management to working adults and students of graduate school
- To invite researchers who specialize in related fields
- To hold seminars and symposiums on derivatives trading and risk management for working adults and students of graduate schools

The Research Division Faculty
The Research Division Faculty consists of specially appointed faculties and jointly appointed faculties of the CSFI.

Specially Appointed Faculties

Hideo NAGAI
Specially Appointed Professor
Professor, Faculty of Engineering Science, Kansai University

Kazuhiko NISHINA
Specially Appointed Professor
Professor, Department of Economics, Meiji Gakuin University

Nabil MAGHREBI
Specially Appointed Professor
Professor, Graduate School of Economics, Wakayama University

Isao ISHIDA
Specially Appointed Associate Professor

Jointly Appointed Faculties

Wataru OHTA, Professor, Graduate School of Economics, Osaka University

Kosuke OYA, Professor, Graduate School of Economics, Osaka University

Yuichi FUKUTA, Professor, Graduate School of Economics, Osaka University

Co-Researchers

Naoto KUNITOMO, Professor, Graduate School of Economics, The University of Tokyo

Hiroshi ISHIJIMA, Associate Professor, Chuo Graduate School of International Accounting, Chuo University

9 Features of the Educational Program

The CSFI offers an educational program consisting of Standard Programs which corresponds to an MA course and Advanced Programs which corresponds to a PhD course. Standard Programs offer three courses: (A) Mathematical Statistical Finance Course, (B) Financial Economics/Engineering Course and (C) Insurance Course. Students who wish to participate in a course must already belong to the respective Graduate School in charge of the program. By taking short-term/part-time students, Standard Programs can also serve as re-education programs for working people and as training programs for business persons in financial institutions. Advanced Programs offer education equivalent to conventional PhD level education, ensuring that new advances in the fields of financial engineering, mathematical finance and actuarial science, which have rapidly developed in the past 20 years, are incorporated in the CSFI's educational program. In both the Standard and Advanced Programs, we plan to flexibly offer various courses, including intensive training courses, to meet requests for practical business education.

Standard Programs

Mathematical and statistical finance course

Mathmatical analysis of mathematical market models

Computing for Financial mathematics

Practical education on risk measurement/evaluation

Basic Mathematics for mathematical finance

Common subjects

· Basic Mathematics for finance theories and epirical finance
· Basic education on monetary/ financial economy

Basics of actuarial mathematics and pension mathematics

Basics of insurance accounting

Mathematical theory for risks

Insurance course

Financial engineering

Financial accounting

Practical education on market analysis

Financial economics/ engineering course

Examples of Advanced Program lecture topics: Application of Malliavin Analysis to Numerical Analysis, Credit Risk Modeling, Volatility Tracking, Risk Measurement and Optimal Designing etc.

In April 2011, the CSFI started offering Graduate Program for Advanced Interdisciplinary Studies (Software Innovation Leading [Finance Software Course]). Finance Software Course aims at cultivating human resource on the software technology and offers a series of basic subjects such as financial engineering, mathematical finance, and financial econometrics.

10 Course Outlines

The CSFI offers three courses in the following programs.

- **Graduate Minor Program (Finance and Insurance) for graduate students enrolled after 2011**
- **Graduate Program for Advanced Interdisciplinary Studies (Finance and Insurance) for graduate students enrolled before 2010**
- **Advanced Program for Credited Auditors (Finance and Insurance)**

Mathematical Statistical Finance Course

The Mathematical Statistical Finance Course offers educational programs related to mathematical finance focusing on mastering the basic mathematical and quantitative methods used for finance theories and empirical study based on basic education of mathematical foundation and financial economics. This content is common to all three courses. The course offers abundant curriculum related to mathematical modeling and analysis of the market based on arbitration theory and martingale theory, and other related fields which are especially important for the analysis method, such as time-series analysis, stochastic differential equations, stochastic analysis, statistical analysis, mathematical programming and stochastic control, and aims to advance education in mathematical quantitative finance, quoting those. Also, lectures on new mathematical basic theory on risk measurement, evaluation and management as well as practical education by business practitioners are prepared.

Financial Economics and Engineering Course

The Financial Economics/Engineering Course has a single purpose; to learn finance theories systematically supported by a solid background in modern economics. At the same time, the central pillar of this course is to efficiently master how to apply it across a wide range of related fields from an engineering point of view focusing on its aspect of practical science. Therefore, this course offers a curriculum which is highly advanced and rich in variety, including not only the basic theory of finance, financial economics and financial engineering, but also the basic mathematics of probability, stochastic process and optimization, the mathematical and numerical calculation skills for evaluation and operation of financial assets and risk management, the statistical, econometric and positive analysis of various financial data, the economic analysis of financial policy relating to interest rates and exchange rates, the analysis and evaluation of business and corporations, and more.

Insurance Course

Since the first semester in 2007, this course has began a series of subjects to master the mathematical fundamentals of mathematical finance and actuarial mathematics, such as the basics of probability theory, stochastic calculus and actuarial mathematics 1, and exercises and lectures on risk theory and mathematical viewpoints on non-life insurance. Furthermore, in the second semester of that year, this course delivered a series of lectures on the continuation of actuarial mathematics and risk theory, also began a series of lectures on mathematical insurance science and model theory (intensive course) to learn more about practical business. Many of the faculty of subject related insurance have business experience, and aim for better analysis and clarification of the questions on the mathematical and business aspects of insurance.

In 2012, The CSFI started offering a new course, the Graduate Program for Advanced Interdisciplinary Studies (Software Innovation Leading [Finance Software Course]).

Students can select a course for various purposes.

Course	Subject Section		Subject Code	Subject of CSFI	Faculty
	Section ①	Section ②			
Mathematical and statistical finance	Basic Subject	Elective	M-01	Foundation of Financial Systems	Nomura Securities Co., Ltd.
			M-02	Investment Theory	Wataru OHTA
			M-03	Stochastic Analysis	Shojiro MANABE
			M-04	Statistical Analysis	Hidetoshi SHIMODAIRA
			M-05	Statistical Inference	Masayuki UCHIDA
			M-06	Multivariate analysis	Yutaka KANO
	Special Subject	Elective	M-07	Introduction to financial mathematics	Jun SEKINE
			M-08	Advanced Mathematical Finance	Kimiaki AONUMA
			M-09	Advanced Mathematical Programming	Toru NAKAI
			M-10	Stochastic Analysis in Finance	Jun SEKINE
			M-11	Stochastic differential equations	Hidehiro KAISE
			M-12	Process of Statistical Data Analysis	Etsuo KUMAGAI
			M-13	Time Series Analysis	Yasutaka SHIMIZU
			M-14	Financial Engineering	Masamitsu OHNISHI
			M-15	Risk Management	Masamitsu OHNISHI
			M-16	Numerical Methods in Finance	Yoshihiko UCHIDA (2011)
			M-44	Introduction to Computational Finance	Kazutoshi YAMAZAKI
	Advanced Subject	Elective	M-17	Statistics and high frequency data	Jean JACOD (2010)
			M-18	Numerical simulations	Reiichiro KAWAI (2009)
			M-19	Applied Malliavin Calculus	Emmanuel GOBET (2009)
			M-20	Credit Risk Models	Marek Rutkowski (2007)
			M-21	G-Brownian Motion and Dynamic Risk Measure under Volatility Uncertainty	Shige PENG (2007)
			M-22	Market models defined by stochastic process with jump	Takao MIYAHARA (2007)
			M-23	Stochastic Volatility Models	
			M-24	Non-Parametric Statistical Methods	Hideatsu TSUKAHARA (2010)
			M-25	Inverse Problems in Financial Modeling:Theoretical and Numerical Aspects of Model Calibration	Rama CONT (2006)
			M-26	Real Option	Michi NISHIHARA
			M-27	Risk Management on financial Risk	Shigeo KUSUOKA (2008)
			M-28	Recent Topics in Finance 1	Hiroshi ISHIJIMA (2007)
			M-29	Portfolio Optimization and Risk Management via Stochastic Programming	Jitka DUPACOVA (2006)
			M-30	Recent Topics in Finance 2	Hiroshi ISHIJIMA
			M-31	Actuarial Science and Financial Engineering	Yoshifumi MUROI (2009)
			M-32	Introduction to Insurance Mathematics	Yoshifumi MUROI (2007)
			M-33	Topics in Derivatives and Statistical Risk Management 1	Naoto KUNITOMO (2007) / Yoshifumi MUROI (2007)
			M-34	Recent Topics in Finance 3	Hiroshi ISHIJIMA
			M-35	Introduction to high frequency data analysis	Masaaki FUKASAWA (2010)
			M-36	Dynamic Risk Measures	Freddy DELBAEN (2008)
			M-37	Introduction to Backward Stochastic Differential Equations and their Financial Applications	Jun SEKINE (2008)
			M-38	Macroeconometrics and Financial Econometrics	Mototsugu SHINTANI (2009)
			M-40	Risk-sensitive portfolio optimization	Jun SEKINE (2011)
			M-41	Numerical Analysis for Optimal Control Problems	Kazutoshi YAMAZAKI
			M-42	Financial Time Series Analysis	Isao ISHIDA
			M-43	Empirical Finance	Isao ISHIDA

Course	Subject Section		Subject Code	Subject of CSFI	Faculty
	Section ①	Section ②			
F i n a n c i a l e c o n o m i c s a n d e n g i n e e r i n g	Basic Subject	Elective	E-01	Foundation of Financial Systems	Nomura Securities Co., Ltd.
			E-02	Investment Theory	Wataru OHTA
			E-03	Probability Theory	Hiroshi SUGITA
			E-04	Elementary Stochastic Calculus	Masamitsu OHNISHI / Michi NISHIHARA
	Special Subject	Elective	E-05	Corporate Finance	Risa SAI
			E-06	Financial Economics	Yuichi FUKUTA
			E-07	Financial Econometrics	Kosuke OYA
			E-08	Central Banking	Yuzo HONDA (2008)
			E-09	Financial Engineering	Masamitsu OHNISHI
			E-10	Risk Management	Masamitsu OHNISHI
			E-11	Business Analysis and valuation	Tatsushi YAMAMOTO
			E-12	Numerical Methods in Finance	Yoshihiko UCHIDA (2011)
			E-13	Introduction to financial mathematics	Jun SEKINE
			E-14	Stochastic Analysis in Finance	Jun SEKINE
			E-16	Life Insurance Mathematics 1	Jun ASANO / Toshihiro HORII / Muneyuki YAMAUCHI
			E-17	Stochastic Programming	Hiroaki ISHII (2009)
			E-42	Valuation of Life Insurance Liabilities 1	Miyoshi YUASA
			E-40	Valuation of Life Insurance Liabilities 2	Miyoshi YUASA
			E-56	Optimization Models and Algorithms	Shunji UMETANI
	Advanced Subject	Elective	E-18	Asset Pricing	Risa SAI (2011)
			E-19	Market Microstructure	Wataru OHTA (2011)
			E-20	Behavial Finance	
			E-21	Real Option	Michi NISHIHARA
			E-22	Baysian Econometrics	
			E-23	Wavelet	
			E-24	Stochastic Analysis	Shojiro MANABE
			E-25	Stochastic differential equations	Hidehiro KAISE
			E-26	Advanced Mathematical Finance	Kimiaki AONUMA
			E-27	Pension Mathematics	Akira KONISHI / Itsushi KOMATSU / Mitsuru HATA
			E-28	Statistics and high frequency data	Jean JACOD (2010)
			E-29	Credit Risk Models	Marek RUTKOWSKI (2007)
			E-30	Risk Management on financial Risk	Shigeo KUSUOKA (2008)
			E-31	International Monetary Economics 1	Shinji TAKAGI
			E-32	International Monetary Economics 2	Shinji TAKAGI
			E-33	Recent Topics in Finance 1	Hiroshi ISHIJIMA (2007)
			E-34	Inverse Problems in Financial Modeling:Theoretical and	Rama CONT (2006)
			E-35	Portfolio Optimization and Risk Management via Stochastic	Jitka DUPACOVA (2006)
			E-36	Theory and Practice of Asset Management	Japan Securities Investment
			E-37	Market models defined by stochastic process with jump	Takao MIYAHARA (2007)
			E-38	Recent Topics in Finance 2	Hiroshi ISHIJIMA
			E-39	Actuarial Science and Financial Engineering	Yoshifumi MUROI (2009)
			E-41	Introduction to Insurance Mathematics	Yoshifumi MUROI (2007)
			E-43	Topics in Derivatives and Statistical Risk Management 1	Naoto KUNITOMO (2007) / Yoshifumi MUROI (2007)
			E-44	Numerical simulations	Reiichiro KAWAI (2009)
			E-45	Introduction to Financial Econometric	Yoshiyuki TAKEUCHI (2010)
			E-46	Recent Topics in Finance 3	Hiroshi ISHIJIMA
			E-47	Introduction to high frequency data analysis	Masaaki FUKASAWA (2010)
			E-48	Dynamic Risk Measures	Freddy DELBAEN (2008)
			E-49	Introduction to Backward Stochastic Differential Equations and their Financial Applications	Jun SEKINE (2008)
			E-50	Macroeconometrics and Financial Econometrics	Mototsugu SHINTANI (2009)
			E-51	Risk-sensitive portfolio optimization	Jun SEKINE (2009)
			E-52	Applied Malliavin Calculus	Emmanuel GOBET (2009)
			E-53	Special Lecture on Finance	Kazuhiko NISHINA (2009)
			E-54	Numerical Analysis for Optimal Control Problems	Kazutoshi YAMAZAKI
			E-55	Financial Time Series Analysis	Isao ISHIDA
			E-57	Empirical Finance	Isao ISHIDA
			E-58	Empirical Analysis of Market Microstructure	Wataru OHTA, Kosuke OYA
			E-59	Introduction to Computational Finance	Kazutoshi YAMAZAKI

Course	Subject Section		Subject Code	Subject of CSFI	Faculty
	Section ①	Section ②			
Insurance	Basic Subject	Compulsory	I-01	Foundation of Financial Systems	Nomura Securities Co., Ltd.
			I-02	Life Insurance Mathematics 1	Jun ASANO Toshihiro HORII Muneyuki YAMAUCHI
		Elective	I-03	Pension Mathematics	Akira KONISHI Itsushi KOMATSU Mitsuru HATA
			I-04	Elementary Stochastic Calculus	Masamitsu OHNISHI Michi NISHIHARA
			I-05	Statistical Analysis	Hidetoshi SHIMODAIRA
	Special Subject	Compulsory	I-29	Valuation of Life Insurance Liabilities 1	Miyoshi YUASA
			I-31	Risk Theory 1	Yosuke FUJISAWA
		Elective	I-08	Exercise session for actuarial mathematics	Takehiko MORITA
			I-09	Risk Management	Masamitsu OHNISHI
			I-10	Stochastic Programming	Hiroaki ISHII (2009)
			I-11	Numerical Methods in Finance	Yoshihiko UCHIDA (2011)
			I-12	Probability Theory	Hiroshi SUGITA
			I-13	Introduction to financial mathematics	Jun SEKINE
			I-14	Life Insurance Mathematics 2	
			I-30	Valuation of Life Insurance Liabilities 2	Miyoshi YUASA
			I-32	Risk Theory 2	Yosuke FUJISAWA
			I-33	Topics on Valuation of Life Insurance Liabilities 1	Miyoshi YUASA
			I-34	Topics on Valuation of Life Insurance Liabilities 2	Miyoshi YUASA
			I-38	Introduction to Insurance Mathematics	Yoshifumi MUROI (2007)
			I-52	Financial Engineering	Masamitsu OHNISHI
			I-56	Optimization Models and Algorithms	Shunji UMETANI
	Advanced Subject	Elective	I-15	Modellings for Actuaries 1	Takehiko MORITA
			I-16	Modellings for Actuaries 2	
			I-17	Modellings for Actuaries 3	
			I-18	Special Lecture for Risk Theory	
			I-19	Stochastic Analysis	Shojiro MANABE
			I-20	Stochastic Analysis in Finance	Jun SEKINE
			I-21	Stochastic differential equations	Hidehiro KAISE
			I-22	Numerical simulations	Reiichiro KAWAI (2009)
			I-23	Credit Risk Models	Marek RUTKOWSKI (2007)
			I-24	Risk Management on financial Risk	Shigeo KUSUOKA (2008)
			I-25	G-Brownian Motion and Dynamic Risk Measure under Volatility Uncertainty	Shige PENG (2007)
			I-26	Recent Topics in Finance 1	Hiroshi ISHIJIMA (2007)
			I-27	Inverse Problems in Financial Modeling: Theoretical and Numerical Aspects of Model Calibration	Rama CONT (2006)
			I-28	Portfolio Optimization and Risk Management via Stochastic Programming	Jitka DUPACOVA (2006)
			I-35	Actuarial Science and Financial Engineering	Yoshifumi MUROI (2009)
			I-36	Recent Topics in Finance 2	Hiroshi ISHIJIMA
			I-37	Market models defined by stochastic process with jump	Takao MIYAHARA (2007)
			I-39	Computational Informatics	Koji OKUHARA
			I-40	Real Option	Michi NISHIHARA
			I-41	Topics in Derivatives and Statistical Risk Management 1	Naoto KUNITOMO (2007) Yoshifumi MUROI (2007)
			I-42	Recent Topics in Finance 3	Hiroshi ISHIJIMA
			I-43	Introduction to high frequency data analysis	Masaaki FUKASAWA (2010)
			I-44	Topics on Valuation of Life Insurance Liabilities 3	Miyoshi YUASA
			I-45	Topics on Valuation of Life Insurance Liabilities 4	Miyoshi YUASA
			I-46	Dynamic Risk Measures	Freddy DELBAEN (2008)
			I-47	Introduction to Backward Stochastic Differential Equations and their Financial Applications	Jun SEKINE (2008)
			I-48	Applications of Valuation of Life Insurance 1	Miyoshi YUASA
			I-49	Applications of Valuation of Life Insurance 2	Miyoshi YUASA
			I-50	Macroeconometrics and Financial Econometrics	Mototsugu SHINTANI (2009)
			I-51	Risk-sensitive portfolio optimization	Jun SEKINE (2009)
			I-53	Applied Malliavin Calculus	Emmanuel GOBET (2009)
			I-54	Numerical Analysis for Optimal Control Problems	Kazutoshi YAMAZAKI
			I-55	Financial Time Series Analysis	Isao ISHIDA
			I-57	Statistics and high frequency data	Jean JACOD (2010)
			I-58	Empirical Finance	Isao ISHIDA
			I-59	Introduction to Computational Finance	Kazutoshi YAMAZAKI

**Graduate Program for Advanced Interdisciplinary Studies
(Software Innovation Leading [Finance Software Course])**

Finance Software Course

The Finance Software Course offers exercise classes on simulation study and empirical analysis with the use of various programming languages and statistical software as well as lessons related to asset and risk management, mathematical fundamentals and simulation methods for the pricing of financial derivatives, and statistical and econometric methods for the analysis of various financial data.

Course	Subject Section		Subject Code	Subject of CSFI	Faculty
	Section ①	Section ②			
Software	Finance	Elective	S-01	Foundation of Financial Systems	Nomura Securities Co., Ltd.
			S-02	Introduction to Computational Finance	Kazutoshi YAMAZAKI
			S-03	Risk Management	Masamitsu OHNISHI
			S-04	Financial Time Series Analysis	Isao ISHIDA
			S-05	Optimization Models and Algorithms	Shunji UMETANI
			S-06	Advanced Mathematical Finance	Kimiaki AONUMA
			S-07	Numerical Analysis for Optimal Control Problems	Kazutoshi YAMAZAKI
			S-08	Process of Statistical Data Analysis	Etsuo KUMAGAI

11 Career Opportunities

The CSFI aims to train exceptionally talented persons who are free from the traditional framework of natural science or social science and have the ability to deal with the advanced financial transaction systems of recent years.

The financial institutions require people who are knowledgeable in advanced mathematics including probability and statistics, computers, in accordance with the recent advancements in financial transactions. At the same time, people who have a thorough understanding of economics are required, as the financial institutional frameworks are also advancing. To meet these demands of recent society, it is necessary to train science students to have an acute sense of the financial economy, and humanities students to have a scientific perspective.

	Mathematical and statistical finance Course	Financial Economics/ Engineering Course	Insurance Course
Occupation	Advanced financial engineer, Quantitative analyst	Advanced financial analyst, Advanced financial planner, Designer/manager of new financial systems	Actuary with broad knowledge of finance
Duties	- Development on investment technology - Development of financial products - Consulting in investment technology - Measurement, management, analysis, and evaluation of monetary risks - Development of mathematical models - Investment, evaluation and management of financial assets - Research and analysis of financial market - Development financial system - Financial trading	- Analysis of carious securities - Financial consulting - Measurement, management, analysis and evaluation of monetary risks - Development of financial products - Evaluation, maintenance and management of financial assets - Financial trading - Research and analysis of financial market - Planning/analysis of financial policies - Financial decision-making and strategy analysis - Analysis and evaluation of business projects - Valuation and appraisal of real estate	- Actuary - Design of insurance/annuity products - Financial management of insurance/annuity services - Risk management of insurance/annuity services
Employment	**Operation/product development/research department of financial institutions** (banks, securities companies, insurance companies) **Life insurance companies, non-life insurance companies, trust banks** (insurance/pension mathematics department) **Financial department of business corporations, venture-capital companies Think tanks** (IT-system/financial/securities/corporate analysis department/ etc.) **Consulting companies, auditing firms** (certified public accountant) **Lawyer, Stock exchanges, financial information service companies, central bank, Financial/fiscal policy development/analysis department of the central/local governments Academics**		

The CSFI's educational programs aim to develop human resources having the broad knowledge of both social and natural sciences that is essential for building a stable monetary economic society in the future. In this regard, it is of great importance to offer an integrated post-graduate education in social and natural sciences. The CSFI's educational program is designed to train the types of professionals such as advanced financial engineers, quantitative analysts, advanced financial analysts, advanced financial planners, who can support banks and security companies by designing financial derivatives, evaluating projects based on financial analyses and making investment decisions. The CSFI also aims to train actuaries with a broad knowledge of finance, and high calibre researchers.

12 Registrations for Study and Careers after Completion

The conditions of registration for courses

The CSFI offers the course to registered graduate students of the Osaka University as well as re-education program which is the curriculum for credited auditors to working adults who wish to acquire knowledge and skills of finance and insurance. The registration of study as of year 2012 is as follows.

2012

Program/Course \ Graduate School	Engineering Science	Economics	Information Science and Technology	Science	Engineering	Human Sciences	Frontier Biosciences	Medicine	Credited Auditor	Total
Total	34	54	15	20	9	1	2	1	9	145
Standard Program	34	49	15	20	9	1	2	1	5	136
Advanced Program	0	5	0	0	0	0	0	0	4	9
Financial Economics and Engineering Course	23	49	12	13	8	1	2	1	6	115
Insurance Course	16	9	6	9	0	0	1	0	1	42
Mathematical Statistical Finance Course	27	19	5	10	1	0	1	0	2	65
Finance Software Course	2	8	1	1	3	0	0	0		15

Careers after completion

Careers for students who completed the CSFI course are stated as follows.

