NUS-UTOKYO WORKSHOP ON QUANTITATIVE FINANCE

25 – 26 SEPTEMBER, 2014

THE UNIVERSITY OF TOKYO

Jointly Organized By:

Table of Contents

PROGRAM

OVERVIEW | DAILY SCHEDULE

Program Overview

Thursday 25 September 2014	Friday 26 September 2014
09:00-09:20 Registration	**09:00-09:30** Registration
09:20-09:30 Opening Address (Conference Room)	
09:30-10:20 (IS) Shigeo KUSUOKA	**09:30-10:20** (IS) David SCHMEIDLER
10:20-10:40 Break	**10:20-10:40** Break
10:40-11:30 (IS) Chao ZHOU	**10:40-11:30** (IS) Jiro AKAHORI
11:30-12:20 (IS) Valery KHOLODNYI	**11:30-12:20** (IS) Yue Kuen KWOK
12:20-13:30 Lunch	**12:20-13:30** Lunch
13:30-14:20 (IS) Dan CRISAN	**13:30-14:20** (IS) Nakahiro YOSHIDA
14:20-15:10 (IS) Steven KOU	**14:20-15:10** (IS) Sandeep JUNEJA
15:10-15:30 Break	**15:10-15:30** Break
15:30-16:20 (IS) Takuji ARAI	**15:30-16:20** (IS) Min DAI
16:25-16:45 (CS A) Ajay JASRA (CS B) Taiga SAITO	**16:25-16:45** (CS A) Kenichiro SHIRAYA (CS B) Bünyamin KIZILDEMIR
16:45-17:05 (CS A) Abhijeet CHANDRA (CS B) Yuri IMAMURA	**16:45-17:05** (CS A) Yuan TIAN (CS B) Toshihiro YAMADA
17:05-17:25 (CS A) Hiroyuki MORIYA (CS B) Yukihiro TSUZUKI	**17:05-17:15** Closing Address (Seminar Room #2)

Invited Talks @ 2F Conference Room

Contributed Talks (Parallel Sessions) @ 1F

A: Seminar Room #1, B: Seminar Room #2

Daily Schedule

Thursday, 25 September 2014			
TIME	**ACTIVITY**	**VENUE**	**REF**
09:00-09:20	Registration	Reception Desk	
09:20-09:30	Opening Address	Conference Room	
Invited Talks			
09:30-10:20	**Shigeo KUSUOKA** (The University of Tokyo) *Monte Carlo Method on pricing Bermudan Derivatives*	Conference Room	Pg 15
10:20-10:40	Break	Coffee Lounge	
10:40-11:30	**Chao ZHOU** (National University of Singapore) *Robust Utility Maximisation in Non-dominated Models*	Conference Room	Pg 17
11:30-12:20	**Valery KHOLODNYI** (Verbund Trading GmbH) *Extracting Forward-Looking Market-Implied Risk-Neutral Probabilities for Energy Spots from Energy Forwards and Options in the Unified Framework of the Non-Markovian Approach*	Conference Room	Pg 14
12:20-13:30	Lunch		
13:30-14:20	**Dan CRISAN** (Imperial College London) *Asset pricing through competing traders valuations*	Conference Room	Pg 13
14:20-15:10	**Steven KOU** (National University of Singapore) *EM Algorithm and Stochastic Control*	Conference Room	Pg 14
15:10-15:30	Break	Coffee Lounge	
15:30-16:20	**Takuji ARAI** (Keio University) *Local risk-minimization for Lévy markets*	Conference Room	Pg 11

Contributed Talks (Parallel Sessions)

16:25-16:45	**Ajay JASRA** (National University of Singapore) *The Alive Particle Filter and its use in Particle Markov chain Monte Carlo*	A #1 Seminar Room	Pg 23
	Taiga SAITO (The University of Tokyo) *Local Risk Minimization on Liquidity Model with Market Impacts*	B #2 Seminar Room	Pg 26
16:45-17:05	**Abhijeet CHANDRA** (Indian Institute of Technology Madras) *Investor Sentiment as Priced Risk Factor: Empirical Evidence*	A #1 Seminar Room	Pg 21
	Yuri IMAMURA (Ritsumeikan University) *An Asymptotic Static Hedge of a Timing Risk and its Error*	B #2 Seminar Room	Pg 22
17:05-17:25	**Hiroyuki MORIYA** (Quasars22 Private Limited) *Statistical mechanics of foreign exchange price movements: How pips, the number of transactions and other constraints affects its distribution*	A #1 Seminar Room	Pg 25
	Yukihiro TSUZUKI (The University of Tokyo) *No-Arbitrage Conditions for Barrier Options*	B #2 Seminar Room	Pg 27

