2025 WEHIA (Winter)

Workshop of Economics with Heterogeneous Interacting Agents

Programme

Hosts

International Business School Suzhou, Xi'an Jiaotong-Liverpool University

College of Management and Economics, Tianjin University

Support

National Natural Science Foundation of China (No 72342022)

Modelling and Data Analytics on Cross-Sectional Financial Risk: Evidence on Microscopic Data from Banking, Security Industry and Real Estates

Feb 13-16, 2025

Suzhou, China

ABOUT THE CONFERENCE

The Annual Workshop on Economics with Heterogeneous Interacting Agents (WEHIA) is organised by The Society for Economic Science with Heterogeneous Interacting Agents (ESHIA). Since its first meeting in 2003, the annual WEHIA has represented a unique opportunity to present and discuss the latest research on various aspects of the economy and financial markets as a complex system made up of heterogeneous interacting agents. The workshop is intended to foster diversity in the approach and methodology used to analyse economic and financial issues. The past workshops have been held across most European countries (https://sites.google.com/view/eshia-site/past-conferences-and-events)

Founded in 2006, ESHIA (https://sites.google.com/view/eshia-site/home) aims to provide a unique medium of communication for multidisciplinary approaches, either empirical or theoretical, to the study of complex socio-economic problems. It intends to promote the cross-fertilization of ideas and the exchange of concepts and techniques developed within diverse scientific disciplines including economics, social sciences physics, and computer science. The focus of ESHIA is especially on simulating and synthesizing emergent phenomena and collective behaviours to understand real complex economic and social systems. ESHIA is particularly keen to showcase the combination of agent-based computing/modelling in IT with finance/economics issues such as market microstructure design, policy analysis, systemic risk, and financial engineering. Agents, heterogeneity, and interactions are key concepts in this multidisciplinary approach in coping with important issues with complexity in nature and provide a novel driving force to study, either empirical or theoretical, of the socio-economic systems research.

VENUE

No.8 Chongwen Road
BS Building
International Business School Suzhou (IBSS)
Xi'an Jiaotong-Liverpool University (XJTLU)
Suzhou Dushu Lake Higher Education Town
Suzhou, Jiangsu Province
China

XJTLU Wi-Fi CONNECTION

- Wifi Account: XJTLU
- User Name: wifi44
- Password: Wifi442025
- Wi-Fi connection is available during the Conference in XJTLU.

LUNCH AND DINNER VENUE

- Tea Breaks: IBSS Floor 5 (F5)
- Lunches: East Dining Hall
- Dinner: Jiangnan Shouxi (江南首席·湖滨壹号)
  158 Xinggang St, Wuzhong District, Suzhou, Jiangsu, 215027

USEFUL CONTACT

WEHIA Organisation Committee (WEHIA2025.IBSS@xjtlu.edu.cn)

INSTRUCTIONS FOR PRESENTATIONS

- Each paper will be assigned a time slot of 30 minutes.
- The length of each presentation will be approximately 20-25 minutes, followed by 5-10 minutes of discussion.

CONFERENCEC COMMITTEE

Chairs:

Xue-Zhong (Tony) He	Xi'an Jiaotong-Liverpool University
Wei Zhang	Tianjin University

Members (external):

Xu Feng	Tianjin University
Xindan Li	Nanjing University
Shen Lin	Tianjin University
Lijian Wei	Sun Yat-sen University
Xiong Xiong	Tianjin University
Xuewei Yang	Nanjing University
Yongjie Zhang	Tianjin University

Local Organizers

Liang Fu	Economics, IBSS
Bo Jiang	Economics, IBSS
Jiatao Liu	Finance, IBSS
Zihua Liu	Finance, IBSS
Rouzhi Wang	Finance, IBSS
Yajun Xiao	Finance, IBSS
Xingzhi Yao	Finance, IBSS
Wenting Zhou	Economics, IBSS

Prof Shu-Heng Chen, Keynote

Dr. Shu-Heng Chen (陳樹衡) is a Distinguished Professor in the Department of Economics, Director of the AI-ECON Research Center, and the organiser of the Experimental Economics Laboratory at ***National Chengchi University*** and the Computational, Cognitive and Behavioral Social Science Lab. He also serves as the ***editor-in-chief*** of the *Journal of New Mathematics and Natural Computation* (World Scientific), *Journal of Economic Interaction and Coordination* (Springer) and *Journal of Experimental Economics and Management Science*, the ***associate editor*** of *Evolutionary and Institutional Economic Review* (Springer), the editor of *International Journal of Financial Engineering and Risk Management* (Inderscience) as well as *Economia Politica* (Springer).

Prof. Chen holds a PhD. in Economics from University of California at Los Angeles. His research interest is mainly in computational intelligence, agent-based computational economics, behavioral and experimental economics, and computational social sciences. He takes a biologically-inspired approach to modelling the boundedly rational behavior of agents, i.e., the so-called ecological rationality; in this regard, he stands in a position of carrying on the legacy of Herbert Simon. Under his leadership, the AI-ECON Research Center is internationally acknowledged via the invention of an agent-based artificial stock model. In recent years, he further leads the Center to conduct researches that incorporate agent-based computational economics, behavioral economics, and experimental economics.He has more than 160 referred publications in international journals and edited book volumes. Over the last decades, he served as a keynote speaker at many international conferences, including the *International Conference on the Society for Computational Economics* (London, 2010), the *Workshop on Computational Finance and Economics* at the Central Bank of Mexico (2012), the *World Congress on Social Simulation* (São Paulo, 2014), and the *Conference on Complex Systems* at Arizona State University (2015). He is also the winner of the 2014 NordSud International Prize Foundation Pescarabruzzo.

Prof Giulia Iori

Former President: ***The Society for Economic Science with Heterogeneous Interacting Agents (ESHIA)***

Co-Editor: ***Journal of Economics Dynamics and Control***
Journal of Economic Interaction and Coordination

Professor Iori obtained a BSc and a PhD in Physics from the University of Rome La Sapienza. Between 1993 and 1998 she was a research fellow in theoretical physics at the *University of California Santa Cruz*, the CEA-Saclay in Paris and the *University of Barcelona*. Before joining ***Ca'Foscari University of Venice***, she has been Professor of Economics at *City University of London*, Lecturer in Finance at the *University of Essex* and lecturer, and then Reader, in Financial Mathematics at *Kings College London*. She has taught courses in Financial Engineering, Corporate Finance, Investment, Financial Mathematics, Financial Derivatives and Real Options.

Giulia is an interdisciplinary researcher and a leading contributor to the development of novel approaches to complexity in financial markets and economic networks. Her work aims to understand how microlevel interactions of heterogeneous constituents, who react and adapt to each other and the environment they create, lead to the emergence of aggregate dynamics that is non trivially predictable from the behaviour of the individual components. Within this broad area her interests have shifted over the years from applications to protein folding and spin glass models, to pattern formation, and to finance and economics. These apparently different topics all relate in some way to the collective behaviour of heterogeneous agents, where agents can be as diverse as amino-acids in a protein, spins, particle of sands, or human beings.

Giulia has been a pioneer in applying *Agent Based Models* to uncover the mechanisms that can lead to large fluctuations in financial markets, to the emergence of systemic risk in interbank markets, and to assess the effectiveness of regulatory approaches to control these risks. She has applied novel techniques to analyse high frequency financial data and other big datasets. She is the author of more than 50 publications on leading journals in Economics, Finance and Physics and regularly presents her work at international conferences as a keynote or invited speaker. Her research has been funded by the *European Commission*, the *EPSRC*, and the *British Academy*. She was awarded the *Lamfalussy Fellowship by the European Central Bank* in 2003. She is a member of the London Mathematical Society and of the Institute of Physics and a panel member for the ESRC and UKRI grant schemes.

Prof Wei Zhang, Organising Committee Chair

College of Management and Economics, Laboratory of CACMS, Tianjin University

Professor Zhang obtained a PhD in engineering from the Tianjin University. His main research areas are financial engineering, financial big data analysis, agent-based computational finance, etc.

Prof Zhang is one of the earliest scholars in China to engage in financial engineering education and research; he presided over and completed the *first Major Project of the National Natural Science Foundation of China* on financial engineering and financial mathematics; he translated and published the first book on real options theory in China and was the first in China to receive funding from the *National Natural Science Foundation* to conduct research on real options and option games; he was the first in China to receive funding from the National Natural Science Foundation to conduct agent-based computational finance.

Professor Zhang is the leader of the "*Innovation Team*" of the *Ministry of Education of China*. He is currently the **co-chairman** of the *China Management Modernization Research Association*, the **director** of the *Management Science and Engineering Teaching Steering Committee* of the *Ministry of Education of China*. He serves as the **executive editor-in-chief** of the *管理科学学报* and *Journal of Management Science and Engineering*, and is an **editorial board member** or **advisory board member** of many domestic and foreign academic journals such as *Journal of Economic Interaction and Coordination*, *Service Science*, *管理评论*, and *系统工程理论与实**践***.. He was formerly the **vice-director** of the *Management Science Department of the National Natural Science Foundation of China*, the **vice president** of *Tianjin University of Finance and Economics*, and the first **director** of the *School of Management and Economics of Tianjin University*. He was a senior visiting scholar at the Haas School of Business at the University of California, Berkeley, and a visiting professor at the Larry School of Management at Rensselaer Polytechnic Institute and the Business School of the University of Technology Sydney, Australia.

Prof Xue-Zhong (Tony) He, Organising Committee Chair

Finance Department, IBSS, Xi' an Jiaotong-Liverpool University

Prof Tony He received his Ph.D. in Finance in 2001 from University of Technology Sydney and Ph.D. in Applied Mathematics in 1995 from Flinders University in Australia. Before joining XJTLU, Tony was a Professor of Finance at the University of Technology Sydney from 2010 to 2021. Before that, he worked at the University of Sydney and University of Technology Sydney as a Lecturer, Senior Lecturer, and Associate Professor. In addition, he has been a **Co-Editor** of the *Journal of Economic Dynamics and Control* for 10 years (2013-2022), a **Senior Editor**, **Department Editor**, **Associate Editor**, and **Guest Editor** for several other journals in economics, finance and mathematics. In 2023, Tony was awarded as a *Distinguished Foreign Expert* (*杰出国际型学科领军人才*)-Dushuhu Science and Technology Innovation District Administration, Suzhou Industrial Park.

Tony is an internationally recognized expert in asset pricing, financial market modelling, market microstructure, financial economics, and nonlinear dynamics in finance and economics. His international research profile is attested by his publications in the field of finance and economics, invited contributions to the prestigious *Handbook of Financial Markets* and *Handbook of Computational Economics*, numerous keynote talks at international conferences, and many competitively Australian and Chinese research grants (in a total of AUD$2 million, including four *Australian Research Council Discovery* (ARC) Project Grants, one ARC Linkage Project, and a total of RMB7.6 million three grants in *National Natural Science Foundation of China*). Regarding research impact, RePEc (Research Papers in Economics) Ranking puts Tony in the Top 3% in Asia and China. He has published one book, 15 chapters, and more than 60 journal papers. His publications have been highly cited (more than 3,600 times in Scopus and 6,000 times in Google Scholar). Tony is a *Highly Cited Chinese Researcher* by Elsevier for contributions to *Applied Economics*.

SCHEDULE

Date	Time	Event	Room
Feb 13	16:00-18:00	**Registration:** Ground Floor International Business School Suzhou **Reception:** Ground Floor International Academic Exchange & Collaboration Centre	BS G02 East Dining Hall
		DAY-1	
Feb 14	08:00-08:30	**Registration:** Ground Floor, International Business School Suzhou	BS G02
	08:30-09:00	**Opening Remark-1: Prof Youmin Xi** *Executive President of Xi'an Jiaotong-Liverpool University* *Pro-Vice-Chancellor of the University of Liverpool* **Chaired by Prof Tony He**	
		Opening Remark-2: Prof Jorg Bley *Dear, International Business School of Suzhou (IBSS)* **Chaired by Prof Tony He**	
		Group Photo	
	09:00-10:00	**Keynote-I: Prof Shu-Heng Chen** *From Soil to Soul: Three Decades of Exploration and Reflection on Agent-Based Modeling and Its Interdisciplinary Essence* **Chaired by Prof Tony He**	
	10:00-10:30	Coffee Break	BS F5
	10:30-12:00	**Session 1A**: Climate Change and Green Innovation	BS 548
		Session 1B: Asset Pricing-I	BS 550
		Session 1C: Credit Risk and Expectation Formation	BS 574
	12:00-13:30	**Lunch**	East Dining Hall
	13:30-15:30	**Session 2A**: Machine Learning-I	BS 548
		Session 2B: Agent-Based Model (ABM)-Financial Markets	BS 550
		Session 2C: ABM-Complexity	BS 574
	15:30-16:00	Coffee Break	BS F5
	16:00-18:00	**Session 3A**: ABM-Economics	BS 548
		Session 3B: Bond Markets	BS 550
		Session 3C: Socioeconomic Dynamics	BS 574

		DAY-2	
Feb 15	09:00-10:00	**Keynote-II: Prof Giulia Iori** *Information diffusion in financial markets: experiments, networks and agent based models* **Chaired by Prof Wei Zhang**	BS G02
	10:00-10:30	Coffee Break	BS F5
	10:30-12:00	**Session 4A**: ESG and Sustainability	BS 548
		Session 4B: Asset Pricing-II	BS 550
		Session 4C: Macroeconomic Modeling	BS 574
	12:00-13:30	**Lunch**	East Dining Hall
	13:30-15:00	**Session 5A**: Machine Learning-II	BS 548
		Session 5B: Information and Trading	BS 550
		Session 5C: Experiments-I	BS 574
	15:00-15:30	Coffee Break	BS F5
	15:30-17:00	**Session 6A**: Risk Management	BS 548
		Session 6B: ABM and Trading	BS 550
		Session 6C: Experiments-II	BS 574
	18:00-20:30	**Social Dinner**	Jiangnan Shouxi
		DAY-3	
Feb 16	09:00-10:30	**Session 7A**: Ambiguity and Investment	BS 548
		Session 7B: ETFs and Funds	BS 550
		Session 7C: Uncertainty and Chinese Economy	BS 574
	10:30-10:45	Coffee Break	BS F5
	10:45-12:15	**Session 8A**: Attention and Network	BS 548
		Session 8B: Asset Pricing-III	BS 550
		Session 8C: Exchange Rate and Yield	BS 574
	12:15-13:30	**Lunch**	East Dining Hall