		Banks / Trusts	Securities Companies	Insurance Companies	Think Tanks	Manufacturers	Educators / Researchers	Public office	advance to school	undecided	Others	Not submitted	Total
Year 2006 Graduates	Standard	2									1		3
	Advanced												0
	Total	2	0	0	0	0	0	0	0	0	1	0	3
Year 2007 Graduates	Standard	4	1	4	1	1	1				1	4	17
	Advanced						1						1
	Total	4	1	4	1	1	2	0	0	0	1	4	18
Year 2008 Graduates	Standard	3	1	8		1					1	5	19
	Advanced											1	1
	Total	3	1	8	0	1	0	0	0	0	1	6	20
Year 2009 Graduates	Standard	2		1		3	2	1	2	1	1	7	20
	Advanced											1	1
	Total	2	0	1	0	3	2	1	2	1	1	8	21
Year 2010 Graduates	Standard	2	1	2	2	1					3	4	15
	Advanced												0
	Total	2	1	2	2	1	0	0	0	0	3	4	15
Year 2011 Graduates	Standard			2		1			1		1	6	11
	Advanced											1	1
	Total	0	0	2	0	1	0	0	1	0	1	7	12
Year 2012 Graduates	Standard	4		3		1		1	2		4	2	17
	Advanced												0
	Finance Software					1			1		1		3
	Total	4	0	3	0	2	0	1	3	0	5	2	20

First Semester in 2006

Subject	Engineering Science	Economics	Engineering	International Public Policy	Information Science and Technology	Science	Total number of entries	Total number of earned Units
Stochastic Analysis	22	4	0	1	5	3	35	8
Statistical Analysis	13	1	0	0	3	3	20	17
Advanced Mathematical Programming	17	3	0	0	5	4	29	18
Pension Mathematics	15	2	0	1	8	3	29	10
Advanced Mathematical Finance	22	5	0	1	7	3	38	16
Introduction to financial mathematics	27	8	1	0	9	6	51	17
Financial Economics	7	8	0	0	3	4	22	11
Foundation of Financial Systems	25	8	0	0	9	9	51	31
Investment Theory	13	8	0	0	8	7	36	12
Risk Management	15	6	0	0	6	9	36	14
Elementary Stochastic Calculus	12	10	1	1	2	5	31	15
Probability Theory	3	6	1	0	8	2	20	5
Stochastic Programming	1	1	0	0	8	1	11	7
Life Insurance Mathematics 1	1	1	0	0	3	5	10	3
Exercise session for actuarial mathematics	1	1	0	0	4	4	10	4
	194	72	3	4	88	68	429	188

Second Semester in 2006

Subject	Special Student	Engineering Science	Economics	Engineering	Information Science and Technology	Science	Total number of entries	Total number of earned Units
Corporate Finance	0	2	4	0	4	2	12	5
Financial Econometric	1	3	6	0	5	0	15	5
Central Banking	0	3	9	0	2	2	16	9
Financial Engineering	0	8	7	0	2	2	19	11
Valuation of Life Insurance Liabilities	2	0	0	0	2	1	5	5
Inverse Problems in Financial Modeling: Theoretical and Numerical Aspects of Model Calibration	0	11	0	0	0	0	11	9
Stochastic Analysis in Finance	0	13	5	0	2	4	24	11
Stochastic differential equations	0	9	2	0	3	2	16	11
International Monetary Economics 1	0	0	0	0	0	0	0	0
International Monetary Economics 2	0	0	0	0	0	0	0	0
Numerical Methods in Finance	0	4	1	0	1	0	6	2
Statistical Inference	0	13	1	0	2	1	17	13
Multivariate analysis	0	8	1	0	2	0	11	9
Process of Statistical Data Analysis	0	7	1	0	2	0	10	4
Time Series Analysis	0	12	1	0	2	0	15	10
Business Analysis and Valuation	1	2	3	0	2	0	8	5
Portfolio Optimization and Risk Management via Stochastic Programming	0	2	2	0	0	0	4	1
Recent Topics in Finance 1	2	1	5	0	0	1	9	6
Risk Theory	0	0	0	0	2	2	4	1
Modellings for Actuaries 1	0	3	1	0	2	1	7	6
	6	101	49	0	35	18	209	123

First Semester in 2007

Subject	Special Student	Engineering Science	Economics	Engineering	Information Science and Technology	Science	Total number of entries	Total number of earned Units
Stochastic Analysis	2	12	1	0	1	5	21	6
Statistical Analysis	1	24	0	0	0	1	26	20
Advanced Mathematical Programming	1	22	1	0	0	1	25	11
Pension Mathematics	0	19	2	0	5	3	29	13
Advanced Mathematical Finance	2	22	4	1	3	1	33	14
Introduction to financial mathematics	1	20	4	3	0	1	29	20
Introduction to Risk Management	1	16	0	0	2	1	20	8
G–Brownian Motion and Dynamic Risk Measure under Volatility Uncertainty	1	17	0	0	1	0	19	5
Financial Economics	1	0	7	0	0	0	8	7
Foundation of Financial Systems	1	21	8	2	6	3	41	34
International Monetary Economics 1	0	0	1	0	0	0	1	1
International Monetary Economics 2	0	0	1	0	0	0	1	1
Investment Theory	0	5	7	3	0	1	16	8
Risk Management	0	15	6	0	7	0	28	20
Theory and Practice of Asset Management	0	4	8	0	3	0	15	7
Elementary Stochastic Calculus	1	6	4	1	2	0	14	8
Business Analysis and Valuation	0	2	4	1	2	0	9	8
Probability Theory	0	4	4	0	3	3	14	6
Market Microstructure	0	1	2	0	1	1	5	5
Recent Topics in Finance 2	3	6	2	0	0	0	11	5
Stochastic Programming	0	0	0	0	3	1	4	4
Life Insurance Mathematics 1	0	6	1	1	0	7	15	14
Exercise session for actuarial mathematics	0	0	1	0	5	1	7	3
Risk Theory 1	0	1	1	0	5	4	11	9
Valuation of Life Insurance Liabilities 1	0	3	0	0	0	2	5	5
Valuation of Life Insurance Liabilities 2	2	0	0	0	2	0	4	4
Introduction to Insurance Mathematics	1	3	0	0	4	5	13	8
	18	229	69	12	55	41	424	254

Second Semester in 2007

Subject	Special Student	Engineering Science	Economics	Information Science and Technology	Science	Total number of entries	Total number of earned Units
Computational Informatics	0	0	0	2	0	2	0
Risk Theory 2	0	1	0	3	1	5	5
Credit Risk Models	0	13	0	0	0	13	3
Numerical simulations	0	9	0	0	0	9	7
Topics on Valuation of Life Insurance Liabilities 1	2	0	0	0	0	2	2
Topics on Valuation of Life Insurance Liabilities 2	2	0	0	0	0	2	2
Stochastic Analysis in Finance	1	8	1	0	0	10	7
Stochastic differential equations	1	9	0	0	0	10	6
Financial Econometric	1	2	7	0	0	10	5
Central Banking	1	0	4	0	0	5	3
Financial Engineering	1	9	5	2	1	18	5
Corporate Finance	0	1	3	0	0	4	3
Asset Pricing	1	0	8	0	1	10	4
Numerical Methods in Finance	1	2	2	0	0	5	1
Market models defined by stochastic process with jump	1	4	1	0	0	6	2
Statistical Inference	0	12	0	0	0	12	9
Multivariate analysis	0	9	0	0	0	9	3
Process of Statistical Data Analysis	0	11	0	0	0	11	8
Time Series Analysis	0	16	0	0	0	16	9
Actuarial Science and Financial Engineering	0	3	0	7	1	11	6
Topics in Derivatives and Statistical Risk Management 1	1	3	5	1	0	10	2
Recent Topics in Finance 1	0	3	4	0	0	7	4
Real Option	0	0	3	0	0	3	2
Modellings for Actuaries 1	0	2	0	0	1	3	3
	13	117	43	15	5	193	101

First Semester in 2008

Subject	Special Student	Engineering Science	Economics	Engineering	Information Science and Technology	Human Sciences	Letters	Science	Total number of entries	Total number of earned Units
Multivariate analysis	0	9	0	0	1	0	0	0	10	7
Stochastic Analysis	0	9	1	1	2	0	0	4	17	5
Statistical Analysis	0	17	0	0	1	1	0	4	23	21
Advanced Mathematical Programming	0	16	0	0	3	0	0	1	20	15
Pension Mathematics	0	15	1	0	5	1	0	2	24	15
Advanced Mathematical Finance	0	19	2	2	7	0	0	4	34	15
Introduction to financial mathematics	0	13	7	3	3	0	0	4	30	14
Introduction to Risk Management	1	22	3	1	2	0	0	4	33	16
Foundation of Financial Systems	3	30	18	3	3	1	0	12	70	53
International Monetary Economics 1	0	1	1	0	0	0	0	0	2	1
International Monetary Economics 2	0	0	1	0	0	0	0	0	1	1
Investment Theory	3	15	23	3	6	0	1	5	56	23
Financial Economics	2	0	11	1	2	0	1	3	20	14
Risk Management	1	12	14	3	4	0	0	4	38	28
Theory and Practice of Asset Management	0	4	16	1	1	0	0	0	22	20
Actuarial Science and Financial Engineering	0	2	7	0	0	1	0	7	17	14
Elementary Stochastic Calculus	1	3	14	4	5	0	0	6	33	17
Business Analysis and Valuation	1	2	7	1	3	0	0	2	16	7
Numerical Methods in Finance	0	1	2	3	4	0	0	0	10	5
Probability Theory	1	11	8	2	2	1	0	8	33	9
Recent Topics in Finance 2	2	7	6	1	1	0	0	6	23	9
Stochastic Programming	0	0	0	0	1	0	0	0	1	0
Life Insurance Mathematics 1	1	7	2	1	0	0	0	10	21	14
Valuation of Life Insurance Liabilities 1	0	5	1	0	0	0	0	10	16	12
Valuation of Life Insurance Liabilities 2	0	1	0	0	1	0	0	4	6	4
Exercise session for actuarial mathematics	0	6	1	0	0	0	0	7	14	8
Topics on Valuation of Life Insurance Liabilities 3	1	0	0	0	0	0	0	0	1	1
Topics on Valuation of Life Insurance Liabilities 4	1	0	0	0	0	0	0	0	1	1
Risk Theory 1	0	10	1	0	2	0	0	8	21	13
	18	237	147	30	59	5	2	115	613	362

Second Semester in 2008

Subject	Special Student	Engineering Science	Economics	Engineering	Information Science and Technology	Science	Total number of entries	Total number of earned Units
Process of Statistical Data Analysis	0	4	1	0	2	0	7	2
Statistical Inference	0	3	1	1	2	0	7	3
Time Series Analysis	0	13	1	0	1	2	17	9
Stochastic Analysis in Finance	1	11	1	0	1	6	20	7
Stochastic differential equations	0	7	1	0	1	2	11	5
Introduction to high frequency data analysis	1	4	0	0	0	0	5	1
Backward stochastic differential equations and applications in finance	0	3	0	0	0	0	3	1
Numerical simulations	1	7	2	0	1	0	11	8
Dynamic Risk Measures	1	2	0	0	1	0	4	1
Introduction to Financial Econometrics	0	1	2	0	0	0	3	0
Central Banking	0	1	9	0	1	3	14	6
Financial Econometric	0	0	14	0	0	2	16	4
Corporate Finance	2	3	16	0	2	3	26	14
Financial Engineering	2	5	9	0	2	2	20	14
Real Option	3	1	10	1	0	0	15	12
Recent Topics in Finance 3	2	2	4	1	1	2	12	3
Modellings for Actuaries 1	0	0	0	0	0	1	1	1
Topics on Valuation of Life Insurance Liabilities 1	0	1	1	0	1	2	5	3
Topics on Valuation of Life Insurance Liabilities 2	1	0	0	0	0	1	2	1
Risk Theory 2	0	1	1	0	0	2	4	4
Applied actuarial mathematics 1	1	0	0	0	0	1	2	1
	15	69	73	3	16	29	205	100

First Semester in 2009

Subject	Special Student	Engineering Science	Economics	Engineering	Information Science and Technology	Human Sciences	Letters	Science	Law and Politics	Frontier Biosciences	Total number of entries
Multivariate analysis	0	34	1	7	0	1	0	0	0	0	43
Stochastic Analysis	0	12	2	1	3	0	0	13	0	0	31
Statistical Analysis	1	51	0	7	1	0	0	3	0	0	63
Advanced Mathematical Programming	1	23	3	2	1	0	0	0	0	0	30
Pension Mathematics	0	6	1	1	2	0	0	6	0	0	16
Advanced Mathematical Finance	1	21	0	1	6	0	0	2	0	0	31
Introduction to financial mathematics	0	16	8	0	4	0	0	2	0	1	31
Applied Malliavin Calculus	1	3	0	0	0	0	0	0	0	0	4
Foundation of Financial Systems	2	20	37	2	11	0	0	10	1	1	84
International Monetary Economics 1	0	0	4	0	2	0	0	0	0	0	6
International Monetary Economics 2	0	0	4	0	2	0	0	0	0	0	6
Investment Theory	0	7	36	5	8	0	0	4	0	0	60
Financial Economics	0	2	23	0	0	0	0	1	0	1	27
Risk Management	1	12	27	1	10	0	0	4	0	0	55
Theory and Practice of Asset	1	8	20	1	0	0	0	1	0	0	31
Actuarial Science and Financial	0	3	13	0	2	0	0	5	0	0	23
Elementary Stochastic Calculus	1	2	18	0	1	0	0	3	0	0	25
Numerical Methods in Finance	0	1	5	0	3	0	1	2	0	0	12
Probability Theory	3	6	14	0	3	0	0	17	0	1	44
Recent Topics in Finance 2	1	2	13	0	8	0	0	3	0	0	27
Stochastic Programming	0	0	0	2	23	0	0	0	0	0	25
Market Microstructure	0	1	8	0	0	0	0	0	0	0	9
Macroeconometrics and Financial Econometrics	0	0	10	0	2	0	0	0	0	0	12
Applications of Valuation of Life Insurance 2	1	0	0	0	3	0	0	1	0	0	5
Life Insurance Mathematics 1	0	1	2	0	9	0	0	16	0	0	28
Valuation of Life Insurance Liabilities 1	0	0	1	0	4	0	0	9	0	0	14
Exercise session for actuarial mathematics	0	0	1	0	2	0	0	6	0	0	9
Topics on Valuation of Life Insurance Liabilities 3	1	0	0	0	0	0	0	0	0	0	1
Topics on Valuation of Life Insurance Liabilities 4	1	0	0	0	0	0	0	0	0	0	1
Risk Theory 1	0	0	2	0	2	0	0	10	0	0	14
	16	231	253	30	112	1	1	118	1	4	767

Second Semester in 2009

Subject	Special Student	Engineering Science	Economics	Engineering	Information Science and Technology	Human Sciences	Science	International Public Policy	Total number of entries
Process of Statistical Data Analysis	0	11	3	0	2	0	0	0	16
Statistical Inference	0	9	0	0	0	0	0	0	9
Time Series Analysis	2	17	2	0	1	0	1	0	23
Stochastic Analysis in Finance	3	5	4	0	0	0	3	0	15
Stochastic differential equations	2	10	0	0	2	0	5	0	19
Numerical simulations	0	9	2	0	1	0	0	0	12
Introduction to high frequency data analysis	0	8	0	0	0	0	0	0	8
Numerical Analysis for Optimal Control Problems	0	6	4	0	0	0	0	0	10
Risk-sensitive portfolio optimization	1	7	5	0	1	0	0	0	14
Introduction to Financial Econometrics	0	0	13	0	0	0	0	0	13
Financial Econometric	1	0	4	0	1	0	0	1	7
Corporate Finance	0	3	29	0	6	0	2	0	40
Real Option	0	1	6	0	3	0	0	0	10
Recent Topics in Finance 3	3	2	10	0	5	0	0	0	20
Business Analysis and Valuation	3	0	16	0	2	0	1	0	22
Asset Pricing	0	0	4	0	0	0	0	0	4
Special Lecture on Finance	0	0	12	0	0	1	0	0	13
Financial Engineering	0	1	13	0	2	0	1	0	17
Modellings for Actuaries 1	0	1	0	0	0	0	4	0	5
Topics on Valuation of Life Insurance Liabilities 1	0	0	0	0	0	0	1	0	1
Topics on Valuation of Life Insurance Liabilities 2	0	0	0	0	0	0	3	0	3
Risk Theory 2	0	0	2	0	0	0	5	0	7
Applications of Valuation of Life Insurance 1	1	0	0	0	0	0	1	0	2
Valuation of Life Insurance Liabilities 2	0	0	0	0	1	0	4	0	5
Computational Informatics	0	0	0	1	7	0	0	0	8
	16	90	129	1	34	1	31	1	303

First Semester in 2010

Subject	Credited Auditor	Engineering Science	Economics	Engineering	Information Science and Technology	Human Sciences	Science	International Public Policy	Frontier Biosciences	Total number of entries
Multivariate analysis	0	15	0	0	0	1	0	0	0	16
Stochastic Analysis	2	10	1	0	2	0	19	0	0	34
Statistical Analysis	2	53	1	0	0	0	3	0	0	59
Advanced Mathematical Programming	0	24	2	0	0	0	4	0	0	30
Pension Mathematics	1	17	2	1	2	0	7	0	1	31
Advanced Mathematical Finance	1	20	6	0	3	0	5	0	1	36
Introduction to financial mathematics	0	12	7	2	3	0	12	0	0	36
Foundation of Financial Systems	2	6	39	1	6	0	30	0	1	85
International Monetary Economics 1	0	0	6	0	0	0	0	0	0	6
Investment Theory	3	3	27	2	3	0	8	0	1	47
Financial Economics	1	0	28	2	2	0	1	1	0	35
Risk Management	2	7	16	0	2	0	9	0	1	37
Theory and Practice of Asset Management	2	1	17	0	1	0	2	0	1	24
Elementary Stochastic Calculus	1	1	15	0	1	0	8	0	1	27
Probability Theory	1	1	4	1	3	0	21	0	1	32
Recent Topics in Finance 2	0	3	14	1	2	0	6	0	1	27
Market Microstructure	0	1	6	1	0	0	0	0	0	8
Applications of Valuation of Life Insurance 2	1	0	0	0	1	0	1	0	0	3
Life Insurance Mathematics 1	1	1	2	1	12	0	24	0	0	41
Valuation of Life Insurance Liabilities 1	0	1	2	0	4	0	12	0	0	19
Exercise session for actuarial mathematics	0	1	0	0	3	0	5	0	0	9
Topics on Valuation of Life Insurance Liabilities 3	0	0	0	0	0	0	1	0	0	1
Topics on Valuation of Life Insurance Liabilities 4	0	0	0	0	1	0	0	0	0	1
Optimization models and algorithms	0	0	0	0	14	0	0	0	0	14
Financial Time Series Analysis	0	2	18	2	3	0	2	0	1	28
Modellings for Actuaries 1	0	0	0	0	0	0	5	0	0	5
Risk Theory 1	0	1	1	1	2	0	8	0	0	13
	20	180	214	15	70	1	193	1	10	704

Second Semester in 2010

Subject	Credited Auditor	Engineering Science	Economics	Information Science and Technology	Science	Frontier Biosciences	Total number of entries
Process of Statistical Data Analysis	0	13	4	0	1	0	18
Statistical Inference	0	14	1	0	1	0	16
Time Series Analysis	0	15	6	0	0	0	21
Stochastic Analysis in Finance	1	9	3	1	5	0	19
Stochastic differential equations	0	11	2	1	8	0	22
Introduction to high frequency data analysis	1	5	2	0	1	0	9
Numerical Analysis for Optimal Control Problems	0	2	8	0	0	0	10
Introduction to Financial Econometrics	0	0	7	0	1	0	8
Financial Econometric	1	0	16	0	0	0	17
Corporate Finance	2	0	26	0	2	1	31
Real Option	0	0	12	0	0	0	12
Recent Topics in Finance 3	1	1	18	0	1	0	21
Business Analysis and Valuation	0	0	14	0	0	0	14
Financial Engineering	1	3	12	0	8	0	24
Topics on Valuation of Life Insurance Liabilities 1	1	0	0	0	0	0	1
Topics on Valuation of Life Insurance Liabilities 2	0	0	0	0	0	0	0
Risk Theory 2	0	1	0	1	5	0	7
Applications of Valuation of Life Insurance 1	0	0	0	1	0	0	1
Valuation of Life Insurance Liabilities 2	0	0	0	3	7	0	10
Numerical Methods in Finance	0	5	4	0	0	0	9
International Monetary Economics 2	0	0	5	0	0	0	5
Empirical Finance	1	0	18	0	0	0	19
High Frequency Data Analysis	0	4	1	0	0	0	5
Non-Parametric Statistical Methods	0	6	1	0	0	0	7
Computational Informatics	0	0	0	8	0	0	8
	9	89	160	15	40	1	314

First Semester in 2011

Subject	Credited Auditor	Engineering Science	Economics	Engineering	Information Science and Technology	Human Sciences	Science	Frontier Biosciences	Total number of entries
Multivariate analysis	1	45	0	0	0	0	0	0	46
Stochastic Analysis	0	12	1	0	1	0	8	1	23
Statistical Analysis	0	43	1	1	0	0	2	0	47
Advanced Mathematical Programming	0	19	1	1	0	0	0	0	21
Pension Mathematics	0	6	0	0	0	0	0	0	6
Advanced Mathematical Finance	0	10	4	1	2	0	1	0	18
Introduction to financial mathematics	1	9	8	0	2	0	1	1	22
Foundation of Financial Systems	1	9	32	3	3	1	5	1	55
International Monetary Economics 1	0	0	3	0	0	0	0	0	3
Investment Theory	0	5	16	1	2	1	0	1	26
Risk Management	0	7	18	1	1	0	0	1	28
Theory and Practice of Asset Management	1	1	16	0	0	0	0	0	18
Elementary Stochastic Calculus	0	2	15	0	1	0	0	0	18
Probability Theory	0	9	9	0	2	0	5	0	25
Recent Topics in Finance 2	1	1	13	0	2	0	2	0	19
Market Microstructure	0	0	6	0	0	0	0	0	6
Applications of Valuation of Life Insurance 2	0	0	0	0	0	0	0	0	0
Life Insurance Mathematics 1	0	6	5	0	5	0	8	1	25
Valuation of Life Insurance Liabilities 1	0	5	2	0	7	0	4	0	18
Exercise session for actuarial mathematics	0	4	1	0	0	0	3	0	8
Topics on Valuation of Life Insurance Liabilities 3	0	0	0	0	0	0	0	0	0
Topics on Valuation of Life Insurance Liabilities 4	0	0	0	0	0	0	0	0	0
Optimization models and algorithms	0	0	0	0	8	0	0	0	8
Financial Time Series Analysis	1	3	13	0	2	0	1	0	20
Risk Theory 1	0	1	0	0	1	0	4	1	7
	6	197	164	8	39	2	44	7	467

Second Semester in 2011

Subject	Credited Auditor	Engineering Science	Economics	Information Science and Technology	Science	Frontier Biosciences	Total number of entries
Process of Statistical Data Analysis	2	7	1	0	0	0	10
Computational Informatics	0	1	0	8	0	0	9
Statistical Inference	0	8	0	0	1	1	10
Time Series Analysis	0	12	1	0	0	0	13
Stochastic Analysis in Finance	0	12	4	2	1	1	20
Stochastic differential equations	0	12	1	0	6	1	20
Numerical Analysis for Optimal Control Problems	1	1	2	0	0	0	4
Financial Econometric	0	0	11	0	0	0	11
Corporate Finance	1	1	38	1	0	1	42
Real Option	1	0	8	0	0	0	9
Recent Topics in Finance 3	0	1	12	0	0	0	13
Business Analysis and Valuation	1	0	23	0	0	0	24
Financial Engineering	0	1	12	1	3	1	18
Topics on Valuation of Life Insurance Liabilities 1	0	0	0	0	0	0	0
Topics on Valuation of Life Insurance Liabilities 2	0	0	0	0	0	0	0
Risk Theory 2	0	0	1	1	2	0	4
Applications of Valuation of Life Insurance 1	0	0	0	0	0	0	0
Valuation of Life Insurance Liabilities 2	0	1	0	0	5	0	6
Numerical Methods in Finance	0	5	7	0	0	1	13
International Monetary Economics 2	0	1	1	0	0	0	2
Empirical Finance	1	0	5	0	0	0	6
Asset Pricing	0	0	6	0	0	0	6
Modellings for Actuaries 1	0	0	2	0	0	0	2
	7	63	135	13	18	6	242

