The Institute for Advanced Economic Research
Dongbei University of Finance and Economics

IAER Econometrics Workshop 2023

June 27th – 28th, 2023

Institute for Advanced Economic Research
School of Economics

Dongbei University of Finance and Economics

Dalian, China

The Institute for Advanced Economic Research
Dongbei University of Finance and Economics

Dongbei University of Finance and Economics

Dongbei University of Finance and Economics (DUFE) was founded in October 1952. With the mission of “cultivating excellent financial and economic talents to serve economic and social developments”, DUFE is a multidisciplinary and research-oriented university focusing on economics, management, law, literature, and science. DUFE is now offering 47 Ph.D. programs, 94 master programs. 25 undergraduate programs have been selected as national first-class undergraduate programs, and 6 provincial. The proportion of first-class undergraduate programs is as high as 79.5%.

In April 2012, China’s Ministry of Finance, Ministry of Education, and the Liaoning Provincial Government signed an agreement to foster DUFE’s development. Since then, DUFE has made great strides towards achieving better academic excellence. According to China University Subject Rankings (CUSR) released by the China Academic Degrees and Graduate Education Centre (CDGDC) in December 2017, Applied Economics at DUFE is ranked 2-5% (2% excluded, the same below), Business Administration and Statistics 5-10%, and Management Science and Engineering 10-20%. In recent years, the university subjects have developed in a balanced manner, with outstanding advantages in economics and management. The overall strength of the subjects has further improved, and a historic breakthrough has been made in the latest round of subject rankings.

DUFE initiated international exchanges at the beginning of the 1980s and Chinese-foreign cooperative programs in 1994. Up to now, DUFE has established different forms of cooperative relations with 133 universities and 8 international institutions from 27 different countries or regions, among which 50 universities have carried out long-term stable cooperation with DUFE.

In the decades since its foundation, DUFE has formed its own brand, established itself as a university with a competitive edge and a sound reputation, and achieved much progress in its teaching facilities, education quality, student disciplinary systems, and scientific research.

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Institute for Advanced Economic Research

The Institute for Advanced Economic Research (IAER) at Dongbei University of Finance and Economics (DUFE) was established in 2019, with a mission to build a leading global institute known for its academic excellence in research, teaching, and mentoring. The goal is to attract world-class scholars with outstanding research track records or with great research potential. IAER offers tenure-track positions with various incentives for research and teaching, including competitive salaries, lower teaching loads, and a stimulating research environment.

As a newly-founded institute, IAER now has sixteen full-time faculty members, with three more to join this coming fall. IAER young faculty members have papers published in top-tier international journals, including Journal of Econometrics, Journal of Public Economics, Journal of Economic Theory, Journal of Monetary Economics and Games and Economic Behavior. Some faculty members received grants from the National Natural Science Foundation of China.

Ever since its establishment, IAER has successfully hosted conferences such as CES 2019 China Annual Conference and CES 2019 Presidents' Forum, and a series of workshops such as IAER Econometrics Workshop, Workshop on Growth and Development, and Behavioral and Experimental Economics Workshop. In addition, IAER launched the IAER Seminar series in 2019, where more than 60 speakers have shared their latest research. With more faculty members joining, the IAER Internal Seminar series was introduced in 2022 for faculty members to share with each other their latest research agenda, to brainstorm together, and to exchange ideas.

IAER Honors Program in Economics was granted a national honors program by Ministry of Education of China in 2020, which is one of the 20 honors programs in Economics in China. It's designed for students who are highly motivated to be an economist and are looking for a more research-intensive experience in his or her undergraduate studies. 25 DUFE freshmen are enrolled in this program every year by passing Quality Examination Test and an interview. DUFE is continually investing the program.

The IAER Combined Master-Ph.D. Program in Economics was initiated in 2021, with the aim to build a leading graduate program in China with a strong focus on academic research. The program targets creative and inquisitive students with academic ambitions. By offering thorough trainings in economic theory and econometrics, and by rooting the program in the vibrant research environment at IAER, we offer inspirations for the students to explore their own research interests, cultivate students' research potential, and guide their development as researchers.

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Invited Speakers

Dr. Chunrong AI, The Chinese University of Hong Kong

Dr. Chunrong AI is Professor of Economics and Presidential Chair Professor in the School of Management and Economics, Chinese University of Hong Kong, Shenzhen. He is the Director of the Social and Behavioral Big Data Lab at The Shenzhen Research Institute of Big Data and Associate Director of Shenzhen Finance Institute. Before that, he was Professor of Economics and Florida Term Professor at the University of Florida. He was the founding Dean of the Institute of Statistics and Big Data, Renmin University of China, and the founding Dean of the School of Statistics and Management, Senior Associate Dean of the Institute for Advanced Research and Associate Dean of Business School, Shanghai University of Finance and Economics.

Dr. AI's primary research interests are in the area of econometrics, empirical industrial organization, empirical finance, and Chinese economy. Recently he focused on the interdisciplinary research between data science and behavioral big data. His research outputs are published in the reputable scholarly journals.