Session 1A: Climate Change and Green Innovation

Time: 10:30 - 12:00, February 14, 2025. Room: BS 548
Chair: Xiaoxia Ye, University of Nottingham

1A1: Modeling Green Reputation Decisions in a Nonlinear Cournot Duopoly of Carbon Emission Abatement
Xiaoliang Li, Guangzhou College of Technology and Business
Shuie Sun, Guangzhou College of Technology and Business

1A2: Biodiversity Regulation's Impact on Corporate Green Innovation: Re-evaluating the Porter Effect
Jinlong Zhang, Tianjin University
Wei Zhang, Tianjin University

1A3: The Capital Market Implications of Climate Risk Disclosure
Jiang Luo, Nanyang Technological University
Konstantinos Stathopoulos, The University of Manchester
Avanidhar Subrahmanyam, University of California, Los Angeles
Xiaoxia Ye, University of Nottingham
Ran Zhao, San Diego State University

Session 1B: Asset Pricing-I

Time: 10:30 - 12:00, February 14, 2025. Room: BS 550
Chair: Bin Guo, Nankai University

1B1: Style Switching and Asset Pricing
Huaixin Wang, Tsinghua University

1B2: History Matters: Path-Dependent Return Predictability
Xuezhong (Tony) He, Xi'an Jiaotong-Liverpool University
Haojun Ji, Xi'an Jiaotong-Liverpool University
Kai Li, Macquarie University
Jiatao Liu, Xi'an Jiaotong-Liverpool University

1B3: Intangible Investment in Asset Pricing
Bin Guo, Nankai University
Kewei Hou, The Ohio State University
Han Zhang, Nankai University
Yongjie Zhang, Tianjin University

Session 1C: Credit Risk and Expectation Formation

Time: 10:30 - 12:00, February 14, 2025. Room: BS 574
Chair: Jian Li, Dongbei University of Finance and Economics

1C1: Did Fintch Lending Promote Self-Sorting on Loan Size in the Residential Mortgage Market?
Di Wu, Harbin Institute of Technology

1C2: Diagnostic Expectations and Consumption Dynamics
Jinting Guo, Goethe University Frankfurt
Yulei Luo, University of Hong Kong
Penghui Yin, Central University of Finance and Economics

1C3: Thus Spoke FOMC: The Fed and Sovereign CDS Spreads
Jian Li, Dongbei University of Finance and Economics
Mingyu Liu, Dongbei University of Finance and Economics

Session 2A: Machine Learning-I

Time: 13:30 - 15:30, February 14, 2025. Room: BS 548
Chair: Yi Cao, Xi'an Jiaotong-Liverpool University

2A1: Deep Reinforcement Learning for Arbitrage in Decentralized Exchanges
Junhuan Zhang, Beihang University
Haodong Wang, Beihang University
John R. Birge, University of Chicago

2A2: Different Opinion or Information Asymmetry: Machine-Based Measure and Consequences
Yang Liu, Hunan University
Kang Guo, Hunan University
Tianyu Wang, Tsinghua University

2A3: Application of A Multi-Period Asset Pricing Model Based on LSTM-Transformer in the Chinese Stock Market
Yu Zhang, Southwestern University of Finance and Economics
Mengxiang Zhao, Southwestern University of Finance and Economics

2A4: Economics-Aware Machine Learning for Option-Implied Risk Metrics
Heqing Shi, University of Edinburgh
Yi Cao, Xi'an Jiaotong-Liverpool University
Zexun Chen, University of Edinburgh

Session 2B: Agent-Based Model (ABM)-Financial Markets

Time: 13:30 - 15:30, February 14, 2025. Room: BS 550
Chair: David Goldbaum, University of Technology Sydney

2B1: Information, Prudent Traders, and the Equity Premium Puzzle
Luca Gerotto, Università Cattolica del Sacro Cuore
Paolo Pellizzari, Ca'Foscari University of Venice
Marco Tolotti, Ca'Foscari University of Venice

2B2: Gambling and Spectral Risk in an Agent-Based Asset Pricing Model
Shu-Heng Chen, National Chengchi University
Mao-Wei Hung, National Taiwan University
Hung-Wen Lin, National Chung Hsing University
Kun-Ben Lin, Macau University of Science and Technology

2B3: Enhancing Return Forecasting Using LSTM with Agent-Based Synthetic Data
Lijian Wei, Sun Yat-sen University
Sihang Chen, Sun Yat-sen University
Junqin Lin, Shantou University
Lei Shi, Macquarie University

2B4: The Effects of Seasoned Equity Offerings and Share Buybacks:
Insights from a Heterogeneous Agent Asset Pricing Model
David Goldbaum, University of Technology Sydney
Alessandra Mainini, Catholic University of Sacred Heart
Davida Radi, Catholic University of Sacred Heart

Session 2C: ABM-Complexity

Time: 13:30 - 15:30, February 14, 2025. Room: BS 574
Chair: Marco Tolotti, Ca' Foscari University of Venice

2C1: A Novel Agent-Based Approach to Evaluate the Economic Impact of the Epidemics Mitigation Strategies
Lin Huo, Beijing Language and Culture University
Wei Shang, Academy of Mathematics and Systems Science, Chinese Academy of Sciences
Yi Liu, Industrial and Commercial Bank of China
Xu Ji, University of Chinese Academy of Sciences
Xiang Gao, Academy of Mathematics and Systems Science, Chinese Academy of Sciences
Lei Cao, Tianjin University
Cuihong Yang, Academy of Mathematics and Systems Science, Chinese Academy of Sciences

2C2: Simulating Party Competition in Dynamic Voter Distributions
Leonie Geyer, Zeppelin University
Patrick Mellacher, Graz Schumpeter Centre, University of Graz

2C3: The Complexity of Socio-Health-Economic Factors in Shaping Individual Behavior Towards Vaccination
Simone Marsiglio, University of Pisa
Marco Tolotti, Ca' Foscari University of Venice

Session 3A: ABM-Economics

Time: 16:00 - 18:00, February 14, 2025. Room: BS 548
Chair: Andrea Teglio, Ca' Foscari University of Venice

3A1: Can China Avoids Japan's Lost Decades? Insights From Physics and Mathematics
Seyed Ali Hosseiny Esfidvajani, Shahid Beheshti University

3A2: Firm Structure and Division of Labor Under the Background of Gig Economy
Luning Dong, University of Macau
Guoqiang Li, University of Macau

3A3: Selfish Genes, Collective Production, and the Origin of Natural Property Rights
Sheng Hua, Southeast University
Xiaoqi Zhang, Henan Polytechnic University

3A4: The Importance of Being Many: Dynamics and Aggregation in a Multi-Sector Economy
Marcello Nieddu, Univesity of Genoa
Marco Raberto, Univesity of Genoa
Andrea Teglio, Ca' Foscari University of Venice

Session 3B: Bond Markets

Time: 16:00 - 18:00, February 14, 2025. Room: BS 550
Chair: Qunzi Zhang, Shandong University

3B1: Bond Pricing Under Sticky CIR Process
Haoyan Zhang, Civil Aviation University of China
Yinglun Gao, Civil Aviation University of China
Yingxu Tian, Civil Aviation University of China
Yece Zhou, Civil Aviation University of China

3B2: Enhancing Convertible Bond Valuation:
A Least Squares Monte Carlo Simulation Approach and Market Anomaly Analysis
Wenlan Wang, Shanghai University of International Business and Economics
Canyang Liu, Renmin University of China

3B3: Fear in the "Fearless" Treasury Market
Tianyang Wang, Colorado State University
Yuanzhi Wang, Shandong University
Qunzi Zhang, Shandong University
Guofu Zhou, Olin Business School

Session 3C: Socioeconomic Dynamics

Time: 16:00 - 18:00, February 14, 2025. Room: BS 574
Chair: Lucas M. Bernard, City University of New York

3C1: The Future of Traditional Fuel Vehicles (TFV) and New Energy Vehicles (NEV):
Creative Destruction or Co-Existence?
Zhaojia Huang, BNU-HKBU United International College
Liang Zhang, BNU-HKBU United International College
Tianhao Zhi, BNU-HKBU United International College

3C2: Chasing Dreams: Urban Aspirations as a Driver of Rural-Urban Migration in Vietnam
Mai-Huong Vo, National Chengchi University

3C3: Online Social Network Protocols
Louis Dalpra, University of Strasbourg

3C4: Shades of Grey: Economic Aspects of Non-Traditional Revenue Sources,
the Case of Live Streaming
Lucas M. Bernard, City University of New York (CUNY)
Unurjargal Nyambuu, City University of New York (CUNY)

Session 4A: ESG and Sustainability

Time: 10:30 - 12:00, February 15, 2025. Room: BS 548
Chair: Dongxu Li, Xiamen University

4A1: ESG Peer Effects under Common Ownership
Chengcheng Li, Dongbei University of Finance and Economics
Xiaoqiong Wang, Jacksonville State University
Feifei Zhu, Central University of Finance and Economics

4A2: Lotka-Volterra Heterogeneity, ESG, and Sustainable Development
Yiren Wang, BNU-HKBU United International College
Tianhao Zhi, BNU-HKBU United International College

4A3: A Farewell to Loyalty, a Farewell to Care? Evidence from Takeover Targets
Dongxu Li, Xiamen University
Xiaoran Ni, Xiamen University

Session 4B: Asset Pricing-II

Time: 10:30 - 12:00, February 15, 2025. Room: BS 550
Chair: Xingzhi Yao, Xi'an Jiaotong-Liverpool University

4B1: Cross-Sectional End-of-Day Return Puzzle and Disposition Effect
Xing Han, University of Auckland
Wenqiong Liu, Hunan University

4B2: Cross-Sectoral Crash Risk and Expected Commodity Futures Returns
Ying Jiang, University of Nottingham Ningbo China
Xiaoquan Liu, University of Nottingham Ningbo China
Zhenyu Lu, Xi'an Jiaotong-Liverpool University

4B3: Downside Implied Correlation: A Driving Force of Volatility Risk in Asset Pricing
Zhenxiong Li, Soochow University
Rodrigo Hizmeri, University of Liverpool
Xingzhi Yao, Xi'an Jiaotong-Liverpool University
Marwan Izzeldin, Lancaster University

Session 4C: Macroeconomic Modeling

Time: 10:30 - 12:00, February 15, 2025. Room: BS 574
Chair: Christophre Georges, Hamilton College

4C1: Restricted Perceptions Equilibria with Measurement Errors
Mei Zhu, Shanghai University of Finance and Economics

4C2: CBDC in a Macroeconomic Agent-Based Model
Giulia Iori, Ca Foscari University of Venice

4C3: Macroeconomic Gentrification
Christophre Georges, Hamilton College

Session 5A: Machine Learning-II

Time: 13:30 - 15:00, February 15, 2025. Room: BS 548
Chair: Jin Guo, Xi'an Jiaotong-Liverpool University

5A1: Long-Term Early Warning Information on Corporate Defaults from News Headlines
Hui Bu, Beihang University
Wenjin Tang, Southern University of Science and Technology
Jun Tu, Shanghai Jiaotong University
Junbo Wang, City University of Hong Kong
Shouyang Wang, Chinese Academy of Sciences

5A2: Firm Culture Drives the Stock Price
Libo Yin, Central University of Finance and Economics
Jier Zhang, Central University of Finance and Economics
Lijian Wei, Sun Yat-sen University
Sihang Chen, Sun Yat-sen University

5A3: Exploration or Exploitation? A Machine Learning Approach to Understand Institutional Trading Behavior
Jin Guo, Xi'an Jiaotong-Liverpool University

Session 5B: Information and Trading

Time: 13:30 - 15:00, February 15, 2025. Room: BS 550
Chair: Junqing Kang, Sun Yat-sen University

5B1: On the Limits of Informationally Efficient Stock Markets:
New Insights from a Chartist-Fundamentalist Model
Laura Gardini, University of Urbino Carlo Bo and VSB-Technical University of Ostrava
Davide Radi, Catholic University of the Sacred Heart
Noemi Schmitt, University of Bamberg
Iryna Sushko, Catholic University of the Sacred Heart
Frank Westerhoff, University of Bamberg

5B2: How Markets Shape Prices for Skewed Assets:
Price Reversal in Multi-Assets Experimental Markets
Shuchen Zhao, Dongbei University of Finance and Economics

5B3: Copy Trading and Price Informativeness
Junqing Kang, Sun Yat-sen University

Session 5C: Experiments-I

Time: 13:30 - 15:00, February 15, 2025. Room: BS 574
Chair: Te Bao, Nanyang Technological University

5C1: The Fragility of Reputation while Sustaining Cooperation
Gergely Horvath, Duke Kunshan University
Mengqi Qiu, University of Cambridge
Jaromír Kovárík, University of the Basque Country (UPV/EHU),
and University of West Bohemia

5C2: Can Withholding Information Promote Cooperation and Coordination in Social Dilemmas?
Theory and Experiment
Lin Jing, Dongbei University of Finance and Economics
Yohanes E. Riyanto, Nanyang Technological University

5C3: Paying to Avoid the Spotlight
Te Bao, Nanyang Technological University
John Duffy, University of California, Irvine, and Osaka University
Nobuyuki Hanaki, Osaka University, and University of Limassol

Session 6A: Risk Management

Time: 15:30 - 17:00, February 15, 2025. Room: BS 548
Chair: Wei Shang, Chinese Academy of Sciences

6A1: Portfolio Management Based on an Improved DDPG Algorithm: Optimizing the Balance between Risk and Return
Pujing Lin, Sun Yat-sen University
Lijian Wei, Sun Yat-sen University

6A2: Detecting Insider Trading in the Era of Big Data and Machine Learning
Guang Cheng, University of California
Christian T. Lundblad, University of North Carolina at Chapel Hill
Zhishu Yang, Tsinghua University
Qi Zhang, Shanghai Jiaotong University

6A3: A Synthetic Approach for Corporate Credit Risk Early Warning based on Multi-Source Data
Wei Shang, Chinese Academy of Sciences
Zhi Yang, Chinese Academy of Science
Ying Liu, University of Chinese Academy of Sciences
Zhou He, University of Chinese Academy of Sciences

Session 6B: ABM and Trading

Time: 15:30 - 17:00, February 15, 2025. Room: BS 550
Chair: Xing Gao, Nankai University

6B1: Finding the Impacts of Different Orders: Evidence Based on a Big Brokerage in China
Ya Gao, Dalian University of Technology
Saiya Zhang, Dalian University of Technology
Xiong Xiong, Tianjin University