First Semester in 2012

Subject	Credited Auditor	Engineering Science	Economics	Engineering	Information Science and Technology	Science	Medicine	Frontier Biosciences	Total number of entries
Multivariate analysis	0	9	1	0	0	0	0	0	10
Stochastic Analysis	0	16	0	0	0	7	0	0	23
Statistical Analysis	0	14	0	0	0	0	0	0	14
Advanced Mathematical Programming	0	7	1	0	1	1	0	0	10
Pension Mathematics	0	11	0	1	2	3	0	0	17
Advanced Mathematical Finance	1	26	10	4	1	0	0	0	42
Introduction to financial mathematics	0	26	4	1	0	1	0	0	32
Foundation of Financial Systems	2	7	23	2	3	10	1	0	48
International Monetary Economics 1	0	0	2	0	0	0	0	0	2
Investment Theory	1	0	7	0	3	4	0	2	17
Risk Management	2	19	12	0	5	3	0	3	44
Theory and Practice of Asset Management	1	1	2	1	1	0	0	0	6
Elementary Stochastic Calculus	0	5	10	1	2	5	0	2	25
Probability Theory	0	18	6	1	11	11	0	2	49
Recent Topics in Finance 2	0	6	0	0	0	0	0	0	6
Applications of Valuation of Life Insurance 2	0	0	0	0	0	0	0	0	0
Life Insurance Mathematics 1	0	9	0	1	4	8	0	2	24
Valuation of Life Insurance Liabilities 1	0	0	0	0	4	6	0	0	10
Exercise session for actuarial mathematics	0	0	0	0	2	3	0	0	5
Topics on Valuation of Life Insurance Liabilities 3	0	0	0	0	0	0	0	0	0
Topics on Valuation of Life Insurance Liabilities 4	1	0	0	0	0	0	0	0	1
Optimization models and algorithms	0	0	0	0	6	0	0	0	6
Financial Time Series Analysis	0	6	8	0	6	4	0	0	24
Risk Theory 1	0	1	1	0	0	4	0	0	6
Time Series Analysis	0	7	0	0	0	1	0	0	8
Corporate Finance	1	1	1	0	0	1	0	1	5
Recent Topics in Finance 3	1	0	3	0	0	2	0	0	6
Business Analysis and Valuation	3	0	1	0	1	3	0	1	9
Financial Economics	1	0	2	0	1	0	0	0	4
Introduction to Computational Finance	1	25	13	2	0	2	0	0	43
Empirical Analysis of Market Microstructure	0	0	2	0	0	0	0	0	2
	15	214	109	14	53	79	1	13	498

Second Semester in 2012

Subject	Credited Auditor	Engineering Science	Economics	Engineering	Information Science and Technology	Science	Medicine	Frontier Biosciences	Total number of entries
Process of Statistical Data Analysis	0	2	0	0	0	0	0	0	2
Computational Informatics	0	0	0	0	2	0	0	0	2
Statistical Inference	0	3	0	0	0	2	0	0	5
Stochastic Analysis in Finance	1	16	14	0	0	1	0	0	32
Stochastic differential equations	0	19	11	0	0	4	0	0	34
Numerical Analysis for Optimal Control Problems	1	8	10	0	0	2	0	0	21
Financial Econometric	0	0	4	1	0	2	0	0	7
Real Option	0	0	8	0	0	1	0	0	9
Financial Engineering	2	9	15	0	0	2	0	0	28
Topics on Valuation of Life Insurance Liabilities 1	0	0	0	0	0	0	0	0	0
Topics on Valuation of Life Insurance Liabilities 2	0	0	0	0	0	0	0	0	0
Risk Theory 2	0	0	0	0	0	2	0	0	2
Applications of Valuation of Life Insurance 1	1	0	0	0	0	0	0	0	1
Valuation of Life Insurance Liabilities 2	0	0	0	0	3	5	0	0	8
International Monetary Economics 2	0	0	2	0	0	0	0	0	2
Empirical Finance	0	0	7	0	0	0	0	0	7
Modellings for Actuaries 1	0	2	0	0	0	1	0	0	3
	5	59	71	1	5	22	0	0	163

13 Specially Appointed Faculty from Abroad

The CSFI designs and conducts globally-advanced education with the cooperation of specially appointed faculty invited form abroad.

Second semester in 2010
Jean Jacod (Université Paris VI)
Lecture: Statistics and High Frequency Data

Second semester in 2009
Youri Kabanov (University of Franche-Comté, Besancon)
Lecture: Theory of large financial markets

Second semester in 2009
Goran Peskir (The University of Manchester)
Lecture: Lectures on Optimal Stopping and Free Boundary Problems (with Applications in Mathematical Finance)

First semester in 2009
Mototsugu Shintani (Vanderbilt University)
Lecture: Macroeconometrics and Financial Econometrics

Abstract: This course is designed for graduate students who mastered the introductory econometrics and wish to apply the time-series econometric methods to the field of macroeconomics, international finance, and finance. The selected empirical topics include (1) Business cycle analysis, (2) Exchange rate and price adjustment dynamics, (3) Estimation of dynamic stochastic general equilibrium models, and (4) Financial forecasting and testing for chaos.

First semester in 2009
Emmanuel Gobet (Grenoble Institute of Technology – Ensimag)
Lecture: Applied Malliavin Calculus

Abstract: In the seventies, Paul Malliavin initiated a deep theory of stochastic analysis, in order to prove the Hormander theorem and to study the regularity of probability laws. In the last decade, this so-called Malliavin calculus has also been used in some applications, for probabilistic algorithms and mathematical finance. This course is aimed at giving an
overview of these applications.

Second semester in 2008
Michael Sørensen (University of Copenhagen)
Lecture: Statistical inference for stochastic differential equations from discrete time observations

Abstract: The Pearson diffusions form a flexible class of diffusions defined by having linear drift and quadratic squared diffusion coefficient. It is demonstrated that for this class explicit statistical inference is feasible. A complete model classification is presented for the ergodic Pearson diffusions. The class of stationary distributions equals the full Pearson system of distributions. Well-known instances are the Ornstein-Uhlenbeck processes and the square root (CIR) processes. Also diffusions with heavy-tailed and skew marginals are included. Explicit formulae for the conditional

moments and the polynomial eigenfunctions are derived. Explicit optimal martingale estimating functions are found. The discussion covers GMM, quasi-likelihood, non-linear weighted least squares estimation and likelihood inference too. The analytical tractability is inherited by transformed Pearson diffusions, integrated Pearson diffusions, sums of Pearson diffusions and Pearson stochastic volatility models. For the non-Markov models, explicit optimal prediction-based estimating functions are found. The estimators are shown to be consistent and asymptotically normal.

Second semester in 2008
Freddy Delbaen (Professor Emeritus, Department of Mathematics, ETH Zurich)
Lecture: Dynamic Risk Measures

Abstract: We extend the definition of coherent risk measures, as introduced by Artzner, Delbaen, Eber and Heath, to general probability spaces and we show how to define such measures on the space of all random variables. We also give examples that relates the theory of coherent risk measures to game theory and to distorted probability measures. The mathematics are based on the characterisation of closed convex sets, of probability measures that satisfy the property that every random variable is integrable for at least one probability measure in the set.

The Lecture Note was issued in March 2012 as Osaka University CSFI Lecture Note Series 03

Second semester in 2007
Marek Rutkowski (University of New South Wales, Australia)
Lecture: Credit Risk Models

Abstract:Credit risk embedded in a financial transaction is the risk that at least one of the parties involved in the transaction will suffer a financial loss due to default or decline in the creditworthiness of the counter party to the transaction, or perhaps of some third party. The most extensively studied form of credit risk is the *default risk* – that is, the risk that a counterparty in a financial contract will not fulfil a contractual commitment to meet her/his obligations stated in the contract. For this reason, the main tool in the area of credit risk modeling is a judicious specification of the random time of default. A large part of the present text is devoted to this issue. Our main goal is to present the most important mathematical tools that are used for the arbitrage valuation of defaultable claims, which are also known under the name of credit derivatives. We also examine the important issue of hedging these claims.

The Lecture Note was issued in November 2009 as Osaka University CSFI Lecture Note Series 02

First semester in 2007
Peng Shige (Shandong University & Fudan University China)
Lecture: G-Brownian Motion and Dynamic Risk Measure Under Volatility Uncertainty

Abstract: We present the recent developments of sublinear expectation theory and the related G-normal distribution, G-Brownian motions and its stochastic calculus. We also present the applications of the new stochastic analysis, calculus and numerical calculations to measures of risk in finance under volatility un- certainty.

Second semester in 2006
Rama Cont (Ecole Polytechnique, France, CNRS researcher)
Lecture: Inverse Problems in Financial Modeling: Theoretical and Numerical Aspects of Model Calibration

Abstract: While option pricing theory deals with pricing of derivative instruments given a stochastic process for the underlying asset, a first step involved in applying these models is to identify the

(unknown) stochastic process of the underlying asset from information on prices of certain options. This inverse problem, known as the model calibration problem, is a more difficult and often ill-posed problem, whose solution requires a careful reformulation and has led to the development of specific numerical methods. This course is an introduction to theoretical, numerical and empirical aspects of model calibration. We will review the problem in different settings -static models, diffusion models, Lévy processes, and stochastic volatility models- and discuss solutions based on partial differential equation methods as well as probabilistic solutions, paying attention to numerical implementation of solutions. Along the way we will cover some aspects of the theory of regularization of ill-posed inverse problems, an active branch of applied mathematics.

First semester in 2006
Jitka Dupacova (Charles University, Czech Republic)
Lecture: Portfolio Optimization and Risk Management via Stochastic Programming

1. Brief review of recent results on stochatic programming including scenario analysis,
2. Various models of Portfolio Optimization arizing actual management especially finance,
3. Risk management problems and actual solution methods based on stochastic programming,
4. Some applications to actual investment and insurance problems.

The Lecture Note was issued in September 2009 as Osaka University CSFI Lecture Note Series 01

14 Mini-Lecture Series

The CSFI offers a Mini-Lecture Series to complement the curriculum and enhance the educational effects.

First Semester in 2012
"Financial Engineering and Applications"
Yoshihiko Uchida (Bank of Japan)

Second Semester in 2011
"Bank and Financial Engineering"
Kenichi Arakawa, et al. (Resona Bank)

First Semester in 2011
"Lectures on News Shocks"
Ryo Jinnai (Texas A&M University)

Second Semester in 2010
"Bank and Financial Engineering"
Kenichi Arakawa, et al. (Resona Bank)

First Semester in 2010
"Factor Modelling for High-Dimensional Time Series"
W.F. Lam (London School of Economics and Political Science)

First Semester in 2010
"Employee Stock Options: Contractual Restrictions, Optimal Hedging and Early Exercises"
Siu-Tang Leung (Johns Hopkins University)

Second Semester in 2009
"Theory of Large Financial Markets"
Yuri Kabanov (University of Franche-Comte, Besancon)

Second Semester in 2009
"Lectures on Optimal Stopping and Free Boundary Problems"
(with Applications in Mathematical Finance)
Goran Peskir (University of Manchester)

Second Semester in 2009
"Pricing and management of counter party credit risk"
Katsuichiro Uchiyama（Morgan Stanley）

Second Semester in 2009
"Bank and Financial Engineering"
Kenichi Arakawa, et al. (Resona Bank)

Second Semester in 2008
"An Introduction to Quantitative Analysis"
Sebastian del Bano (Centre de Recerca Matematica, Barcelona Spain)

Second Semester in 2008
"Statistical Inference for Stochastic Differential Equations from Discrete Time Observations"
Michael Sørensen (University of Copenhagen)

First Semester in 2008
"Bank and Financial Engineering"
Kenichi Arakawa, et al. (Resona Bank)

Second Semester in 2006
"Valuation theory: framework and cases"
Nobuyuki Isagawa (Kobe University)

Second Semester in 2006
"Introduction to market microstructure"
Yasuhiko Tanigawa（Waseda University）

Second Semester in 2006
"Preference and utility under uncertainty"
Takao Asano（Keio University）

(Some of the lecture titles in Japanese are translated into English by the CSFI)

15 METI "Industry-Academia Joint Committee on Highly Qualified Human Resources in Finance"

Presently, the industrial world, financial world and academic world, respectively, are facing the problems of strengthening the competitiveness of our financial and capital market through training advanced financial experts. In order to deal successfully with those problems, and to proceed with training advanced finance human resources and to make the best use of such human resources, the Industry-Academia Joint Committee on Highly Qualified Human Resources in Finance was established in June 2007 for industrial world, financial world and academic world to exchange their information to share the knowledge. The committee set up two sub-committees to arrange the present situations of financial staff in the industrial world, financial world and academic world as well as to clarify the common problems and the plan of how to deal with the problems jointly. One is the Commercial Finance Human Resources Committee which is related to project finance and M&A, and the other is the Financial Engineering Human Resources Committee which deals with developing financial products such as derivatives, and risk management. The CSFI participates in the Financial Engineering Human Resources Committee as a committee member.

At the Financial Engineering Human Resources Committee, members discuss improving the finance needs of business corporations and financial institutions, strengthening competitiveness of the financial and capital market, the present situation of advanced finance human resources and the necessity of training those human resources. And the following specific steps are suggested especially for universities to work out.

1. Include substantial elementary finance education in universities.
2. Open a forum to exchange opinions about human resources between universities and business companies.
3. Universities to produce human resources for the financial world.
4. Universities to work in close cooperation with one another to train leading human resources for financial engineering.

The CSFI wishes to respond immediately to realize the above suggestions in co-operation with related organizations.

16 Seminar Series

Distinguished researchers in related fields such as financial economics, financial engineering, and mathematical quantitative finance have been appointed to lecture on the latest research trends.

February 15, 2013
The 45th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Higher order moments and risk premiums"
Hiroshi Sasaki (Hitotsubashi University)

February 15, 2013
The 44th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"An integration-by-parts formula for stopping times and its application"
Tomonori Nakatsu (Ritsumeikan University)

December 26, 2012
The 43rd Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Arbitrage-free SVI volatility surfaces"
Jim Gatheral (Baruch College, The City University of New York)

In this talk we show how to calibrate the widely-used SVI parameterization of the implied volatility surface in such a way as to guarantee the absence of static arbitrage. In particular, we exhibit a large class of arbitrage-free SVI volatility surfaces with a simple closed-form representation. We demonstrate the high quality of typical SVI fits with a numerical example using recent SPX options data.

December 5, 2012
The 42nd Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Estimating the Cost of Equity: Why Do Simple Benchmarks Outperform Factor Models?"
Bradley S. Paye (University of Georgia - C. Herman and Mary Virginia Terry College of Business)

This paper compares the performance of estimates of the cost of equity based on leading factor models to two simple alternatives: the historical asset mean and the historical market mean. We derive analytical expressions for mean squared errors (MSEs) for these estimators and calibrate our formulas for the CAPM
and Fama-French three factor models using data for firms and industries. We show that, even if there is no mispricing and the true factor loadings are known, the market mean outperforms model-based alternatives for a surprising fraction of firms. Our formulas show how mispricing that is negatively correlated with firm and industry market betas further improves the performance of the market mean relative to model-based approaches. Empirical results confirm this form of misspecification for both the CAPM and Fama-French models. Consistent with our analytical and calibration results, we find that the market mean outperforms model-based alternatives out-of-sample.

December 14, 2012
The 41st Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)

"Nadaraya-Watson estimator for stochastic processes driven by stable Lévy motions"

Hongwei Long (Florida Atlantic University)

We discuss the nonparametric Nadaraya-Watson (N-W) estimator of the drift function for ergodic stochastic processes driven by stable noises and observed at discrete instants. Under geometrical mixing condition, we derive consistency and rate of convergence of the N-W estimator of the drift function. Furthermore, we obtain a central limit theorem for stable stochastic integrals. The central limit theorem has its own interest and is a crucial tool for the proofs. A simulation study illustrates the finite sample properties of the N-W estimator.

September 7, 2012
One Day Seminar: Topics in Lévy and Jump Processes

"Censored Stable Processes"
Andreas Kyprianou (University of Bath)

We look at a general two-sided jumping strictly alpha-stable process where alpha is in (0,2). By censoring its path each time it enters the negative half line we show that the resulting process is a positive self-similar Markov Process. Using Lamperti's transformation we uncover an underlying driving Lévy process and, moreover, we are able to describe in surprisingly explicit detail the Wiener-Hopf factorization of the latter. Using this Wiener-Hopf factorization together with a series of spatial path transformations, it is now possible to produce an explicit formula for the law of the original stable processes as it first "enters" a finite interval, thereby generalizing a result of Blumenthal, Getoor and Ray for symmetric stable processes from 1961.

"Finite Maturity Corporate Debt Valuation with Sharing Rule Upon Default Under Lévy Models"
Budhi Arta Surya (Bandung Institute of Technology)

This paper discusses the valuation of finite maturity corporate debt under the Lévy models of underlying firm's assets. The debt specifies that both equity and debt holders will share the total value of the firm upon default due to a certain rule. As proposed by Fan and Sundaresan (2000), the sharing rule is determined by Nash bargaining game. Due to conflict of interest between the equity and debt holders, the firm faces two-stage optimization problem. The firm will perform the first-stage optimization to maximize the total firm value, as the debt holders will act in the anticipation of what the equity holders may do later when the debt is issued. Once the total firm value is calculated, the equity holders will find the optimal default level that maximizes the firm equity value. Since the nature of the optimization problem is of finite maturity, there is no closed form valuation formula available. Therefore, we resolve to numerical method proposed in Surya (2012). The method is based on the associated partial-integro differential equation formulations of the optimization problem. The numerical results verify the recent result of Surya (2012) and Kyprianou and Surya (2006) that the smooth pasting condition may not hold for general Lévy processes.

"Approximation schemes for Lévy driven stochastic differential equations"
Arturo Kohatsu-Higa (Ritsumeikan University)

Stochastic differential equations (sde's) driven by Lévy processes have various applications. Between them notably in Finance, these are infinite activity Lévy processes which are mainly characterized by the fact that their Lévy measure has infinite mass and therefore an infinite amount of jumps in any interval. It is clear (in general) that the path of such Lévy process can not be simulated exactly and therefore usually approximating Lévy process are used. The problem of efficiently simulating the solution of sde's driven by such processes is a challenging problem and we will present some of our recent results in the area. From the mathematical point of view, our approach profits from the splitting method written in a probabilistic framework. We will show that the use of such frame allows a tractable study of the error and therefore providing the study of the optimality of the approximating Lévy process.

"Cocos, bail-in, and tail risks"
Nan Chen (Chinese University of Hong Kong)

We develop a capital structure model to analyze the incentives created by contingent convertibles (CoCos) and bail-in debt, two variants of debt that converts to equity as a bank nears or reaches financial distress. Our formulation includes firm-specific and market-wide tail risk in the form of two types of jumps and leads to a tractable jump-diffusion model of the firm's income and asset value. The firm's liabilities include insured deposits and senior and subordinated debt, as well as convertible debt. Our model combines endogenous default, debt rollover, and jumps; these features are essential in examining how changes in capital structure to include CoCos or bail-in debt change incentives for equity holders. We derive closed-form expressions to value the firm and its liabilities, and we use these to investigate how CoCos affect debt overhang, asset substitution, the firm's ability to absorb losses, the sensitivity of equity holders to various types of risk, and how these properties interact with the firm's debt maturity profile, the tax treatment of CoCo coupons, and the pricing of deposit insurance. We examine the effects of varying the two main design features of CoCos, the conversion trigger and the conversion ratio, and we compare the effects of CoCos with the effects of reduced bankruptcy costs through orderly resolution. Across a wide set of considerations, we find that CoCos generally have positive incentive effects when the conversion trigger is not set too low. The need to roll over debt, the debt tax shield, and tail risk in the firm's income and asset value have particular impact on the effects of CoCos. We also identify a phenomenon of debt-induced collapse that occurs when a firm issues CoCos and then takes on excessive additional debt: the added debt burden can induce equity holders to raise their default barrier above the conversion trigger, effectively changing CoCos to junior straight debt; equity value experiences a sudden drop at the point at which this occurs. Finally, we calibrate the model to past data on the largest U.S. bank holding companies to see what impact CoCos might have had on the financial crisis. We use the calibration to gauge the increase in loss absorbing capacity and the reduction in debt overhang costs resulting from CoCos. We also time approximate conversion dates for high and low conversion triggers.   A joint work with Paul Glasserman, Behzad Nouri, Markus Pelger.

"Optimal Stopping When the Absorbing Boundary is Chasing After"
Masahiko Egami (Kyoto University)

We consider a new type of optimal stopping problems where the absorbing boundary moves as the state process X attains new maxima S. More specifically, we set the absorbing boundary as $S - b$ where b is a certain constant. This problem is naturally connected with excursions from zero of the reflected process

$S - X$. We examine this problem with the state variable X as a spectrally negative Lévy process. This work is motivated by the bank's profit maximization with the constraint that it maintain a certain level of leverage ratio. When the bank's asset value deteriorates, the required capital requirement is endangered. This situation corresponds to $X < S - b$ in our setting. This model may well describes a real-world problem where even a big bank can fail because the absorbing boundary is keeping up with the size of the bank. Moreover, the problem is in nature a two-dimensional one in which, unlike one-dimensional cases, we show that the "threshold strategy" is not in fact optimal. This is a joint work with T. Oryu.

"Future Drawdowns of Lévy processes"
Erik Baurdoux (London School of Economics)

For a Lévy process X we study the future draw-down defined as $D_{t,s} = \inf_{t \leq u \leq t+s}(X_u - X_t)$ which is the minimum increment of X starting at t and length at most s. As an application, consider the case where the value of a stock is modeled by the exponential of a Lévy process. Then $D_{t,s}$ can be thought of as the lowest future log return in the time window $[t, t+s]$. We study $\overline{D}_{T,s} = \sup_{0 \leq t \leq T} D_{t,s}$ which is the largest such future return with t ranging over $[0, T]$. When $S = \infty$ we find the exact asymptotics of $P(\overline{D}_{T,s} > x)$ (as $x \to \infty$) in the case when the Lévy measure is light tailed. Furthermore, in the case

when X only has one-sided jumps we express $P(\overline{D}_{i \wedge \theta_r} > x)$ in terms of scale functions when e_1 and e_2 are independent, exponentially distributed random variables.

June 29, 2012
The 40th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Speed of Convergence to Equilibrium of Random Dynamical Systems - With Applications"
Rabi Bhattacharya (Department of Mathematics, University of Arizona)

Markov processes in discrete time on a standard state space S are of the form $X_n = \alpha_n \cdots \alpha_1 X_0$, where α_n (n = 1, 2, …) are i.i.d. random maps on S, independent of the initial state X_0. For processes of interest here, S is a partially ordered metric space and α n are monotone maps on S into S. We find conditions for the existence of a unique equilibrium π and compute the speed of convergence of X_n to π in an appropriate distance. Applications are given to some growth and ruin problems in economics and insurance, and to the 2D Ising model on finite lattices. In continuous time we consider processes $X_t (t \geq 0)$ on $S = R^k (k \geq 1)$ governed by Ito's stochastic differential equation $dX_t = b(X_t)dt + \sigma(X_t)dB_t$, with an initial X_0 independent of the k-dimensional Brownian motion $B_t (t \geq 0)$. Of particular interest are slow (i.e., polynomial) convergence rates to equilibrium signifying long range dependence.