Thursday, 26 September 2014			
TIME	**ACTIVITY**	**VENUE**	**REF**
09:00-09:30	Registration	Reception Desk	
Invited Talks			
09:30-10:20	**David SCHMEIDLER** (Tel Aviv University) *Subjective Rationality and Bayesianism*	Conference Room	Pg 16
10:20-10:40	Break	Coffee Lounge	
10:40-11:30	**Jiro AKAHORI** (Ritsumeikan University) *On a Generalization of Malliavin-Mancino's Fourier Estimation Method*	Conference Room	Pg 11
11:30-12:20	**Yue Kuen KWOK** (Hong Kong University of Science and Technology) *Pricing discrete timer options under stochastic volatility models*	Conference Room	Pg 16
12:20-13:30	Lunch		
13:30-14:20	**Nakahiro YOSHIDA** (The University of Tokyo) *Information criterion sVIC for volatility model selection*	Conference Room	Pg 17
14:20-15:10	**Sandeep JUNEJA** (Tata Institute of Fundamental Research) *Multi Armed Bandit Sampling in Nested Portfolio Risk Measurement*	Conference Room	Pg 13
15:10-15:30	Break	Coffee Lounge	
15:30-16:20	**Min DAI** (National University of Singapore) *Lifecycle Consumption and Investment with Illiquid Housing and Voluntary Retirement*	Conference Room	Pg 12

Contributed Talks (Parallel Sessions)

16:25-16:45	**Kenichiro SHIRAYA** (Mizuho-DL Financial Technology Co., Ltd.) *Pricing Derivatives under Imperfect Collateralization*	A #1 Seminar Room	Pg 26
	Bünyamin KIZILDEMIR (Nanyang Technological University) *Supermodular ordering of Poisson arrays*	B #2 Seminar Room	Pg 24
16:45-17:05	**Yuan TIAN** (Ryukoku University) *Monopolistic Dealer versus Broker: The Impact of Proprietary Trading with Transaction Fees*	A #1 Seminar Room	Pg 27
	Toshihiro YAMADA (The University of Tokyo) *Asymptotics in computational finance*	B #2 Seminar Room	Pg 28
17:05-17:15	Closing Address	#2 Seminar Room	

ABSTRACTS

INVITED TALKS

On a Generalization of Malliavin-Mancino's Fourier Estimation Method

Jiro AKAHORI, Department of Mathematical Sciences, Ritsumeikan University, Japan

I will start with a basic idea of Malliavin-Manino's method, and then proceed to a generalization, together with some discussions on limit theorems.

Local risk-minimization for Lévy markets

Takuji ARAI, Faculty of Economics, Keio University, Japan

Locally risk-minimizing, which is a well-known hedging method for contingent claims in a quadratic way, is discussed by using Malliavin calculus. We consider a financial market composed of one riskless asset and one risky asset. In particular, the risky asset price process is assumed to be given as an exponential Lévy process. Firstly, we introduce a representation of locally risk-minimizing with Malliavin derivatives of the contingent claim; and illustrate how to calculate Malliavin derivatives of call options, Asian options and lookback options. In the second part, we introduce numerical results by using the fast Fourier transform method.

Authors: Takuji Arai (Keio University), Yuto Imai (Waseda University), Ryoichi Suzuki (Keio University)

Lifecycle Consumption and Investment with Illiquid Housing and Voluntary Retirement

Min DAI, Department of Mathematics and Centre for Quantitative Finance, National University of Singapore, Singapore

Housing and retirement decisions are among the most important life cycle decisions for most households. These decisions are further joint with households financial market investment and daily consumption decisions. However, analysis of such joint decisions is absent in the existing households investment, consumption and labor supply studies. In this talk, we consider these joint decisions of housing, financial market investment, daily consumption and voluntary retirement. We show that an investor will optimally retire if her net wealth to income ratio crosses a state dependent threshold. The investor is more aggressive in investing in both the stock and the house before retirement than after retirement because in the states where stock price or house price goes down, the investor can delay retirement to smooth consumption. The illiquidity in the housing market can also significantly affect the retirement decision and stock investment. In the presence of short-sale constraints for stocks, our model can help explain the well-known stock market nonparticipation puzzle. Furthermore our model predicts that stock investment, daily consumption rate and housing choice all jump at retirement date. This work is jointly with Yingshan Chen and Hong Liu.