6B2: Love at First Trade: The First Stock Bias of Retail Investors
Rong Liu, Tianjin University
Yongjie Zhang, Tianjin University
Xu Feng, Tianjin University

6B3: Trading on Noise in Limit Order Markets
Xing Gao, Nankai University
Xue-Zhong (Tony) He, Xi'an Jiaotong-Liverpool University
Shen Lin, Tianjin University

Session 6C: Experiments-II

Time: 15:30 - 17:00, February 15, 2025. Room: BS 574
Chair: Wenting Zhou, Xi'an Jiaotong-Liverpool University

6C1: Motivated Reasoning in the Social Domain
Peiran Jiao, Maastricht University, and Nuffield College, Oxford
Jing Li, Dongbei University of Finance and Economics
Xinxin Zhu, Maastricht University, and Dongbei University of Finance and Economics
Jichuan Zong, Dongbei University of Finance and Economics

6C2: Beyond Aversion and Seeking: Examining Divergent Ambiguity Attitudes in Experimental Asset Markets
Fan Rao, Dongbei Univeirsity of Finance and Economics
Xu Zhang, The Hong Kong University of Science and Technology (Guangzhou)

6C3: The Influence of Information Quality and Quantity on Risk and Ambiguity Aversion: Experimental Evidence
Wenting Zhou, Xi'an Jiaotong-Liverpool University

Session 7A: Ambiguity and Investment

Time: 09:00 – 10:30, February 16, 2025. Room: BS 548
Chair: Tiecheng Leng, Harbin Institute of Technology

7A1: A Theory of Volatility Ambiguity and Capital Structure
Xin Huang, Tsinghua University
Lihong Zhang, Tsinghua University

7A2: Robust Capital Investment with Nonconvex Cost
Xiaowen Wang, Liaoning University

7A3: From Assembly Line to Delivery Man: The Impact of Gig Economy on Corporate Investment
Tiecheng Leng, Harbin Institute of Technology
Yijing Peng, Peking University
Yi Xiao, Shanghai International Studies University
Qiang Ye, University of Science and Technology of China

Session 7B: ETFs and Funds

Time: 09:00 – 10:30, February 16, 2025. Room: BS 550
Chair: Yangyi Liu, Southwest Jiaotong University

7B1: Beating the Index with ETFs
Wentao Li, Xiamen University

7B2: Security Lending Market, Secondary Market Arbitrageurs, and ETF Mispricing
Bochen Wu, University of Melbourne

7B3: Does Confidence (in Fund Skill Estimates) Matter for Investors?
Yangyi Liu, Southwest Jiaotong University

Session 7C: Uncertainty and Chinese Economy

Time: 09:00 – 10:30, February 16, 2025. Room: BS 574
Chair: Hui Bu, Beihang University

7C1: Institutional Herding and Financial Market Uncertainty
Hui Bu, Beihang University
Chen Gu, Shanghai Business School
Xu Guo, Shenzhen University
Alexander Kurov, West Virginia University
Raluca Stan, University of Minnesota Duluth

7C2: Impact of US Entity List Policy on Reallocation of Credit Resources Within Sanctioned Industries in China
Jiuchang Wei, University of Science and Technology of China
Changchun Chen, University of Science and Technology of China
Li Zhang, University of Science and Technology of China

7C3: Breaking the "Iron Rice Bowl": Reform, Labor Market Misallocation, and Productivity
Helu Jiang, Shanghai University of Finance and Economics
Runsheng Wang, Shanghai University of Finance and Economics
Lijun Zhu, Peking University

Session 8A: Attention and Network

Time: 10:45 – 12:15, February 16, 2025. Room: BS 548
Chair: Suting Zhou, Nanjing University

8A1: The Strengthened Salience Theory Based on the Investor Attention: Evidence from China
Ya Gao, Dalian University of Technology
Ziruo Bai, Dalian University of Technology
Xiong Xiong, Tianjin University

8A2: Interbank Lending, Liquidity Reservation, and Systemic Risk
Tongkui Yu, Southwest University
Xue-Zhong (Tony) He, Xi'an Jiaotong-Liverpool University
Na Zhang, Tianjin University of Technology

8A3: KeGAT: A New Model for Detecting Firm's Financial Fraud
Libing Fang, Nanjing University
Ke Zhang, Nanjing University
Suting Zhou, Nanjing University
Boya Chen, Nanjing University

Session 8B: Asset Pricing-III

Time: 10:45 – 12:15, February 16, 2025. Room: BS 550
Chair: Remco Zwinkels, Vrije Universiteit Amsterdam and Tinbergen Institute

8B1: Retail Investor Heterogeneity and Cross-sectional Asset Pricing
Yiyi Shen, Tianjin University
Xiong Xiong, Tianjin University
Shen Lin, Tianjin University
Ruoxin Chen, Tianjin University

8B2: Seek the Seeking Alpha: Social Media Research and Mutual Fund Flows
Sha Liu, Southwestern University of Finance and Economics
Wenjie Ding, Sun Yat-sen University
Ariel Gu, University of East Anglia
Qingwei Wang, Cardiff University

8B3: Risk, Return, and Sentiment in a Virtual Asset Market
Maurizio Montone, Utrecht University
Remco Zwinkels, Vrije Universiteit Amsterdam and Tinbergen Institute

Session 8C: Exchange Rate and Yield

Time: 10:45 – 12:15, February 16, 2025. Room: BS 574
Chair: Lisha Li, Southwestern University of Finance and Economics

8C1: Do Recent Bitcoin Markets 'Walk' Randomly from the EUR-USD Forex Market? A Threshold Cointegration Analysis
Zheng Nan, Yamanashi Gakuin University

8C2: Modeling and Forecasting Serially Dependent Yield Curves
Hao Li, Nankai University

8C3: Corporate Yields at the Zero Lower Bound
Lisha Li, Southwestern University of Finance and Economics

Abstracts

Session 1A: Climate Change and Green Innovation

Modeling Green Reputation Decisions in a Nonlinear Cournot Duopoly of Carbon Emission Abatement

Xiaoliang Li, Guangzhou College of Technology and Business
Shuie Sun, Guangzhou College of Technology and Business

This paper is devoted to modelling the green reputation decisions of fi rms and discussing the issue of carbon emission abatement in the context of consumers' green awareness. A nonlinear static game is first introduced to examine the effects of green policies. Symbolic computation methods, such as the triangular decomposition method and the cylindrical algebraic decomposition method, are intensively applied in our analysis of the static model. Insightfully, we derive that fi rms' abatement eff orts are positively related to their basic cost levels under nonlinear demand. To our knowledge, this fact has not been found in the linear demand setting commonly used in the literature on oligopoly games. In addition, we construct a dynamic game to explore the impact of green policies on market stability. The results show that the Nash equilibrium may be destabilized if the basic cost levels and the carbon tax rate are sufficiently large at the same time or if the green cost levels are large enough. These conclusions were confirmed by our numerical simulations. The simulations also reveal that the dynamic model may lose its stability through period-doubling or Neimark–Sacker bifurcations.

Biodiversity Regulation's Impact on Corporate Green Innovation: Re-evaluating the Porter Effect

Yiming Zhang, Tianjin University
Wei Zhang, Tianjin University

We focused on firm transformation decisions within the context of biodiversity conservation and utilized the difference-in-differences model to assess the impact of the Green Shield programme (GSSP) on firm green innovation. Our findings indicate that GSSP significantly enhances the green innovation performance of firms and generates a positive spillover effect at the regional level. Furthermore, our analysis reveals a dynamic policy effect, demonstrating that firms transition from passive strategic innovation in the initial stage to active substantive innovation in later stages. Mechanism testing demonstrates that GSSP is crucial in shaping firm green innovation decision-making by improving environmental information disclosure, enhancing management's environmental awareness, and reducing agency costs. Heterogeneity analysis shows that GSSP strongly impacts green innovation, especially for state-owned firms and those in low-product market competition environments. Our study contributes new insights into realizing the Porter effect of environmental regulation and green transformation, offering valuable policy implications for implementing the "Kunming-Montreal Global Biodiversity Framework".

***The Capital Market Implications of Climate Risk Disclosur*e**

Jiang Luo, Nanyang Technological University
Konstantinos Stathopoulos, The University of Manchester
Avanidhar Subrahmanyam, UCLA
Xiaoxia Ye, University of Nottingham
Ran Zhao, San Diego State University

Corporate climate risk (CR) disclosures have become increasingly widespread in recent years. Based on a simple theoretical model, we hypothesize that increased CR disclosure allows a fi rm to appeal to a larger set of institutional investors, and that this, in turn, implies an increased supply of lendable shares, less binding short-selling constraints, and improved market quality. We consider a difference-in-differences setting to test our implications, using the publication of the SEC (2010) guidance on CR disclosure as our DiD event. We find empirical evidence consistent with all of our hypotheses. Our study identifies CR disclosures as a novel source of ownership breadth, and, ultimately, financial market liquidity and efficiency. We also show that socially responsible mutual funds are particularly important in channeling CR disclosures' positive effects on financial markets.

Session 1B: Asset Pricing-I

Style Switching and Asset Pricing

Huaixin Wang, Tsinghua University

This paper studies asset prices in a market where investors actively trade on diverse characteristics. A simple portfolio choice model shows that asset demand tends to switch between competing investment styles, generating externalities across assets. Consequently, assets sharing negative (positive) correlations within the characteristic space display cross-asset reversal (momentum). Trading strategies that empirically exploit this predictability yield annualized returns of 12%. Evidence from institutional trading supports the underlying mechanism. The framework further implies forecastable reversals and momentum in returns of characteristic-sorted portfolios, confirmed using data on a wide range of asset pricing anomalies.

History Matters: Path-Dependent Return Predictability

Xuezhong (Tony) He, Xi'an Jiaotong-Liverpool University
Haojun Ji, Xi'an Jiaotong-Liverpool University
Kai Li, Macquarie University
Jiatao Liu, Xi'an Jiaotong-Liverpool University

We introduce a novel path-dependent approach to extract useful information embedded in path-dependent returns parsimoniously and systematically. We document that path-dependent cross-sectional returns can generate significant alpha and exhibit strong explanatory power for market excess return, momentum, and known return predictors, but not in other way around. This demonstrate that the path-dependent factors are fundamentally driven for return predictability. By decomposing the expected returns, we show that the return paths, instead of returns, play dominating role in the predictability.

Intangible Investment in Asset Pricing

Bin Guo, Nankai University
Kewei Hou, The Ohio State University
Han Zhang, Nankai University
Yongjie Zhang, Tianjin University

We develop a pure production-based asset pricing model in which a stochastic discount factor is recovered by the representative producer's first-order condition with respect to the intangible investment. With the ability that the producer can transform productivity across states of nature, in equilibrium, the marginal cost of intangible investment measured by the contingent claim price equals the expected marginal gain of productivity growth state-by-state. The stochastic discount factor is thus the producer's marginal rate of substitution for intangible investment. In-dependent of consumption data, our intangible investment model addresses the equity premium puzzle from the production side. Furthermore, our model does a reasonable job of explaining the cross-sectional variation in average stock returns.

Session 1C: Credit Risk and Expectation Formation

Did Fintch Lending Promote Self-Sorting on Loan Size in the Residential Mortgage Market?

Di Wu, Harbin Institute of Technology

The residential mortgage market has historically been characterized by price and quantity discrimination based on borrowers' levels of financial sophistication. Whether the emergence of Fintech lenders has alleviated this discrimination remains an open question. Unlike traditional brick-and-mortar mortgage providers, Fintech lenders conduct the entire mortgage approval process online, significantly lowering the search costs for applicants. This shift in lending infrastructure presents the potential for Fintech to reduce traditional biases in mortgage pricing and access. In this study, we empirically investigate the impact of Fintech lending on borrower self-sorting in response to a policy change affecting guarantee fees for residential mortgages in 2022. Specifically, in high-cost areas within the United States, government-sponsored enterprises (GSEs) have imposed higher guarantee fees on mortgages with origination balances exceeding the conforming loan limits, increasing lenders' costs based on loan size. Using this policy change as a quasi-natural experiment, we compare the distribution of mortgage applications around the conforming loan limit before and after the policy shift. The Federal Housing Finance Agency's (FHFA) 2022 policy increase in guarantee fees for certain high-balance and second-home loans provides an ideal setting to observe these dynamics. Our analysis reveals that lenders responded to the policy change by raising interest rates (by 8 to 10 basis points) on mortgages exceeding the conforming loan limit, prompting borrowers to adjust loan sizes to remain within this threshold. Notably, this self-sorting behavior is more pronounced in counties where Fintech lenders command a significant market share. Our findings offer valuable insights into the role of Fintech in reshaping traditional mortgage market dynamics, particularly with regard to borrower behavior and lender pricing strategies.

Diagnostic Expectations and Consumption Dynamics

Jinting Guo, Goethe University Frankfurt
Yulei Luo, University of Hong Kong
Penghui Yin, Central University of Finance and Economics

Household survey data show that positive income shocks lead to a positive change in current consumption, but a negative change in future consumption. These empirical results contradict the predictions of the standard rational expectations-permanent income hypothesis model in which the change in current consumption only depends on unpredictable income shocks. To explain this puzzling consumption pattern, we study a behavioral permanent income hypothesis model under diagnostic expectations, and show that our model with a realistic two-component income process has the potential to generate the observed consumption dynamics. Finally, we show that although the welfare losses due to distorted beliefs are small, diagnostic expectations can have important implications for governments' stimulus fiscal policies.

Thus Spoke FOMC: The Fed and Sovereign CDS Spreads

Jian Li, Dongbei University of Finance and Economics

We aim to study how sovereign credit default swaps (SCDS) respond to central bank communications. Employing a GPT-based NLP communication measure, we find that dramatic changes in the Federal Open Market Committee's (FOMC) hawkish or dovish stance, as conveyed through the FOMC speeches and meeting statements, have provided useful information, influencing the trajectory of SCDS spreads. When the FOMC is already in an extremely hawkish or dovish position, the market overreacts and requires 3-4 days to absorb the information and take appropriate actions. Asymmetries exist upon the direction of central bank communications. The hawkish voices provide signals, meanwhile, the dovish tones indicate noises. We also observe a significant surge of information flowing into the SCDS market one day prior to large shifts of the FOMC's position. Our findings highlight the significance of the application of large language models and provide implications for improving the effectiveness of central bank guidance.