January 26, 2012
The 39th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Market price of risk under LIBOR market models and real world simulation"
Takashi Yasuoka (Shibaura Institute of Technology)

November 18, 2011
The 38th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Asymptotic Expansion Applied for Pricing Hybrid FX Option with Libor Market Models under the Stochastic Volatility and Heston Model in Currency Processes"
Takahiro Hasegawa (Kyoto University)

In this presentation, we will give a discourse on pricing Hybrid FX option between Libor Market Model under Stochastic Volatility and Heston Model in Currency Processes by means of an Asymptotic Expansion Method. In many financial institutions, it is recommended that most of officers at market departments should adopt ideas of Libor Market Model in order to price interest rate derivatives (such as Cap/Floor, Swaption and so on) and it is natural that ideas of Libor Market Model be applied to discounting various assets described as stochastic differential equations. In Monte Carlo Simulation, a frequently-used Simulation used in many financial institutions, however, pricing options with hybrid model requires much time and is just not realistic by using standard applications such as Excel etc. Hence other methods than Monte Carlo Simulation are required to reduce the burden for PCs and yet to produce the same effects. With an Asymptotic Expansion, an approximate probability density function can be obtained faster than with Monte Carlo Simulation and can be computed easily even with Excel only if every term of an Asymptotic Expansion is calculated. In this research, it is confirmed whether pricing hybrid FX option between Libor Market Model and Heston Model with the use of an Asymptotic Expansion Method under the freezing method produces the same effect as Monte Carlo Simulation.

October 21, 2011

One Day Seminar "Topics in Finance and Statistics" (CREST-Research Division Joint Seminar)

"Implementation of asymptotic expansion programs and applications"
Masahiro Nishiba (Tokyo Institute of Technology)

 "Information Criteria under Diffusion Models"
Takayuki Fujii (Osaka Universtiy)

"Volatility estimation of high frequency data under jumps and market microstructure noise"
Shuichi Nagata (Kwansei Gakuin University)

July 25, 2011
The 37th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Conditions for existence of solutions to the Monge problem on the embedded sphere with Euclidean distance squared costs"
Jun Kitagawa (Princeton University)

December 21, 2010
The 36th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Multivariate Asset Return Prediction with Mixture Models"
Marc Paolella (Swiss Banking Institute, University of Zurich and Swiss Finance Institute)

The use of mixture distributions for modeling asset returns has a long history in finance. New methods of demonstrating evidence for their necessity in the multivariate case is provided. The use of a two-component multivariate normal mixture distribution, coupled with shrinkage via a quasi-Bayesian prior, is motivated, and shown to be numerically trivial and reliable to estimate, unlike the majority of multivariate GARCH models in existence. Equally important, it provides a clear improvement over use of GARCH models feasible for use with a large number of assets, such as CCC, DCC, and their extensions, with respect to out-of-sample density forecasting. A generalization to a mixture of multivariate Laplace distributions is motivated via univariate and multivariate analysis of the data, and an EM-algorithm is developed for its estimation in conjunction with a quasi-Bayesian prior. It is shown to deliver significantly better forecasts than the mixed normal, with fast and numerically reliable estimation. Crucially, the distribution theory required for portfolio theory and risk assessment is developed.

November 12, 2010
The 35th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"Computation of Greeks under binomial tree models with discrete Malliavin calculus"
Yoshifumi Muroi (Tohoku University)

August 5, 2010

One Day Seminar "Topics in Mathematical Finance II"

"Arbitrage of the first kind and the structure of wealth processes"
Kostas Kardaras (Boston University)

In this talk, the relationship between absence of arbitrage of the first kind in the market, existence of strictly positive supermartingale deflators and the semimartingale property of discounted asset prices in frictionless financial modeling is explored. The setting will be quite abstract in the beginning in order to state general results. Subsequently, more specialized models will be considered, where sharper results can be obtained.

"On the condition of no unbounded profit with bounded risk"
Koichiro Takaoka (Hitotsubashi University)

As a simple corollary to Delbaen and Schachermayer's fundamental theorem of asset pricing (1994) (1995) (1998), we prove, in a general d-dimensional semimartingale setting, that the no unbounded profit with bounded risk (NUPBR) condition is equivalent to the existence of a strict martingale density for the price process. We do not assume the path continuity nor the positivity of the price process. This extends the result of Choulli and Stricker (1996) to the cadlag cases, and refines partially the second main result of Karatzas and Kardaras (2007) concerning the existence of an equivalent supermartingale deflator.

"H-infinity control of differential game and its application to investment problems"
Hidehiro Kaise (Nagoya University)

H-infinity control is a robust control theory where problems are formulated as zero-sum games between a controller and an unknown deterministic disturbance. Since H-infinity control can be formally obtained by small noise limit and risk-averse limit of risk-sensitive control, we can consider H-infinity control-type formulations of financial problems. In this talk, we review basic ideas and results on H-infinity control of differential games. As applications to mathematical finance, we discuss optimal investment problems in the framework of H-infinity control.

July 26, 2010

One Day Seminar "Topics in Mathematical Finance I"

"Forward-convex convergence of sequences in $\mathbb{L}_+^0$"
Kostas Kardaras (Boston University)

For a sequence in $\mathbb{L}_+^0$, we provide simple necessary and sufficient conditions to ensure that each sequence of its forward convex combinations converges to the same limit. These conditions correspond to a measurefree version of the notion of uniform integrability and are related to the numeraire problem of mathematical finance. (This is joint work with Gordan Zitkovic)

"No-arbitrage criteria under small transaction costs"
Yuri Kabanov (U.F.R. des Sciences et Technologie)

May 11, 2010
The 34th Seminar Series by the CSFI of Osaka University (CSFI-CREST Joint Seminar)
"A mathematical model for multi-name credit based on community"
Kiseop Lee (University of Louisville)

We present a new mathematical model for multi-name credit which employs stochastic flocking. Flocking
mechanisms have been used in a variety of models of biological, sociological and physical aggregation phenomena. As a direct application of a flocking mechanism, we introduce a credit risk model based on community flocking for a credit worthiness index(CWI). Correlations between different credit worthiness indices are explained in terms of an interaction rate from the flocking system. Based on the flocking model for CWI, we provide a credit curve for individual names and a default time distribution. We study how to price credit derivatives such as a credit default swap(CDS) and a collateralized debt obligation(CDO) with the proposed model.

Mach 3, 2010
The 33rd Seminar Series by the CSFI of the Osaka University (CSFI-CREST Joint Seminar)
"BSDE with an unbounded terminal value"
Freddy Delbaen (ETH Zurich)

The theory of dynamic risk measures (or BSDE) with square bounded driver is well understood for bounded terminal values. For unbounded terminal values having exponential moments we can still prove existence and uniqueness of the solution. I will present some new results.

February 16, 2010
The 32nd Seminar Series by the CSFI of the Osaka University (CSFI-CREST Joint Seminar)
 "An Alternative to Stochastic Volatility Models"
Andrea Macrina (King's College London)

This work is devoted to the development of conditional density models for asset prices. In particular we construct models for the conditional risk-neutral density under incomplete information. The so-called implied density models associated with option prices are proposed as an alternative to stochastic volatility models. We derive a nonlinear infinite-dimensional stochastic differential equation for the dynamics of the conditional density that is adapted to a Brownian filtration. Solutions to this differential equation are characterised by the initial density and the so-called volatility structure determining, together with the model for partial information, the corresponding class of asset price processes. We show that the conditional density process associated with the so-called "information-based asset price models" proposed by Brody, Hughston and Macrina that are constructed by use of Brownian bridges, satisfy the studied SDE over a finite time interval, for an arbitrary initial density and a particular volatility structure. We prove that the innovation process driving the information-based asset price process coincides indeed with the Brownian motion that arises in the general SDE for the conditional density. Furthermore we show that the conditional density process of the Bachelier model for asset prices in finite time is a special case of the information-based solutions to the infinite-dimensional SDE. That is, the volatility structure associated with the Bachelier model is included in the information-based class of volatility structures, and the initial density is given by the normal probability density. Another result is obtained by generalising the class of solutions to the nonlinear infinite-dimensional SDE by extending the time horizon to infinity and, at the same time, by considering volatility structures defined in terms of a deterministic function of two variables while maintaining arbitrary initial densities. Finally we demonstrate that a particular choice of the volatility
structure in the infinite-time setting naturally leads to solutions of the SDE in finite time and in particular it gives rise to the information-based models for the conditional density of asset prices. (Joint work with D. Filipovic and L. P. Hughston)

November 28, 2009

One Day Seminar: Finance, Stochastics and Asymptotic Analysis

"Multi-scale analysis of small time behavior of stochastic volatility models, and viscosity solution method" (based on the joint work with J.P. Fouque and Martin Forde)
Jin Feng (Univ. of Kansas, USA)

"Asymptotic analysis for stochastic volatility: martingale expansion"
Masaaki Fukasawa (Osaka University CSFI & JST)

"Hamilton-Jacobi-Bellman equation for an optimal consumption problem"
Hiroaki Hata (Academia Sinica)

"Recurrence and transience of diffusion processes associated with Bellman equations of ergodic type"
Naoyuki Ichihara (Graduate School of Engineering, Hiroshima University)

"Hypoellipticity and ergodicity of the Wonham filter as a diffusion process"
Takashi Tamura (Graduate School of Engineering Science, Osaka University & & JST)

October 16, 2009
The 31st Seminar Series by the CSFI of the Osaka University
"Analytic-Tree: An Introduction"
Takashi Omoto (Quantitative Research Dept., Nomura Securities Co. Ltd)

It is well known that European-type (and barrier) problem can be expressed by closed forms in case of log-normal underling assets. But for Bermudan-type Dirichlet boundary problems, PDE approach or tri-nominal tree model are applied. Here we revisit power-digital and digital-barrier problems, and later present a different "analytic-tree" method to solve such exotic callable options via using closed forms and polynomials.

October 9, 2009
The 30th Seminar Series by the CSFI of the Osaka University
"Generalisation of Mack's formula for claims reserving"
Shingo Saito (Postdoctoral fellow, Faculty of Mathematics, Kyushu University)

General insurance companies need to hold claims reserves in order to cover future liabilities for events that have already occurred but not yet been settled. The chain-ladder method, being classical and yet probably the most widely used in measuring claims reserves, have a disadvantage in that it only provides a point estimator of the outstanding claims payments. Mack obtained a confidence interval by deriving a formula to estimate the mean squared error of the estimator of the outstanding claims payments based on his own model. I shall give a formula that estimates the mean squared errors of various other estimators based on a model that generalises Mack's. It, for example, allows us to get a confidence interval of how much the insurance company is liable to pay next year for claims that occurred two years ago.

September 18, 2009
The 29th Seminar Series by the CSFI of the Osaka University
"Bayesian Estimation of the Cost of Equity with a Hierarchical Prior"
Teruo Nakatsuma (Associate Professor, Faculty of Economics, Keio University)

We propose a new hierarchical Bayes approach for estimating the cost of equity for a specific industry. Our approach utilizes the well-known relationship among firm-specific levered betas and the industry-specific unlevered beta to construct a hierarchical prior of parameters in a multi-factor model of stock returns. The Bayesian estimation procedure is conducted with the standard Gibbs sampling. We apply the new approach to the Japanese automobile industry and perform sensitivity analysis on the subjective belief about the future market performance and other prior information.

September 11, 2009
The 28th Seminar Series by the CSFI of the Osaka University
"Some probabilistic aspects of financial bubbles"
Hans Foellmer (Professor, Humboldt University of Berlin)

August 27, 2009
The 27th Seminar Series by the CSFI of the Osaka University
"On the HJB equation arising in the consumption-investment problem with transaction costs"
Yuri Kabanov (UFR Sciences et Technologie)

August 21, 2009
The 26th Seminar Series by the CSFI of the Osaka University
"Extremes of Regularly Varying Levy Driven Ornstein-Uhlenbeck Processes under Discrete Observation"
Takashi Owada (Cornell University)

We study discretely observed supOU(Ornstein-Uhlenbeck) processes driven by regularly varying Levy processes. SupOU processes are obtained by adding and weighing different types of OU processes, and one of the advantages of that process is that long range dependence can be easily introduced into the model.
In this talk, we investigate the tail behavior of discretely observed supOU processes and corresponding driving Levy processes. We also discuss point process convergence of these processes.

August 20, 2009
The 25th Seminar Series by the CSFI of the Osaka University
"Recent results in the theory of financial markets with transaction costs"
Yuri Kabanov (UFR Sciences et Technologie)

June 26, 2009
The 24th Seminar Series by the CSFI of the Osaka University
"Asymptotic Theory of Sequential Change Detection and Identification"
Kazutoshi Yamazaki (Assistant Professor of CSFI, Osaka University)

We study the joint problem of change point detection and
sequential multiple hypothesis testing. Based on a sequence of observations, one needs to detect a sudden and unobservable change at the earliest and identify its cause accurately. We propose a sequential decision strategy that triggers an alarm when the posterior probability of a certain type of change exceeds some threshold for the first time. We show its asymptotic optimalities under the Bayes risk and the fixed-error formulations as the unit cost of detection delay and the probability of a misdiagnosis go to zero, respectively. We verify the results numerically using an example where the observation process is normally distributed.

June 2, 2009
The 23rd Seminar Series by the CSFI of the Osaka University
"A Dynamic Theory of Pecking-Order Financing"
Takao Kobayashi (Professor, Graduate School of Economics, The University of Tokyo)

An interplay of dynamic optimization and frictions in financial markets creates an interesting theory of corporate finance. We extend the dynamic theory of a firm's optimal investment policy, which was developed during the three decades starting in 1960s, to the issue of optimal dividend and financing policy. To our knowledge this is the first within such attempts to predict that the optimal dynamic financing policy is the "pecking-order" which was originally founded on the assumption of asymmetric information.

May 7, 2009
The 22nd Seminar Series by the CSFI of the Osaka University
"Risk Sensitive Value Measure"
Yoshio Miyahara (Professor, Graduate School of Economics, Nagoya City University)

In this paper we study the evaluation problem for random cash flows which occurs from a project. We first consider the random present value (RPV) of the cash flow and investigate what is the suitable evaluation functional of RPV. We see that the concave monetary utility function is the most suitable candidate for this end. Next we try to introduce the real option approach and to construct a dynamic value measure so that it can be applied to dynamic models. Then we see that the idea of time-consistency is very important, and that the dynamic entropic value measure is the best. We can

see that this dynamic value measure is related to the risk sensitive control.   And finally we conclude that the risk sensitive value measure method,
which is a combination of the ideas such that monetary utility function, indifference price, real option approach, time-consistency and risk sensitive control, should be the most powerful method for the project evaluation.

February 10, 2009
Osaka University CSFI Seminar
"Recent developments in time consistent utility theory and BSDE"
Freddy Delbaen（Professor emeritus at ETH Zürich）

February 27, 2009
The 21st Seminar Series by the CSFI of the Osaka University
"Analyzing the fine structure of stochastic processes"
Jeannette Woerner (Professor, Technical University of Dortmund)

In the recent years starting from the Black-Scholes model in mathematical finance many different models either based on semimartingales, purely continuous, pure jump and a mixture of both, or fractional Brownian motion have been proposed in an attempt to capture the empirical facts of real data both in finance and physics, e.g. heavy tails, skewness, excess kurtosis and long range dependence.
We propose to include the fine structure into this analysis, which makes it possible to distinguish between semimartingales and fractional Brownian motion on the one hand and on the other hand determine the presence of jumps and measurement errors or market microstructure.
We will compare two different approaches, one based on the regularity of the sample paths, the other one based on the correlation structure. For both methods we provide consistency and a distributional theory and apply them to high frequency financial data and turbulence data.   Furthermore, the distributional theory for fractional Brownian motion based models provides some new insight in the scaling laws for turbulence data.

January 9, 2009
The 20th Seminar Series by the CSFI of the Osaka University
"The nature of the growing financial crisis and the future of capitalism"
Ushio Sumita (Professor in the Department of Social Systems and Management at University of Tsukuba)

The world-wide financial crisis that originated with the subprime market crash in America has become increasingly severe.   The world economy is still mired in a recession without any prospect of being settled.   In this talk, we discuss this problem from three perspectives so as to investigate the future of the market-based principles.   Firstly, we study the basic principle of the financial services in hyper-capitalism and delve into the essence of the repeated financial crises including the Japanese asset price bubble and Enron.   Secondly, we consider the ideological structure of the notorious "collateralized debt obligations (CDOs)".   We study whether these crises were caused by the misusage of CDOs or by the ideological structure itself.   In particular, we apply CDOs in the newsvendor problem, and pursue through mathematical and numerical analysis their potential use in risk management.   Lastly, taking into consideration the bankruptcy of the American International Group, we study life insurance and capitalism using the general structure of actuarial mathematics, and explore the future of the 21st century capitalism.

December 22, 2008
The 19th Seminar Series by the CSFI of the Osaka University
"Asymptotically distribution free test for diffusion by different sample schemes"
Ilia Negri (Department of Information Technology and Mathematical Methods, University of Bergamo, Italy)

We consider nonparametric goodness of fit test problem for the drift coefficient of a one-dimensional

ergodic diffusions. We present results based on three different sample scheme: continuous time observation, discrete time observation and tick time sample. We study the limit distribution of the proposed test statistics based on different sample schemes and we prove that it is the supremum of the standard Brownian motion in the three considered cases. We also show that the tests are consistent under any fixed alternatives.

November 7, 2008
The 18th Seminar Series by the CSFI of the Osaka University
"Long-term optimization models for household financial planning"
Norio Hibiki (Professor in the Department of Administration Engineering Faculty of Science and Technology at Keio University)

Households are exposed to risks associated with the decrease in real financial wealth due to inflation, loss of wage income due to householders' death or health problems, and loss by fire. Financial planners develop and help them run investment and insurance strategies based on family compositions, income, expenditure, asset, debt, home purchasing, education and retirement. This paper pursues a long-term optimization model of building wealth while avoiding these risks. Based on Hibiki, Komoribayashi and Toyota (2005), Hibiki and Komoribayashi (2006) and Hibiki (2007), we investigate numerically the followings with the aim of giving a realistic framework that will be accessible to financial planners:

1) elaboration of household cash flow including tax payments,
2) insurance portfolios consisting of term insurance, decreasing term insurance and income security insurance, and the comparison among them,
3) models taking into account the income tax for the benefits from income security insurance,
4) optimal insurance strategy models based on the "100-age" investment strategy and the constant-rebalance strategy,
5) effect of premium loading in insurance,
6) effect of wage fluctuations and correlated returns of stocks.

October 31, 2008

One Day Seminar: Finance, Stochastics and Asymptotic Analysis

Equilibrium Equity Premium, and Interest Rate of a Large-Firm Economy in the Presence of Moral
Hazard
Sung Jaeyoung   (Illinois University at Chcago)

Macroeconomic Implications of Term Structures of Interest Rates under Stochastic Differential Utility with Non-Unitary IES
Hisashi Nakamura (University of Tokyo)

Consumption and Portfolio Selection: A Survey
Hyeng Keun Koo (Ajou University)

Max-plus Stochastic Control and Risk-sensitivity
Hidehiro Kaise (Nagoya University)

July 17, 2008

One Day Seminar: Finance, Stochastics and Asymptotic Analysis

Real Options Stochastic Variational Inequalities for a Nonlinear Oscillator
Alain Bensoussan (Univ. Texas at Dallas)

Optimal stopping of Hunt and Lévy processes
Ernesto Mordecki （Universidad de la Republica Uruguay）

Improving the Convergence Rate of Diffusion Processes to the Equilibrium
Shuenn-Jyi Sheu (Academia Sinica)

July 4, 2008
The 17th Seminar Series by the CSFI of the Osaka University
"Estimating the degree of activity of jumps in high frequency financial data"
Yacine Ait-Sahalia (Bendheim Center in Finance, Princeton University)

We propose estimators of the index of jump activity of a discretely sampled process, and derive their properties. These estimators are applicable despite the presence of Brownian volatility in the process, which makes it more challenging to learn about the small, infinite activity, jumps. When the method is applied to high frequency stock returns, we find evidence of infinitely active jumps in the data and estimate their index of activity.

June 27, 2008
The 16th Seminar Series by the CSFI of the Osaka University
Choice of Three Investment Projects with Fixed and Quadratic Adjustment Costs under Uncertainty
Motoo Tsujimura (Associate Professor, Ryukoku University)

This paper examines an optimal investment policy with fixed and quadratic adjustment costs. A firm has three available investment projects indexed by i (i = 1,2,3). The scale of project 3 is the largest among them, and its cost is the most expensive. On the other hand, the scale of project 1 is the smallest among them, and its cost is the lowest. The scale and cost of project 2 are middle. The firm's problem is to choose project among them so as to maximize expected total discounted profit. To this end, we formulate it as an optimal stopping problem. Then, we show that which project the firm chooses and when the firm invests the project.

May 16, 2008
The 15th Seminar Series by the CSFI of the Osaka University
Aggregation of State-Dependent Utilities
Chiaki Hara (Professor, Institute of Economic Research)

In an exchange economy under uncertainty populated by consumers having state-contingent utility functions, we analyze the nature of the efficient risk-sharing rules and the representative consumer's statecontingent
utility function. We show that the representative consumer's responsiveness to state variables
will typically depend on aggregate consumption levels even when the individual consumers' responsiveness do not depend on own consumptions. We also find that the heterogeneity in the individual consumers' responsiveness to state variables gives rise to a "convexifying effect" on the representative consumer's utility function, in a sense to be made precise. We also present applications of this result to the cases of heterogeneous beliefs and heterogeneous impatience.

April 25, 2008
The 14th Seminar Series by the CSFI of the Osaka University
"Non-Parametric Specification Testing for Continuous-Time Markov Processes: Do the Processes Follow Diffusions?"
Shin Kanaya (University of Wisconsin-Madison)

I propose a new non-parametric testing procedure to determine whether or not an underlying continuoustime process is a diffusion. While many papers in economics and finance presuppose that

the dynamics of economic variables are described by diffusion processes, an empirical validation of the diffusion hypothesis is rarely found. I develop a new theorem which non-parametrically and fully identifies diffusion processes within a class of univariate stationary Markov processes through their infinitesimal generators – functional operators computed via derivatives of the conditional expectations with respect to time. I construct test statistics based on this theorem and derive their asymptotic distributions. I also propose a simulation-based 33 technique to approximate the asymptotic distributions, since the distributions of the original statistics depend upon a large number of unknown parameters and functions. Monte-Carlo simulations are conducted to study the finite-sample size and power properties of the test. I apply the proposed method to short-term interest rates and foreign exchange rates to examine the validity of the diffusion hypothesis.

February 29, 2008
The 13th Seminar Series by the CSFI of the Osaka University
"Positive Analysis of Jumps in Investment Markets"
Takayuki Morimoto (Lecturer in the Department of Economics at the Hitotsubashi University)
In recent years, quantitative analysis called Realized Multi-Power Variation (MPV) which uses high-frequency data is becoming the norm. In order to apply MPV to analyze the investment market, detecting jumps in the price list is considered to be the first step. Especially, the non-parametric methods which were introduced recently by "Lee and Mykland (2007)" are useful to analyze the microstructure of an investment market because it recognizes the diurnal structure of jumps. This research considers jumps in the price-earnings ratio of an investment market such as the stock price index, and the individual description and exchange rate in connection with "expected news" or "unexpected news" to analyze and evaluate its impact.
Keywords: multi-power variation, high-frequency data, jumps, news announcements

October 26, 2007
The 12th Seminar Series by the CSFI of the Osaka University
"Fear of Failure and Information Cascade"
Jie Qin (Associate Professor of the Colleges of Economics of the Ritsumeikan University)

This research focuses on the relationship between psychological bias and information cascade to analyze the mechanism between the psychology of fear of investment failure and the causes of an information cascade. And it was proven that the information cascade can occur in a volatile market where the price changes at every transaction on assumption that it is in a relatively simple situation. The analysis results show that the combined action of the existence of asymmetric information, and bias caused by psychological factors, can cause a stock market crash.

September 28, 2007
The 11th Seminar Series by the CSFI of the Osaka University
"Relationship between share price and trading volume before and after taxation and ex-dividend date" – Refer to the data obtained in Japan between 2001 and 2006.
Takashi Hatakeda (Associate Professor of the Graduate School of Business Administration of the Kobe University)

This paper clarifies the relationship between taxation and dividend by empirical analysis of the change of a preference over dividend depending on the tax rate of each investor around the time when the tax system of shares and tax treaty were revised in 2003. Also, the empirical analysis of a dynamic customer model is carried out to find out if the investor's dynamic trading strategy exists before and after ex-dividend date, or not.