Asset pricing through competing traders valuations

Dan CRISAN, Department of Mathematics, Imperial College London, UK

We consider a model of asset price determination by an infinite collection of competing traders. Each trader's valuations of the assets are given by the solution of a stochastic differential equation, and the infinite system of SDEs, assumed to be exchangeable, is coupled through a common noise process and through the asset prices. In the simplest, single asset setting, the market clearing price at any time t is given by a quantile of the de Finetti measure determined by the individual trader valuations. In the multi-asset setting, the prices are essentially given by the solution of an assignment game introduced by Shapley and Shubik. Existence of solutions for the infinite exchangeable system is obtained by an approximation argument that requires the continuous dependence of the prices on the determining de Finetti measures which is ensured if the de Finetti measures charge every open set. The solution of the SPDE satisfied by the de Finetti measures can be interpreted as the conditional distribution of the solution of a single stochastic differential equation given the common noise and the price process. Under mild nondegeneracy conditions on the coefficients of the stochastic differential equation, the conditional distribution is shown to charge every open set, and under slightly stronger conditions, it is shown to be absolutely continuous with respect to Lebesgue measure with strictly positive density.

Authors: Crisan, Dan; Kurtz, Thomas G.; Lee, Yoonjung; Conditional distributions, exchangeable particle systems, and stochastic partial differential equations. Ann. Inst. Henri Poincaré Probab. Stat. 50 (2014), no. 3, 946–974.

Multi Armed Bandit Sampling in Nested Portfolio Risk Measurement

Sandeep JUNEJA, School of Technology and Computer Science, Tata Institute of Fundamental Research, India

We consider estimating probability that portfolio loss exceeds a large threshold within a time horizon when the portfolio comprises of diverse financial securities and its value at any state-time is a conditional expectation that needs simulation estimation. We develop a multi armed bandit based sampling method to determine whether at any time loss exceeds specified threshold. For this we also develop computation lower bounds on such estimations and show that the proposed method matches them up to the first order.

Extracting Forward-Looking Market-Implied Risk-Neutral Probabilities for Energy Spots from Energy Forwards and Options in the Unified Framework of the Non-Markovian Approach

Valery KHOLODNYI, Risk Management, Principal Quantitative Analyst, Verbund Trading GmbH, Austria

We present and further develop the non-Markovian approach to modeling energy spot prices with spikes proposed earlier by the author. In contrast to other approaches, we model energy spot prices with spikes as a non-Markovian stochastic process that allows for the modeling of positive and negative energy spot prices as well as upward and downward spikes directly as self-reversing jumps. We show that this approach represents a unified modeling framework applicable across instruments, commodities, regions and time periods. We use this approach to model energy forwards and options and extract the forward-looking market-implied risk-neutral probability distributions for the energy spot prices with trends, cyclical patterns and spikes from the related energy forward and option prices. We consider practically important examples of electricity, natural gas, crude oil and emissions markets.

Key words: energy spots, energy forwards, energy options, non-Markovian approach

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EM Algorithm and Stochastic Control

Steven KOU, Department of Mathematics and Centre for Quantitative Finance, National University of Singapore, Singapore

We propose a Monte Carlo simulation based approach, called the dynamic EM algorithm, to solve stochastic control problems. In the special case of just searching for an optimal parameter, the algorithm simply becomes the classical Expectation-Maximization (EM) algorithm in statistics. The new algorithm extends the existing literature as follows: (1) We do not assume any particular dynamics of the stochastic processes such as diffusion or jump diffusions. (2) We show the monotonicity of performance improvement in every iteration, which leads to the convergence results. (3) We focus on finite-time horizon problems, where the optimal policy is not necessarily stationary. Various applications are given, such as real business cycle, stochastic growth, and airline network revenue management.

This is a joint work with Paul Glasserman, Xianhua Peng, and Xingbo Xu.

Monte Carlo Method on pricing Bermudan Derivatives

Shigeo, KUSUOKA, Graduate School of Mathematical Sciences, The University of Tokyo, Japan

It is an interesting and practical problem to compute numerically prices of American derivatives or Bermudan derivatives. Stochastic mesh methods and least square regression methods (so-called Longstaff-Schwarz methods) are well-known methods as Monte Carlo methods solution to this problem. However, each of them has some good points and weak points. As for a stochastic mesh method, the convergence to a true value is clear. But this method is available only when we know the explicit shape of the transition density function of an underlying Markov process, and so models to which we can apply this method are restricted. As for a least square regression method, this method is available if we can simulate paths of an underlying Markov process, and so we can apply this method to a wide class of models. But the convergence to a true value is not clear and it depends on the choice of families of functions as approximating functions for value functions. In this talk, we show our recent results for both methods on convergence when we take Hörmander type diffusion processes as underlying processes. Also, we introduce a new class of random functions as approximating functions for value functions in least square regression methods. The paper on results for stochastic Mesh methods appeared in Adv. Math. Econ. vol.18 (2014). The paper on results for least square regression methods is in preparation.