Dr. Zongwu CAI, University of Kansas

Dr. Zongwu CAI is the Charles Oswald Professor of Econometrics and Professor of Economics at Department of Economics at The University of Kansas, USA. Dr. CAI earned his Bachelor degree in mathematics from China University of Geosciences at Wuhan in 1982, the Master degree in statistics from Zhejiang University in 1988 and the Ph.D. in statistics from University of California at Davis, USA in 1995. Dr. CAI is the Fellow of the American Statistical Association and

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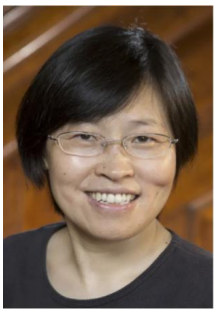
the fellow of the economics journal *Journal of Econometrics*. He was the president of the Chinese Economists Society (2018-2019). Also, he is serving and served as the Associate Editor and the member of the editorial board for several international journals, including but not limit to, *Journal of Business and Economic Statistics*. Dr. CAI is extensively recognized internationally for his professional and academic achievements, and he has published about 130 papers in international journals, including many top journals in economics and statistics as well as finance



Dr. Xiaohong CHEN, Yale University

Dr. Xiaohong CHEN is the Malcolm K. Brachman Professor of Economics and Professor of Management at Yale University. She got her Ph.D. in Economics from University of California, San Diego in 1993. Her research field is econometrics. She is known for her research in penalized sieve estimation and inference on semiparametric and nonparametric models. Dr. Chen has published peer-reviewed papers in top-ranked general-purpose journals in economics: *Econometrica* and *Review of Economic Studies*; as well as in top-ranked journals in statistics and engineering: *Annals of Statistics*, *Journal of the American Statistical Association*, *IEEE Tran Information Theory*, *IEEE Trans Neural Networks*.

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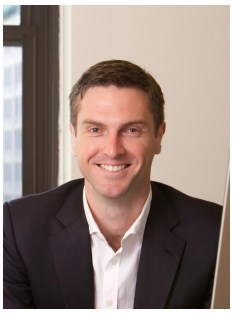

Dr. Timothy CHRISTENSEN, University College London, New York University

Dr. Timothy CHRISTENSEN is Professor at University College London and Associate Professor New York University. He received his Ph.D. in Economics from Yale University in 2014. His areas of research are time-series and nonparametric econometrics. His work has been published extensively in leading journals including, *Econometrica*, *Journal of Econometrics*, *Quantitative Economics*.

Dr. Yongmiao HONG, Chinese Academy of Sciences, University of Chinese Academy of Sciences

Dr. Yongmiao HONG is currently a distinguished research fellow at Academy of Mathematics and Systems Science and Center for Forecasting Science, Chinese Academy of Sciences (CAS), and a special-term professor at School of Economics and Management, University of Chinese Academy of Sciences (UCAS). He received his Ph.D. in Economics from the University of California, San Diego in 1993. Before he joined CAS and UCAS, he was the Ernest S. Liu Professor of Economics and International Studies, a Professor of Statistics, and a field member in Center of Applied Mathematics at Cornell University in the United States. His research interests include model specification testing, nonlinear time series analysis, financial econometrics, and empirical studies on Chinese economy and financial markets. He publishes refereed articles in mainstream economic, financial and statistical journals including *Econometrica*, *Journal of Political Economy*, *Review of Economic Studies*, *Annals of Statistics*, *Quarterly Journal of Economics*, *Biometrika*, *Econometric Theory*, *International Economic Review*, *Journal of American Statistical Association* and *Journal of Business & Economic Statistics*.

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Dr. Ioannis KASPARIS, University of Cyprus

Dr. Ioannis KASPARIS is Associate Professor of University of Cyprus. He holds a Ph.D. from University of Southampton in 2004. His main research interests are time series econometrics, specification testing and asymptotic statistical theory. His work has been published in leading journals including, *Annals of Statistics*, *Journal of Econometrics*, *Econometric Theory*, and *Econometric Reviews*.

Dr. Lung-Fei LEE, Shanghai University of Finance and Economics

Dr. Lung-Fei LEE is a special term professor of Shanghai University of Finance and Economics, China, and an emeritus Professor of Econometrics at Ohio State University. He received his Ph.D. in Economics from the University of Rochester in 1997. His research and publications are in the areas of microeconometrics and theoretical econometrics. He has served as editor in chief of Journal of Spatial Econometrics, consulting editor of Macroeconomic Dynamics. He is also on the editorial boards of Annals of Economics and Finance, Foundations and Trends in Econometrics, and Global Journal of Economics. His work has been published in the top academic journals including *Econometrica*, *Journal of Econometrics*, *Journal of the American Statistical Association*, *Quantitative Economics*, *International Economics Review*, *Journal of Development Economics* and *Review of Economics and Statistics*.

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Dr. Ruixuan LIU, The Chinese University of Hong Kong

Dr. Ruixuan LIU is an Associate Professor at The Chinese University of Hong Kong. He received his Ph.D. from University of Washington in 2015. His research interests include econometrics and data science. His work has been published in journals including, *Journal of Econometrics*, *Quantitative Economics*, and *Econometric Theory*.

Dr. Tassos MAGDALINOS, University of Southampton

Dr. Tassos MAGDALINOS is Professor at University of Southampton. He received his Ph.D. from University of York in 2005. His research interest is time series and financial econometrics. His work has been published in journals including, *Journal of Econometrics*, *Econometric Theory* and *Journal of Time Series Analysis*.

Dr. Hyungsik Roger MOON, University of Southern California

Dr. Hyungsik Roger MOON is Professor of Economics at University of Southern California. He received his Ph.D. in Economics from Yale University in 1998. His main research areas are panel-data models, network models, statistical learning, etc. His work has been published in leading journals including, *Econometrica*, *Journal of Econometrics*, *Quantitative Economics*, *Econometric Theory*, and *Journal of Business and Economic Statistics*.