July 26, 2007
The 10th Seminar Series by the CSFI of the Osaka University
"Uninsurable Risk, Equity Premium and Currency Premium"
Kenji Wada (Professor of the Keio Business School)

This paper develops an integrated model, which addresses the recent Brandt, Cochrane and Santa-Clara (2006) puzzle of reconciling low international risk sharing with a high and variable equity premium. In addition, a new currency risk premium puzzle is addressed.Following Kocherlakota and Pistaferri (2007),we examine two market structures: (i) where private risk cannot be insured and (ii) where the private risk can be partially insured by striking long term insurance contract with truth revelation constraint.Our GMM estimation based on the US-UK financial and cross-sectional household spending data lends support to the second market environment.

June 22, 2007
The 9th Seminar Series by the CSFI of the Osaka University
"Credit Spreads, Optimal Capital Structure, and Implied Volatility with Endogenous Default and Jump Risk (with Steve Kou)"
Professor Chen, Nan (The Chinese University of Hong Kong)

We propose a two-sided jump model for credit risk by extending the Leland-Toft endogenous default model based on the geometric Brownian motion.The model shows that jump risk and endogenous default can have significant impacts on credit spreads, optimal capital structure, and implied volatility of equity options: (1) Jumps and endogenous default can produce a variety of non-zero credit spreads, including upward, humped, and downward shapes; interesting enough, the model can even produce, consistent with empirical findings, upward credit spreads for speculative grade bonds. (2) The jump risk leads to much lower optimal debt/equity ratio; in fact, with jump risk highly risky firms tend to have very little debt. (3) The two-sided jumps lead to a variety of shapes for the implied volatility of equity options, even for long maturity options; although in general credit spreads and implied volatility tend to move in the same direction under exogenous default models, this may not be true in presence of endogenous default and jumps. Pricing formulae of credit default swaps and equity default swaps are also given. In terms of mathematical contribution, we give a proof of a version of the 'smooth fitting' principle under the jump model, justifying a conjecture first suggested by Leland and Toft under the Brownian model.

May 25, 2007
The 8th Seminar Series by the CSFI of the Osaka University
"Empirical Likelihood Estimation of Lévy Process"
Takashi Owada (the Graduate School of Economics of the University of Tokyo)

This seminar introduces the estimation of the Lévy Process (infinitely decomposable distributions). Infinitely decomposable distributions generally do not have a probability density function in a closed form, however a characteristic function can often be expressed in closed form. In this seminar, the Empirical Likelihood method is adopted to propose the estimation methods to apply to the parametric characteristic function of infinitely decomposable distributions. The estimate constructed by this method has a theoretical validity similar to the maximum likelihood method in consistency, asymptotic normality and asymptotic
availability, and it is also better because the parameter estimation can be worked out easily. Furthermore, the seminar explains that this method can be easily extended to the parametric estimation of the "AR process + infinitely decomposable error" model, and at the same time, reports results of the positive analysis (TOPIX daily earnings rate). Finally, the latest research on the estimation of the Lévy process that consists of a Continuous part and Jump part will be reported in this seminar.

April 6, 2007
The 7th Seminar Series by the CSFI of the Osaka University
"Semi-parametric Maximum-Likelihood Estimation for Diffusion Processes"
Shin Kaneya (the Department of Economics of the Wisconsin-Madison University)

In this paper, we consider semi-parametric estimation of ergodic diffusion processes, where the drift function is specified parametrically and the diffusion function is unknown. We propose a two-stage

estimation strategy. In the first stage, we estimate the diffusion function, based on the nonparametric kernel method.   We derive a new uniform convergence result for the nonparametric estimators over the real line, introducing a new technical device, called a damping function. The uniform convergence result of the nonparametric estimators is used to derive the asymptotic properties for the estimator of the parametric drift function in the second stage, where a semi-parametric log-likelihood is constructed by means of Girsanov theorem.Given a discretely recorded sample with the infill and long-span assumptions, we show that the proposed estimator has root-T consistency with an asymptotically normal distribution under fairly weak conditions, and that its asymptotic variance attains the Cramer-Rao bound.

March 23, 2007
The 2nd Joint Seminar by the CSFI of the Osaka University
"Interest-rate Swap Rate and Investment Business"
Fumito Akiyama (the Sumitomo Trust and Banking Co., Ltd.)

March 16, 2007
The 6th Seminar Series by the CSFI of the Osaka University
"Constructing the optimal portfolio: estimation of actual portfolio risk and choice of securities with the genetic algorithm"
Atsushi Yoshida (the Graduate School of Systems and Information Engineering of the University of Tsukuba)

March 2, 2007
The 5th Seminar Series by the CSFI of the Osaka University
"Cross Share Holding, Share Transfer Restriction and Devolution of Management Rights"
Yasuhiko Tanigawa (Professor of the School of Commerce of the Waseda University)

March 2, 2007
The 4th Seminar Series by the CSFI of the Osaka University
"Appraisal method of valuing real assets with the attributes"
Hiroshi Ishijima (Specially appointed faculty of the CSFI of the Osaka University)

November 17, 2006
The 3rd Seminar Series by the CSFI of the Osaka University
"The Lévy Process and Finance"
Reiichiro Kawai (the Daiwa Securities SMBC Co, Ltd., Securities Division)

October 6, 2006
The 2th Seminar Series by the CSFI of the Osaka University
"Price Formation in Open Market"
Wataru Ohta (Assistant Professor of the School of Economics of the Nagoya University)

August 24, 2006
Joint Seminar by the CSFI of the Osaka University
"Learning about Perceived Inflation Target and Stabilization Policy"
Kosuke Aoki (London School of Economics)

July 28, 2006
The 1st Seminar Series by the CSFI of the Osaka University
"Emissions Trading System and Market Design"
Akira Maeda (Assistant Professor of the Graduate School of Energy Science of the Kyoto University)

July 11, 2006
Seminar
"Universal Nonparametric portfolio selection for sequential investment"
Frederic Udina (Universitat Pompeu Fabra, Spain)

(Some of the lecture titles in Japanese are translated into English by the CSFI)

17 The Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange

The division offers a place where researchers from Japan and overseas as well as business practitioners from both public and official sectors can share ideas, and hosts seminars and symposiums to exchange information on latest research trends and requests from business practitioners.

Since its inauguration in June 2007, the Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange has been conducting advanced research while at the same time training staff members to acquire advanced knowledge and skills in the field of derivatives trading and risk management. It offers lectures designed to acquire advanced and practical knowledge in finance and insurance: "Actuarial Science and Financial Engineering" (2008), "Backward Stochastic Differential Equation and Applications in Finance" (2008), "Numerical Methods for Optimal Control Problems" (2009, 2010), "Risk Sensitive Portfolio Optimization" (2009), "Financial Time Series Analysis" (2011, 2012) and "Empirical Finance" (2011, 2012). Furthermore, it actively introduces leading-edge academic research to financial industries through, for example, publicizing the volatility index Japan (VXJ).

On March 8, 2013, the research division organized the Workshop on "Problems in Securities Market." The research presentations include the following.

1. "High-speed trading system and opening price formation" by Wataru Ohta (Osaka University).
2. "Market Liquidity and Bank-Dominated Corporate Governance: Evidence from Japan" by Hideaki Sakawa (Nagoya City University) and Naoki Watanabe (Ritsumeikan University).
3. "Long-run effects of minimum trading unit reductions on stock prices" by Naoto Isaka (Sophia University).
4. "The Microstructure of the European Sovereign Bond Market: A Study of the Euro-zone Crisis" by Atsushi Uno (Waseda University).
5. "Order flows, Fundamentals and Exchange Rates" by Kentaro Iwatsubo (Kobe University).

In addition, the division invited researchers from home and abroad to organize the following seminars and workshops:

1. The Research Division Seminar (37 seminars in total)

2. Nakanoshima Workshop on " Problems in Financial Engineering, Mathematical and Quantitative Finance" (Two days in every December from 2007 to 2012)

3. International Workshop on "MATHEMATICAL FINANCE AND RELATED ISSUES" (September 12 to 15 in 2010, September 2 to 5 in 2012)

4. International Workshop on "FINANCE AND RELATED MATHEMATICAL AND STATISTICAL ISSUES" (September 3 to 6 in 2008)

Seminars supported by Osaka Securities Exchange

February 1, 2013
37th seminar supported by Osaka Securities Exchange
"Time to IPO: A Role of Heterogeneous Venture Capitals"
Miho Takizawa (Toyo University)

Venture capitals (VC) are often syndicated to invest. The characteristics of each syndicate could vary not only in the number of VCs but also in the heterogeneity of VC types (e.g., bank-dependent, independent, and public etc.) included in a syndicate. This paper empirically studies how these two characteristics are related to the dynamics of client firms 'initial public offerings (IPO). We test whether the IPOs of VC-backed entrepreneurial firms tend to be achieved in shorter periods when they are financed by many and/or heterogeneous VCs. The results of our hazard estimation based on more than 6,800 investment rounds for 615 Japanese VC-backed firms accomplishing IPO over the last decade shows that the hazard ratio of IPO increases not only when the number of VCs in a syndicate increases but also the VCs become more heterogeneous. The latter result shows the existence of the complementarity among heterogeneous VCs in the process of screening and managerial value-added. We also confirm that such a positive impact of heterogeneous VCs becomes more sounding in shorter investment duration and/or in the absence of bank-dependent VC. This implies that complementarity among VCs arises when the uncertainty about venture firms, which diminishes over long investment duration and/or due to the existence of informed VCs, remains to be high.

December 11, 2012
36th seminar supported by Osaka Securities Exchange
"Analysis of stock return standardized by realized volatility"
Tetsuya Takaishi (Hiroshima University of Economics)

November 22, 2012
35th seminar supported by Osaka Securities Exchange
"The Fukushima Nuclear Accident, Damage Compensation Resolution and Energy Stock Returns"
Peng Xu (Hosei University)

In this paper, we investigate both the reaction of energy stock prices to the accident and the reaction to the government response. TEPCO, the damaged electric power company's stock price lost the largest for direct damage of its nuclear plants in Fukushima. Contagion effects spread to non-damaged regionally monopolistic electric power stocks for expected increases of nuclear energy costs. The more an electric power company depends on nuclear energy; its stock price dropped more after the accident. Also nuclear construction stock prices lost their market values. Meanwhile, competitive effects occur for alternative energy companies and alternative energy stock prices gained from the accident. Finally, the market believes the primary beneficiary of the Nuclear Damage Liability Facilitation Fund Act was TEPCO.

October 30, 2012
34th seminar supported by Osaka Securities Exchange
"The Impact of IRB Approach on the Credit Risk Exposure under Basel II"
Katsutoshi Shimizu (Nagoya University)

This paper empirically investigates the impact of internal ratings-based (IRB) approach on the risk weight under Basel II. Assuming increasing cost of raising new capital when the requirement constraint is violated, this paper estimates the difference of unknown risk weight parameters between IRB and standardized approach, analyzes how Japanese banks adjusted the amount of risk-weighted assets, and calculates the saved amount of regulatory capital. Furthermore, this paper examines the competitive effect of optional IRB regime and calibrates the model to simulate the impact of more stringent capital requirement under Basel III.

August 24, 2012
Two Day Seminar (Day 2): Topics in Volatility and Forecasting
（supported by CSFI and Osaka Securities Exchange）

"Volatility Derivatives and Model-free Implied Leverage"
Masaaki Fukasawa (Osaka University)

We revisit robust replication theory of volatility derivatives and introduce a broader class which may be considered as the second generation of volatility derivatives. One of them is a swap contract on the quadratic covariation between an asset price and the model-free implied variance (MFIV) of the asset. It can be replicated in a model-free manner and its fair strike may be interpreted as a model-free measure for the covariance of the asset price and the realized variance. The fair strike is given in a remarkably simple form, which enable to compute it from the Black-Scholes implied volatility surface. We call it the model-free implied leverage (MFIL) and give several characterizations. In particular we show its simple relation to the
Black-Scholes implied volatility skew by an asymptotic method. Further to get an intuition, we demonstrate some explicit calculations under the Heston model. We report some empirical evidence from the time series of the MFIV and MFIL of the Nikkei stock average.

"Volatility Forecast Comparison with Biased Proxy"
(A joint work with Kosuke Oya, Osaka University)
Shuichi Nagata (Kwansei Gakuin University)

The various loss functions are employed in the literature to evaluate the forecasting accuracy. However, the rankings of volatility forecasting models given by some loss functions can be misspecified by the error of a volatility proxy. Patton (2011) introduces a new class of loss functions which guarantee the consistency of the ranking (asymptotically) if the volatility proxy is unbiased. Recently, the common volatility proxy is realized variance (RV) in practice. However, it is natural to consider that RV does not satisfy the unbiasedness condition due to market microstructure noise. In this paper, we consider the consistency for the ranking of volatility forecasting when the volatility proxy is biased. We introduce a new notion for the robustness of loss functions to evaluate the effect of the biased volatility proxy on the loss functions and propose a method to choose the better loss function even if the volatility proxy is biased. We conduct a simulation study for access the performance of our method and it complements the theoretical result.

"The information content of model-free implied variance and jump risk"
Masato Ubukata (Kushiro Public University of Economics)

Many papers have examined the information content of implied volatility or variance from option prices in predicting future stock price variability. Also, there has been considerable research in understanding the potentially distinct roles of stochastic volatility and jumps in the underlying process. This paper focuses on the information content of implied large jump risk, which is measured by the difference between model-free implied variances with or without large jump component. We attempt to provide new empirical evidence on this issue in the framework of encompassing regressions.

"Multivariate realized stochastic volatility model with leverage"
Tsunehiro Ishihara (Hitotsubashi University)

A joint model of multivariate returns and realized measures of covariance is proposed. The model of returns is described by a multivariate stochastic volatility model with leverage. The matrix exponential transformation is used to keep the time varying covariance matrices positive definite. The measurement equation of the multivariate realized measure is formulated as a matrix log-linear form, which is a matrixvariate extension of Takahashi, Omori, and Watanabe (2009). A Bayesian estimation method using Markov chain Monte Carlo is discussed. The proposed model and estimation method are applied to stock return data.

"On the Moving Quantile Effects in (Financial) Time Series"
(A joint work with Virmantas Kvedaras, Vilnius University)
Isao Ishida (Osaka University)

We introduce and investigate some properties of a class of nonlinear time series models with the moving order statistics present in the data generating process. This endogenizes the regime changes and allows for non-linear size effects e.g. where the impact of extreme and ordinary events substantially differs. We show by simulations that such effects can produce realizations looking as if the structural breaks were present in the data and having substantially flatter sample autocorrelation functions. Since the usual tests for omitted non-linearity have insufficient power against such type of non-linearity, a suitable test is proposed. Some empirical illustrations using stock market returns are presented.

"Parametric estimation for stochastic regression models from nonsynchronous observations"
Teppei Ogihara (Osaka University)

We study parametric estimation for stochastic regression models from nonsynchronous observations. The problem of nonsynchronous observations appears when estimating the covariance of security returns using high-frequency financial data. We construct a quasi-likelihood function of the model and study the asymptotic behavior of the maximum-likelihood type estimator and the Bayes type estimator when length of observation intervals goes to zero. For this purpose, we follow the approach of likelihood ratio random fields proposed by Ibragimov-Has'minski, and use the polynomial type large deviation inequalities introduced by Yoshida(2011).

August 23, 2012
Two Day Seminar (Day 1): Topics in Volatility and Forecasting
（supported by CSFI and Osaka Securities Exchange）

"Stochastic volatility with self-exciting jumps: Risk Premium and Hedging Implications"
Ser-huang Poon（University of Manchester）

We introduce self-exciting jumps to Heston stochastic volatility process to capture the market behavior after a big equity price drop, and estimate risk premium for jumps and stochastic volatility from equity return series and option data. Instead of using option prices directly, we use cumulants and the nuber of factors implied by the SPX vol surface. We use particle filter nested in an EM framework for the joint estimation. The evidence of high skewness in 2008 shows time varying jump intensity plays a very important role in the crisis period and explained most of the risk premium, while in other period, stochastic variance accounts for most of the risk premium.

In the second part, we use the joint characteristic function of equity price and state variables to produce a consistent pricing framework for contingent claims on both equity and VIX. Based on linear approximation of jump size, we show that one factor models lead to a constant correlation for VIX futures of all maturity. In the multi-factor models, we demonstrate how to calculate the optimal hedging ratio for VIX option using VIX future. Finally, we derived the unconditional correlation term strucuture of VIX future implied by the model based on the stationary distribution of the state variables. The empirically observed pattern of VIX correlation suggests the two-factor model is adequate for short maturity VIX options but more factors are necessary if longer maturity VIX derivatives are to be priced and hedged accurately.

June 1, 2012
33rd seminar supported by Osaka Securities Exchange
"Mixed-frequency Regression Modelling with Some Financial Applications"
Virmantas Kvedaras (Vilnius University)

Regression modelling alternatives are considered whenever the regularly sampled explanatory variables are observed at a higher frequency than the dependent one. The ordered weighted

aggregation (OWA) and the mixed data sampling (MIDAS) alternatives are discussed in more detail. An LM-type test is proposed to detect the non-linearity induced by the OWA-type effects. Its small sample properties are compared with the established tests for omitted non-linearity. Next, the statistical origin is defined of the non-linear restriction on parameters imposed in the MIDAS regressions, and the tests for its empirical adequacy are characterized in regressions with finite and infinite number of higher-frequency lags of explanatory variables. The relevance of OWA-type effects and the application of the MIDAS testing are illustrated using the stock exchange indices data.

May 21, 2012
32nd seminar supported by Osaka Securities Exchange
"Intraday Liquidity Trading Opportunities"
Masahiro Yamada （Department of Economics, University College London）

This paper empirically investigates intra-day price manipulation in a stock market. My microstructure model is specifically designed to define the conditions under which a manipulation opportunity arises from the variation in liquidity as measured by price impact. My empirical analysis using data from the Tokyo Stock Exchange suggests that while there is approximately a 30% chance of uninformed manipulation across time and stock codes, it is not profitable enough to affect price fluctuations. Analysis of intraday price and trade sizes shows that the opportunity begins to disappear in 10 minutes, and that past returns and order imbalances can provide a manipulation opportunity.

March 19, 2012
31st seminar supported by Osaka Securities Exchange
"**Intertrade durations of stocks listed on the Tokyo Stock Exchange"**
Mai Shibata (Rikkyo University)

February 8, 2012
30th seminar supported by Osaka Securities Exchange
"Directionally Differentiable Econometric Models with Application to Rosenberg's Conditional Heteroskedasticity Models"
Jin Seo Cho (Yonsei University)

We relax the differentiability condition for standard econometric models to the level of directional Gateaux differentiability and analyze asymptotic distribution of extremum estimator. We show that its asymptotic distribution can be represented as a functional of Gaussian process indexed by direction. Our analysis also treats the differentiable models as a special case of directionally differentiable models. For data inference, we rene standard likelihood ratio, Wald, and Lagrange multiplier test statistics. These renements also permit the presence of nuisance parameters. Further, from this, these test statistics are shown to be asymptotically equivalent if the null models are differentiable and do not have boundary parameters.

January 16, 2012
29th seminar supported by Osaka Securities Exchange
"Institutional foundations of the modern Japanese rice market"
Yasuo Takatsuki (Kobe University)

December 5, 2011
28th seminar supported by Osaka Securities Exchange
"Stock Option Grants and Managerial Risk Taking: Evidence from Japanese Intraday Stock Returns Data"
Kounari Uchida (Kyushu University)

This paper investigates whether stock option grants in Japan increase stock volatility in a research environment that suffers less from two contamination problems. We conduct a short-term event study of stock volatility change by using intraday stock return data to eliminate the contamination problem

that is attributable to corporate information releases made after the announcement of stock option grants. For the entire sample, we find firms that announce stock option grants experience a signicant increase in realized stock return volatility during a few days surrounding the announcement day. However, we do not find a significant increase in the stock volatility when we limit the analysis to companies that release no other information at the announcement day of stock option grants. The results suggest that researchers should control for the effect of various information releases on stock return volatility when adopting stock return volatility as a measure of managerial risk taking.

November 10, 2011
27th seminar supported by Osaka Securities Exchange
"**New Mechanism of Market Price Observation: Liquidity and Leptokurtic Return Distributions, Common Dynamic Factors Driving Metal and Energy Prices**"
Yusho Kaguraoka (Musashi University)

Topic 1: The model assumes a hidden price and an observable market price; The latter price is updated and equalized to the former price when the change in the hidden process exceeds a threshold. The level of the threshold is proportional to liquidity. The resulting observed returns have a leptokurtic distribution. The kurtosis of the return distribution is proportional to the level of threshold as well as liquidity. Our model is
conirmed by studying spot rate processes of two kinds of Japanese Government Bonds (JGBs), liquid and illiquid ones.

Topic 2: Price booms in the metal and energy markets over the past ten years are controversial issues; how many factors drive the metal and energy prices, and which macroeconomic factors explain the price variations? To disentangle movements of metal and energy prices, the generalized dynamic factor model of Forni et al. (2000) is applied. The model can incorporate the lead/lag structures in commodities prices and the spillover effects. Commodities prices are expressed as a combination of common and idiosyncratic components. Using 118 series of metal and energy monthly prices from 2000 to 2010, it is found that the number of common dynamic factors is q = 3 and the first three common factors explain more than 75% of their variations. As examination of the individual metal and energy returns shows that the ratios of variance explained by the common factors are high. We conjecture that one of the factors is crude oil.

August 3, 2011
26th seminar supported by Osaka Securities Exchange
"**The Effect of Bank-firm Relationships on Sell-side Analyst Research: Evidence from Financial Deregulations in Japan**"
Hidetomo Takahashi (Hosei University)

In this paper, I evaluate the benefits and costs of universal banking from the perspective of outside investors by examining whether close ties between banks and borrowing firms improve quality of analysts' earnings forecasts in the Japanese market. I find that the relationships lower earnings quality, which means that universal banking is not benecial for outside investors. However, I also find empirical evidence that the problem attenuates if banks have strong bargaining powers over their client firms.

July 15, 2011
25th seminar supported by Osaka Securities Exchange
"**The carrier advancement competition towards the CEO position and overconfidence**"
Kazutoshi Tashiro (Yokohama National University)

May 23, 2011
24th seminar supported by Osaka Securities Exchange
"**Price Discrepancy and Optimal Timing to Buy Derivatives**"
Tim Leung (Johns Hopkins University)
In incomplete markets, where not all risks can be hedged, different risk-neutral or risk-averse pricing

models may yield a range of no-arbitrage prices. Consequently, the investor's model price may disagree with the market price. This leads to the natural and important question of when is the optimal time to buy a derivative security from the market. We consider an investor who attempts to maximize the spread between her model price and the offered market price through optimally timing the purchase. Both the investor and the market value the options by risk-neutral expectations but under different equivalent martingale measures representing different market views or risk premia speci_cations. We show that the structure of the resulting optimal stopping problem depends on the interaction between the respective market price of risk and the option payoff. In particular, a crucial role is played by the delayed purchase premium that is related to the stochastic bracket between the market price and the buyer's risk premia. Explicit characterization of the purchase timing and numerical examples are given for two representative classes of Markovian models: (i) defaultable equity models with local intensity; (ii) diffusion stochastic volatility models.

May 16, 2011
23rd seminar supported by Osaka Securities Exchange
"Product Market Competition and Equity Returns"
Masahiro Watanabe (University of Alberta)

We develop an analytically tractable equilibrium model to examine the link between competition in product markets and stock returns. Firms maximize profits from the sale of their products to consumers, who maximize their expected utility. Investors receive firm profits as investment returns. We characterize firms' optimal production plans and expected equity returns, and show that firm heterogeneity within an industry leads to differences in "production risk premia" across firms. In addition, we demonstrate that the intensity of product market competition can have different effects on expected returns of firms with different characteristics. The model further suggests that the size and value effects may partly arise at the industry level. We show empirically that the compensation for bearing cash flow risk resulting from competition in output markets is economically significant and that product market competition is associated with expected returns in ways that are consistent with the model.