This is a joint work with Yusuke Morimoto (Bank of Tokyo Mitsubishi UFJ, The University of Tokyo).

Pricing discrete timer options under stochastic volatility models

Yue Kuen KWOK, Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong

Timer options are barrier style options in the volatility space. A typical timer option is similar to its European vanilla counterpart, except with uncertain expiration date. The finite-maturity timer option expires either when the accumulated realized variance of the underlying asset has reached a pre-specified level or on the mandated expiration date, whichever comes earlier. The challenge in the pricing procedure is the incorporation of the barrier feature in terms of the accumulated realized variance instead of the usual knock-out feature of hitting a barrier by the underlying asset price. We construct efficient and accurate numerical algorithms for pricing finite-maturity discrete timer options under different types of stochastic volatility processes. The stochastic volatility processes nest some popular stochastic volatility models, like the Heston model and 3/2 stochastic volatility model. Our numerical tests demonstrate high level of accuracy of the fast Hilbert transform algorithms. We also explore the pricing properties of the timer options with respect to various parameters, like volatility of variance, correlation coefficient between the asset price process and instantaneous variance process, sampling frequency, and variance budget.

This is a joint work with Pingping ZENG and Wendong ZHENG

Subjective Rationality and Bayesianism

David SCHMEIDLER, School of Mathematical Sciences, Tel Aviv University, Israel

The presentation is about foundations of decisions under uncertainty. It defines rationality and argues that, contrary to the popular view within the economic theory, rationality does not imply Bayesianism. Justifications and implications of the terms above are discussed.

Information criterion sVIC for volatility model selection

Nakahiro YOSHIDA, Graduate School of Mathematical Sciences, The University of Tokyo

Stochastic differential equations are applied for modeling structures of volatility. Since various models can be considered for a data set, model selection is a basic problem to develop data analysis. In this talk, we give a spot volatility information criterion sVIC for volatility model selection. Inferential statistical methods give an approach to this question for dependent data, as ergodic statistics did for independent observations. However, non-ergodic statistics appears when observations are sampled discretely under finite time horizon. In this situation, construction of the information criterion is not straightforward due to the non-ergodicity, differently from the classical AIC that has the number of parameters for the correction term. To find a criterion, we need new machineries, i.e., the quasi likelihood analysis for volatility (SPA 2013 with M. Uchida), and the martingale expansion in mixed normal limit (arXiv 2012, SPA 2013).

Robust Utility Maximisation in Non-dominated Models

Chao ZHOU, Department of Mathematics National University of Singapore, Singapore

The problem of robust utility maximisation with volatility uncertainty is considered, in the sense that the volatility is only assumed to lie between two given bounds. The set of all possible models (probability measures) considered here is non-dominated. We propose studying this problem in the framework of second order backward stochastic dierential equations (2BSDEs for short) with quadratic growth generators. We show for exponential, power and logarithmic utilities that the value function of the problem can be written as the initial value of a particular 2BSDE and prove existence of an optimal strategy. Finally, we provide several examples which shed more light on the problem and its links with the classical utility maximization one. In particular, we show that in some cases, the upper bound of the volatility interval plays a central role, exactly as in the option pricing problem with uncertain volatility models. This is a joint work with Anis Matoussi and Dylan Possamaï.

ABSTRACTS

CONTRIBUTED TALKS

Investor Sentiment as Priced Risk Factor: Empirical Evidence

Abhijeet CHANDRA, Management Studies (DoMS), Indian Institute of Technology Madras, India

Demystifying why the cross-section of expected returns of one stock varies from that of another is a puzzle yet to be solved. Subrahmanyam (2010) finds that predictive variables used to study the cross-section of equity returns emanate from informal argument based on intuition of finance professionals and scholars, alternative tests of standard risk-return models, cognitively challenged investor behavior and behavioral biases, and market frictions such as volatility and illiquidity. In recent years, the effect of behavioral biases on expected stock returns have taken the centre-stage of finance research. In the present paper, we study whether the cross-section of expected stock returns capture the sentiment as pricing factor. Following Baker, et al. (2012), we develop a sentiment index as the first principal component of ten macro-orthogonalized market-related implicit proxies as an indicator of aggregate investor sentiment in the stock market. To estimate the effect of sentiment component related to a stock, as primarily indicated by trading behavior, we use stock-specific coefficient that we obtain by regressing lagged return of Nifty stocks on aggregate sentiment proxy, and model it as a sentiment-as-risk parameter. We use several hypothetical portfolios of stocks that exhibit aggressive, moderate and dull trading behaviour as shown by sentiment level associated with each of sample stocks. We also form portfolios based on whether a sample stock belongs to high or low volatile category. Employing Fama-MacBeth (1973) return regression using various dummies characterizing for sentiment, trading behavior, and volatility, we examine the effect of such factors on cross-section of excess stock returns. The estimates suggest that investor sentiment and trading behavior are contrarian indicators of excess stock returns, and stocks exhibiting high volatility tend to generate positive returns. Essentially, we show that investor sentiment and trading behavior are the prime factors driving excess asset returns.