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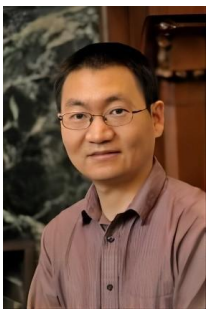
Dr. Qi-Man SHAO, Southern University of Science and Technology

Qi-Man SHAO, Chair Professor at Southern University of Science and Technology, China. His main research areas are the limit theory in probability and the asymptotic large sample theory in statistics. He has made fundamental contributions for the self-normalized limit theory and the Stein method for normal and nonnormal approximation. Noticeable honors and professional services include: an invited speaker at the International Congress of Mathematicians (2010); IMS Medallion Lecturer, a Keynote Speaker at the 2011 Joint Statistical Meetings; State National Science Award (2nd class) (2015); co-Editor, The Annals of Applied Probability (1/2022 - 12/2024); Associate Editor, Bernoulli (1/2013 - 12/2021); Associate Editor, The Annals of Statistics (11/2003 - 12/2012).



Dr. Xiaofeng SHAO, University of Illinois at Urbana-Champaign

Dr. Xiaofeng SHAO is now a full professor at University of Illinois at Urbana-Champaign. He was granted his Ph.D. degree in statistics by University of Chicago in 2006. His research interests lie in time series analysis, functional data analysis, change point detection, and high-dimensional data analysis. His paper has appeared in leading journals including, *Journal of the Royal Statistical Society Series B: Statistical Methodology*, *Journal of the American Statistical Association*, *Annals of Statistics*, *Biometrika*, *Journal of Econometrics*, *Journal of Business and Economic Statistics*. Dr. Shao is an elected fellow of IMS and ASA and currently serves as associate editors for *Journal of the American Statistical Association*, *Journal of Royal Statistical Society*, *Series B*, and *Journal of Time Series Analysis*.

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Programs

Opening / June 27 / 08:00 – 09:00

08:00 – 08:20 **Registration**

08:20 – 08:40 **Welcome Speech**

08:40 – 09:00 **Photo-taking**

Location: University Library Auditorium

Session 1 / June 27 / 09:00 – 10:00

1. 09:00-9:30 **Time-Varying Factor Selection: A Sparse Fused GMM Approach**
   Yongmiao Hong (Chinese Academy of Sciences, University of Chinese Academy of Sciences)
2. 09:30-10:00 **Identification and Estimation of Treatment Effects in the Limited Overlap Region**
   Xiaohong Chen (Yale University)

Chair: Yanqin Fan
Location: University Library Auditorium

Coffee Break / June 27 / 10:00 – 10:15

Location: Lounge next to Auditorium

Session 2 / June 27 / 10:15-11:45

3. 10:15-10:45 **Normal Approximation in Large Network Models**
   Hyungsik Roger Moon (University of Southern California)
4. 10:45-11:15 **Maximum Likelihood Estimation of a Spatial Autoregressive Model for Origin-Destination Flow Variables**
   Lung-Fei Lee (Shanghai University of Finance and Economics, Ohio State University)

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5. 11:15-11:45 **Estimating quantile-dependent networks on panel data**
   Yutao Sun (Dongbei University of Finance and Economics)

Chair: Hyeonseok Park
Location: University Library Auditorium

Lunch / June 27 / 11:45 – 13:30

Location: Central Dining Hall (next to University Library)

Session 3 / June 27 / 13:30 – 15:30

6. 13:30 – 14:00 **Distributed Statistical Inference under Heterogeneity**
   Qi-Man Shao (Southern University of Science and Technology)

7. 14:00 – 14:30 **Optimal Decision Rules when Payoffs are Partially Identified**
   Timothy Christensen (University College London, New York University)

8. 14:30 – 15:00 **Testing for Skewness, Kurtosis, and Normality Under Self-Normalization**
   Jun Yi Peng Zhou (Dongbei University of Finance and Economics)

9. 15:00 – 15:30 **Structural Regularization**
   Jiaming Mao (Xiamen University)

Chair: Yiu Lim Lui
Location: University Library Auditorium

Coffee Break / June 27 / 15:30 – 15:45

Location: Lounge next to Auditorium

Session 4 / June 27 / 15:45 – 17:45

10. 15:45 – 16:15 **The Influence of Digital Finance Development on Bank Efficiency: Evidence from China**
    Menggen Chen (Beijing Normal University)

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11. 16:15 – 16:45 **Conventional Inference in the Vicinity of Refined Nonstationarity Boundaries: Regressions with Heavy Tailed Weakly Nonstationary Processes**
    Ioannis Kasparis (University of Cyprus)

12. 16:45 – 17:15 **Long Monthly European Temperature Series and the North Atlantic Oscillation**
    Jian Kang (Dongbei University of Finance and Economics)

13. 17:15 – 17:45 **Measuring Monetary Policy under the Evolution of Monetary Policy Framework in China**
    Ping An (The People's Bank of China)

Chair: Yutao Sun
Location: University Library Auditorium

Session 5 / June 28 / 08:30 – 10:00

14. 08:30 – 09:00 **Estimating Counterfactual Distribution Functions via Optimal Distribution Balancing**
    Zongwu Cai (The University of Kansas)

15. 09:00 – 09:30 **Econometric Learning: A Select Review**
    Chunrong Ai (The Chinese University of Hong Kong)