April 14, 2011
22nd seminar supported by Osaka Securities Exchange
"Size of Market Inefficiency:Trading System and Price Bubble"
Tatsuyoshi Miyakoshi (Osaka University)

The purpose of the paper is to propose a new measurement of " size of market inefficiency " and apply our measurement to evaluate trading system and bubble prices by using the stock market indices of Japan, USA, Italy, Canada, Korea, Singapore, India, Malaysia. We compute the size of the market inefficiency to evaluate the trading system and separate the size of inefciency from the market price to evaluate the correct price bubble.

March 7, 2011
21st seminar supported by Osaka Securities Exchange
"Measure of Bank Productivity and its Impact on the Capital Investments of Client Firms"
Daisuke Miyakawa (Development Bank of Japan)

This paper proposes one measure of bank productivity and studies how it affects the sensitivity of client firm's capital investment with respect to investment opportunity. As a direct measure of bank-level productivity, we employ the risk-adjusted profit of an individual bank, which is considered as output in a modified version of FISIM (Financial Intermediation Services Indirectly Measured) concept, per its operating cost. We combine such bank-level productivity panel-data with bank and firm characteristics as well as the loan relationship data between Japanese listed companies and banks over the last three decades. The panel estimations for an extended investment equation based on Q-theory show that firm's capital investment becomes more sensitive to investment opportunity in statistically and economically significant levels when they hold the relationships with more productive banks and face relatively severe cash-flow constraint. These results imply that it is necessary to relate firm performances not only to the discrete characteristics of banks (e.g., mainbank relations) as in the

extant literature, but to the continuously measured characteristics of the banks having relationships with the firm.

February 28, 2011
20th seminar supported by Osaka Securities Exchange
"Repayment Enforcement and Informational Advantages: Empirical Determinants of Trade Credit Use"
Hirofumi Uchida (Kobe University)

Using unique data we test various trade credit theories and find the following. First, the length of a buyer-seller relationship has a positive impact on the use of trade credit, especially for longer-term credit. In contrast, short-term trade credit is extended based on buyers' hard information. Second, trade credit is more frequently used for transactions in differentiated goods, and the relative bargaining power between the buyer and the seller also matters for the use/non-use of trade credit. Third, we find that the reduction of transaction costs is an important determinant of the use of trade credit. We interpret these findings in light of various theories of trade credit.

February 8, 2011
19th seminar supported by Osaka Securities Exchange
"Risk, Return and New Information: Learning from the Flow"
Ido Kallir (S. Peres Academic Center, Graduate School of Business)

This paper provides new evidence on how information shapes the flow of Pension Funds and how households learn to improve their investments from newly available information. We use a unique database that includes monthly information of ten years of Returns, Alphas, Asset Allocation and the Flow of Funds of the entire Providence Funds market in Israel. We also obtain the Dollar-value invested in advertising by each Family of Funds and the number of log-ins to the governmental system which ranks the funds. We use these three complimentary databases in order to construct a unique empirical setting. We show that the determinants of the Flow of Funds adjust themselves to the investor's ability to receive information, either objectively, i.e., risk adjusted rating, or subjectively, i.e., advertisements. We also demonstrate that the investors' capacity to utilize financial factors is determined by how easily this information can be accessed. Finally, we show that though superior performance is interpreted to additional advertisement, the campaigns are ineffective. Only small fund families' advertising campaigns are able to create new flow.

January 28, 2011
18th seminar supported by Osaka Securities Exchange
"Corporate debt structure and renegotiations of debts"
Shintaro Tomita (Keio University)

November 19, 2010
17th seminar supported by Osaka Securities Exchange
"The Deposit Insurance and the Risk-Shifting Incentive Evidence from the Blanket Deposit Insurance in Japan"
Wako Watanabe (Keio University)

Using the option pricing based model of the deposit insurance, for all the listed banks in Japan, we compute the actuarially fair insurance premium as well as the market value of assets and asset volatility implied by banks' stock prices. The findings based on these variables imply that banks shifted risks to the deposit insurer who charged them risk insensitive premiums. The temporary unlimited blanket coverage of all the deposits had accelerated risk-shifting before the prompt corrective action (PCA) though such acceleration of risk-shifting was prevented when the PCA was in effect as the regulatory discipline discouraged banks to lever.

July 20, 2010

16th seminar supported by Osaka Securities Exchange
"An empirical study of the relation between stock repurchases and stock liquidity"
Takaaki Hoda, Otaru University of Commerce

July 5, 2010
15th seminar supported by Osaka Securities Exchange
"Payout policies and share splitting of Japanese firms: An empirical analysis based on a survey of institutional investors"
Toshio Serita (Aoyama Gakuin University)

June 24, 2010
14th seminar supported by Osaka Securities Exchange
"Term structure of equilibrium interest rates: Consumption CAPM with durable consumption goods"
Ryoichi Ikeda (Nanzan University)

Novemebr 20, 2009
13th seminar supported by Osaka Securities Exchange
"The Effects of Collateral on SME Performance in Japan"
Iichiro Uesugi (Institute of Economic Research Hitotsubashi University)

This paper examines how collateral and personal guarantees affect firms' ex-post performance employing the propensity score matching estimation approach. Based on a unique firm-level panel data set of more than 500 small and medium-sized borrower firms in Japan, we find the following: (1) the increase in profitability and reduction in riskiness of borrowers that provide collateral to lenders are more sizeable than of borrowers that do not; (2) On the other hand, the lending attitude and monitoring frequency of borrowers' main banks do not change significantly at the time of collateral being pledged; and (3) The increase in profitability of collateralized borrowers is driven by cost reductions rather than by sales growth. These
findings are consistent with the hypothesis that by providing collateral, borrowers curb their own incentives for moral hazard in order to further enhance their creditworthiness.

Novemebr 6, 2009
12th seminar supported by Osaka Securities Exchange
"The risk and P&L of Dispersion Trading"
Satoshi Yamanaka (Quantitative Research Dept., Nomura Securities Co. Ltd)

Dispersion trading is one of the arbitrage trading which exploits correlation risk premiums from the relationship of an index and its component stocks. The trading risk and P&L of the stochastic delta hedge position are modeled by general stochastic volatility. This seminar focuses on theoretical and empirical differences of dispersion trading by using variance swaps and options and their effectiveness as a practical trading strategy.

October 30, 2009
11th seminar supported by Osaka Securities Exchange
Scanning multivariate conditional densities with probability transforms, with an application to volatility modeling.
Isao Ishida (Osaka University CSFI)

This paper introduces a new approach to construct integral transforms (PITs) of random vectors that complement the approach of Diebold, Hahn, and Tay (1999) (DHT) for evaluating multivariate conditional density forecasts, and explores ways to increase power to detect deviations of forecasts from the true densities. The DHT approach produces PIT series that are not informative about the accuracy of density forecasts in some cases. This paper points out the simple fact that by transforming multivariate time sries into a single random variable at each point in time as an

intermdediate step and then taking the PITs of it delivers an i.i.d. uniform series under the null of correct forecasts. Restricting attention to the class of linear transform functions in a particular bivaraite normal case, the paper proposes a way to construct PIT series that lead to powerful tests and demonstrates with examples that using forecasat density fucntions themselves as transform functions may achieve high power, in particular in high dimensional settings. An empirical example is also given that appleis several different PITs to specification testing of Engle's (2002) DCC model for mutlivariate financial returns time series.

October 22, 2009
10th seminar supported by Osaka Securities Exchange
"What Happened to Risk Management During the 2008-09 Financial Crisis?"
Michael McAleer (Erasmus School of Economics, Erasmus University Rotterdam)

When dealing with market risk under the Basel II Accord, variation pays in the form of lower capital requirements and higher profits. Typically, GARCH type models are chosen to forecast Value-at-Risk (VaR) using a single risk model. In this paper we illustrate two useful variations to the standard mechanism for choosing forecasts, namely: (i) combining different forecast models for each period, such as a daily model that forecasts the supremum or infinum value for the VaR; (ii) alternatively, select a single model to forecast VaR, and then modify the daily forecast, depending on the recent history of violations under the Basel II Accord. We illustrate these points using the Standard and Poor's 500 Composite Index. In many cases we find significant decreases in the capital requirements, while incurring a number of violations that stays within the Basel II Accord limits.

October 9, 2009
9th seminar supported by Osaka Securities Exchange
"Analytical solution for expected loss of a collateralized loan: A square-root intensity process negatively correlated with the collateral value"
Toshinao Yoshiba (Director and Senior Economist, Institute for Monetary and Economic Studies, Bank of Japan)

In this study, we derive an explicit solution for expected loss of a collateralized loan, focusing on a negative correlation between the default intensity and the collateral value. Three requirements for the default intensity and the collateral value are imposed. First, the default event is possible to happen at any time until the loan maturity according to an exogenous stochastic process of default intensity. Second, the default intensity and the collateral value are negatively correlated. Third, the default intensity and collateral value are non-negative. To develop the explicit solution, we propose a square-root process for the default intensity and an affine diffusion process for the collateral value. In those setting, we show two conclusions: 1) an integrand of the expected recovery value can be analytically evaluated in an extended affine model; 2) the expected recovery value is obtained by a Stieltjes integral with a measure-changed survival probability. Finally, numerical examples are shown.

July 24, 2009
8th seminar supported by Osaka Securities Exchange
"Endogenous Liquidity Provision in a Market with Asymmetric Information"
Katsumasa Nishide (Interdisciplinary Research Center, Yokohama National University)

We extend Bondarenko (2001) and endogenize the participation of market makers who provide market liquidity in a Kyle-type market with long-lived asymmetric information. The numerical calculation shows how a concentrated equilibrium is formed over the trading periods. Our model effectively explains the daily and weekly patterns observed in empirical reports.

October 17, 2008
7th seminar supported by Osaka Securities Exchange
"Liquidity, Volume and Informational Efficiency: Evidence from High-frequency FX data"
Kentaro Iwatsubo (Graduate School of Economics, Kobe University)

This paper investigates the impacts of spreads and volume on informational efficiency in the Euro/Dollar and Yen/Dollar markets. Following Chordia et al. (2008), we exploit the short-run return predictability from lagged returns and order flows as an inverse indicator of informational efficiency. The relationship between the adverse selection component of bid-ask spreads and the efficiency measure is also analyzed to examine the endogeneity of spreads. Using the high-frequency Electronic Broking Services (EBS) data, we find that the effect of a bid-ask spread on efficiency is negative, while that of volume is positive. The decomposition of bid-ask spreads reveals that the adverse selection component is negatively related to efficiency, suggesting that informed traders generally submit limit orders and determine the bid-ask spreads. Therefore, the endogeneity does not seem to hinder our interpretation about the causality between spreads and efficiency. The evidence supports the transaction cost view of liquidity and the asymmetric information view of the volume-efficiency relationship.

August 26, 2008
6th seminar supported by Osaka Securities Exchange
"International Real Interest Rate Convergence and Regime-Switching"
Mark Holmes (Department of Economics, The University ofWaikato)

This study is an investigation of long-run real interest parity among the G7 economies. In contrast to the existing literature, unit-root tests of real interest differentials are embedded within a Markov regimeswitching framework. Whereas standard univariate unit-root tests provide little support for parity, the evidence suggests that real convergence is present after allowing for regime switches in real interest misalignments. However, differentials across members of the euro zone are likely to exhibit greater persistence despite nominal convergence.

August 1, 2008
5th seminar supported by Osaka Securities Exchange
"Spurious Regressions in Technical Trading: Momentum or Contrarian?"
Mototsugu Shintani (Vanderbilt University)

This paper investigates the spurious effect in forecasting asset returns when signals from technical trading rules are used as predictors. Against economic intuition, the simulation result shows that, even if past information has non predictive power, buy or sell signals based on the difference between the short-period and long-period moving averages of past asset prices can be statistically significant when the forecast horizon is relatively long. The theory implies that both 'momentum' and 'contrarian' strategies can be falsely supported, while the probability of obtaining each result depends on the type of the test statistics employed.
Several modifications to these test statistics are considered for the purpose of avoiding spurious regressions. They are applied to the stock market index and the foreign exchange rate in order to reconsider the predictive power of technical trading rules.

June 5, 2008
4th seminar supported by Osaka Securities Exchange
"Time Series Nonparametric Regression Using Asymmetric Kernels with an Application to Estimation of Scalar Diffusion Processes"
Masayuki Hirukawa (Northern Illinois University)

This paper considers a nonstandard kernel regression for strongly mixing processes when the regressor is nonnegative. The nonparametric regression is implemented using asymmetric kernels [Gamma (Chen, 2000b), Inverse Gaussian and Reciprocal Inverse Gaussian (Scaillet, 2004) kernels]

that possess some appealling properties such as lack of boundary bias and adaptability in the amount of smoothing. The paper investigates the asymptotic and .nite-sample properties of the asymmetric kernel Nadaraya-Watson, local linear, and re-weighted Nadaraya-Watson estimators. Pointwise weak consistency, rates of
convergence and asymptotic normality are established for each of these estimators. As an important economic application of asymmetric kernel regression estimators, we reexamine the problem of estimating scalar diffusion processes.

March 26, 2008
3rd seminar supported by Osaka Securities Exchange
"A GARCH Option Pricing Model with Possibly Non-Normal Innovations"
Yong-Jin Kim (Associate Professor, Hosei University)

This paper extends the original GARCH option pricing model of Duan (1995), when the conditional innovation of the asset price dynamic is not necessarily normally distributed. By imposing restrictions on the state price density process as in Schroder (2004), we can obtain the market price dynamics of risk
premium with closed-form expressions in most cases, which are key inputs in the risk neutral dynamics of the underlying asset price process. We also investigate the effects of non-normality of the conditional innovations on the GARCH option pricing performance, using Nikkei 225 options data.

January 24, 2008
2nd seminar supported by Osaka Securities Exchange
"Market microstructure noise"
Wataru Ohta (Associate Professor, Graduate School of Economics, Osaka University)

November 1, 2007
1st seminar supported by Osaka securities Exchange
"Overview and market characteristics of CLO derivatives"
Kimiaki Aonuma (Credit planning division, Bank of Tokyo-Mitsubishi UFJ)

(Some of the lecture titles in Japanese are translated into English by the CSFI)

18 Workshop

We have organized workshops to develop the interchange between researchers and practitioners in the field of finance and insurance.

Workshop (Coop with Math Program)
"Mathematics for Measuring, Managing and Controlling Financial Risk"
Date: March 28 (Thu) and 29 (Fri), 2013
Place: Toyonaka Campus, Osaka University

March 28, 2013

1. Takashi Kato (Osaka University & CSFI)
Survey on Quantitative Financial Risk Management

2. Takashi Isogai (Bank of Japan)
A comparative study on VaR/ES measuring methods.

3. Takanori Adachi (ICS, Hitotsubashi University)
Decision Theory and its Categorical Framework

4. Hidehiro Kaise (Osaka University & CSFI)
Introduction to dynamic importance sampling and differential game method.

5. Hidetoshi Nakagawa (ICS, Hitotsubashi University)
An EBIT-based structural model and credit spreads.

6. Takeshi Oyama (Tohmatsu Industry Group)
New global regulatory trends beyond Basel III.

March 29, 2013

1.Teppei Ogihara (Osaka University & CSFI)
Covariance estimation using high-frequency data and related topics.

2. Takayuki Fujii (Shiga University)
Statistical model selection for diffusion processes and its application to financial data analysis.

3. Shin Kanaya (Aarhus University, Department of Economics and Busuiness)
Optimal Sampling and Bandwidth Selection for Kernel Estimators of Diffusion Processes

4. Akihiro Sato (Graduate School of Informatics, Kyoto University)
Market state estimation using high-resolution exchange data and risk measurement.

5. Yoshihiko Uchida (Bank of Japan)
On recent arguments for CVA/FVA, stress test and risk appetite.

6. Riho Sato (Tohmatsu Industry Group)
Future trends and issues on operational risk and regulation

7. Jun Hironaka (Nomura Asset Management Co., Ltd.)
Practical issues on financial risk management and countermeasures.

8. Yosuke Fujisawa (LIFENET INSURANCE COMPANY)
Pension/Insurance-related problems and the role of models for estimating mortality rates.

CSFI Workshop supported by Osaka Securities Exchange
Workshop on "Problems in Securities Market"
Date: March 3 (Fri), 2013
Place: Nakanoshima Center, Osaka University
Supported by Osaka Securities Exchange

1. Wataru Ohta (Osaka University)
High-speed trading system and opening price formation

2. Hideaki Sakawa (Nagoya City University) & Naoki Watanabe (Ritsumeikan University)
Market Liquidity and Bank-dominated Corporate Governance: Evidence from Japan

3. Naoto Isaka (Sophia University)
Long-run effects of minimum trading unit reductions on stock prices

4. Jun Uno(Waseda University)
The Microstructure of the European Sovereign Bond Market: A Study of the Euro-zone Crisis

5. Kentaro Iwatsubo(Kobe University)
Order Flows, Fundamentals and Exchange Rates

CSFI Two Day Workshop
Workshop on Finance, Stochastics and Asymptotic Analysis
Date: February 11 (Mon) & February 12 (Tue), 2013
Place: Osaka University, Graduate School of Engineering Science I-204

February 11 (Mon)

1. J. Sekine (Osaka University)
Sensitivity analysis for utility maximization via an associated FB-system of SDEs

2. N. Ichihara (Hiroshima University)
Criticality of ergodic type HJB equations and stochastic ergodic control

3. W. Runggaldier (University of Padova)
On market models that do not admit an equivalent local martingale measure

4. K. Yamazaki (Osaka University)
Optimal dividends in the dual model

5. M. Fukasawa (Osaka University)
Efficient price dynamics in financial markets with non-linear supply curve

February 12 (Tue)

6. H. Nagai (Kansai University)
Estimates of certain large deviation probabilities for controlled semi-martingales

7. H. Pham (University Paris 7 Diderot)
Feynman-Kac representation for Hamilton-Jacobi-Bellman IPDE

8. K. Fujimoto (Mitsubishi-UFJ)
Expected utility maximization under incomplete information and with Cox-processes observations

9. T. Kato (Osaka University)
Effects of short-sale constraints in an agent-based model of stock markets: From the approach based on the Föllmer-Schweizer model

10. S. Ogawa (Ritsumeikan University)
Around the Fourier series method for volatility estimation

11. D. Hernandez-Hernandez (CIMAT)
A zero-sum game between stochastic controller and a discretionary stopper

CSFI Workshop
"Problems in Financial Engineering, Mathematical and Quantitative Finance 2012"

Date: Nov. 30 (Fri) – Dec. 1 (Sat), 2012
Place: Nakanoshima Center, Osaka University
Supported by Sumitomo Management Technology Forum

November 30 (Fri)

1. Hiroshi Ishijima (Chuo University)
A valuation model for real estate prices and returns with its applications.

2. Yoshifumi Muroi (Tohoku University)
Calculation of greeks on jump diffusion processes using a binomial tree model.

3. Yuji Umezawa (Mizuho-DL Financial Technology Co., Ltd.)
Pricing Path-Dependent Options with Discrete Monitoring under Time-Changed L´evy Processes

4. Teppei Ogihara (Osaka University & CSFI, JST CREST)
On covariance estimation using high-frequency data.

5. Takayuki Fujii (Osaka University & CSFI, JST CREST)
Nonparametric estimation for jump Markov processes.

6. Shinichi Aihara (Tokyo University of Science, Suwa)
Estimation and Identification of Stochastic Volatility

7. Keita Owari (The University of Tokyo)
On Convex Risk Measures for Unbounded Risks

8. Takanori Adachi (Hitotsubashi University)
A Note on Categorical Risk Measure Theory

9. Masahiro Haramiishi (Bank of Japan)
On solutions to inverse problems related to calculating CVA.

December 1 (Sat)

10. Katsumasa Nishide (Yokohama National University)
Pricing of Discount Bonds with a Markov Switching Regime

11. Yuichi Takano (Tokyo Institute of Technology)
Dynamic portfolio optimization using a nonlinear control policy

12. Yuusuke Morimoto (Bank of Tokyo-Mitsubishi UFJ, Ltd.)
American Monte Carlo method and refinement of going-concern valuation.

13. Arturo Kohatsu-Higa (Ritsumeikan University)
Recent Advances in Infinite Dimensional Analysis with Applications

14. Kazufumi Fujimoto (Bank of Tokyo-Mitsubishi UFJ, Ltd.)
Expected Utility Maximization under Incomplete Information and with Cox-Process Observations

15. Yumiharu Nakano (Tokyo Institute of Technology)
On numerical methods for stochastic control problems.

16. Tatsuyoshi Okimoto (Hitotsubashi University)
Increasing Trends in the Excess Comovement of Commodity Prices

17. Hideyuki Takamizawa (Hitotsubashi University)
Impact of No-arbitrage on Interest Rate Dynamics

CSFI Workshop on "Mathematical Finance and Related Issues"

Date: September 2 (Sun) - September 5 (Wed), 2012
Place: Kyoto Research Park
Supported by Osaka Securities Exchange Co., Ltd.