An Asymptotic Static Hedge of a Timing Risk and its Error

Yuri IMAMURA, Department of Mathematical Sciences, Ritsumeikan University, Japan

In the talk, we discuss how a risk associated with a stopping time, which we call a timing risk, could be hedged by a static position of European path-independent options. Timing risk is a risk of uncertain dividend, especially of its payment time. Carr and Picron (1999) tried to apply the semi-static hedging formula of barrier options to hedge a payment at a stopping time in a Black-Scholes environment. The hedging strategy is obtained by an integration of those of (digital) barrier options, which was first introduced by Bowie and Carr (1996)} by using put-call symmetry in the Black-Scholes framework. The strategy is semi-static in that it is a portfolio of two European options with a Fixed maturity rebalanced at most one time; one is a long call, and the other is a short put, when the option to be hedged is a call knocked out when the underlying hits a boundary. The static hedge of a timing risk, in contrast, requires options with continuum of different maturities. This observation in turn led to the asymptotic expansion of static hedge. In this study, we show that an asymptotic static hedge of a timing risk in a general diffusion model is possible, and then we give an error estimate of the asymptotic static hedge of a generalized timing risk.

The Alive Particle Filter and its use in Particle Markov chain Monte Carlo

Ajay JASRA, Department of Statistics & Applied Probability, National University of Singapore, Singapore

In the following work we investigate a particle filter for approximating Feynman-Kac models with indicator potentials and we use this algorithm within Markov chain Monte Carlo (MCMC) to learn static parameters of the model. Examples of such models include approximate Bayesian computation (ABC) posteriors associated with hidden Markov models (HMMs) or rare-event problems. Such models require the use of advanced particle filter or MCMC algorithms, to perform estimation. One of the drawbacks of existing particle filters, is that they may 'collapse', in that the algorithm may terminate early, due to the indicator potentials. In this work, using a newly developed special case of the locally adaptive particle filter, we use an algorithm which can deal with this latter problem, whilst introducing a random cost per-time step. In particular, we show how this algorithm can be used within MCMC, using particle MCMC. It is established that, when not taking into account computational time, when the new MCMC algorithm is applied to a simplified model it has a lower asymptotic variance in comparison to a standard particle MCMC algorithm. Numerical examples are presented for ABC approximations of HMMs applied to stochastic volatility models in finance.

Key words: Particle Filters, Markov Chain Monte Carlo, Feynman-Kac Formulae.

Authors: Ajay Jasra (Department of Statistics & Applied Probability, National University of Singapore, Singapore), Anthony Lee (Department of Statistics, University of Warwick, Christopher Yau and Xiaole Zhang (Department of Mathematics, Imperial College London)

Supermodular ordering of Poisson arrays

Bünyamin KIZILDEMIR, School of Mathematical and Physical Sciences, Nanyang Technological University, Singapore

Supermodular ordering of probability distribution is useful in risk management. It measures the interdependence of sets of random vectors. Müller and Scarsini (2000) have characterized the supermodular ordering of Gaussian random vectors using the componentwise ordering of their covariance matrices. In this talk, we will consider the case of Poisson random vectors and show that similar necessary and sufficient conditions can be derived under a certain dependence structure of Poisson arrays and then its relation with risk measures such as tail value-at-risk will be mentioned.

Authors: Bünyamin Kızıldemir, Nicolas Privault (School of Mathematical and Physical Sciences, Nanyang Technological University)

Statistical mechanics of foreign exchange price movements: How pips, the number of transactions and other constraints affects its distribution

Hiroyuki MORIYA, Quasars22 Private Limited, Japan

The concepts of multiplicity developed in statistical mechanics have been extensively applied in many fields of science. The presentation explains the concepts and some of their applications to finance. Financial markets are interacting dynamical systems with many constraints. Price movements in foreign exchange markets are a function of a size of pip, the number of trades, and several other constraints, as well as ways of interactions. The multiplicity is a key concept that quantifies and models a dynamical system.