16. 09:30 – 10:00 **Dimension-agnostic Change Point Detection**
    Xiaofeng Shao (University of Illinois at Urbana-Champaign)

Chair: Jun Yi Peng Zhou
Location: University Library Auditorium

Coffee Break / June 28 / 10:00 – 10:15

Location: Lounge next to Auditorium

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Session 6 / June 28 / 10:15 – 11:45

17. 10:15 – 10:45 **Double Robust Bayesian Inference on Average Treatment Effects**
    Ruixuan Liu (The Chinese University of Hong Kong)
18. 10:45 – 11:15 **Quantifying Distributional Model Risk in Relaxed Marginal Problems via Optimal Transport**
    Hyeonseok Park (Dongbei University of Finance and Economics)
19. 11:15 – 11:45 **Discrete Choice under Risk and Model Uncertainty**
    Wei Ma (Shandong University)

Chair: Yiu Lim Lui
Location: University Library Auditorium

Lunch / June 28 / 11:45 – 13:30

Location: Central Dining Hall (next to University Library)

Session 7 / June 28 / 13:30 – 15:30

20. 13:30 – 14:00 **Choosing in the dark! On the choice of primary care practices**
    Yuejun Zhao (University of Edinburgh)
21. 14:00 – 14:30 **A Quasi Synthetic Control Method for Nonlinear Models**
    Zixuan Wu (Xiamen University)
22. 14:30 – 15:00 **Multi-Matrix Autoregressive Models with an Application to Multi-Layer Regional Macroeconomic Network**
    Shiqi Ye (Xiamen University)
23. 15:00 – 15:30 **Uniform Inference for Nonlinear Endogenous Treatment Effects with High-Dimensional Covariates**
    Ziwei Mei (The Chinese University of Hong Kong)

Chair: Hyeonseok Park
Location: University Library Auditorium

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Coffee Break / June 28 / 15:30 – 15:45

Location: Lounge next to Auditorium

Session 8 / June 28 / 15:45 – 17:15

24. 15:45 – 16:15 **Uniform Inference with Autoregressive Processes**
    Tassos Magdalinos (University of Southampton)

25. 16:15 – 16:45 **Robust Testing for Explosive Behavior with Strongly Dependent Errors**
    Yiu Lim Lui (Dongbei University of Finance and Economics)

26. 16:45 – 17:15 **Mexican Migration to the United States: Selection, Assignment, and Welfare**
    Paweł Gola (University of Edinburgh)

Chair: Yutao Sun

Location: University Library Auditorium

Closing speech / June 28 / 17:15 – 17:30

Location: University Library Auditorium

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List of Abstracts

In order of presentations

1. **Time-Varying Factor Selection: A Sparse Fused GMM Approach**

   Yongmiao Hong, Liyuan Cui, Guanhao Feng, Jiangshan Yang

   This paper presents a sparse fused GMM approach (SFGMM) for estimating a time-varying coefficient model with heterogeneous structural breaks, enabling the incorporation of time-varying sparsity. SFGMM provides an alternative estimation for the dynamic stochastic discount factor model with sparse and time-varying factor risk prices. Our empirical findings highlight the superior performance of timevarying coefficient models, particularly SFGMM, over constant-coefficient models for U.S. equity factors. Risk factors demonstrate their highest explanatory power during periods of high aggregate dividend yield or default yield, but their effectiveness declines in situations of low market liquidity. Furthermore, our study reveals changing factor selection over time, with previously successful factors like short-term reversal and idiosyncratic volatility disappearing in the past decade, while new factors like betting-against-beta and expected growth have emerged.

2. **Identification and Estimation of Treatment Effects in the Limited Overlap Region**

   Xiaohong Chen, Yanqin Fan, Wendao Xue

   Strong ignorability is a commonly used assumption to identify average treatment effects based on observational data. It is often argued that the conditional independence assumption can be made more plausible by using more covariates. However using more covariates makes the overlapping assumption less likely to hold. In most empirical applications the supports of distributions of the covariate vector for different groups do not fully overlap or have limited overlap. Without imposing additional assumptions on the limited or no overlap region, average treatment effects for either the limited overlap region or for the whole population are not point identified. In this paper. we make a natural domain shift assumption for the limited overlap region based on optimal transport theory. We study identification of average treatment effects for the limited overlap region and

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propose three-step estimators of the average treatment effect and quantile treatment effect for the treated in the limited overlap region. We establish consistency and asymptotic normality of the proposed estimators under high level assumptions on the estimator of the optimal transport map. Three examples of the estimator of the optima transport map are studied in detail and are shown to satisfy the high level assumptions under primitive conditions. We investigate the finite sample performance of our estimator and Wald inference via simulation.

3. **Normal Approximation in Large Network Models**
   Hyungsik Roger Moon, Michael Leung
   We prove a central limit theorem for network moments in a model of network formation with strategic interactions and homophilous agents. Since data often consists of observations on a single large network, we consider an asymptotic framework in which the network size diverges. We argue that a modification of "exponential stabilization" conditions from the literature on geometric graphs provides a useful high-level formulation of weak dependence, which we use to establish an abstract central limit theorem. We then derive primitive conditions for stabilization using results in branching process theory. We discuss practical inference procedures justified by our results and outline a methodology for deriving primitive conditions that can be applied more broadly to other large network models with strategic interactions.