Session 2A: Machine Learning-I

Deep Reinforcement Learning for Arbitrage in Decentralized Exchanges

Junhuan Zhang, Beihang University
Haodong Wang, Beihang University
John R. Birge, University of Chicago

We propose a game-theoretic market microstructure model to illustrate the strategic decisions of arbitrageurs resulting in successful arbitrage opportunities, as well as to illustrate the strategies of liquidity providers, swap traders, and miners in decentralized exchanges with automated market makers. Arbitrageurs use the two-point (TA) and cyclic arbitrage (CA) strategies, and their decision-making processes are described by the deep reinforcement learning method. Liquidity providers use balancing swap fees and impermanent loss strategy. Swap traders' strategies are moving average (MA) and zero intelligence (ZI) ones. Miners use an honest strategy. We present empirical analysis using daily closing prices of eight cryptocurrency pairs, i.e., BNB/UNI, BTC/ETH, BTC/UNI, ETH/BNB, USDT/BNB, USDT/BTC, USDT/ETH, and USDT/UNI from January 1, 2021, to December 31, 2023. The results using daily closing prices show that 1) both TA and CA arbitrageurs

achieve positive mean rewards; 2) TA arbitrageurs obtain the maximum accumulated rewards and the largest portfolio value among all traders; 3) the arbitrage activities of the optimized TA arbitrageurs reduce the profitability of the CA arbitrageur; 4) the mean rewards for liquidity providers are positive and close to zero; 5) The arbitrageurs' trading activities also decrease the profitability of liquidity providers; 6) MA and ZI swap traders suffer losses.

Different Opinion or Information Asymmetry: Machine-Based Measure and Consequences

Yang Liu, Hunan University
Kang Guo, Hunan University
Tianyu Wang, Tsinghua University

We leverage machine learning to introduce belief dispersion measures to distinguish different opinion (DO) and information asymmetry (IA). Our measures align with the human-based measure and relate to economic outcomes in a manner consistent with theoretical prediction: DO negatively relates to illiquidity, while IA positively does. Moreover, IA negatively predicts the cross-section of stock returns, while DO predicts returns positively for underpriced stocks and negatively for overpriced ones. Our findings reconcile conflicting disagree-return relations in the literature and are consistent with Atmaz and Basak (2018)'s model. We also show that the return predictability of DO and IA stems from their unique economic rationales, underscoring that components of disagreement can influence market equilibrium via distinct mechanisms.

Application of A Multi-Period Asset Pricing Model Based on LSTM-Transformer in the Chinese Stock Market

Yu Zhang, Southwestern University of Finance and Economics
Mengxiang Zhao, Southwestern University of Finance and Economics

The Chinese stock market is an important component of China's financial system. Since the reform and opening up, China's economy has rapidly advanced. The Chinese stock market has evolved from its initial stage to become the second-largest stock market in the world. Throughout this process, the demand among the Chinese population for asset preservation and appreciation has increased, leading to active participation in stock market trading. Meanwhile, machine learning, as a subset of the rapidly evolving field of artificial intelligence, is being increasingly applied to investment strategies. In this context, this study introduces machine learning techniques to multi-factor asset pricing models. We integrate Long Short-Term Memory networks (LSTM) with the Transformer encoder-decoder architecture to develop an LSTM-Transformer multi-period asset pricing model. This model enables multi-period forecasting and identifies feature importance using an intrinsic interpretability method. A total of 103 company features are selected as input variables. Monthly return data from the Chinese stock market from January 2001 to December 2022 is utilized. Based on the predictive results of the LSTM-Transformer multi-period asset pricing model, stock portfolios are constructed and their performances are systematically evaluated. The findings indicate that investment strategies developed using this model, particularly the strategy of predicting for two months and holding for two months, achieve a good balance between returns and risks. Even after accounting for transaction costs, these strategies still generate decent excess returns. Furthermore, through empirical analysis of feature importance, we propose two composite factors—aggregative feature importance measure and contrastive feature importance measure. These two factors demonstrate significant pricing ability in the Chinese stock market. Based on these findings, we further develop a new four-factor model. Compared to the classical Fama-French three-factor model, this new model exhibits stronger explanatory power in describing the variations in cross-sectional stock returns in the Chinese stock market.

Economics-Aware Machine Learning for Option-Implied Risk Metrics

Heqing Shi, University of Edinburgh
Yi Cao, Xi'an Jiaotong-Liverpool University
Zexun Chen, University of Edinburgh

Machine learning models are predominantly data-driven and often lack embedded domain knowledge. This limitation is particularly significant in the field of finance, where certain as-set conditions must be maintained. To address this, we propose a novel constrained Gaussian Process model (consGP) that simultaneously minimises interpolation loss and satisfies encoded linear inequalities representing economic constraints. This approach enables the consGP to learn from market data whilst adhering to fundamental economic principles. We apply this model to the estimation of option-implied risk metrics, where the consGP demonstrates robust performance in estimating risk-neutral density (RND) across sparse and noisy option observations. This model has been demonstrated to be particularly suitable for modelling stock options with limited sample sizes due to insufficient liquidity. Our comprehensive empirical studies, conducted using a cross-section of S&P 500 stocks, reveal that the consGP model outperforms traditional structural models in recovering stock-level RND. This improved performance translates into enhanced predictive information and tangible economic benefits for investors. The consGP model thus represents a significant advancement in integrating machine learning techniques with domain-specific financial constraints, offering a more robust and economics-aware approach to option pricing and risk assessment.

Session 2B: Agent-Based Model (ABM)-Financial Markets

Information, Prudent Traders, and the Equity Premium Puzzle

Luca Gerotto,Università Cattolica del Sacro Cuore
Paolo Pellizzari, Ca'Foscari University of Venice
Marco Tolotti, Ca'Foscari University of Venice

We analyse a financial market with a large number of investors who implement a learning process based on imitation to select among a wide range of different strategies that differ in the amount (and quality) of information used to build their in-vestment portfolio. Through the analysis of a simulation-based approach, we show that the majority of investors, at the equilibrium, rely on a limited number of strategies; in most scenarios, two strategies prevail: prudent traders and informed traders. The former include few equity in their holding and dominate the market in terms of market shares, but the latter generate on average higher profits. Our model can help to justify the existence of an equity premium puzzle: in equilibrium, the higher mean profit of informed investors is associated with a median profit that is equal to that of more prudent or misinformed investors.

Gambling and Spectral Risk in an Agent-Based Asset Pricing Model

Shu-Heng Chen, National Chengchi University
Mao-Wei Hung, National Taiwan University
Hung-Wen Lin, National Chung Hsing University
Kun-Ben Lin, Macau University of Science and Technology

An agent-based asset pricing model populated by gambling, fundamentalist, and trend-chasing agents is developed. In this model, despite continuous past gains or losses in the asset price, the gambling agents tend to

expect the asset price to skyrocket. The rationale behind this proposition is twofold. First, from the perspective of the house money effect and hot hand fallacy, such agents deem that they will once again make profits in the future when past returns are positive. Second, in terms of the break-even effect and illusion of control, the desire to win back will guide them to be more aggressive even though past returns are negative. In addition, we allow for various magnitudes of risk tolerance among such three strands of agents. The fundamental price is derived from equal aggregate demand and supply. By leaning on a market-maker scenario, we retrieve the trading price from the excess demand. We then calibrate the model using the Standard and Poor's 500 index. The model reproduces stylized facts in financial markets well after calibrations, encompassing fat-tailed returns and the absent autocorrelation of returns. We deploy this validated model to set up a pile of computational experiments within three artificial financial markets. The gambling and trend-chasing agents constitute the first market. Moreover, the second market comprises fundamentalist and gambling agents, while the third market is made up of fundamentalist and trend-chasing agents. The findings vary across the three markets regarding the price deviations from fundamentals. In a market fully dominated by boundedly rational agents, i.e., the first market, the price deviations are much more severe than those of other markets. Such deviations mushroom when the risk tolerance of boundedly rational agents escalates. When the fundamentalist agents come into play in the market, say, the second and third markets, the price deviations are only slightly curbed. Furthermore, among the second and third markets, the strategic profits of the fundamentalist agents are generally worse than those of gambling and trend-chasing agents. We further perceive two prevalent findings regarding gambling agents. First, when we give various agents the same magnitude of risk tolerance, the strategic spectral risks of the gambling agents are significantly milder than those of other agents. However, the strategic profits of the gambling agents are not inferior to those of other agents. Although trend-chasing agents are less speculative than gambling agents, the strategic profits of the former are lower than those of the latter in the first market. Second, the strategic profits of the gambling agents are positively associated with the magnitude of risk tolerance, while the burgeoning risk tolerance does not strengthen their strategic spectral risks across various markets. It is not indispensable for gambling agents to bear more risks in obtaining higher profits although they are saliently speculative. In a nutshell, the entire outcomes by and large suggest the strategic profits of agents are positively associated with the magnitude of speculative behaviors within markets fraught with price deviations. Of note, more speculations do not certainly result in more drastic spectral risks.

Enhancing Return Forecasting Using LSTM with Agent-Based Synthetic Data

Lijian Wei, Sun Yat-sen University
Sihang Chen, Sun Yat-sen University
Junqin Lin, Shantou University
Lei Shi, Macquarie University

Financial markets, as complex adaptive systems, are characterized by historical data limitations and inherent evolution and non-stationarity, which challenge the effectiveness of deep learning models like Long Short-Term Memory (LSTM). We address these challenges by generating synthetic data using Agent-Based Modeling (ABM) to simulate complex market conditions through "what-if" scenarios. Our method begins by pre-training the LSTM model on historical data, then generates synthetic data with the ABM using "what-if" scenarios, followed by fine-tuning the pre-trained LSTM with ABM-generated synthetic data. Results show that the ABM-generated data significantly improves model performance across various statistical and economic metrics, and is robust in diverse market environments, model architectures, and data frequencies. Our primary contribution is modelling the complex adaptive systems' properties with the ABM-generated synthetic data, highlighting the need for new complex scenarios to better simulate future market conditions that are distinct from historical trends. We explore the potential of ABM in generating unique synthetic data, offering a framework to address the challenges imposed by the complex adaptive systems' properties of financial markets, in particular,

improving the discriminative ability of forecasting models such as the LSTM model.

The Effects of Seasoned Equity Offerings and Share Buybacks: Insights from a Heterogeneous Agent Asset Pricing Model

David Goldbaum, University of Technology Sydney
Alessandra Mainini, Catholic University of Sacred Heart
Davida Radi, Catholic University of Sacred Heart

We propose an asset pricing model with heterogeneous agents, asynchronous updating of beliefs, a market maker, and a firm that issues or buys back its own shares to exploit mispricing. The deterministic skeleton of the model is a two-dimensional piecewise-smooth map. We present an analytical study of the fundamental equilibrium and the coexisting non-fundamental equilibrium. In comparison to Hommes et al (2005), the firm's trading helps to dampen the extreme price realisations in the chaotic region of the model. The trading activities benefit the firm, generating growth in its value over time. The same firm engagement in a Walrasian market requires limits on firm leveraging to avoid its dissolution. The firm sets a divided policy as well as engaging in speculative market interventions. The firm's behavior affects the number of shares outstanding and its liquidity in the form of cash holdings. The firm has operating profits from its core business and trading profits derived from market interventions. With these activities both the value per share outstanding and the firm's overall value are evolving with the market. When a market maker sets the price, the firm's speculative intervention in the market strengthening the influence of fundamentals in the price. This undermines the success of the chartists, dampening the price the extremes. In the Walrasian market, the simultaneous change in the underlying value of the firm interacts with the market dynamics to generate greater price instability when the price is downwardly biased.

Session 2C: ABM-Complexity

A Novel Agent-Based Approach to Evaluate the Economic Impact of the Epidemics Mitigation Strategies

Lin Huo, Beijing Language and Culture University
Wei Shang, Academy of Mathematics and Systems Science, Chinese Academy of Sciences
Yi Liu, Industrial and Commercial Bank of China
Xu Ji, University of Chinese Academy of Sciences
Xiang Gao, Academy of Mathematics and Systems Science, Chinese Academy of Sciences
Lei Cao, Tianjin University
Cuihong Yang, Academy of Mathematics and Systems Science, Chinese Academy of Science

The human have been struggling with epidemic since ancient times. In recent centuries, both public and personal strategies to mitigate epidemics has been optimized and the effects are significant. However, they bring a great deal of economic burden alongside. We derive SEAIR-TQ, an agent-based model synthesized strategies of restricting movement, virus testing, quarantine, and isolation, and also considered the economic cost from the operating of strategies. We employed various combinations of frequencies of virus test and quarantine, and recorded the corresponding epidemic scale and economic cost emerged. We observe that both virus test and quarantine strategies mitigate the epidemic by shortening the duration and reducing the size. When one strategy is looser, the other's effect is more obvious. The mitigation strategies cost lost in labor force

which harms the economy. In our simulation a strategy combination of strict quarantine and loose test best balances the epidemic control the and economy cost. The results help policy makers to derive epidemic strategies considering both controlling epidemic and the cost.

Simulating Party Competition in Dynamic Voter Distributions

Leonie Geyer, Zeppelin University
Patrick Mellacher, Graz Schumpeter Centre, University of Graz

We study strategic party interaction in a spatial voting model where voters' ideological positions may change. Building on a rich empirical and theoretical literature, we assume that voters align their ideology with others who are sufficiently close to them (social influence with bounded confidence) as well as with the party that they support (party attraction). We show that these changes have strong implications on the results of the party competition model by Laver (2005). Two strategies stand out in our simulations: Aggregators, who always follow the mean policy of their supporters, and predators, who always chase the strongest party. Aggregators are most likely to win in a large corridor of the parameter space. However, predators can outperform them if party attraction is strong. This is interesting because predators are on average the worst-performing parties in the static voter distribution benchmark. We argue that these results are connected to real-world debates about how mainstream parties should react to the rise of extremist parties, as the two strategies epitomize debates about focusing on own strengths and supporters (aggregators) vs. adapting towards successful extremists (predators). We also demonstrate that the level of polarization and fragmentation of parties and voters is strongly affected by social influence and party attraction. While medium-sized confidence bounds and party attraction increase the polarization of voters and parties, unconstrained social influence decreases it.