Principle of maximum entropy connects the dynamics with maximum entropy distributions such as the normal distribution for given mean of random price movements and their variance, the exponential distribution for positive and given mean, and the uniform distribution for an isolated market. These distributions are derived from the well known form of multiplicity:

$$W = \frac{N!}{\prod_{i=1}^{I} N_i!} \prod_{i=1}^{I} 2^{N_i},$$

where N is the number of transactions and N_i is the number of transactions with i th size of transaction price movements. The i th size of the transaction price movement is given by

$$x_i = \pm x_0 \cdot i,$$

where x_0 is a pip. The maximum transaction price movement is

$$x_I = x_0 \cdot I.$$

If it is assumed that the price movements are not stationary or the number of transactions is not enough to implement the principle of maximum entropy, the multiplicity must be changed to

$$W = \sum_{j=1}^{J} \frac{N!}{\prod_{i=1}^{I} N_i!} \prod_{i=1}^{I} 2^{N_i} = \left(\sum_{i=1}^{I} 2 \right),$$

where

$$J = \frac{(N + I - 1)!}{N!(I - 1)!}.$$

The distribution given by this multiplicity is much more complicated than the previous one and computationally difficult.

The presentation shows the empirical findings in fluctuation of I and its seasonality and compares and contrast the reality and model behaviors.

Local Risk Minimization on Liquidity Model with Market Impacts

Taiga SAITO, Graduate School of Economics, The University of Tokyo, Japan

We consider local risk minimization on a liquidity model with market impacts in discrete time. Local risk minimization is one of criteria that defines an optimal trading strategy in an incomplete market. Although several good properties of the criterion are known both in discrete and continuous time, the usual assumption that the price process of an asset is independent of the history of a trading strategy of a hedger does not hold in a model with price impacts. In this study, we consider the minimization problem on a linear supply curve model with price impacts introduced by Roch and Cetin et al. We show that an approximate local risk minimizing strategy expanded with respect to a time dependent market impact parameter around a constant can be obtained recursively. Moreover, we show that when the parameter is constant, uniqueness and existence of a local risk minimizing strategy hold and the strategy is solved by backward induction.

Pricing Derivatives under Imperfect Collateralization

Kenichiro SHIRAYA, Financial Technology Department, Mizuho-DL Financial Technology Co., Ltd., Japan

This paper studies impacts of imperfect collateralization on option values whose underlying asset is WTI futures. Especially, in addition to uncollateralized cases we examine time-lagged collateral cases by a five factor model, where the collateral values depend not only on the underlying contract prices, but also on other asset values. Moreover, we also investigate the effect of imperfect collateralization on WTI and Brent futures basket options.

Monopolistic Dealer versus Broker: The Impact of Proprietary Trading with Transaction Fees

Yuan TIAN, Faculty of Economics, Ryukoku University, Japan

In this paper, we consider a one-period financial market with a monopolistic dealer/broker and infinitely many investors. While the dealer who trades on his/her own account (with proprietary trading) sets simultaneously both the transaction fees and asset price, the broker who brings investors' orders to the market (with no proprietary trading) sets transaction fees, given the price determined by the market clearing condition among investors. We analyze the impact of proprietary trading on the asset price, transaction fees, trading volume, and welfare. We find that proprietary trading enables the dealer to set a more favorable price for investors to seek profits. As a result, the trading volume and transaction fees increase, and the social welfare (the expected utilities of both the dealer and investors in average) is improved. Our study effectively demonstrates how proprietary trading affects a market equilibrium.

Authors: Yuan Tian, Katsumasa Nishide (Department of Economics, Yokohama National University)

No-Arbitrage Conditions for Barrier Options

Yukihiro TSUZUKI, Graduate School of Economics, The University of Tokyo, Japan

In this talk, no-arbitrage conditions for barrier options are provided without postulating a stochastic process as an underlying process provided that the relevant touch option is given, where the touch option is a barrier option which pays a unit of currency if the barrier is or is not hit. No arbitrage conditions for European call and put options are well-known: absence of calendar and butterfly spread arbitrage. Motivated by the research for European options and by the fact that barrier options are most liquidly traded among exotic derivatives, this study investigates the similar problems: whether there are arbitrage opportunities for a given price set of barrier options as well as European options.

The findings are as follows: a condition that excludes arbitrage opportunities if only static trading strategies are allowed, the pricing bounds on barrier options using other barrier options, whether a term structure of touch options improves these bounds in case of single barrier options and no static arbitrage conditions between barrier options with different maturities.