4. **Maximum likelihood estimation of a spatial autoregressive model for origin-destination flow variables**
   Lung-Fei Lee, Hanbat Jeong
   We introduce a spatial autoregressive model for an origin-destination flow (SARF model). Each flow $y_{n,ij}$ illustrates a signal from an origin j to a destination i. Our model quantifies three channels of spatial influences on $y_{n,ij}$: (i) effect by outflows from j, (ii) effect by inflows to i, and (iii) effect by flows among third-party units. To accommodate the frequent data environment of flows, we introduce the SARF Tobit model for a censored flow variable. In the event of no censoring, we present the linear SARF model. To illustrate the formation of zero flows well, the SARF hurdle models are developed as an extension, which works better than the

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standard SARF Tobit specification in our empirical application. We also accommodate two-way fixed effects in the model for origin and destination innate characteristics. The maximum likelihood (ML) estimation method is employed to estimate the model's parameters. Asymptotic properties of the MLE are investigated by the spatial near-epoch dependence (NED) concept. Under the fixed-effect specification, the existence of asymptotic bias in the MLE is verified. Hence, we derive the analytic bias correction formula. Test statistics for testing the validity of the normal distribution assumption for the SARF Tobit model are provided. Using our model, we estimate the three channels of spatial influences in the U.S. states' migration flows.

5. **Estimating quantile-dependent networks on panel data**

   Yutao Sun

   We propose methods for the estimation of an unknown network (in particular, the corresponding adjacency matrix) from a panel data set in which the individuals are connected through the network. We consider two scenarios: a quantile-dependent network and a quantile-invariant network. A quantile-dependent network involves links that mutate across data quantiles. In such a case, our approach involves a nonlinear quantile regression model where the entries of the adjacency matrix are treated as model parameters. A quantile-invariant network possesses links that are constant and do not change over data quantiles. When the network is quantile-invariant, we consider a composite quantile estimation approach which estimates the entries of the adjacency matrix on multiple data quantile levels. Such an approach exploits the information at several quantile levels jointly and is efficient. We further impose a sparsity assumption on the network and invoke standard regularization techniques to improve the estimation efficiency. Our estimation procedures are computationally feasible in that we establish a derivative-based nonlinear programming algorithm for the underlying optimization problem. Simulation studies are conducted to investigate the performance of our methods.

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6. **Distributed Statistical Inference under Heterogeneity**
   Qi-Man Shao

   In this talk we consider distributed estimation under heterogeneous distributions among different data blocks and propose a self-normalized weighed distributed estimator. The asymptotic normality and the Cramer type moderate deviation theorem will be discussed.

7. **Optimal Decision Rules when Payoffs are Partially Identified**
   Timothy Christensen, Hyungsik Roger Moon, Frank Schorfheide
   We derive optimal statistical decision rules for discrete choice problems when payoffs depend on a partially-identified parameter (theta) and the decision maker can use a point-identified parameter (P) to deduce restrictions on theta. Leading examples include optimal treatment choice under partial identification and optimal pricing with rich unobserved heterogeneity. Our optimal decision rules minimize the maximum risk or regret over the identified set of payoffs conditional on P and use the data efficiently to learn about P. We discuss implementation of optimal decision rules via the bootstrap and Bayesian methods, in both parametric and semiparametric models. We provide detailed applications to treatment choice and optimal pricing. Using a limits of experiments framework, we show that our optimal decision rules can dominate seemingly natural alternatives. Our asymptotic approach is well suited for realistic empirical settings in which the derivation of finite-sample optimal rules is intractable.

8. Testing For Skewness, Kurtosis, and Normality Under Self-Normalization
   Jun Yi Peng Zhou, Xiaojun Song
   Testing for skewness, kurtosis, and normality in time series is relevant not only for modelling and testing purposes in econometrics but it also affects our understanding of many economic and financial phenomena, as well as the validity of the models developed to explain them. In this paper we propose an extension of the skewness, kurtosis and normality test introduced by Bai and Ng (2005) to a self-normalized framework where the statistics are transformed to eliminate the effect of the long-run variance, allowing us to avoid the use of the long-run variance estimator, which is poorly approximated in finite sample and at the same

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time rule out the need to choose the lag-truncation parameter. We present general conditions on the self-normalization function to be applicable, and give two simple examples, using fixed-b asymptotics and the normalization proposed by Lobato (2001). Monte Carlo simulations show that the self-normalized test statistics for skewness and normality have good finite-sample size and power, whereas the test for kurtosis presents substantial size distortions unless the distribution has thin tails, such as the normal distribution. We apply the tests to seventeen different macroeconomic and financial series.

9. **Structural Regularization**

   Jiaming Mao, Zhesheng Zheng

   We propose a method for modeling data by using structural models based on economic theory as regularizers for statistical models. We show that even if a structural model is misspecified, as long as it is informative about the data-generating mechanism, our method can outperform both the (misspecified) structural model and unregularized statistical models. The method permits a Bayesian interpretation of theory as prior knowledge and can be used both for statistical prediction and causal inference. It contributes to transfer learning by showing how incorporating theory into statistical modeling can significantly improve out-of-domain predictions and offers a way to synthesize reduced-form and structural approaches to causal inference. Simulation experiments demonstrate the potential of our method in various settings, including first-price auctions, dynamic models of entry and exit, and demand estimation with instrumental variables. Our method has potential applications not only in economics, but in other scientific disciplines whose theoretical models offer important insight but are subject to significant misspecification concerns.