The Complexity of Socio-Health-Economic Factors in Shaping Individual Behavior Towards Vaccination

Simone Marsiglio, University of Pisa
Marco Tolotti, Ca' Foscari University of Venice

We analyse the determinants of individual vaccination decisions and their implications on the aggregate immunization coverage and disease prevalence. We show that the relation between key socio-health-economic and epidemiological parameters determines which of the several alternative outcomes may arise (unique and multiple stable equilibria, monotonic and fluctuating trajectories, chaotic dynamics and path dependency). By comparing the deterministic dynamics with their stochastic counterpart, we also show that the deterministic approximation typically employed in economic epidemiology may lead to misleading conclusions about the true stochastic outcome because of the metastable properties of the stochastic system. Public policy by affecting socio-health-economic parameters may play a fundamental role in ruling out some undesired outcomes and promoting eradication. To this aim, we extend a basic epidemiological framework, inspired by, to account for how individuals make their vaccination decisions by comparing the benefits and costs of vaccination accounting for social and health conditions. We consider a (stochastic) susceptible-infected-recovered (SIR) model of communicable diseases with vital dynamics. Since we aim to focus on the determinants and implications of vaccination and for most vaccine-preventable diseases vaccination is recommended at an early stage in life, it is convenient to consider a framework with vaccination at recruitment, that is vaccination occurs at birth and vaccination decisions are made by parents. In order to characterize parental vaccination decisions, we consider a random utility model in which heterogeneous parents optimally decide whether to vaccinate or not to vaccinate their children in order to maximize their utility. We characterize the long run outcome which may be

associated with either disease eradication (disease-free equilibrium) or endemicity (endemic equilibrium). We also run simulations on a stochastic version of the model where the number of actors is finite. This allows us to identify several alternative situations in which a fallout in vaccination and thus a reoccurrence of disease outbreaks is possible, consistent with the recent experience of several industrialized countries. Some of the most interesting results (coexistence of multiple stable equilibria, chaotic dynamics, and metastability) may occur even in the most realistic situation in which individuals are vaccine hesitant.

Session 3A: ABM-Economics

Can China Avoids Japan's Lost Decades? Insights From Physics and Mathematics

Seyed Ali Hosseiny Esfidvajani, Shahid Beheshti University

In the wake of decades of remarkable economic growth, Japan experienced prolonged stagnation and deflation. While the causes of this phenomenon have been extensively studied, this talk focuses on the potential impact of inappropriate monetary policy. Economic indices, such as the real growth rate and inflation, fail the circularity test. In other words, we can produce a set of numbers for the quantity of products and their related prices, starting and ending with the same values. Yet, our measurements yield nonzero values for inflation and growth rates. Irving Fisher first noticed the systematic failure of these indices. It is interesting to note that tradable commodities and goods maintain roughly worldwide prices. Non-tradable industries, namely services, however, have local prices. Still, a worldwide trend is inevitable. Since productivity barely grows in service sectors, prices for them have a higher growth rate compared to the manufacturing sectors. The key point is that, unlike developed countries which have faced a smooth transition to a service economy, fast-growing economies such as postwar Japan experienced a faster transition. Such an effect is observed in China. Faster growth of prices in the service sector raises demand for money. Targeting inflation in such cases results in the appreciation of the national currency. In this talk, we observe this effect in the exchange rates of the Japanese Yen (JPY) and United States Dollar (USD) over the 1980s. Along with several phenomena leading to the big booms in Japanese assets, the appreciation of the Yen has been another cause. We will see that such a phenomenon could happen to the Chinese Yuan. Therefore, our analysis suggests careful monetary policy for China which will be discussed in our presentation.

Firm Structure and Division of Labor Under the Background of Gig Economy

Luning Dong, University of Macau
Guoqiang Li, University of Macau

In the context of the development of the digital economy, this paper introduces the factor of gig economy, tests a series of new firm structures, and uses inframarginal analysis to systematically explain how to transition from autarky and non-firm structure to firm structure. We focus on discussing the conditions for the emergence of firm structure, the expansion and contraction of firms, and the issue of the ownership. We show the important role that transaction efficiency plays in the change of firm structure. The markets for different types of labor are introduced and therefore the size of the firm is endogenously determined.

Selfish Genes, Collective Production, and the Origin of Natural Property Rights

Sheng Hua, Southeast University
Xiaoqi Zhang, Henan Polytechnic University

This study develops an evolutionary game to characterize the emergence of natural property rights. The collective production is augmented onto the classical Hawk-Dove game that endogenizes the network connection among agents and turns out to be the key to generate the asymmetry required for the emergence of natural property rights. Compared to the classical endowment effect, the collective production creates and highlights the asymmetry between individuals and the entire population, which provides a completely different mechanism to exclude the anti-property-right equilibrium. Natural property right emerges from collective production peacefully, instead of violently relying on the defensive fighting between owners and intruders, therefore, won't generate dead-weight welfare loss on the population level. But the emergence happens at a cost of increasing the distributional inequality among the agents insisting on different strategies, leading to the trade off between fairness and efficiency. The mechanism of collective production turns out valid under a variety of model modifications accounting for different types of heterogeneity in the population, therefore provides a novel and effective way to explain the establishment of property rights in ancient human society.

The Importance of Being Many: Dynamics and Aggregation in a Multi-Sector Economy

Marcello Nieddu, Univesity of Genoa
Marco Raberto, Univesity of Genoa
Andrea Teglio, Ca' Foscari University of Venice

Input-output models are analytical tools designed to understand the interdependencies between different sectors of an economy. In this work, we propose three main contributions: (1) We initiate a sequence of models within the theoretical framework of dynamic input-output models; (2) we define the first element in this sequence, allowing us to (3) rigorously examine the significance of interactions in the economy (addressing Blanchard's critique). We establish the theoretical conditions under which it is not possible to describe the system through representative agents. To achieve this, we need to redefine the concept of representative agent within our model. We identify two main procedures for grouping multiple agents into a single agent artifact, namely the 'representative' agent and the 'equivalent' agent. Depending on the subset from which the system originates, episodes of agent rationing or coordination failures may occur, leading the system to behave in a non-standard way compared to simpler cases that can be, to some extent, reduced to a representative agent model. These nonstandard cases, therefore, cannot be successfully represented by the representative artifacts introduced above, and as the importance of individual interactions between agents increases, models with aggregated agents tend to be less accurate approximations of the original multi-agent model.

Session 3B: Bond Markets

Bond Pricing Under Sticky CIR Process

Haoyan Zhang, Civil Aviation University of China
Yinglun Gao, Civil Aviation University of China
Yingxu Tian, Civil Aviation University of China
Yece Zhou Tian, Civil Aviation University of China

This paper documents conditional characteristic function and bond pricing under sticky CIR process. By introducing a time change involving symmetric local time, we derive sticky CIR process from standard CIR process. For studying the conditional characteristic function of sticky CIR process, we solve an equation concerned with the infinitesimal generator and its domain. Parallel to previous computing idea, we handle with

its application in bond pricing with the help of Sharpe ratio. All the results we get are closed forms.

Enhancing Convertible Bond Valuation: A Least Squares Monte Carlo Simulation Approach and Market Anomaly Analysis

Wenlan Wang, Shanghai University of International Business and Economics
Canyang Liu, Renmin University of China

Our research introduces a refined valuation model for convertible bonds, employing the least squares Monte Carlo simulation to capture their complex, path-dependent options. This model comprehensively assesses the bonds' unique attributes, including conversion rights and the downward revision clause of the conversion price. Our findings highlight a consistent overvaluation in the Chinese convertible bond market, particularly for bonds in the conversion period and those related to stocks that can be short-sold. The market's left-skewed pricing errors indicate a systemic bias towards higher valuations. Investor composition and the trading system significantly influence these anomalies. Institutional investors are less affected by market noise, while major shareholders have a limited impact on overvaluation. Retail investors, swayed by online discussions and differing opinions, are the primary drivers of pricing inefficiencies. The T+0 trading system, which enables immediate transactions, exacerbates this issue by favoring bonds with underlying stocks that can be short-sold, leading to a significant deviation of market prices from their fundamental values.

Fear in the "Fearless" Treasury Market

Tianyang Wang, Colorado State University
Yuanzhi Wang, Shandong University
Qunzi Zhang, Shandong University
Guofu Zhou, Olin Business School

This paper examines how fear affects the Treasury market and predicts Treasury bond returns. Using a text-based fear index from social and news media, we find that fear significantly predicts future Treasury returns, both in-sample and out-of-sample, and suggests the global transmission of fear. We also propose a model explaining that risk aversion shocks drive bond risk premia. Our paper further explores various dimensions of fear effects, such as term, magnitude, dynamics, and sources, and compares them with other sentiments. The results highlight the critical role of fear in Treasury market dynamics.

Session 3C: Socioeconomic Dynamics

The Future of Traditional Fuel Vehicles (TFV) and New Energy Vehicles (NEV): Creative Destruction or Co-Existence?

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Liang Zhang, BNU-HKBU United International College
Tianhao Zhi, BNU-HKBU United International College

There is a rapid development and commercialization of new Energy Vehicles (NEV) in recent years. Although traditional fuel vehicles (TFV) still occupy a majority share of the market, it is generally believed that NEV is more efficient, more environmental friendly, and has a greater potential of a Schumpeterian "creative

destruction" that may lead to a paradigm shift in auto production and consumption. However, less is discussed regarding the potential environmental impact of NEV production and future uncertainty in R&D bottleneck of NEV technology and innovation. This paper aims to propose a modelling framework based on Lux (1995) that investigates the long-term dynamics of TFV and NEV, along with their associated environmental externality. We argue that environmental and technological policies will play a critical role in determining its future development. It is of vital importance to constantly monitor the potential environmental impact of both sectors and support the R&D of critical NEV technology, as well as curbing its negative externality in a preemptive manner.

Chasing Dreams: Urban Aspirations as a Driver of Rural-Urban Migration in Vietnam

Mai-Huong Vo, National Chengchi University

This study investigates the drivers of rural-urban migration in Vietnam, focusing on the interplay between economic factors and personal aspirations for urban life. An agent-based model (ABM) is developed to simulate migration decisions, incorporating empirical data from 2011-2018 to characterize provinces and cities based on average income, employment rate, and living cost. The model considers both economic incentives and the allure of major cities in shaping migration patterns. The results reveal that while income disparities play a significant role, the aspiration for urban living is a crucial driver of migration, particularly towards major cities like Ho Chi Minh City. The model also highlights a subtle gender difference in migration rates, with a slightly higher proportion of women migrating to these cities, confirming the "feminization of migration" in Vietnam. This research emphasizes the necessity to account for both economic and aspirational elements in migration studies and policy formulation. Additionally, it demonstrates the effectiveness of ABM as a valuable instrument for analyzing migration.

Online Social Network Protocols

Louis Dalpra, University of Strasbourg

In the competitive market of Online Social Networks (OSNs) used by the population, explaining why one platform outperforms another, or why users migrate, remains a complex challenge. While existing literature often emphasizes the competitive advantage created by network effects, our research proposes that network protocols – the foundational rules shaping the creation of OSNs and the interactions within them - play a crucial role in why users prefer one platform over another. To substantiate our argument, we employ computer simulations of different network structures, derived from various network protocols. Our findings reveal significant insights; for instance, directed networks can markedly impede the diffusion of information, and the presence of sub-communities is vital for enhancing collective actions. These simulations demonstrate that the nuances of network design can lead to vastly different outcomes, providing a deeper understanding of user behavior and platform dynamics in online social networks.

Shades of Grey: Economic Aspects of Non-Traditional Revenue Sources, the Case of Live Streaming

Lucas M. Bernard, City University of New York (CUNY)
Unurjargal Nyambuu, City University of New York (CUNY)

In this paper, focusing on live streaming, we explore microeconomic aspects of non-traditional revenue sources. We use Nonlinear Model Predictive Control (NMPC) to analyse several online games typically used in live

streaming. We discuss some of the macroeconomic issues involved as well as international currency transactions. Although there is little hard data on this relatively new phenomenon, we believe it is a necessary first step in considering the broader class of transactions loosely known as the Shadow Economy. Although the focus of most economic research is on conventional industry-based activity, the Internet has given rise to a plethora of alternatives. We show that our existing tools are quite capable of unraveling at least some of the tangle, which involves not only economics, but politics, psychology, and sociology.

Session 4A: ESG and Sustainability

ESG Peer Effects under Common Ownership

Chengcheng Li, Dongbei University of Finance and Economics
Xiaoqiong Wang, Jacksonville State University
Feifei Zhu, Central University of Finance and Economics

This paper examines the peer effects of Environmental, Social, and Governance (ESG) activities under common ownership, focusing on fi rms from different industries and diverse locations. We find that fi rms commonly held by institutional investors tend to comove in their ESG activities even after excluding industry and location links. These findings are robust after controlling for endogeneity concerns. We demonstrate that common owners actively shape ESG practices, leading to greater ESG alignment among their portfolio fi rms through both "voice" and "exit" strategies. Additionally, the ESG peer effects are stronger in highly competitive industries and those with high stakeholder sensitivity. Our overall results underscore the monitoring role of common institutional investors.

Lotka-Volterra Heterogeneity, ESG, and Sustainable Development

Yiren Wang, BNU-HKBU United International College
Tianhao Zhi, BNU-HKBU United International College

The dire situation of global warming and other environmental crises had led to rethinking of current myopic corporate behaviour and the creation of ESG-type investment ratings. Despite of its great importance, the current ESG methodology lacks a strong theoretical foundation and is easily prone to inaccuracy and subjectivity. To this purpose, this research aims to fill the gap between ESG and dynamic modelling. The Lotka-Volterra system can potentially provide a strong theoretical basis for ESG-type ratings in assessing the ramification of economic and environment outcomes under different policy regimes.

A Farewell to Loyalty, a Farewell to Care? Evidence from Takeover Targets

Dongxu Li, Xiamen University
Xiaoran Ni, Xiamen University

Motivated by managers' ethical dilemma between their loyalty to shareholders and their care to corporate stakeholders, we examine how waiving the managerial duty of loyalty can discharge their duty of care as takeover targets, avoiding the violation of firm-stakeholder implicit contracts. Exploiting the staggered introduction of Corporate Opportunity Waivers (COWs) that reduce loyalty requirement for directors and managers' fiduciary duties as quasi-exogenous shocks, we find that the likelihood of receiving takeover bids for treated firms becomes significantly lower following the legislation. The baseline relation still holds when

employing the stack-cohort approach to address concerns regarding biased staggered DiD estimators. However, conditional on deals that are accepted by takeover targets, the announcement returns and takeover premiums are higher following the legislation. Overall, these results suggest that permitting a breach of the duty of loyalty orients the boards of takeover targets towards the interest of a larger spectrum of stakeholders when the conflicts between shareholders and other stakeholders tend to be substantially large.