Asymptotics in computational finance

Toshihiro YAMADA, Graduate School of Economics, The University of Tokyo, Japan

In the presentation, we show efficient numerical approximation methods with convergence rates for practical problems in computational finance. The results are based on asymptotic analysis on Wiener space.

INFORMATION

COMMITTEE | LOGISTICS | GENERAL

Committee

ORGANIZING COMMITTEE

Tomio ARAI (The University of Tokyo, Japan)

Min DAI (National University of Singapore, Singapore)

Steven KOU (National University of Singapore, Singapore)

Seisho SATO (The University of Tokyo, Japan)

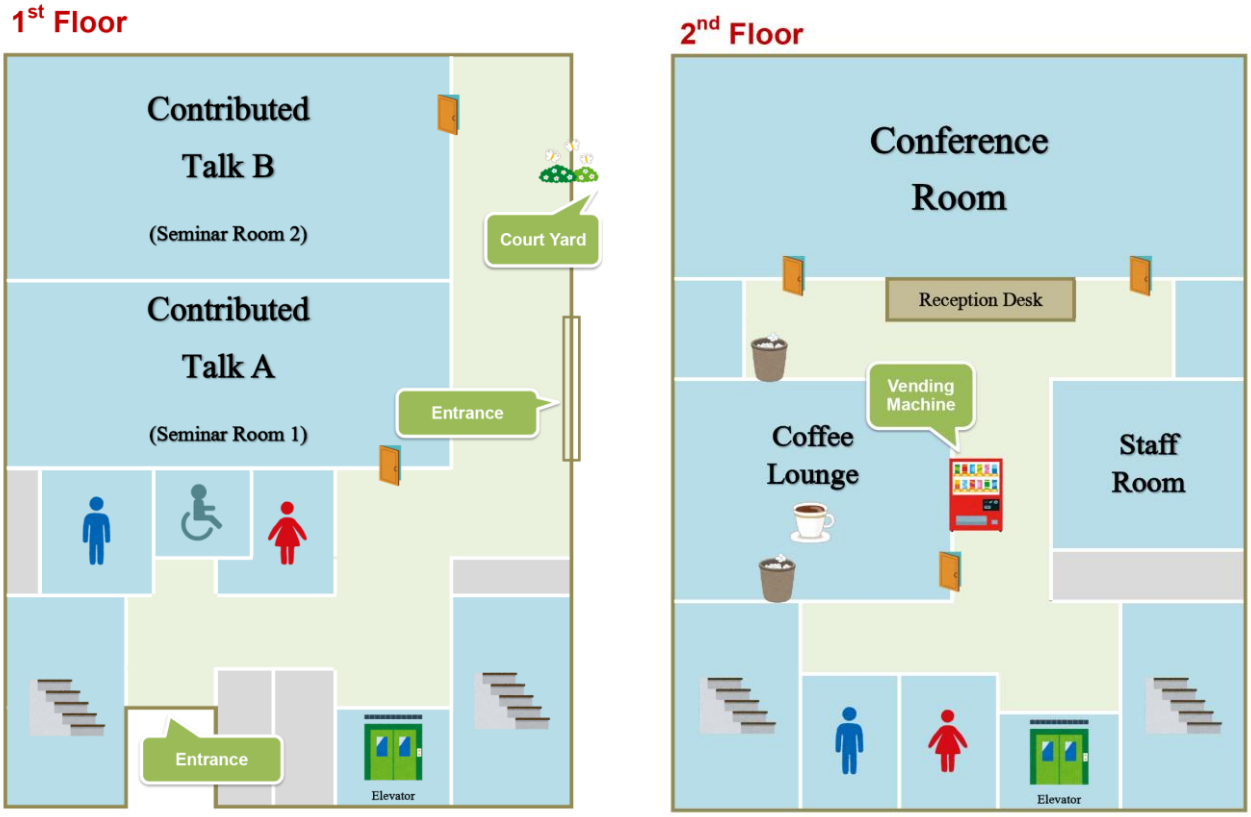
Akihiko TAKAHASHI (The University of Tokyo, Japan)

Logistics

Lecture Venues

Invited talks will take place in Conference Room (2nd floor) at Economics Research Annex (Kojima Hall). The duration for each talk is 50 minutes (including discussion time).

Parallel sessions of contributed talks will take place in and Seminar Room 1 and 2 (1st floor). The duration for each contributed talk is 20 minutes (including discussion time).



The rooms are equipped with laptop computer connected to LCD projector, projector screen and white board.