10. **The Influence of Digital Finance Development on Bank Efficiency: Evidence from China**

    Menggen Chen, Qiao Zhang

    Digital finance has increased the accessibility of financial services and lowered their cost while also bringing a great challenge to the traditional mode of financial business. Based on the functional view of finance, a theoretical model including

commercial banks, households, and enterprises is constructed to analyze the impact of digital finance on bank efficiency and explore its mechanisms from the liability and asset sides. In this paper, a three-dimensional framework including digital financial foundation, digital banking business and new financial services is constructed and a digital finance index is calculated to represent the development of digital finance at the city level. Then, using data on commercial banks from 2011 to 2020, this empirical study shows that the development of digital finance has strongly promoted the efficiency of China's commercial banks. These results also suggest that the influence of digital finance on the change in bank efficiency varies across different regions, scales, and types of ownership, among which high GDP regions, large-scale banks, and state-owned banks have a relatively strong effect on the improvement of efficiency. A further analysis of the mechanism shows that the development of digital finance affects the liability structure of banks, i.e., banks are usually inclined to have a smaller proportion of interbank liabilities as digital finance advances. At the same time, digital finance also changes the profitability of banks, which in turn affects their asset side. The underlying mechanism by which digital finance promotes bank efficiency is more closely connected to the strong optimization effect of digital finance on the liability side than to the weakening effect on the asset side.

11. **Conventional Inference in the Vicinity of Refined Nonstationarity Boundaries: Regressions with Heavy Tailed Weakly Nonstationary Processes**

    Ioannis Kasparis, James Duffy

    The interaction of long memory/persistence with heavy tails results directly in an enlargement of the nonstationary region i.e. the covariate model space for which conventional inference is not applicable in general. In this work we consider parametric and non-parametric regression methods that bridge inference between stationary and nonstationary environments in the presence of heavy tails. We first develop a new limit theory for heavy tailed weakly nonstationary processes (HT-WNPs hereafter) i.e. processes that lie on the threshold of nonstationarity (cf. Duffy and Kasparis, 2021; Ann. Stat.). We then show that the proposed methods yield conventional inference for a wide range of heavy tailed

covariates including stationary long memory, WNPs, and strongly nonstationary long memory. Possible applications to the predictability of stock returns by (long memory heavy tailed) risk measures are provided.

12. **Long Monthly European Temperature Series and the North Atlantic Oscillation**

    Jian Kang, Changli He, Annastiina Silvennoinen, Timo Teräsvirta

    In this paper the relationship between the surface air temperatures in 28 European cities and towns and the North Atlantic Oscillation (NAO) are modelled using the Vector Seasonal Shifting Mean and Covariance Autoregressive model, extended to contain exogenous variables. The model also incorporates season-specific spatial correlations that are functions of latitudinal, longitudinal, and elevation differences of the various locations. The empirical results, based on long monthly time series, agree with previous ones in the literature in that the NAO is found to have its strongest effect on temperatures during winter months. The transition from the winter to the summer is not monotonic, however. The strength of the error correlations of the model between locations is inversely related to the distance between the locations, with a slower decay in the east-west than north-south direction. Altitude differences also matter but only during the winter half of the year.

13. **Measuring Monetary Policy under the Evolution of Monetary Policy Framework in China**

    Ping An, Ji Zhang

    This paper employs Autoregressive Distributed Lag (ARDL) models and monetary base growth to construct an exogenous and comprehensive monetary policy measure in China, where various monetary policy instruments co-exist, and the operational and intermediate targets are changing over time. Our methodology relies on the market equilibrium relationship instead of ad hoc policy rules and strict identification assumptions, hence is robust to monetary policy frameworks in any economy. The empirical results show that the active monetary base growth (AMBG) constructed via the ARDL models is an excellent description of the behavior of People's Banks of China across time, and generates impacts on macro variables consistent with implications of macro theory when used in VAR analyses.

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14. **Estimating Counterfactual Distribution Functions via Optimal Distribution Balancing**

    Zongwu Cai, Ying Fang, Ming Lin and Yaqian Wu

    To avoid estimating the inverse propensity weights, which is sensitive to model specification and easily causes unstable estimates, and often fails to adequately balance covariates in finite samples, this paper proposes a new quantile treatment effect estimator to avoid these shortcomings. We find the weights of minimum dispersion that exactly balance the estimated conditional distributions among the treated, untreated, and combined group via a well-defined convex optimization problem. The resulting quantile treatment effect estimator is shown to converge weakly to a mean zero Gaussian process at the usual parametric rate -- squared root of n, which does not need the use of a high order kernel in a nonparametric estimation. Also, we show that a properly designed Bootstrap method can be used to obtain confidence intervals and conduct inference, together with its theoretical justification. Monte Carlo simulations demonstrate that our estimator performs better than the inverse propensity weighting estimator in many scenarios. Finally, our empirical study revisits the effect of maternal smoking on infant birth weight.

15. **Econometric Learning: A Select Review**

    Chunrong Ai

    Machine learning algorithms have been increasingly used to improve econometric inference and to design policies. However, some adjustments must be made to the traditional econometrics to preserve correct inference and policy designs. This talk reviews some recent advances.

16. **Dimension-agnostic Change Point Detection**

    Xiaofeng Shao

    The detection and estimation of change-point(s) in the mean is a classical problem in statistics and has broad applications in a wide range of areas. Though many methods have been developed in the literature, most are applicable only under a specific dimensional setting. Specifically, the methods designed for low-dimensional problems may not work well in the high-dimensional environment

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and vice versa. Motivated by this limitation, we propose a dimension-agnostic procedure of change-point testing for time series by applying dimension reduction and self-normalization. Our test statistics can accommodate both temporal and cross-sectional dependence, regardless of the dimensionality. Both asymptotic theory and numerical studies confirm the appealing property of the proposed test. A review of self-normalization for time series will be provided in the beginning to make the talk self-contained.