Sunday, September 2

1. F. Delbaen (ETH Zurich)
Super hedging in the non-dominated case

2. S. Robertson (Carnegie Mellon University)
Utility-Based Pricing in the Large Position, Nearly Complete Limit

3. A.E. Kyprianou (University of Bath)
Multi-Level Wiener-Hopf Monte-Carlo Simulation methods

4. T. Ichiba (University of California, Santa Barbara)
Portfolios under markets with rank-based characteristics

5. M. Rutkowski (University of Sydney)
Multi-Person Game Contracts and Multi-dimensional Reflected BSDEs

6. Y. Dolinsky (ETH Zurich)
Numerical Schemes for G-Expectations

7. N. Touzi (Ecole Polytechnique)
Viscosity Solutions of Fully Nonlinear Path-Dependent PDEs

8. E. Osuka (Tohoku University)
Girsanov's formula for G-Brownian motion

9. K. Yamazaki (Osaka University)

Default swap games driven by spectrally negative Lévy processes

10. F.Wang (Shandong University)

BSDE, path-dependent PDE and nonlinear Feynman-Kac formula (cancelled)

Monday, September 3

11. Q. Tang (University of Iowa)

Loss Given Default in the Presence of Multivariate Regular Variation

12. Y. Shimizu (Osaka University)

Asymptotic expansion of ruin probability under Lévy risk models

13. B.A. Surya (Bandung Institute of Technology)

Finite Maturity Optimal Stopping of Lévy Processes with Running Cost, Stopping Cost and Terminal Gain

14. E. Baurdoux (London School of Economics)

Predicting the time of the ultimate supremum of a Lévy process

15. E. Eberlein (University of Freiburg)
Market Models for Credit Risky Portfolios

16. T. Arai (Keio University)

An explicit representation of locally risk-minimizing for Lévy markets

17. P. Guasoni (Dublin City University)
Dynamic Trading Volume (cancelled)

18. C. Li (Peking University)
Closed-form Expansion, Conditional Expectation, and Option Valuation

19. T. Fujii (Osaka University)
Adaptive AIC type information criteria for discretely observed ergodic diffusion processes

20. T. Ogihara (Osaka University)
Parametric estimation for stochastic regression model from nonsynchronous observations

Tuesday, September 4

21. J.P. Fouque (University of California, Santa Barbara)
Coupled diffusions and systemic risk

22. C.H. Han (National Tsing Hua University)
Joint Calibration to Cross-Market Data: A Monte Carlo Approach

23. M. Zervos (London School of Economics)
A zero-sum game between a singular stochastic controller and a discretionary stopper

24. H. Pham (Universit´e Paris VII Diderot)
Backward SDEs with partially nonpositive jumps and Hamilton-Jacobi-Bellman IPDEs

Wednesday, September 5

25. S. Peng (Shandong University)
BSDE driven by G-Brownian Motion (cancelled)

26. R. Cont (Universit´e Paris VI)
Functional Ito Calculus and Functional Kolmogorov equations (cancelled)

27. A. Schied (University of Mannheim)
A control problem with fuel constraint arising in finance and Dawson-Watanabe superprocesses

28. J. Obloj (University of Oxford)
Long-run Investment under Drawdown Constraints: optimal portfolios and numeraire property

29. M. Sørensen (University of Copenhagen)
Statistical inference for integrated diffusion processes

30. M. Rosenbaum (Universit´e Paris VI)
On the ultra high frequency efficient price

31. J. Jacod (Universit´e Paris VI)
Microstructure noise: a statistical approach

CSFI Workshop
"Problems in Financial Engineering, Mathematical and Quantitative Finance 2011"

Date: Dec. 2 (Fri) – Dec. 3 (Sat), 2011
Place: Nakanoshima Center, Osaka University
Supported by Sumitomo Management Technology Forum

Dec 2 (Fri)

1. Masaaki Kijima (Tokyo Metropolitan University)
Equilibrium Price and Allocation in the Presence of Transaction Costs (joint work with C. Hara and A. Tamura)

2. Kensuke Ishitani (Mitsubishi UFJ Trust Investment Technology Institute)
An analytical valuation method for credit risk using wavelet transforms: A fast computational algorithm for the multi-factor Merton model

3. Takanori Adachi (HitotsubashiUniversity)
Credit Risk Modeling with Delayed Information

4. Hidetoshi Nakagawa (HitotsubashiUniversity)
On Surrender and Default Risk (joint work with Olivier Le Courtois)

5. Takaki Hayashi (Keio University)
Transaction prices and time stamps in high-frequency data

6. Yasuhiro Omori (The University of Tokyo)
Realized Stochastic Volatility with Leverage and Long Memory (joint work with Shinichiro Shirota and Takayuki Hizu)

7. Yoshihiko Nishiyama (Kyoto Universtity)
A Goodness of Fit Test for Ergodic Markov Processes (joint work with Vance Martin and John Stachurki)

8. Takayuki Fujii (Osaka University)
An AIC-type information criterion based on discrete-time observations of diffusion processes

9. Toshiki Honda (Hitotsubashi University)
The global minimum variance portfolio and portfolio management

10. Ken-ichiro Macklin (Keio University)
GPGPU Parallel Computing for Bayesian Portfolio Selection with a Massive Number of Assets (joint work with Teruo Nakatsuma)

Dec 3 (Sat)

11. Akira Maeda (The University of Tokyo)
Market-based policy instruments for environmental energy: Discussions on the safety valve mechanisms of the market

12. Yuji Morimoto (Capitas Consulting)
On the challenges confronting insurance mathematics and the insurance industry

13. Hisashi Nakamura (Hitotsubashi University)
A Continuous-Time Optimal Insurance Design with Costly Monitoring

14. Daisuke Yoshikawa (Mizuho-DL Financial Technology)
An Equilibrium Approach to Indifference Pricing and Utility-based Price

15. Yuuki Shinbara (Bank of Mitsubishi Tokyo UFJ)
Static hedging of barrier options based on asymptotic expansions of the local stochastic volatility model

16. Masaaki Fujii (The University of Tokyo)
Pricing of Collateralized Derivatives (joint work with Akihiko Takahashi)

17. Akira Yamazaki (Mizuho-DL Financial Technology & The University of Tokyo)
Exponential Lévy Models Extended by a Jump-to-default

18. Kentaro Kikuchi (Bank of Japan)
Interest rate analysis that takes the zero-interest-rate constraint and the fat-tail property into consideration: A new term structure of interest rates model with a non-negativity constraint and an empirical analysis based on it

19. Jun-ya Gotoh, Chuo University
Robust portfolio maximization reducing the vulnerability of CVaR minimization

20. Kyoko Yagi (Akita Prefectural University)
Management compensation and capital structure of firms issuing convertible bonds (joint study with RyutaTakashima)

CSFI Workshop
"Problems in Financial Engineering, Mathematical and Quantitative Finance 2010"

Date: Dec. 3 (Fri) – Dec. 4 (Sat), 2010
Place: Osaka City Central Public Hall (Osaka-shi Chuo Kokaido)
Supported by Sumitomo Management Technology Forum

Dec 3 (Fri)

1. Ryuta Takashima (Chiba Institute of Technology)
Irreversible Investment under Competition with Markov Switching Regime

2. Shunichi Kimura (Hokkaido University)
Continuous-Time Models for Valuing Executive Stock Options

3. Yusuke Tashiro (University of Tokyo)
Pricing Swing Options by a dual approach

4. Kazutoshi Yamazaki (Osaka University)
Model-free Implied Volatility: From Surface to Index

5. Yuji Sakurai (Bank of Japan)
Counter party risk： wrong-way risk of CVA and currency swaps

6. Shingo Saito（Kyushu University）
Asymptotic tail dependence of the normal copula

7. Yuri Imamura (Ritsumeikan University)
Static Hedging of Options Written on the Last Exit Time

8. Satoshi Yamanaka (Nomura Securities Co, Ltd.)
Volatility risk premium and tracking

9. Yuji Umezawa (Mizuho-DL Financial Technology Co. Ltd.)
An Extension of Credit Grades Model Approach with Lévy Processes

10. Kohei Shintani（Bank of Japan）
Developments of credit risk transfer and optimal portfolio choice

11. Hiroshi Takehara（Waseda University）
Empirical studies on liquidity, information asymmetry and stock price formation: based on current research on PIN variable

Dec 4 (Sat)

12. Yusuke Watanabe (Osaka University）
Risk-Sensitive Portfolio Optimization and Down-Side Risk Minimization for a Hidden Markov Factor Model

13. Masafumi Hayashi (Osaka University）
Asymptotic expansion for stochastic differential equations with jumps

14. Yasuhiro Tamba（Credit Pricing Corporation）
Liquid deposit balance and duration estimation model for currency risk management for banks

15. Akira Yamazaki（Mizuho-DL Financial Technology ）
On Valuation with Stochastic Proportional Hazard Models in Finance

16. Takashi Hatada (Kobe University)
Excessive Risk Taking in Japanese Regional Financial Institutions under the Mean-Variance Approach

17. Yasutaka Shimizu（Osaka University）
Nonparametric Estimation of the Gerber-Shiu Function

18. Hiroki Masuda（Kyushu University）
Mighty convergence of pseudo likelihood estimation of jump processes

19. Teppei Ogihara (Mitsubishi UFJ Trust investment Technology Institute）
Pseudo likelihood estimation and Bayesian estimation of jump diffusion processes

20. Risa Sai（University of Tokyo）
A Dynamic Theory of Pecking Order Financing

21. Iichiro Uesugi（The Research Institute of Economy, Trade and Industry）
The Effect of Mega Bank Merger on Bank-firm Relationships and Borrowing Costs

22. Wataru Ohta (Osaka University)
Quote updating and price discovery before the market opening

CSFI Workshop on "Finance and Related Mathematical and Statistical Issues"

Date: September 12 (Sun)-15 (Wed), 2010
Place: Kyoto Research Park
Supported by Osaka Securities Exchange Co., Ltd.

Sunday, September 12

Marek Rutkowski (University of Sydney)
Market Models of Forward CDS Spreads

Monique Jeanblanc (Université d'Evry Val d'Essonne)
An Extension of Cox Model for Credit Risk

Boris Rozovsky (Brown University)
Nonlinear Filtering for Estimation of Multi-scale Systems

Lane P. Hughston (Imperial College London)
Rational Term Structure Models with Geometric Lévy Martingales

Bruno Bouchard (Université Paris-Dauphine)
Generalized Stochastic Target Problems for Pricing and Partial Hedging under Loss Constraints - Application in Optimal Book Liquidation

Mihai Sîrbu (Univ. of Texas at Austin)
Optimal Investment with High-watermark Performance Fee

Huyên Pham (University Paris 7 Diderot)
Pricing and Optimal Investment under Multiple Defaults and Contagion Risk

Libo Li (University of Sydney)
Construction of Random Time with Given Azéma Super-Martingale: A Multiplicative System Approach

Hiroaki Hata (Academia Sinica)
An Optimal Consumption Problem with Partial Information

Kazutoshi Yamazaki　(Osaka Univ.)
On Scale Functions of Spectrally Negative Levy Processes with Phase-Type Jumps

Monday, September 13

Shige Peng (Shandong University)
g-Expectation, G-Expectation and Dynamic Risk Measures

Jianfeng Zhang (University of Southern California)
Martingale Representation Theorem for the G-expectation

Jaeyoung Sung (Ajou Univ.)
CEO Pay and Firm Size in CEO Job Market Equilibrium in the Presence of Career Concerns
Hyeng Keun Koo (Ajou Univ.)
Asymmetric Information, Inventory Risk, and Asset Pricing

Chiaki Hara (Kyoto University)
Heterogeneous Beliefs and Mispricing of Derivative Assets

Shanjian Tang (Fudan University)
A Two-Agent Dynamic Equilibrium

Dan Crisan (Imperial College London)
Accelerated Numerical Schemes for Solving Backward SDEs: Application to Nonlinear Pricing

Azmi Makhlouf (Osaka University)
L_2-time Regularity of BSDEs with Irregular Terminal Functions

Koichi Matsumoto (Kyushu University)
Weak Time Consistency Conditions for Tail VaR Measures

Yasutaka Shimizu (Osaka University)
Estimation of the Expected Discounted Penalty Function for Wiener-Poisson Risk Model from Certain Discrete Data

Masaaki Fukasawa (Osaka University)
Model-free Bounds on the Implied Volatility with Application to the Volatility Index Japan

Tuesday, September 14

Nizar Touzi (Ecole Polytechnique)
Model Independent Bound for Option Pricing:　A Stochastic Control Approach

Fausto Gozzi (Luiss Guido Carli)
Constrained Portfolio Choices Arising in Pension Fund Management: Regularity of HJB Equations and Applicatoins

Thomas Knispel (Leibniz University Hannover)
Optimal Long Term Investment under Model Ambiguity

Shuenn-Jyi Sheu (Academia Sinica)
On the Hamilton-Jacobi-Bellman Equation for an Optimal Consumption Problem

Wednesday, September 15

Paul Embrechts (ETH Zurich)
Mathematics and the Financial Crisis

Koichiro Takaoka (Hitotsubashi University)
On the Condition of No Unbounded Profit with Bounded Risk

Nakahiro Yoshida (University of Tokyo)
Statistical Inference for Diffusions

Michael Sørensen (University of Copenhagen)
Explicit Martingale Estimating Functions for Diffusions with Jumps

Hideatsu Tsukahara (Seijo University)
Applications of Distortion Risk Measures

Daniel Hernández-Hernández (CIMAT)
Dynamic Risk Measures for Exponential Levy Market Models

CSFI Workshop
"Problems in Financial Engineering, Mathematical and Quantitative Finance 2009"

Date: Dec 4 (Fri) - Dec 5 (Sat), 2009
Place: Seminar Room, 7th floor, Nakanoshima Center, Osaka University
Supported by Sumitomo Management Technology Forum

Dec 4 (Fri)

Masaaki Fukasawa（CSFI, Oaska University）
The structure of the implied volatility surface under stochastic volatility

Takahiro Tsuchiya（Ritsumeikan University）
An application of heat kernel approach to defaultable bond

Koichiro Takaoka（Graduate School of Commerce and Management, Hitotsubashi University）
On the instantaneous volatility process of an extended Black-Scholes model

Hideaki Miyata（Graduate School of Science, Kyoto University）
Dynamic protection for Bayesian optimal portfolio

Hiroaki Hata（Academia Sinica）
Hamilton-Jacobi-Bellman equation for an optimal consumption problem

Hidehiro Kaise (Graduate School of Informatics and Sciences, Nagoya University)
H-infinity control approach to optimal investment problems under partial information

Katsuichiro Uchiyama（Credit Methodology Group, Morgan Stanley）
Pricing of collaterallized derivatives

Takehiro Fujiwara (Quantitative Research Center, Nomura Securities Co., Ltd.)
More efficient pricing of derivative securities with early exercise provisions:
The Kusuoka approximation and the finite difference method on integral curves

Kohei Marumo（Financial Systems and Bank Examination Department, Bank of Japan）
An application of distributional approximations with polynomials to financial risk measurement:
An examination of the possibilities of the representation of interdependent relations of variables by
Berntein polynomials.

Kazufumi Fujimoto (Mitsubishi UFJ Securities Co., Ltd.)
Pricing exotic derivatives with variance curve model

Tetsuya Yamada（Institute for Monetary and Economic Studies, Bank of Japan）
Corporate investment behaviour and credit risk under the conditions of low interest rates

Dec 5 (Sat) AM

Isao Ishida（CSFI, Oaska University）
An empirical investigation of the dynamic properties of the VIX
using high-frequency data

Seisho Sato（The Institute of Statistical Mathematics）
High-frequency data analysis via the SIML method

Yasumasa Matsuda (Graduate School of Economics and Management, Tohoku University)
Semiparametric estimation of the long memory stochastic volatility model

Koichi Miyazaki（The University of Electro-Communications）
Empirical analyses on deterministic and stochastic volatility models
under lattice framework: Evidence from NIKKEI225 options market

Nagae Takeshi（The University of Electro-Communications）
The entry/exit option problem with incomplete market risk

Panel Discussion
**"The recent financial crisis from the perspectives of financial engineering and financial
econometrics"**

Chair:
**Yoshihiko Uchida (Financial Systems and Bank Examination Department, Bank of Japan, and
CSFI)**

Panelists:
Katsuichiro Uchiyama（Credit Methodology Group, Morgan Stanley）
Tomonori Uchiyama（Quantitative Research Center, Nomura Securities Co., Ltd.)
Kimiaki Aonuma (The Bank of Tokyo-Mitsubishi UFJ, Ltd.)
Jun Sekine（Institute of Economic Research, Kyoto University ＆ CSFI）

Kazutoshi Yamazaki（CSFI, Oaska University）
Fluctuation theory of Levy processes and applications to risk management

Hiroki Masuda（Faculty of Mathematics, Kyushu Universtiy）
On calibrating a skewed-stable model with finite mean

Nakahiro Yoshida（Graduate School of Mathematical Sciences, The University of Tokyo ＆ JST）
Asymptotic expansions of stochastic processes: A review of the current state and future prospects

（Some of the lecture titles in Japanese are translated into English by the CSFI)

CSFI Workshop
"Problems in Financial Engineering, Mathematical and Quantitative Finance 2008"

Date: Dec 6 (Sat) - Dec 7 (Sun), 2008
Place: Seminar Room, 7th floor, Nakanoshima Center, Osaka University
Supported by Sumitomo Management Technology Forum

Dec 6 (Sat)

1. **Teruyoshi Suzuki (Graduate School of Economics, Hokkaido University)**
   The Optimal Capital Structure and Endogenous Bankruptcy for a Fixed Term Debt Issued at Par

2. **Tian Yuan (Graduate School of Economics, Kyoto University)**
   Compensation Measures for Alliance Formation: A Real Options Analysis

3. **Takashi Shibata**（Graduate School of Social Sciences, Tokyo Metropolitan University）
   Dynamic Investment and Corporate Structure under Manager-Shareholder Conflicts

4. **Keiichi Tanaka**（Graduate School of Social Sciences, Tokyo Metropolitan University）
   Dynamic Asset Allocation under Stochastic Interest Rate and Market Price of Risk

5. **Yuji Yamada**（Graduate School of Business Sciences, University of Tsukuba, Tokyo）
   Optimal Hedging Using Additive Models

6. **Takuji Arai**（Graduate School of Economics, Keio University）
   Good Deal Bounds Induced by Shortfall Risk

7. **Jiro Akahori**（Department of Mathematical Sciences, Ritsumeikan University,）
   Constructing Interest Rate Models with Jumps by Heat Kernel Approach

8. **Isao Ishida**（Graduate School of Economics & Public Policy, The University of Tokyo）
   "Prediction of Realized Volatility of NIKKEI Futures: Jumps, Leverage and Spill-over Effect from US markets"

9. **Hideyuki Takamizawa**（Graduate School of Humanities and Social Sciences , University of Tsukuba）
   Interest Rate Volatility Implicit in Term Structure Data

10. **Hideatsu Tsukahara**（Faculty of Economics, Seijo University）
    Comparative Analysis of VaR and Some Distortion Risk Measure

11. **Tetsuya Yamada**（**Institute for Monetary and Economic Studies, Bank of Japan**）
"Risk on Main-Bank Relationship and Valuation of Debt: An Approach of Game-theoretic Real Option"

Dec 7 (Sun)

12. **Koichiro Takaoka**（**Graduate School of Commerce and Management, Hitotsubashi University**）
The Instantaneous Volatility and the Implied Volatility Surface for a Generalized Black-Scholes Model

13. **Takahiko Fujita**（**Graduate School of Commerce and Management, Hitotsubashi University**）**& Research Institute for Mathematical Sciences, Kyoto University**）
Pricing Put and Call Options on a Simple Stochastic Volatility Model

14. **Takashi Kato**（**Graduate School of Mathematical Sciences, The University of Tokyo**）
Optimal Execution Problem with Random Market Impact

15. **Yuji Sakurai**
The Application of SABR Formula to the Pricing of Option on Realized Variance

16. **Hiroshi Ishijima**（**The Chuo Graduate School of International Accounting**）
"Regime-Switching Factor Analysis and its Application"

17. **Junichi Imai**（**Department of Administration Engineering Faculty of Science and Technology , Keio University**）
An Enhanced Quasi-Monte Carlo Method for Simulating L´evy Process

18. **Atsushi Takeuchi**（**Graduate School of Science, Osaka City University**）
Sensitivity Analysis for Asset Price Dynamics with Gamma Processes

19. **Shoichi Ninomiya**（**Tokyo Institute of Technology Graduate School of Innovation Management & Center for Research in Advanced Financial Technology**）
Kusuoka Scheme: A New Weak Approximation Method of Diffusion Processes

20. **Masayuki Uchida**（**Graduate School of Engineering Science & CSFI, Osaka University**）
Estimation for Misspecified Diffusion Processes and its Application to Model Selection

21. **Hiroki Masuda**（**Kyushu University Faculty of Mathematics**）
Simple Test for the Variation of a Discretely Observed Process: Long-Term Asymptoics

22. **Masaaki Fukasawa**（**CSFI, Oaska University**）
On the Validity of a Singular Perturbation Expansion of the Implied Volatility

Symposium

"Financial Engineering and Management Decision Making"

Date: December 5 (Fri), 2008
Venue: Seminar room (7F), Osaka University Nakanoshima center
Co-host: The Operations Research Society of Japan (ORSJ) Kansai chapter

1. **Yasuharu Miyake (Resona Holdings, Inc.)**

   "Financial Engineering and Management of Banks"

2. **Tomohiko Taniyama (Nomura Research Institute / Graduate School of Economics, Osaka University)**

   Kana Takahashi (Nomura Research Institute / School of International and Public Policy, Hitotsubashi University)

   "Evaluation and Control of Business Risk in Corporate Management"

3. **Yukio Muromachi (Graduate School of Social Sciences, Tokyo Metropolitan University)**

   "Subprime Loan Problems and Financial Engineering"

3. **Yoshitaka Kai (Kwansei Gakuin University Institute of Business and Accounting)**

   "Financial Engineering Education in Graduate School of Business Administration"

CSFI Workshop on "Finance and Related Mathematical and Statistical Issues"

Date: Sep 3 (Wed) - Sep 6 (Sat), 2008
Place: Kyoto Research Park
Supported by Osaka Securities Exchange Co., Ltd.

Sep 3 (Wed)

Hans Föllmer (Humboldt University ,Berlin, Germany)
Asymptotic arbitrage and large deviations

Shige Peng (Shandong & Fudan University, China)
A New Central Limit Theorem & Law of Large Numbers under Mean and Variance Uncertainty
and Applications to Finance

Philip Protter (Cornell University, USA)
Modelling Financial Bubbles

Alain Bensoussan (University of Texas at Dallas, USA)
Optimal Consumption and Portfolio Decisions with partially observable real prices

Mihail Zervos (London School of Economics, UK)
Optimal Consumption and Investment with Habit Formation and Hyperbolic Discounting

Jun Sekine (Kyoto University, Japan)
Remarks on long-term optimal portfolios with floor

Xunyu Zhou (University of Oxford, UK)
Thou Shalt Still Buy and Hold

Sep 4 (Thus)

Yuri Kabanov (University of Franche Comte, Besancon, France)
Hedging of American Options under Transaction Costs

Shanjian Tang (Fudan University, China)
Hedging of Contingent Claims, BSDEs, and BMO Martingales

Jan Obłoj (Imperial College London, UK)
Model-free Pricing and Robust Hedging of Double Barrier Options

Josef Teichmann (Vienna University of Technology, Austria)
Evaluation of the Heath-Jarrow-Morton equation by cubature methods for SPDEs

Martijn Pistorius (King's College, UK)
On the pricing and hedging of barrier options driven by additive processes

Kazuhiro Yasuda (Hosei University, Japan)
Simulation on multidimensional density functions through the Malliavin-Thalmaier formula

Reiichiro Kawai (Osaka University, Japan)
Recent Developements on Financial Greeks Computation for Models with Pure-Jump L´evy Processes

Koichi Matsumoto (Kyushu University, Japan)
Mean-Variance Hedging in Discrete Time with Execution Uncertainty

Takashi Tamura (Osaka University, Japan)
Maximization of long-term growth rate for a portfolio with fixed and proportional transaction costs

Sep 5 (Fri)

Jaeyoung Sung (University of Illinois at Chicago, USA)
Equilibrium Equity Premium, and Interest Rate of a Large-Firm Economy in the Presence of Moral Hazard

Chenghu Ma (Xiamen University, China)
MPS risk aversion and continuous time mean-variance analysis in presence of Levy jumps

Chiaki Hara (Kyoto University, Japan)
Aggregation of State-Dependent Utilities

Sep 6 (Fri)

Jean Jacod (University of Paris VI, France)
Testing finite activity versus infinite activity for jumps

Nakahiro Yoshida (University of Tokyo, Japan)
Expansion of Asymptotically Conditionally Normal Law

Nicolas Privault (City University of Hong Kong)
Stein estimation for the drift of Gaussian processes using the Malliavin calculus

Shigeo Kusuoka (University of Tokyo, Japan)
Computational Finance and Malliavin Calculus

Marek Rutkowski (University of New SouthWales, Australia)
Credit Default Swaps and Swaptions in a Hazard Process Model

Masaaki Fukasawa (Osaka University, Japan)
Realized volatility with a stochastic sampling

Yasutaka Shimizu (Osaka University, Japan)
A practical threshold estimation for jump processes

Michi Nishihara (Osaka University, Japan)
Strategic Investment with Debt Financing

CSFI Workshop
"Problems in Financial Engineering, Mathematical and Quantitative Finance"

Date: Dec. 1(Sat.) - Dec. 2 (Sun), 2007
Place: Room 2, 7th floor, Nakanoshima center, Osaka University

Dec 1 (Sat)

Wataru Ohta (Osaka University)	Spread in the Limit Order Market
Takayuki Morimoto (Hitotsubashi University)	Analysis of High Frequency Financial Data by Random Matrices (joint work with Kanta Tachibana)
Masato Ubukata (Osaka University)	Choice of Parameters in the Bias Correct Cumulative Covariance Estimator
Masahiko Egami* (Kyoto University)	On the One-dimensional Optimal Switching Problem
Michi Nishihara* (CSFI, Osaka University)	Real Options under Asymmetric Information
Kota TAKEHARA* (The University of Tokyo)	An Asymptotic Expansion Approach to Pricing Long-term Currency Options
Nabil Maghrebi (Wakayama University)	The Stochastic Behavior of the Nikkei 225 Implied Volatility Index (joint work with Kazuhiko Nishina and Moo Sung Kim)
Yoshihiko SUGIHARA (Bank of Japan)	Model-free Implied Volatility in Japanese Stock Market
Yasuhumi Osajima (BNP Paribas Securities)	General Asymptotics of Wiener Functionals and Application to Mathematical Finance
Yukio Muromachi (NLI Research Institute)	Risk Concentration Analysis Taking account of Credit Risk – Decomposition of VaR and ES into each Asset
Tomonori Uchiyama (Nomura Securities)	Effects of Infration Indexed Bonds on the Economic Equilibrium
Hajime Fujiwara (Nomura Securities)	Pricing of Path-dependent American Options
Takehiko Fujita (Hitotsubashi University)	On Pricing "Meander Option"