Session 4B: Asset Pricing-II

Cross-Sectional End-of-Day Return Puzzle and Disposition Effect

Xing Han, University of Auckland
Wenqiong Liu, Hunan University

This paper presents a distinctive end-of-day pattern in the cross-sectional stock returns in China: Long-minus-short mispricing factor exhibits significantly positive returns at the last half-hour trading interval but performs poorly during the other daytime trading period. This cross-sectional intraday seasonality pattern of China is reversed compared to that of the US (Bogousslavsky 2021). We attribute this end-of-day return puzzle to the disposition effect, specifically, investors have a strong tendency to sell out stocks with prior capital gains at the end of the day, when the market is most liquid. The results are robust in a natural experiment setting in which the capital-flow interconnection between the shadow banking market and the stock market is more pronounced in speculative stocks with capital gains. We validate the consistency of this end-of-day pattern over different time-series samples and prominent anomalies.

Cross-Sectoral Crash Risk and Expected Commodity Futures Returns

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Xiaoquan Liu, University of Nottingham Ningbo China
Zhenyu Lu, Xi'an Jiaotong-Liverpool University

This study examines the pricing of equity cross-sectoral crash (CSC) risk in the cross section of commodity futures returns. Theoretically, commodity futures with higher exposure to the CSC risk are expected to offer lower subsequent returns as they hedge against the CSC risk. We first construct a CSC risk measure by averaging the pairwise left-tail dependence across 17 sectors in the US market, which allows us to better capture granular sector-level shocks often washed out at the aggregate level. We find that the return spread between commodity futures with the lowest and highest loading of the CSC risk is 1.04% per month and significant at the 1% level. This result can be rationalized as shocks to the CSC risk precede impaired economic activities in the future. Overall, our paper sheds light on the pricing of commodity futures with a novel stock market crash risk factor.

Downside Implied Correlation: A Driving Force of Volatility Risk in Asset Pricing

Zhenxiong Li, Soochow University
Rodrigo Hizmeri, University of Liverpool
Xingzhi Yao, Xi'an Jiaotong-Liverpool University
Marwan Izzeldin, Lancaster University

This paper proposes new ex-ante measures of downside and upside averaged implied correlation. Built exclusively from out-of-the-money put options of the index and stocks, the downside correlation explicitly captures increased asset interdependence during periods of market distress, which significantly exceeds the total and upside measures. While upside correlation risk is not priced, innovations in downside correlation carry a significant negative premium. The negative downside correlation premium is consistent with investors demanding a hedge against spikes in correlations when diversification fails. With a decomposition of the aggregate volatility risk into the averaged stock volatility and correlation, we show that the pricing of volatility risk documented in the literature primarily arises from the downside correlation risk and not from the other components. A simple mean-variance exercise demonstrates that augmenting standard factor models with the downside correlation factor significantly increases the Sharpe ratio of the portfolio.

Session 4C: Macroeconomic Modeling

Restricted Perceptions Equilibria with Measurement Errors

Mei Zhu, Shanghai University of Finance and Economics

This paper investigates the interplay between adaptive learning, heterogeneous expectations, and measurement errors in a typical asset pricing model and the New Keynesian Philips curve. Traditional models often assume homogeneous expectations and perfect information, which can lead to unrealistic predictions and diminished policy effectiveness. By incorporating adaptive learning, where economic agents update their beliefs based on past information with bounded rationality, and allowing for heterogeneous expectations across different agent groups, this study provides a more nuanced understanding of expectation formation in dynamic economies. Additionally, the presence of measurement errors in key economic indicators is explicitly modeled to reflect real-world data imperfections. Our findings reveal that adaptive learning and heterogeneous expectations significantly influence the persistence and propagation of economic shocks, while measurement errors exacerbate uncertainty and volatility in the economy. These insights have important implications for monetary policy, suggesting that policymakers must account for diverse expectation paths and data inaccuracies to design more robust and effective interventions. This study contributes to the literature by bridging gaps between behavioral economic theories and traditional models, offering a comprehensive approach to understanding and mitigating the complexities arising from bounded rationality and informational constraints in economic decision-making.

CBDC in a Macroeconomic Agent-Based Model

Giulia Iori, Ca Foscari University of Venice

The debate on issuing retail CBDC primarily focuses on welfare and financial stability implications. The literature has highlighted a key trade-off concerning retail CBDC. On one hand, CBDC aligns with citizens' preferences for digital payments; on the other, there are concerns regarding the substitution of deposits with digital money, which could lead to financial disintermediation with negative effects for the real economy and instability under stress. While the literature generally associates the issuance of CBDC with positive welfare effects, careful design is required to find a balance along the above trade-off. As far as financial stability is concerned, several papers point out that CBDC effectively boosts the probability of a bank run, but the welfare effects are not so obvious. If CBDC is issued, the probability of a bank run increases because depositors may easily switch to a safe asset (CBDC) under conditions of financial stress. There are several papers dealing with banks runs and CBDC. Existing work is builds on the fact that CBDC is more attractive than physical currency

because it is accepted in a wider array of transactions, therefore a bank run with CBDC is more likely but it will hurt households less than in case only physical currency is in place because households can use CBDC to perform transactions in more situations. In a way, banking panics are more frequent but are less disruptive. The increase in the probability of a bank run may be mitigated by two factors: banks will react doing less maturity transformation which renders them less exposed to banks runs; monitoring the flow of funds into CBDC allows policymakers to resolve weak banks sooner. Furthermore, CBDC may lead to a more resilient financial system if the central bank (CB) lends the deposits in the CBDC account to banks. In the limit, the CB can become a monopolist for deposits endangering credit supply to the real economy. We aim to contribute to the debate on financial stability through the analysis of an agent based model. The model considers firms, banks, unions and households who interact on labor, goods, credit and interbank markets and build upon the agent based frameworks developed. Households decide whether to move their savings from bank deposits into CBDC depending on the perceived riskiness of their own banks. The model produces endogenous fluctuations driven by the pricing behaviour of firms and banks and the wage setting behaviour of unions. Fluctuations can lead to loan defaults and to a credit crunch. We evaluate whether financial stability is enhanced or further exacerbated by the introduction of the CBDC. In particular, we explore whether a bank-run scenario may materialize in a situation of distress.

Macroeconomic Gentrification

Christophre Georges, Hamilton College

This paper explores the relationship between product innovation, economic dynamism, and consumption inequality in an agent-based macroeconomic model. A rise in rents accruing to high income consumers can shift both production and R&D spending toward products targeted to that class of consumer. The increase in income inequality can then have a magnified impact on consumption inequality through induced changes in product quality and availability. We label this process macroeconomic gentrification. We extend the agent-based macroeconomic model in Georges (2011, 2018) and document three channels that contribute to this process: an income channel, a variety channel, and an innovation channel. We further find that the relationship in the model between the distribution of income and long run economic dynamism can be highly nonlinear.

Session 5A: Machine Learning-II

Long-Term Early Warning Information on Corporate Defaults from News Headlines

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Wenjin Tang, Southern University of Science and Technology
Jun Tu, Shanghai Jiaotong University
Junbo Wang, City University of Hong Kong
Shouyang Wang, Chinese Academy of Sciences

This study explores the information value and predictive power of news headlines in forecasting first-time defaults among corporate bond issuers in the Chinese market. We introduce a novel credit risk dictionary that integrates domain knowledge-derived topics and cause-effect logic, allowing the formulation of firm-level risk topic-related news variables extracted from headlines. Our findings reveal that these risk-related topics in news headlines offer incremental information beyond traditional financial ratios and economic variables, indicating long-term early warning capabilities, particularly within a 6-month horizon. Furthermore, this study confirms that media outlets have unique information channels, reporting on key internal management insights beyond publicly available financial and market data. The media's ability to uncover information is influenced by

incentive mechanisms and the attention of market investors. The study introduces a new approach to extracting news information to enhance risk management and provides evidence on why news contains fresh insights, detailing the topics these insights cover.

Firm Culture Drives the Stock Price

Libo Yin, Central University of Finance and Economics
Jier Zhang, Central University of Finance and Economics
Lijian Wei, Sun Yat-sen University
Sihang Chen, Sun Yat-sen University

This study investigates the asset pricing implications of firm culture. Based on large language models (LLMs) and Bert text segmentation to analyse MD&A, we extract 183,829 culture passages from 2,301,602 original passages and identify 7 firm culture attributes (innovation, market orientation, employee orientation, normalization, efficiency, social benefit, and openness). Empirical results indicates that a long-short portfolio constructed from firms with high-low firm culture strength generates a significant positive return spread. Among the seven sub-cultures, there is also a significant premium for normalization, efficiency, and openness. We favor that underreaction due to investors and financial analysts' neglect pushes up stock returns and strictly rule out a risk explanation for this premium by five methods. More important, neglected firm cultures effectively drive the firms' future growth.

Exploration or Exploitation? A Machine Learning Approach to Understand Institutional Trading Behavior

Jin Guo, Xi'an Jiaotong-Liverpool University

This study aims to fill a gap in the literature by investigating "exploration" as a behavioral component within the context of institutional investment. The study employs machine learning classification methodologies to discern variations in trading strategies during the initiation of new investment ventures. Using a multivariate machine learning classification model, I find that a substantial proportion of institutional investors, exceeding 59.4%, engage in extensive exploration-oriented trading when faced with new investment opportunities. Furthermore, portfolios of investors focused on exploration exhibit higher levels of both systematic and idiosyncratic volatility, indicating a greater propensity for risk-taking. Additionally, I introduce a novel metric for industry diversification, which reaffirms the tendency of exploratory investors to maintain diverse portfolios across sectors. Consequently, this study confirms that "exploration," a crucial aspect of the decision-making process in neuroscience and psychology, also plays a significant role in institutional investment behavior.

Session 5B: Information and Trading

On the Limits of Informationally Efficient Stock Markets: New Insights from a Chartist-Fundamentalist Model

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Davide Radi, Catholic University of the Sacred Heart
Noemi Schmitt, University of Bamberg
Iryna Sushko, Catholic University of the Sacred Heart
Frank Westerhoff, University of Bamberg

We utilize a chartist-fundamentalist model to examine the limits of informationally efficient stock markets. In

our model, chartists are permanently active in the stock market, while fundamentalists trade only when their mispricing-dependent trading signals are strong. Our findings indicate the possible coexistence of two distinct regimes. Depending on the initial conditions, the stock market may exhibit either constant or oscillatory mispricing. Constant mispricing occurs when chartists remain the sole active speculators, causing the stock price to converge toward a nonfundamental value. Conversely, the stock price oscillates around its fundamental value when fundamentalists repeatedly enter and exit the market. Exogenous shocks result in intricate regime-switching dynamics.

How Markets Shape Prices for Skewed Assets: Price Reversal in Multi-Assets Experimental Markets

Shuchen Zhao, Dongbei University of Finance and Economics

This paper explores the pricing of skewed assets in multi-asset markets where assets with both positive and negative skewness coexist, a context that remains understudied in the existing literature. Using a series of laboratory experiments, I examine whether the preference for positively skewed assets observed in individual decision-making set-tings extends to multi-assets market environments. I begin by demonstrating that traders strongly prefer positively skewed assets when making individual investment decisions in a traditional BDM (Becker et al. [1964]) task. However, when these assets are traded in continuous double auction markets, this preference is reversed: negatively skewed assets are consistently overvalued relative to positively skewed ones, contradicting individual-level biases. Further experiments decompose market complexities by adjusting the market size, trading frequency, and the number of assets. Simplifying market settings reduces mispricing, but none fully restore the preferences for positively skewed assets observed in individual contexts, revealing that these factors collectively drive the pricing reversals. These findings highlight how market complexity can reshape trader behavior and suggest that asset pricing is context-dependent.

Copy Trading and Price Informativeness

Junqing Kang, Sun Yat-sen University

This paper investigates the effects of copy trading—a mechanism that allows investors to replicate the strategies of successful traders—on price efficiency. We develop a rational expectation equilibrium (REE) model with operational risks to analyse the impact of copy trading. While introducing informed capital by replicating leaders' strategies, copy trading also injects systematic noise due to common operational errors among followers. With moderate operational errors, our findings reveal a non-linear relationship between copy trading fees and price efficiency. As the cost of copy trading decreases, the positive impact of informed capital diminishes, while the negative effect of operational risks escalates. This dynamic results in an initial improvement in price efficiency, followed by a decline, culminating in a hump-shaped relationship between copy trading fees and price efficiency.

Session 5C: Experiments-I

The Fragility of Reputation while Sustaining Cooperation

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Reputation is a key cooperation-fostering mechanism, both in theoretical models and real-world scenarios (Manrique et al. (2021); Nowak (2006); Takács et al. (2021)). However, real-life reputation systems are imperfect due to potentially noisy or manipulated information (Antonioni et al. (2016); Hilbe et al. (2018)). Here, we experimentally study the robustness of the role of reputation when individuals can manipulate their public image and test to what extent the possibility to verify the accuracy of public information reinstates cooperation. As a control situation, we employ a standard repeated experimental protocol that combines reputation and network reciprocity, allowing people to observe others' past behavior and decide jointly with whom to interact and whether to cooperate or defect against all their network neighbors. In line with previous evidence, the level of cooperation is high and stable in this framework. In our first treatment condition, people can manipulate public information about their last action at a cost. Cooperation rates decline rapidly to zero in this framework, as about half of the participants engages in reputation manipulation. In our second treatment, in which subjects can both manipulate their public reputation but also verify others' reputations at a cost, neither the level nor the stability of cooperation recover fully. Rather, cooperation emerges to some extent but declines over time. These findings call for further investigation of the underlying mechanisms that contribute to the vital yet complex role of reputation systems in human societies.

Can Withholding Information Promote Cooperation and Coordination in Social Dilemmas? Theory and Experiment

Lin Jing, Dongbei University of Finance and Economics
Yohanes E. Riyanto, Nanyang Technological University

We explore how manipulating information can enhance cooperation and coordination in social dilemmas (specifically, threshold public goods games) through both theoretical analysis and laboratory experiment. Our theoretical model indicates that withholding information about the threshold universally could increase contributions by circumventing individuals' inclination towards equal-cost-sharing strategies. The experimental findings reveal important insights into the coordination challenges posed by information scarcity. While asymmetrically withholding information hinders effective cooperation, the introduction of a one-way cheap talk mechanism in this scenario unexpectedly increases contributions. This effect is likely because the cheap talk message acts as a vital focal point for coordination. Overall, these results highlight the nuanced relationship between information disclosure and cooperative behavior in the provision of public goods.