17. **Double Robust Bayesian Inference on Average Treatment Effects**
Ruixuan Liu, Christoph Breunig, Zhengfei Yu
We study a double robust Bayesian inference procedure on the average treatment effect (ATE) under unconfoundedness. Our robust Bayesian approach involves two adjustment steps: first, we make a correction for prior distributions of the conditional mean function; second, we introduce a recentering term on the posterior distribution of the resulting ATE. We prove asymptotic equivalence of our Bayesian estimator and double robust frequentist estimators by establishing a new semiparametric Bernstein-von Mises theorem under double robustness; i.e., the lack of smoothness of conditional mean functions can be compensated by high regularity of the propensity score and vice versa. Consequently, the resulting Bayesian point estimator internalizes the bias correction as the frequentist-type doubly robust estimator, and the Bayesian credible sets form confidence intervals with asymptotically exact coverage probability. In simulations, we find that this robust Bayesian procedure leads to significant bias reduction of point estimation and accurate coverage of confidence intervals, especially when the dimensionality of covariates is large relative to the sample size and the underlying functions become complex. We illustrate our method in an application to thse National Supported Work Demonstration.

18. **Quantifying Distributional Model Risk in Relaxed Marginal Problems via Optimal Transport**
Hyeonseok Park, Yanqin Fan, Gaoqian Xu
This paper studies distributional model risk in relaxed marginal problems, where each marginal measure is assumed to lie in a Wasserstein ball of a given radius

and centered at a fixed marginal reference measure. Theoretically, we establish strong duality of the proposed distributional model risk function (of radius). We studies the additional properties such as the finiteness and continuity of the proposed problem, as well as the existence of an optimizer for each radius. Practically, we illustrate our results on four distinct applications when the sample information comes from multiple data sources and only marginal reference measures are identified. They are: partial identification of treatment effects; externally valid treatment choice via robust welfare functions; Wasserstein distributionally robust estimation under data combination; and evaluation of the worst aggregate risk measures.

19. **Discrete Choice under Risk and Model Uncertainty**
    Wei Ma
    This paper studies the aggregation of discrete choice models under risk. We propose a unanimity condition: if every model predicts one item is chosen more frequently from a menu than another, so should the aggregate model. We show that this condition entails the aggregate model must be a mixture of the individual models. This result provides a behavioral characterization of the Bayesian model averaging method for discrete choice models under risk. As an application of the result, we examine the aggregation of a continuum of probability measures.

20. **Choosing in the dark! On the choice of primary care practices.**
    Yuejun Zhao, Lina Maria Ellegård, Gustav Kjellsson, Roxanne Kovacs
    Patients tend to choose high-quality providers when supplied with quality information in secondary care settings. In primary care, however, they are often left in the dark due to a lack of quality information. In this paper, we exploit detailed individual level health register data in Sweden to examine if patients choose high-quality primary care practices, and whether patients appreciate certain types of quality more than others. In addition to the subjective quality dimensions examined in prior work, we measure objective quality using a set of clinical process indicators, developed in a GP-led quality assessment initiative. We then model the influence of subjective and objective quality on individuals' choices using conditional logit models motivated by a random utility framework.

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The results indicate that certain process indicators—advice on lifestyle, physical examination of suspected infections, treatment of new depression or anxiety diagnoses, and appropriate prescribing—have significant and varying effects on individuals' choice. Such effects are amplified when examined among patients with chronic conditions.

21. **A Quasi Synthetic Control Method for Nonlinear Models**
    Zixuan Wu, Zongwu Cai, Ying Fang, Ming Lin
    To relax the convex hull assumption for the conventional synthetic control method to estimate the average treatment effect, this article proposes a quasi synthesis control method for nonlinear models under index model framework, together with a suggestion of using the minimum average variance estimation method to estimate parameters and the LASSO type procedure to choose covariates. Also, we derive the asymptotic distribution of the proposed estimators. A properly designed Bootstrap method is proposed to obtain confidence intervals and its theoretical justification is provided. Finally, Monte Carlo simulation studies are conducted to illustrate the finite sample performance and an empirical application to reanalyze the data from the National Supported Work Demonstration is also considered to demonstrate the proposed model to be practically useful.

22. **Multi-Matrix Autoregressive Models with an Application to Multi-Layer Regional Macroeconomic Network**
    Shiqi Ye
    Matrix time series data have become increasingly prevalent across diverse fields, including economics, finance, computer science, engineering, and signal processing. This study introduces a novel multi-matrix autoregressive (MMAR) model designed to jointly model matrix time series with varying structures. Notably, the well-known matrix-valued autoregressive model and three-order tensor autoregressive model are special cases of the proposed model. We present three distinct estimation methods for the MMAR model, investigate their statistical properties, and provide numerical simulations to corroborate them. Moreover, we integrate the MMAR model with connectedness network analysis to concurrently model the macroeconomic matrix time series of China's 31 provinces and a vector

time series comprising the economic policy uncertainty index, trade policy uncertainty index, and China's geopolitical risk. By constructing multi-level connectedness networks, we delve into the intricate interrelationships between China's regional economy and macroeconomic regulation. The findings of this study provide valuable insights for further research and policy-making in the relevant domains.