Beverage

Coffee and soft drinks are served at the Coffee Lounge near the Conference Room (2nd floor). Lunches and Dinners are not included.

Smoking Area

Smoking is prohibited except designated area on campus. Please ask the detail at the reception desk.

General Information

Food & Shops

Restaurants are located on campus and outside campus. Most of the restaurants outside campus open at 11:00am and close by 9:00pm. (Outside campus restaurant map is available at the reception desk). Convenience stores are available anywhere you can find very easily and opening 24hours. Vending machine for soft drinks is available next to the Conference Room (2nd floor).

Most of the department stores are found at the big terminal station like Shinjuku, Ikebukuro and Ginza and they operate from 10:00am to 8:00pm every day.

Bank Services & Foreign Exchange

Participants may use major credit cards to withdraw cash using the Auto Tellar Machine (ATM: some cash dispensers require the charges for using ATM), which can be found in various locations on campus (near university co-op), convenience stores and post offices. Alternatively, the local banks offer regular banking services including processing foreign exchange and traveler's cheque. The nearest branches are:

Post Office (Hongo)

Address: Hongo 6-1-15, Bunkyo-Ku, Tokyo

Operating hours: 9:00am-4:00pm (Weekdays)

Traveler's cheque: They accept American Express ONLY. Cirrus, PLUS are available.

Mizuho Bank (Hongo Branch)

Address: Hongo 3-34-3, Bunkyo-Ku, Tokyo

Operating hours: 9:00am-3:00pm (Weekdays)

CITI Bank (Otemachi Branch)

Address: Otemachi Center Building 1F, Otemachi 1-1-3, Chiyoda-Ku, Tokyo

Operating hours: 9:00am-3:00pm (Weekdays)

It would take about 7minuites by Subway Marunouchi Line from Hongo-Sanchome Station to Otemachi Station.

Useful Phone Numbers

Taxi (EM Jiko): 03-3545-3501

24-hour Flight Enquiry (Narita Airport): 0476-34-8000

24-hour Flight Enquiry (Haneda Airport):03-6428-0888

Official Hotel (Forest Hongo): 03-3813-4408

Police Emergency: 110

Ambulance and Fire Department: 119


本郷キャンパス
Hongō Section
Capo PELLICANO
(1F : Food Stand
13F: Italian Restaurant)
UT Cafe
BELTHOLLET Rouge
Café FORESTA
Seimon(Main Gate)
Akamon(Red Gate)
Hotel
Forest Hongo
Hongo
Post Office
Restaurant Chinzanso
Camellia (French Cuisine)
Economics
Research Annex
(Kojima Hall)
生協浅野店
Co-op Asano Store
生協本郷トラベルセンター
Co-op Hongo Travel Center
生協書籍部
Co-op Bookstore
生協御殿下パンショップ
Co-op Gotenshita Ground Shop
生協第二購買部
Co-op Store 2
生協第一購買部
Co-op Store 1
生協農学部店
Co-op Nogakubu Store
生協赤門店
Co-op Akamon Store
東京大学内郵便局
Campus Post Office
花慶
Hanakei
Kショップガーデン
K Shop Garden
リ・リーフ
Hair Salon "Le Leaf"
あすなろ
Asunaro
LAWSON
ATM
KITADOKO
Seven-Eleven
Family Mart
LAWSON Store 100
NATURAL LAWSON
Sunkus
Police
Hongo 4 Post Office
大江戸線
本郷三丁目駅
Ōedo L.
Hongō-sanchōme Sta.
丸ノ内線
本郷三丁目駅
Marunouchi L.
Hongō-sanchōme Sta.
千代田線 根津駅
iyoda L. Nezu Sta.
前駅
Todaimae Sta.
弥生門
Yayoi Gate
浅野正門
Asano Main Gate
浅野南門
Asano South Gate
鉄門
Tetsu-mon (Gate)
龍岡門
Tatsuoka Gate
春日門
Kasuga Gate
赤門
Akamon
農正門
No-seimon (Gate)
西片門
Nishikata Gate
本郷通り
Hongo-dori Ave.
春日通り
Kasuga-dori Ave.
弥生二丁目遺跡
弥生式土器発掘ゆかりの地
三好晋六郎像
ウェスト像
コンドル像
ベルツの庭石
ベルツ像
スクリバ像
ミュルレル像
山川健次郎像
隈川宗雄像
浜尾新像
青山胤通像
佐藤三吉像
ノーベル賞受賞記念碑
古市公威像
夏季休暇・イベント等により一部変更が生じる場合もございます。
hours may change without notice due to vacations.