Paying to Avoid the Spotlight

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John Duffy, University of California, Irvine, and Osaka University
Nobuyuki Hanaki, Osaka University, and University of Limassol

In the digital age, privacy in economic activities is increasingly threatened. In considering policies to address

this threat, it is useful to consider what value, if any, people attach to privacy in their economic activities. This valuation may be influenced by a mixture of concerns including the desire for personal autonomy, concerns about the exposure of confidential information, and the risk of reputational damage due to dishonest or stigmatized behavior. Our focus is primarily on reputational concerns as we assess individuals' willingness to pay (WTP) to avoid scrutiny of their potentially dishonest behavior in a simple coin flipping task. We gather and analyse data from Japan, China, and the U.S.A. to determine if there are notable differences across these nations in WTP. Our findings reveal that people's WTP to "avoid the spotlight" is positive and economically sizable across all three countries and is the largest in Japan.

Session 6A: Risk Management

Portfolio Management Based on an Improved DDPG Algorithm: Optimizing the Balance between Risk and Return

Pujing Lin, Sun Yat-sen University
Lijian Wei, Sun Yat-sen University

In a dynamic and uncertain financial market environment, the core challenge of portfolio management is balancing risk and return. Traditional portfolio management methods, such as the mean-variance model, though theoretically sound, often struggle to achieve stable optimal returns in fast-evolving, high-noise market conditions. Deep Reinforcement Learning (DRL), and particularly the Deep Deterministic Policy Gradient (DDPG) algorithm, has demonstrated potential in dynamic optimisation for quantitative trading. However, standard DDPG typically optimizes cumulative discounted returns without adequately addressing risk management, leading to high return volatility and limited adaptability in complex market environments. To address these limitations, this paper proposes an improved DDPG algorithm that optimizes a utility function incorporating both mean-variance and mean objectives, achieving a balanced focus on return maximisation and risk control.

Detecting Insider Trading in the Era of Big Data and Machine Learning

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Zhishu Yang, Tsinghua University
Qi Zhang, Shanghai Jiaotong University

Reliably detecting insider trading is a major impediment to both research and regulatory practice. Using account-level transaction data, we propose a novel approach. Specifically, after extracting several key empirical features of typical insider trading cases from existing regulatory actions, we employ a machine learning methodology to identify suspicious insiders across our full sample. Our identified outliers, on average, earn a significantly higher return and use more limit orders relative to a random sample. Further, we find that the trading patterns of selected suspicious insiders exhibit similarities with the changes in a firm's central decision-makers. We also find that identified outliers are more likely to use multiple accounts to trade around a major information event and have superior performance around earnings announcement events of the same firms. Our approach significantly augments an otherwise elusive ability to detect insider trading.

A Synthetic Approach for Corporate Credit Risk Early Warning Based on Multi-Source Data

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Zhi Yang, Academy of Mathematics and Systems Science, Chinese Academy of Science
Ying Liu, University of Chinese Academy of Sciences
Zhou He, University of Chinese Academy of Sciences

Corporate credit risk evaluation and monitoring is often a very challenging task in situations, such as supplier risk management in manufacturing conglomerates, or corporate credit granting in commercial banks. Existing researches have proposed various approaches to use financial reports, market data and Internet news to predict corporate credit risks, such as financial fraud or debt default. Meaningful antecedents have been discovered and machine learning and time varying models have been approved to have relatively better prediction power. However, for corporate credit risk management practices, it is essential to detect potential risks among a batch of corporations in a certain domain timely and reliably with sound and interpretable reasoning considering both factors inside and outside the corporations. This research proposed a synthetic solution to incorporate multiple sources of social data and private data to build a supplier risk indicator system based on multiple machine learning models for early detection of potential corporate credit risks. Three issues are addressed in this research. First one is the decision of benchmark of key credit risk indicators across corporations of different type, size and specialty. Second is the design of interpretable modelling of the risk early warning mechanisms considering industrial trends as well as individual corporation growth. Third one is the incremental learning strategies for continuous corporate risk monitoring with relatively stable and consist early warning results. To distinguish it from debt default or contract default, corporate credit risk in this research is defined as the failure to fulfill the normal corporate function in all aspects. Such situation can may cause by insufficient financial, manufacturing or technological resources or any other reason from inside or outside the organisation. Without loss of generality, taking the manufacturing industry as an example, five major aspects are considered to measure the corporation's ability of fulfilling normal corporate functions. They are technology innovation capability, production or service capability, quality control capability, financial operation capability and compliance capability. Technology innovation capability is measured by patent and awards of the suppliers. Production or service capability and financial operation capability are measured by existing contracts, facilities, personnel, and financial reports provided by the supplier itself. Quality control capability is measured by the suppliers' quality management certificate as well as its self-report of quality control administration criteria. Compliance capability is measured by open-source data from the Internet related to legal cases and administrative penalty. To cope with the compatibility of different types, sizes and scopes of a batch of corporations, text mining based hierarchical clustering is conducted to all the corporation samples according to their existing achievements and business scope. A capability indicator system and specific measures are designed using human expert survey and a multidimensional entropy method. Benchmark specification criteria is proposed for each individual risk evaluation indicators. And multiple machine learning models are trained using negative samples of corporation with known risks. Benchmark updating and incremental learning mechanisms are designed for continuous risk monitoring and new corporation samples. The proposed approach of corporate risk early warning is empirically tested in an organisation with more than one thousand suppliers, among which twelve of them revealed credit risk and listed in the negative list. The machine learning models reveal more than 50% accuracy and around 80% recall of the risk cases. And the proposed solution with continuous updating social and private corporate data have been serving for the supplier qualification and risk management in this organisation for more than two years. The benchmarking, early warning and information updating techniques have been proved to be feasible and effective. The proposed synthetic approach contributes to a novel framework for corporate risk early warning considering industrial knowledge from both inside and outside corporations, and it can be adopted in other organisation or other corporate risk monitoring situations if related social and private data is available.

Session 6B: ABM and Trading

Finding the Impacts of Different Orders: Evidence Based on a Big Brokerage in China

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Saiya Zhang, Dalian University of Technology
Xiong Xiong, Tianjin University

Based on the desensitized account data from a big brokerage in China covering Jan 2014 to Aug 2022, this paper explores the heterogeneous influences of individual investors' trading on future returns. Results based on the daily, weekly, and monthly frequencies reveal the robust negative influences from investors with tiny to big wealth levels and the positive influences from large investors, indicating that these influences persist for an extended period and unproportionally change with the lower trading frequency. We also provide comprehensive explanations based on the stock preferences, information acquisition, attention allocation, and sentiment-driven trading on our findings, and the two-stage decomposition method reveals a significant explanation of liquidity and gambol hypotheses. In addition, further analyses reveal the varied performances during the calm, bubble, crisis, and after COVID-19 periods, and the changed liquidity and gambol hypotheses and varied attention allocation can provide explanations. Overall, this paper understands the heterogeneous influences of different individual investors' order imbalances, figures out the potential influencing mechanism, and points out varied performances during different periods.

Love at First Trade: The First Stock Bias of Retail Investors

Rong Liu, Tianjin University
Yongjie Zhang, Tianjin University
Xu Feng, Tianjin University

This paper examines the effect of initial investment experience on subsequent investment decisions. Using a large representative sample of Chinese retail equity investors and their trading records from a large broker between 2013 and 2016, we find that people tend to favor the first stock they ever purchased, regardless of whether it was a loss or a profit at the first time. This first stock bias is associated with more amount and times of being bought in the subsequent investment decision-making process and is not wealth enhancing. Moreover, we also document this effect exists in a relatively long term and the first stock bias spillover to the same industry but in a short term. Overall, our findings contribute to the literature on experience effects by showing that initial experience plays an important role in the investment decision-making of retail investors.

Trading on Noise in Limit Order Markets

Xing Gao, Nankai University
Xue-Zhong (Tony) He, Xi'an Jiaotong-Liverpool University
Shen Lin, Tianjin University

We examine how noise trading affects equilibrium trading behaviors and market quality in limit order markets using reinforcement learning. We show that the liquidity provision (consumption) of noise traders has a substitution effect to the liquidity consumption (provision) of informed and uninformed traders. Increasing liquidity consumption from noise traders increases the spread and the adverse selection for the uninformed, reducing price efficiency. However, increasing liquidity provision from noise traders can generate a U-shaped price efficiency in the number of noise traders, to which uninformed traders plays a dominating role. More

importantly, at the increasing loss of noise traders, liquidity provision from more noise traders improves order profitability of informed and particularly uninformed traders, market liquidity, and price efficiency.

Session 6C: Experiments-II

Motivated Reasoning in the Social Domain

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Xinxin Zhu, Maastricht University, and Dongbei University of Finance and Economics
Jichuan Zong, Dongbei University of Finance and Economics

Individuals engage in motivated reasoning, trying to maintain their self-image in ego-relevant domains. This paper experimentally tests motivated reasoning regarding one's altruism in two forms, namely asymmetric updating and selective recall, and their dynamics. We, for the first time, extend the optimistic updating bias to the domain of social behavior. More interestingly, we document new evidence that suggests a belief-based utility foundation for asymmetric updating. That is, we find a novel framing effect: asymmetric updating was more severe when participants updated beliefs about being the least selfish than about being the most altruistic. Moreover, we replicate and extend earlier findings about selective recall and find the dynamic patterns of recalls and beliefs are largely consistent. We further demonstrate that motivated reasoning is more likely a deliberate process rather than an unintended behavioral mistake.

Beyond Aversion and Seeking: Examining Divergent Ambiguity Attitudes in Experimental Asset Markets

Fan Rao, Dongbei Univeirsity of Finance and Economics
Xu Zhang, The Hong Kong University of Science and Technology (Guangzhou)

This study investigates the effects of divergent ambiguity attitudes on asset pricing and trading behavior when the fundamental value is ambiguous. Specifically, we manipulate the composition of traders within experimental asset markets based on their ambiguity attitudes. Contrary to the equilibrium predictions of prevailing asset pricing models under ambiguity, we find that prices in markets with only ambiguity-seeking traders are no higher than those with only ambiguity-averse traders, yet prices during initial trading periods are the highest in markets with an equal number of ambiguity-seeking and ambiguity-averse traders. In addition, bubbles are more pronounced and less likely to burst in ambiguity-averse markets. A closer look at the data suggests that ambiguity-seeking and ambiguity-averse traders tend to adopt different trading strategies: ambiguity-seeking traders on average behave more like fundamentalists, while ambiguity-averse traders behave more like speculators. This previously overlooked association between one's tendency to speculate and ambiguity attitude reconciles the asset pricing model predictions and our results, providing a novel explanation of why ambiguity effects are hardly observed in experimental asset markets.

The Influence of Information Quality and Quantity on Risk and Ambiguity Aversion: Experimental Evidence

Wenting Zhou, Xi'an Jiaotong-Liverpool University

With the rapid development of communication technologies, individuals are able to acquire information more conveniently for daily decision-making. Meanwhile, they are increasingly exposed to overwhelming amounts

of low-quality or irrelevant information, complicating the decision-making process, particularly in contexts of risk and ambiguity. Through a laboratory experiment, we investigate the impact of information quality and quantity on individual decision-making under risk and ambiguity. Participants completed two types of allocation problems: one under ambiguity, where only joint probabilities for certain states were available, and the other under risk, where exact probabilities for all states were provided. Additionally, each state was associated with an exchange rate affecting the payoff for each token allocated to that state. Three treatments were employed to examine the influence of information. In the standard treatment, participants received exact exchange rate information. The quality treatment reduced information quality by providing only a range of the possible exchange rate, while the quantity treatment increased the volume of irrelevant information. Each participant was exposed to only one treatment, preventing cross-contamination of results. We analysed subjects' risk preferences by estimating risk-aversion parameters across various preference functions, incorporating both constant relative risk aversion (RR) and constant absolute risk aversion (AR) utility functions. Our results indicate that information quality and quantity affect individuals' attitudes toward risk and ambiguity in two aspects: First, higher information quality lead to increased risk and ambiguity aversion; second, greater information quantity lead to more risk-seeking decisions and reduced ambiguity aversion, even when the additional information is irrelevant. Our findings will suggest financial decision-making and regulation, particularly in situations where decision-makers experience information overload.

Session 7A: Ambiguity and Investment

A Theory of Volatility Ambiguity and Capital Structure

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Lihong Zhang, Tsinghua University

We propose a dynamic capital structure model where investors have ambiguity about the firm's fundamental volatility. We solve the model by using machine learning. Our model features a time-inconsistent choice of the worst case, driven by two effects: the portfolio selection effect and the leverage effect. The portfolio selection effect is against higher volatility; while the leverage effect favors higher volatility in low-leverage cases because a higher volatility provides the possibility that the fi rm can adjust to the optimal capital structure more quickly. The time inconsistency of investors can transmit to the firm side through capital markets, and have real effects on fi rms. The firm will invest more in the low-leverage scenario, and invest less in the high-leverage scenario. The borrowing will always be higher. The borrowing and investment dynamics result in an asymmetric pattern of leverage change. Therefore, the cost of controlling leverage is higher when the leverage is high. The optimal capital structure under ambiguity has a lower leverage.

Robust Capital Investment with Nonconvex Cost

Xiaowen Wang, Liaoning University

This paper adapts Sargent's version of Lucas and Prescott's model of investment under uncertainty in a competitive industrial equilibrium setting. In this setting, individual fi rms' capital cost function is proportional to the adjustment size and firms make investment decisions subject to model uncertainty. The introduction of ambiguity on demand shocks smoothes aggregate investment, leads to firms' more cautious attitude towards favorable demand shocks, resulting in underinvestment. When we assume agents are subject to idiosyncratic shocks and employ an (S,s) policy, model uncertainty widens the agent's inaction band and produces heterogenous lumpiness at the micro level.