*Co-organized Session with The Operations Research Society of Japan Research Forum on Finance and Decision Making

Dec 2 (Sun)

Masayuki Uchida (Osaka University)	Estimation for Discretely Observed Ergodic Diffusions under Incorrect Models
Hiroki Masuda (Kyushu University)	On the Use of Long-term Multipower Variations in Estimation Problems
Yasutaka Shimizu (Osaka University)	Detection of Jumps for Simple Jump-Diffusions from Finite Samples
Yoshifumi Muroi (Osaka University)	Pricing Double Barrier Options with Fast Mean-Reverting Stochastic Volatility
Toshiyuki Nakayama (Mitsubishi UFJ Securities)	Introduction to a consistency problem for interest rate modeling
Reiichiro Kawai (Osaka University)	Some Applications of Stochastic Approximation Algorithms to Monte Carlo Variance Reduction
Hiroaki Hata (Academia Sinica, Taiwan)	Asymptotics of the Probability Minimizing a "Down-side" Risk (joint work with Hideo Nagai and Shuenn-Jyi Sheu)
Shinya Yokoya (Mizuho Securities)	Acceleration method for CDO pricing
Special Session I: Nakahiro Yoshida (The University of Tokyo)	Nonsynchronous Covariance Estimation and Limit Theorems
Special Session II: Marek Rutkowski (University of New South Wales, Australia)	Convertible Bonds with Credit Risk

CSFI Workshop
"Problems in Financial Engineering, Mathematical and Quantitative Finance"

Date: Dec 7 (Sat)-Dec 8 (Sun), 2006
Place: Room 2, 7th floor, Nakanoshima center, Osaka University

Dec 7 (Sat)

Shunichi Kimura (Hokkaido University)	Valuing Continuous-installment options via Laplace transformations: European vs. American
Toshinao Yoshiba (Bank of Japan)	The relation among EaD, LGD, PD and expected / unexpected loss under one period structural model
Yuji Umezawa (The University of Tokyo)	Multi-period risk measure and hedging
Masaya Fujimori (Sumitomo Mitsui Banking Corporation)	Value estimation of Liquid deposit and risk management
Hidetoshi Nakagawa (Tokyo Institute of Technology)	Pricing model for RMBS
Yoshifumi Muroi (Osaka University)	Valuation method for credit derivatives considering correlation of hazard
Takehiro Fujiwara (Nomura Securities)	An extension of Kusuoka scheme and its application
Shigeo Kusuoka (The University of Tokyo)	Finance and Numerical Analysis
Arturo Kohatsu-Higa (Osaka University)	Introduction to "Premia" a numerical computing software

Dec 8 (Sun)

Shuji Tanaka (Nihon University)	Contact between insurance and financial engineering
Masayuki Uchida (Kyushu University)	Statistical model selection for diffusion processes
Yasutaka Shimizu (Osaka University)	Statistical inference for diffusion processes with jumps from sampled data
Kazuhiro Yasuda (Osaka University)	Estimation of multivariate density function using Malliavin calculus and its application
Muneki Kawaguchi (MTEC)	Valuation model for credit risk using rating
Yasufumi Osajima (Mitsubishi UFJ Securities)	The Implied Volatility for Dynamic SABR Model and FX Hybrid Model
Yumiharu Nakano (Osaka University)	On pricing based on risk measures
Jun Sekine (Kyoto University)	On computing long-term optimal portfolio
Hideo Nagai (Osaka University)	Filtering, stochastic control and dynamic optimization

Center for the Study of Finance and Insurance
Workshop on Mathematical Finance and Stochastic Control

Date:　　August 24 (Thur) – 27(Sun), 2006
Venue:　Holiday Inn Kyoto
Backup: Ministry of Education, Culture, Sports, Science and Technology
　　　　　　(Grant-in-Aid for Scientific Research, Open Research Center Project)
　　　　　Japan Society for the Promotion of Science（Japan-France Integrated Action Program）

August 24 (Thur)

Kunita, Hiroshi (Nanzan University, Japan)
　Local time of a one dimensional stochastic flow and its application to a problem of a game option
Crepey, Stephane (Universite d'Evry, France)
　Valuation and hedging of defaultable game options in a hazard rate model
Corcuera, Jose Manuel (Universitat de Barcelona, Spain)
　A functional central limit theorem for the realized power variation of integrated stable processes
Bouchard, Bruno (Universite Paris 6 & CREST, France)
　Discrete time approximation for continuously and discretely reflected BSDE's
Zhou, Xunyu (The Chinese University of Hong Kong, Hong Kong)
　Prospect Theorey and Equity Premium Puzzle in Continuous Time
Nakano, Yumiharu (Osaka University, Japan)
　On the shortfall risk minimization with average value at risk
Peng, Shige (Shandong University & Fudan University, China)
　G-Expectation, G-Measures of Risk and Related Stochastic Calculus
Sekine, Jun (Kyoto University, Japan)
　Some remarks on risk-sensitive portfolio optimization

August 25 (Fri)

Miyahara, Yoshio (Nagoya City University, Japan)
　Minimal distance martingale measures for the geometric Levy　process models
Zabczyk, Jerzy (Instytut Matematyczny Polskiej Akademii Nauk, Poland)

　Bond markets with Lévy noise
Fujiwara, Tsukasa (Hyogo University of Teacher Education, Japan)
　On the minimal entropy martingale measures for geometric Lévy　processes:
　theoretical results and examples
Yamazato, Makoto (University of the Ryukyus, Japan)
　First passage times for storage processes: A survey
Becherer, Dick (Imperial College London, UK)
　On BSDEs with Jumps and Utility Optimization
Porchet, Arnaud (Universite Paris Dauphine-Ceremade Electricite de France, France)
　Valuation of a Power Plant Under Production Constraints and Market Incompleteness
August 26 (Sat)

Delbaen, Freddy (ETH, Schweiz)

An operator characterisation of the parameter b(M) for continuous BMO martingales

Kijima, Masaaki (Kyoto University & Tokyo Metropolitan University, Japan)

A reverse Monte Carlo method for pricing of American options

Bally, Vlad (Universite de Marne-la-Vallee, France)

Integration by parts formula for jump type processes and applications in finance

Ishikawa, **Ishikawa, Yasushi (Ehima University, Japan)**

Malliavin calculus applied to mathematical finance and a new formulation of the integration-by-parts

Rutkowski, Marek (University of New South Wales, Australia)

Valuation and Hedging of Basket Credit Derivatives

Runggaldier, Wolfgang (Universita degli studi di Padova, Italy)

On Filtering in Affine Credit Risk Models

Mnif, Mohamed (LEGI Ecole Polytechnique de Tunisie, Tunisia)

Optimal multiple stopping and valuation of swing options in Lévy models

Tankov, Peter (Universite Paris 7, France)

Optimal consumption problem in a market model with liquidity risk and the associated coupled system of integro-differential equations

August 27(Sun)

Sellami, Afef (Universite Paris 7, France)

Functional quantization of multi-dimensional stochastic differential equations and option pricing

Guyon, Julien (Ecole Nationale des Ponts et Chaussees, France)

Fine Properties of The Euler Scheme for Stochastic Differential Equations

Stettner, Lukasz (Polish Academy of Sciences, Poland)

Long time investments on markets with transaction costs

Sheu, Shuenn-Jyi (Academia Sinica, Taiwan)

Some stochastic control problems in markets under transaction costs

(Some of the lecture titles in Japanese are translated into English by the CSFI)

19 CREST

The project entitled Mathematical structure of complex financial products and infinite dimensional analysis was selected by the program Alliance for Breakthrough between Mathematics and Sciences (ABMS) supported by Core Research for Evolutional Science and Technology (CREST) of the Japan Science and Technology Agency (JST).

The main goal of the project is to improve the current mathematical understanding of several structure products used in the financial world.

Structured products are complex financial derivatives whose liquidity has increased in recent years. They have been blamed as part of the current financial crisis. The goal of this project is to provide a sound mathematical framework for these products using infinite dimensional methods. Furthermore we aim to use projection/dimension reduction approaches in order to provide effective valuation, hedging and estimation methods as well as risk control methods for these products.

The project is hosted by the Center for Finance and Insurance at Osaka University. From October 2009 to March 2011, there were seven CSFI members from the areas of statistics, econometrics and stochastic processes. Since the project leader Arturo Kohatsu-Higa and the project researcher Masafumi Hayashi moved from CSFI to Ritsumeikan University and Takayuki Fujii was appointed an assistant professor of CSFI, there are at present six members from CSFI in the project. Another two researchers come from the Graduate School of Engineering Science and 4 others are from Nomura Securities.

At present the project is concentrating on Credit Risk products and in particular CDO type structures and taking in consideration counterparty risk. The statistics group concentrates in the estimation of parameters for stochastic differential equations with applications to financial problems.

The project is hosted by the CSFI at Osaka University. From October 2009 to March 2011, there were seven CSFI members from the areas of statistics, econometrics and stochastic processes, two professors from the Graduate School of Engineering Science, and four researchers from Nomura Securities. In April 2011, the project leader Arturo Kohatsu-Higa moved from the CSFI to Ritsumeikan University and Takayuki Fujii was appointed an assistant professor of CSFI. In September 2011, the project researcher Masafumi Hayashi also moved from the CSFI to Ritsumeikan University. In April 2012, an assistant professor Azmi Makhlouf moved to Ritsumeikan University and an associate professor Yasutaka Shimizu was appointed as a joint associate professor of CSFI. Additionally, Teppei Ogihara was appointed as an assistant professor of CSFI in July 2012 and Takayuki Fujii moved to Shiga University in December 2012. As of March 2013, there are six members from CSFI in the project.

Researchers from CSFI:
Masayuki Uchida, Masamitsu Ohnishi, Kosuke Oya, Yasutaka Shimizu, Masaaki Fukasawa, Takayuki Fujii (moved to Shiga University in December 2012), Teppei Ogihara

20 Volatility Index Japan (VXJ)

The Volatility Index Japan (VXJ) provides a measure of how volatile the Japanese stock market is expected to be over the next month, and it is based on Nikkei225 index options traded on the Osaka Securities Exchange. The VXJ index is updated on regular basis and disseminated since July 2008 by the CSFI Research Group on its website. It is herein presented not so much as a new tradable class of assets, but as a guide for individual and institutional investors in the dynamic hedging of exposures to equity risk, and for financial regulators in the supervision of banks' compliance with capital requirements through value-at-risk modelling. This volatility index can be also useful in the examination of the relation between volatility expectations and macroeconomic information. Empirical studies suggest that implied volatility indices provide reliable forecasts of short-term volatility, and the 'fear gauge' appellation is widely accepted in light of its negative dynamic relation with market returns.
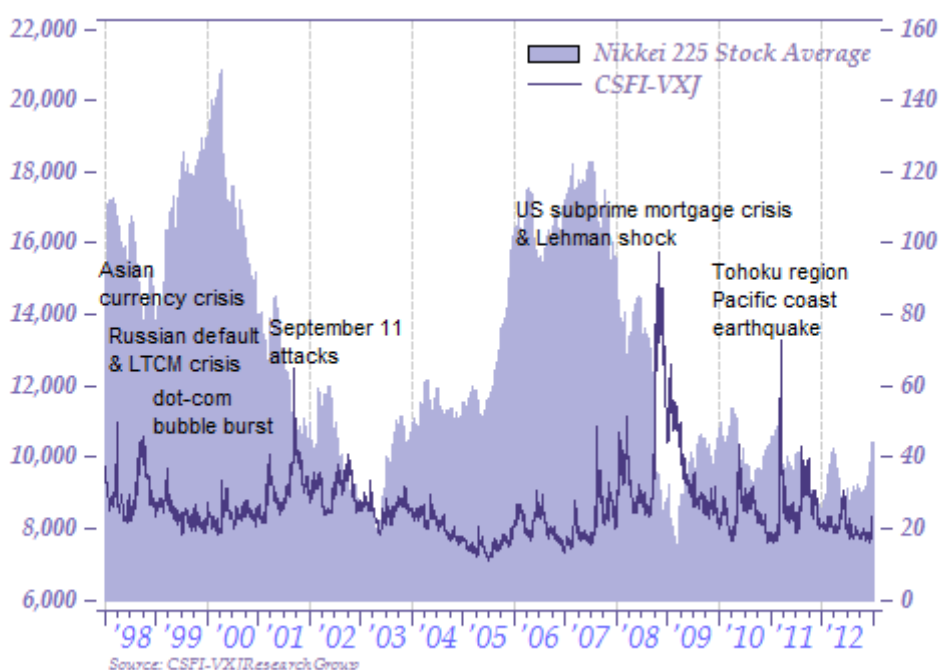
The VXJ index is indeed reflective of the impact of major economic shocks on anticipated uncertainty levels, such as the Asian financial and currency crisis from 1997 through 1997, Russian debt default and LTCM crisis in 1998, US subprime mortgage crisis in 2007, and euro-area sovereign debt problems, inter alia (see above chart).

The model-free approach to the VXJ index calculation is, for comparative purposes, similar to the new VIX index disseminated by the Chicago Board Options Exchange, and akin to the VDAX-New developed by the Deutsche Börse. It is noted that the VXJ Research Group has developed a new improved numerical approximation scheme for the integration formula involved in the VIX calculus. The CSFI-VXJ index is based on this new numerical approach, which is conducive to marginal improvement in forecast acuracy. Along with the VXJ index, the historical time-series of the new CSFI-VXJ index as well as regular updates are also available on the CSFI webpage.

http://www-csfi.sigmath.es.osaka-u.ac.jp/en/structure/activity/vxj.php

The VXJ index is the result of a purely academic exercise, undertaken with the aim of measuring volatility expectations in the Japanese market. The VXJ and new CSFI-VXJ series are provided solely for research and public information purposes, and all reasonable efforts are being made towards frequent and regular updates.

VXJ Research Group Members:

Kazuhiko NISHINA
Specially Appointed Professor of CSFI
Professor, Department of Economics, Meiji Gakuin University

Kosuke OYA
Professor, Graduate School of Economics

Nabil MAGHREBI
Specially Appointed Professor of CSFI
Professor of Graduate School of Economics, Wakayama University

Masaaki FUKASAWA
Associate Professor, Graduate School of Science

Kazutoshi YAMAZAKI
Assistant professor of CSFI

Isao ISHIDA
Associate professor of CSFI (The Research Division of Derivatives Trading and Risk Management supported by Osaka Securities Exchange)

Certification Results in 2007

As of March 2008

No.	Entry	Graduate School	Major	Program *	Course **
1	2006 Apr	Engineering Science	Systems Innovation	A	E・I・M
2	2006 Apr	Engineering Science	Systems Innovation	S	E・I・M
3	2006 Apr	Engineering Science	Systems Innovation	S	M
4	2007 Apr	Engineering Science	Materials Engineering Science	S	M
5	2006 Apr	Engineering Science	Materials Engineering Science	S	M
6	2006 Apr	Engineering Science	Systems Innovation	S	M
7	2006 Apr	Engineering Science	Systems Innovation	S	M
8	2006 Apr	Engineering Science	Systems Innovation	S	M
9	2006 Apr	Engineering Science	Materials Engineering Science	S	E
10	2006 Apr	Engineering Science	Systems Innovation	S	M
11	2006 Apr	Engineering Science	Systems Innovation	S	M
12	2006 Apr	Engineering Science	Systems Innovation	S	M
13	2006 Apr	Economics	Economics	S	E
14	2006 Apr	Economics	Management Science and Business Administration	S	E
15	2006 Apr	Economics	Management Science and Business Administration	S	E
16	2006 Apr	Information Science and Technology	Pure and Applied Mathematics	S	E・I・M
17	2006 Oct	Information Science and Technology	Pure and Applied Mathematics	S	E・I・M
18	2007 Apr	Science	Mathematics	S	I

Program *

  A: Advanced

  S: Standard

Course **

  M: Mathematical and statistical finance

  E: Financial economics / engineering

  I : Insurance

Certification Results in 2008

As of March 2009

No.	Entry	Graduate School	Major	Program *	Course **
1	2007 Apr	Credited Auditor	–	A	E
2	2007 Apr	Engineering Science	Systems Innovation	S	M
3	2007 Apr	Engineering Science	Systems Innovation	S	I
4	2007 Apr	Engineering Science	Systems Innovation	S	M
5	2007 Apr	Engineering Science	Systems Innovation	S	M
6	2007 Apr	Engineering Science	Systems Innovation	S	M
7	2007 Apr	Engineering Science	Materials Engineering Science	S	E·I·M
8	2007 Apr	Engineering Science	Systems Innovation	S	M
9	2007 Apr	Engineering Science	Systems Innovation	S	E·I·M
10	2007 Apr	Engineering Science	Systems Innovation	S	I
11	2007 Apr	Engineering Science	Systems Innovation	S	E·I·M
12	2007 Apr	Economics	Management Science and Business Administration	S	E·M
13	2007 Apr	Economics	Applied Economics and Policy Studies	S	E·I
14	2007 Apr	Economics	Applied Economics and Policy Studies	S	E
15	2007 Apr	Information Science and Technology	Pure and Applied Mathematics	S	I
16	2007 Apr	Science	Mathematics	S	I
17	2007 Apr	Engineering Science	Systems Innovation	S	M
18	2006 Oct	Credited Auditor	–	S	I
19	2007 Apr	Engineering Science	Materials Engineering Science	S	M
20	2007 Apr	Information Science and Technology	Pure and Applied Mathematics	S	E

Program *

    A: Advanced

    S: Standard

Course **

    M: Mathematical and statistical finance

    E: Financial economics / engineering

    I :   Insurance

Certification Results in 2009

As of March 2010

No.	Entry	Graduate School	Major	Program *	Course **
1	2008 Apr	Science	Mathematics	S	I
2	2008 Apr	Science	Mathematics	S	I
3	2008 Apr	Science	Mathematics	S	E
4	2008 Apr	Science	Mathematics	S	I
5	2008 Apr	Information Science and Technology	Information and Physical Sciences	S	M
6	2008 Apr	Economics	Management Science and Business Administration	S	E
7	2008 Apr	Economics	Management Science and Business Administration	S	E
8	2008 Apr	Economics	Applied Economics and Policy Studies	S	E
9	2008 Apr	Economics	Management Science and Business Administration	S	E
10	2008 Apr	Economics	Management Science and Business Administration	S	E
11	2008 Apr	Engineering Science	Systems Innovation	S	M
12	2008 Apr	Engineering Science	Systems Innovation	S	M
13	2008 Apr	Engineering Science	Systems Innovation	S	M
14	2008 Apr	Engineering Science	Systems Innovation	S	M
15	2009 Apr	Engineering Science	Systems Innovation	S	M
16	2009 Apr	Engineering Science	Systems Innovation	S	M
17	2006 Oct	Credited Auditor	_	A	I
18	2008 Apr	Credited Auditor	_	S	E
19	2008 Apr	Credited Auditor	_	S	M
20	2008 Apr	Engineering Science	Systems Innovation	S	M
21	2008 Apr	Engineering Science	Systems Innovation	S	M

Program *

  A: **Advanced**

  S: **Standard**

Course **

  M: **Mathematical and statistical finance**

  E: **Financial economics / engineering**

  I :   **Insurance**

Certification Results in 2010

No.	Entry	Graduate School	Major	Program *	Course **
1	2009 Apr	Information Science and Technology	Computer Science	S	E
2	2009 Apr	Economics	Applied Economics and Policy Studies	S	E & M
3	2009 Apr	Information Science and Technology	Computer Science	S	E
4	2009 Apr	Information Science and Technology	Pure and Applied Mathematics	S	E
5	2009 Apr	Information Science and Technology	Information and Physical Sciences	S	E
6	2009 Apr	Economics	Management Science and Business Administration	S	E
7	2009 Apr	Science	Mathematics	S	E & I
8	2009 Apr	Economics	Management Science and Business Administration	S	E & I
9	2009 Apr	Economics	Management Science and Business Administration	S	E & I
10	2009 Apr	Economics	Management Science and Business Administration	S	E & I & M
11	2009 Apr	Science	Mathematics	S	E
12	2009 Apr	Science	Mathematics	S	E
13	2010 Apr	Credited Auditor	_	S	E
14	2009 Apr	Science	Mathematics	S	I
15	2009 Apr	Economics	Management Science and Business Administration	S	E

Program *

    A: **Advanced**

    S: **Standard**

Course **

    M: **Mathematical and statistical finance**

    E: **Financial economics / engineering**

    I :   **Insurance**

Certification Results in 2011

No.	Entry	Graduate School	Major	Program *	Course **
1	2010 Oct	Credited Auditor	_	A	I

No.	Entry	Graduate School	Major	Program *	Course **
1	2010 Apr	Engineering Science	Systems Innovation	S	M
2	2010 Apr	Engineering Science	Systems Innovation	S	M
3	2010 Apr	Engineering Science	Systems Innovation	S	M
4	2010 Apr	Economics	Management Science and Business Administration	S	E
5	2010 Apr	Economics	Management Science and Business Administration	S	E & M
6	2010 Apr	Economics	Management Science and Business Administration	S	E & M
7	2010 Apr	Science	Mathematics	S	E & M
8	2010 Apr	Science	Mathematics	S	E & I & M
9	2010 Apr	Science	Mathematics	S	I
10	2010 Apr	Information Science and Technology	Pure and Applied Mathematics	S	I
11	2011 Apr	Economics	Management Science and Business Administration	S	E

Program *

    A: **Advanced**

    S: **Standard**

Course **

    M: **Mathematical and statistical finance**

    E: **Financial economics / engineering**

    I :   **Insurance**

Certification Results in 2012

As of March 2013

No.	Entry	Graduate School	Major	Program *	Course **	Course ***
1	2011 Apr	Engineering Science	Systems Innovation	S	E & M	
2	2011 Apr	Engineering Science	Systems Innovation	S	M	
3	2011 Apr	Engineering Science	Systems Innovation	S	M	
4	2011 Apr	Engineering Science	Systems Innovation	S	I & M	
5	2011 Apr	Engineering Science	Systems Innovation	S	E & M	
6	2011 Apr	Engineering Science	Systems Innovation	S	I & M	
7	2011 Apr	Engineering Science	Systems Innovation	S	E & I & M	
8	2011 Apr	Engineering Science	Systems Innovation	S	M	
9	2011 Apr	Economics	Economics	S	M	F
10	2012 Apr	Economics	Management Science and Business Administration	S	E	
11	2011 Apr	Economics	Management Science and Business Administration	S	E	
12	2011 Apr	Economics	Management Science and Business Administration	S	M	
13	2012 Apr	Economics	Management Science and Business Administration	S	E & M	F
14	2011 Apr	Economics	Management Science and Business Administration	S	E & I & M	
15	2011 Apr	Economics	Management Science and Business Administration	S	E	
16	2011 Apr	Economics	Management Science and Business Administration	S	E & I & M	
17	2011 Apr	Information Science and Technology	Pure and Applied Mathematics	S	E	E
18	2011 Apr	Engineering	Mechanical Engineering	-	-	F

Graduate Minor Program (for students enrolled after 2011)

Graduate Program for Advanced Interdisciplinary Studies

Program *

A: **Advanced**

S: **Standard**

Course **

M: **Mathematical and statistical finance**

E: **Financial economics and engineering**

I :   **Insurance**

Graduate Program for Advanced Interdisciplinary Studies

Course ***

F :   **Finance Software (Software Innovation Leading)**