From Assembly Line to Delivery Man: The Impact of Gig Economy on Corporate Investment

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Yijing Peng, Peking University
Yi Xiao, Shanghai International Studies University
Qiang Ye, University of Science and Technology of China

We explore how labor supply shocks from the gig economy affect corporate investment by exploiting Ele.me's staggered entry into 245 major Chinese cities between 2010 and 2015. Following Ele.me's expansion, firm investment declines due to reduced employment and rising wages, especially in labor-intensive or less innovative firms and in regions with labor shortages and high mobile phone penetration. Job postings data confirm that increased local gig opportunities negatively correlate with corporate investment. Addressing endogeneity, we show that Ele.me's entry is independent of local factors and that the investment decline is not due to deteriorated investment opportunities. Finally, firms respond to labor shortages induced by the platform by investing more in labor-saving automation technologies.

Session 7B: ETFs and Funds

Beating the Index with ETFs

Wentao Li, Xiamen University

This paper uncovers a new source of tax efficiency for ETFs—using highly correlated ETFs to harvest capital losses without violating the wash-sale rule. By exploiting the tax loophole, investors can potentially earn a better return than the index. The study reveals that highly correlated ETFs have an average monthly tax-loss trading volume of 9.1% of their assets under management, which accounts for 20.7% of their total trading volume. Tax-loss harvesting is negatively related to past returns, especially for recent and negative ones. ETFs with high past volatility have higher tax-loss trading volumes, while smaller and less liquid ones have lower tax-loss trading volumes. This paper develops a parsimonious model to explain the relationship between tax-loss harvesting and past price movements. Simulations with the model predict an annual tax revenue loss of 0.52% of assets under management for highly correlated ETFs, equivalent to approximately 25 billion USD in 2021.

Security Lending Market, Secondary Market Arbitrageurs, and ETF Mispricing

Bochen Wu, University of Melbourne

This paper examines the effect of ETF short-sale costs on ETF pricing efficiency. I find that ETF premiums are positively associated with the costs of borrowing ETFs, which are primarily a friction for ETF secondary market arbitrageurs. Leveraging two exogenous variations in ETF borrowing costs, I establish a causal effect of borrowing costs on ETF mispricing. Furthermore, the sensitivity of ETF mispricing on borrowing costs depends on the activeness of primary market arbitrageurs. Collectively, empirical findings in the paper emphasize the role of the secondary market participants in the ETF arbitrage mechanism, and reveal an interdependence between the primary and secondary markets.

Does Confidence (in Fund Skill Estimates) Matter for Investors?

Yangyi Liu, Southwest Jiaotong University

Existing literature assumes that mutual fund investor learns fund skills exclusively based on individual fund performance, neglecting the crucial impact of inherent model uncertainty in the fund return generating process. This paper introduces the framework of "learning with model uncertainty," in which mutual fund investors balance a bias-variance tradeoff between individual fund performance and group-average performance of comparable funds. We develop a novel metric, Confidence, based on pairwise t-tests, to capture investors' relative confidence in individual fund performance. Using data from US actively-managed domestic equity mutual funds, we show that Confidence significantly increases flow-performance sensitivity and reduces sensitivity of fund flows to group-average performance. Our new framework offers comparable explanatory power for fund flows than Morningstar ratings. Furthermore, fund flows predicted by this framework positively forecast future fund performance. Finally, high-Confidence funds, particularly those with extreme performance, exhibit a strategic shift from systematic to idiosyncratic risk. Hence, our study extends the connotation of investors' confidence and better captures investor learning.

Session 7C: Uncertainty and Chinese Economy

Institutional Herding and Financial Market Uncertainty

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Xu Guo, Shenzhen University
Alexander Kurov, West Virginia University
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This study investigates the role of financial market uncertainty in institutional herding and its impact on stock prices. We show that financial market uncertainty is a determinant of institutional herding. Fund managers tend to follow the trades of other managers more frequently during high uncertainty periods than low uncertainty periods. We find that herding destabilizes the stock market when uncertainty is high, but stabilizes the stock market when uncertainty is low. Institutional investors' motives for herding may thus vary with the market environment. Specifically, in an uncertain and relatively poorly informed market, herding is more likely due to non-information reasons, such as the reputational concerns of fund managers. In a stable and relatively well-informed market, herding is more likely based on managers' proprietary fundamental information. Moreover, the uncertainty effect on the price impact of herding is more noticeable for high risk, young, non-profitable, low tangibility, and distressed firms.

Impact of US Entity List Policy on Reallocation of Credit Resources Within Sanctioned Industries in China

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Li Zhang, University of Science and Technology of China

This paper studies the spillover effects of US Entity List sanctions on Chinese industries. Our results indicate that these sanctions prompt a reallocation of credit resources from low-innovation to high-innovation

companies within the affected sectors. This effect is more pronounced in non-state-owned enterprises (non-SOEs), smaller companies, firms located in regions with higher levels of marketization, and in industries with intense competition. Overall, our findings suggest that US Entity List sanctions may inadvertently benefit China's technological advancement in the impacted industries by optimizing the allocation of credit resources.

Breaking the "Iron Rice Bowl": Reform, Labor Market Misallocation, and Productivity

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Reallocation of workers across firms was extremely restricted under the so-called "iron rice bowl" system in China before its state-owned enterprises (SOE) reform in the late 1990s. An average worker spent 80% of her work life in one single firm in 1995; this number decreased to below 30% in 2018. This paper revisits this reform through the lens of a heterogeneous firm model with a frictional labor market. We first show how the old system leads to labor misallocation and efficiency loss for SOEs, and then evaluate the impact of reform-induced worker reallocation across firms, along both the intensive and extensive margins, on aggregate productivity.

Session 8A: Attention and Network

The Strengthened Salience Theory Based on the Investor Attention: Evidence from China

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Xiong Xiong, Tianjin University

Motivated by evidence of the salience theory (ST) effect in the United States, we introduce two strengthened salience indicators to identify individual investors' biases in the Chinese stock market. Our new metrics, ST-guba and ST-search, assess distortions in investor return expectations by additionally considering discussions on the Eastmoney guba platform, the Baidu search index, on top of the metrics (ST-ret) that consider salient stock returns proposed by Cosemans and Frehen (2021). Our study shows that significance metrics (ST-guba and ST-search) can negatively predict future stock returns more strongly than ST-ret. We explore the mechanism by which the salience factors generate a premium, that excessive investor attention to convexity status is at the root of the premium, and that ST-guba and ST-search more accurately predict retail investors' net buying of small and medium-sized orders. In addition, the salient effect of our new indicators remains consistent across investor sentiment, market volatility, and arbitrage constraints, consistently outperforming ST-ret.

Interbank Lending, Liquidity Reservation and Systemic Risk

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Na Zhang, Tianjin University of Technology

Interbank lending network is crucial to mitigate liquidity risk and financial stability. How should the network be formed and what can be optimal network structure are two most important questions to the functions of the

interbank network. This paper introduces Nash equilibrium to a simple interbank network model to capture the trade-off between the profitability and survivability when individual bank maximizes its expected profit, and the trade-off between risk-sharing and free-riding when banks decide to form the interbank coalition. Banks collude for risk-sharing but compete for free-riding. In Nash equilibrium, banks have incentives to form the interbank coalition when the profit margin is sufficiently high and their sizes (in deposits) are compatible. As the number of banks in the network increases, the shifting dominance from risk-sharing to free-riding generates a hump-shaped relationship to banks' expected profit, implying a relatively small optimal network among compatible banks. The results provide some insights to "too-big-to-fail" and "too-interconnected-to-fail".

KeGAT: A New Model for Detecting Firm's Financial Fraud

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Firms' financial fraud involves engaging in deceptive and illegal activities with the intention of misleading investors, stakeholders, or the general public regarding a firm's financial position, performance, or prospects (Amiram et al., 2018). It is a serious issue that can have far-reaching consequences, not only for the companies involved but also for investors, employees, and the broader economy. When firms engage in financial fraud, they typically misrepresent their financial health, which can lead to misleading investors, inflating stock prices, and causing market instability. This can result in significant financial losses for stakeholders and damage public trust in financial markets. We propose a new "end-to-end" model, called KeGAT, that integrates both structured and unstructured data by unifying knowledge graph embedding (KGE) and graph attention neural networks (GAT). The structured data includes the financial ratios (e.g., profitability, liquidity, leverage) that captures the discrepancies between reported financial figures and cash flows, and inconsistencies in accounting practices over time. It also includes the stock market ratios (e.g., return, turnover and volatility) that captures anomalies in financial performance and market behavior that deviate from expected norms, signaling potential manipulative activities or underlying issues. Most of these two series of ratios are usually, and at least partly included in the literature (e.g., Amiram et al., 2018; Barton et al., 2024; Hiebl, 2014; Kong et al., 2019). We propose that KeGAT shows significant promise in both finance and computer science academia. In finance, its ability to effectively handle and integrate various types of relationships and transactions makes it highly effective for fraud detection and network analysis, providing deeper insights into corporate governance and regulatory compliance. Addressing the DSE entity overload problem and demonstrating the importance of specific features through detailed ablation studies contribute to the robustness and interpretability of the model in financial applications. In computer science, KeGAT's separate modules architecture for learning DSE profiles and RPT graphs advances the field of graph neural networks, offering a novel approach to handling complex and heterogeneous graph data. This modular design enhances the model's flexibility and performance, making it a valuable contribution to the broader field of graph-based machine learning.

Session 8B: Asset Pricing-III

Retail Investor Heterogeneity and Cross-sectional Asset Pricing

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Xiong Xiong, Tianjin University
Shen Lin, Tianjin University
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We study how retail investor heterogeneity affects the cross-section of stock re-turns. By exploiting a retail trading data sample, we cluster the retail investors based on their stockholding preference and classify them into four types. We find that the return predictability of the Premium Speculators' shareholder dynamics who prefer high-price-high-attention and shell-value stocks is the most robust in all four types, with a return spread of -1.11% per month using HG (shareholder number growth rate) as a proxy. The predictability does not predominantly rely on firm-specific characteristics, the interaction of all retail investors, and investors' order flow. Our finding aligns with the story that investors overreact to past returns and value information. As a result, Premium Speculators' overreaction leads to short-term mispricing, which will revert in a year's horizon.

Seek the Seeking Alpha: Social Media Research and Mutual Fund Flows

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Ariel Gu, University of East Anglia
Qingwei Wang, Cardiff University

Using information from Seeking Alpha (SA), we demonstrate that the attention and opinions expressed about individual stocks on social media platforms significantly influence mutual fund investors' investment decisions. Specifically, investors allocate more money to funds whose holdings receive higher SA coverage. Aggregated SA tone of fund holdings positively (negatively) predicts fund flows over monthly (quarterly) intervals. Investors who react positively to coverage or tone are driven by sentiment and are thus less informed, while those who act contrary to tone represent "smart money." The effects of SA research on fund flows are further amplified by investor recognition and attention.

Risk, Return, and Sentiment in a Virtual Asset Market

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Remco Zwinkels, Vrije Universiteit Amsterdam and Tinbergen Institute

The joint-hypothesis problem makes economic fundamentals and mispricing hard to disentangle in equity markets. In this paper, we propose a novel approach to address this issue. We study the impact of investor behavior on price formation in a large virtual market for risky assets where fundamentals are predetermined and publicly known. We find that several well-established determinants of stock returns also operate in this market despite the absence of systematic risk. In additional tests, we find a positive correlation between market valuations and real-life equity prices. Our results provide novel evidence that real-world equity spreads include a nontrivial behavioral component.

Session 8C: Exchange Rate and Yield

Do Recent Bitcoin Markets 'Walk' Randomly from the EUR-USD Forex Market? A Threshold Cointegration Analysis

Zheng Nan, Yamanashi Gakuin University

While both U.S. dollar and euro bitcoin prices exhibit significant volatility, the USD/EUR bitcoin exchange rate closely mimics its Forex counterpart, the USD/EUR spot exchange rate. The spread between the bitcoin exchange rate and the spot rate, representing the rate of triangular arbitrage return (RTA), displays mean-reversion and potential structural changes. Nan and Kaizoji (2024) propose dividing the spread rate's evolution into three regimes using two breakpoints out of three possible candidates. Regimes A (2013-09-10 to 2014-04-10) and B (2014-04-10 to 2018-01-09) exhibit conventional mean-reverting behavior, while Regime C (2018-01-09 to 2023-02-15) appears to follow a random walk with minimal fluctuations and occasional. This recent random walk behavior motivated us to examine the nonstationarity of the spread rate and its implications for bitcoin markets. One possible cause may be transaction costs associated with bitcoin exchanges, which create a band within which the spread rate meanders randomly; prices outside this band are corrected by arbitrage. Balke and Fomby (1997) demonstrated that the interest rate spread can follow a band threshold autoregressive (TAR) model, a framework that may also apply to the bitcoin exchange rate spread. Another factor is the nonlinearity of cointegration. From May 1, 2014, to November 21, 2017, the bitcoin and Forex rates are found to be cointegrated (Nan & Kaizoji, 2019). A random walk in their spread rate may suggest a breakdown of linear cointegration, necessitating a nonlinear specification. Threshold cointegration and its error-correction representation—the threshold vector error correction model (TVECM)—suggest that random walk processes may remain stationary under a three-regime specification (B. E. Hansen & Seo, 2002; Lo & Zivot, 2001; Seo, 2006). Finally, statistical tests can be performed on several specifications: linearity vs. nonlinearity, two regimes vs. three regimes, and cointegration vs. threshold cointegration (Bec et al., 2004; B. Hansen, 1999; B. E. Hansen & Seo, 2002; Kapetanios & Shin, 2006).

Modeling and Forecasting Serially Dependent Yield Curves

Hao Li, Nankai University

Yield curves are serially dependent. To benefit from this feature, this paper proposes a new model to estimate and forecast yield curves based on factors driving this serial dependence. In my semiparametric approach, factor loadings are related to the autocovariance functions of the continuous and smooth yield curve subject to unobservable errors, the dynamic evolution is driven by a vector autoregression for a small set of factors, and the yield data determine the number of factors and aggregation of information over different lags. Applying this method to monthly U.S. government bond yields from January 1985 through December 2023, I find that the dynamic structure of yield curves reduces to a vector process lying in a 3-dimensional space, with 1-month lag information. Yield curve residuals from this new model exhibit less autocorrelation than alternative three-factor models. Moreover, this new model provides favorable forecasting results.

Corporate Yields at the Zero Lower Bound

Lisha Li, Southwestern University of Finance and Economics

This paper assesses the performance of the shadow rate term structure model on corporate forward rates during the lower bound period, then evaluate the impact of the lower bound on corporate yields. The results indicate that the shadow rate term structure model better explains corporate yields and credit spreads at long horizons both in-sample and out-of-sample. The lower bound constraints affect short-and intermediate corporate interest rates.