23. **Uniform Inference for Nonlinear Endogenous Treatment Effects with High-Dimensional Covariates**

    Ziwei Mei, Qingliang Fan, Zijian Guo, Cun-Hui Zhang

    Nonlinearity and endogeneity are common in empirical studies with observational data. This paper proposes new estimation and inference procedures for nonparametric treatment effect functions with potentially high-dimensional covariates. One innovation of this paper is the uniform confidence band of the marginal effect function, defined as the derivative of the nonlinear treatment function, which is essential in the policy-relevant decision-making process. The asymptotic honesty of the confidence band is verified in theory. Simulation studies and an empirical study of air pollution and migration show the validity of our procedures.

24. **Uniform Inference with Autoregressive Processes**

    Tassos Magdalinos, Katerina Petrova

    A unified theory of estimation and inference is developed for an autoregressive process with root in $(-\infty,\infty)$ that includes the stable, unstable, explosive and all intermediate regions. The discontinuity of the limit distribution of the t-statistic along autoregressive regions and its dependence on the distribution of the innovations in the explosive regions $(-\infty,-1)\cup(1,\infty)$ are addressed simultaneously. A novel estimation procedure, based on a data-driven combination of a near-stationary and a mildly explosive endogenously constructed instrument, delivers an asymptotic mixed-Gaussian theory of estimation and gives rise to an asymptotically standard normal t-statistic across all autoregressive regions independently of the distribution of the innovations. The resulting hypothesis tests and confidence intervals are shown to have correct asymptotic size (uniformly

over the parameter space) both in autoregressive and in predictive regression models, thereby establishing a general and unified framework for inference with autoregressive processes. Extensive Monte Carlo experimentation shows that the proposed methodology exhibits very good finite sample properties over the entire autoregressive parameter space (-∞,∞) and compares favourably to existing methods within their parametric (-1,1] validity range. We demonstrate that a first-order difference equation for the number of infections with an explosive/stable root results naturally after linearisation of an SIR model at the outbreak and apply our procedure to Covid-19 infections to construct confidence intervals on the model's parameters, including the epidemic's basic reproduction number, across a panel of countries without a priori knowledge of the model's stability/explosivity properties.

25. **Robust Testing for Explosive Behavior with Strongly Dependent Errors**
Yiu Lim Lui, Jun Yu, Peter Phillips
A heteroskedasticity-autocorrelation robust (HAR) test statistic is proposed to test for the presence of explosive roots in financial or real asset prices when the equation errors are strongly dependent. Limit theory for the test statistic is developed and extended to heteroskedastic models. The new test has stable size properties unlike conventional test statistics that typically lead to size distortion and inconsistency in the presence of strongly dependent equation errors. The new procedure can be used to consistently time-stamp the origination and termination of an explosive episode under similar conditions of long memory errors. Simulations are conducted to assess the finite sample performance of the proposed test and estimators. An empirical application to the S&P 500 index highlights the usefulness of the proposed procedures in practical work.

26. **Mexican Migration to the United States: Selection, Assignment, and Welfare**
Paweł Gola, Michał Burzyński
This paper analyzes how migration policy reforms shape migrants' self-selection and, through that, the distribution of wages in the sending and destination countries. First, we show that if migrants' skill distribution is worse than natives' skill distribution, then the standard assignment model predicts that the

average-wage maximization and inequality-minimization goals of migration policy are in conflict: Any change in migration which leads to a worsening (improvement) of the overall distribution of wages raises (decreases) both the average wage and wage inequality among the natives. Second, we develop and calibrate a two-country extension of the assignment model with endogenous migration and heterogeneous migration costs. Finally, we use our calibrated model to quantify the implications of realistic migration policy reforms. Somewhat counter-intuitively, we find that a more liberal migration policy towards high-skilled Mexican migrants would benefit all but the lowest skilled U.S. citizens.

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List of Speakers

In order of presentations

Yongmiao Hong	Chinese Academy of Sciences, University of Chinese Academy of Sciences
Xiaohong Chen	Yale University
Hyungsik Roger Moon	University of Southern California
Lung-Fei Lee	Shanghai University of Finance and Economics, Ohio State University
Yutao Sun	Dongbei University of Finance and Economics
Qi-Man Shao	Southern University of Science and Technology
Timothy Christensen	University College London, New York University
Jun Yi Peng Zhou	Dongbei University of Finance and Economics
Jiaming Mao	Xiamen University
Menggen Chen	Beijing Normal University
Ioannis Kasparis	University of Cyprus
Jian Kang	Dongbei University of Finance and Economics
Ping An	The People's Bank of China
Zongwu Cai	The University of Kansas
Chunrong Ai	The Chinese University of Hong Kong
Xiaofeng Shao	University of Illinois at Urbana-Champaign
Ruixuan Liu	The Chinese University of Hong Kong
Hyeonseok Park	Dongbei University of Finance and Economics
Wei Ma	Shandong University

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Yuejun Zhao	University of Edinburgh
Zixuan Wu	Xiamen University
Shiqi Ye	Xiamen University
Ziwei Mei	The Chinese University of Hong Kong
Tassos Magdalinos	University of Southampton
Yiu Lim Lui	Dongbei University of Finance and Economics
Paweł Gola	University of Edinburgh

Scientific Committee

Yanqin FAN	University of Washington
Weiguo WANG	Dongbei University of Finance and Economics
Jun YU	Singapore Management University

Local Committee

Rong HU	Dongbei University of Finance and Economics
Yiu Lim LUI	Dongbei University of Finance and Economics
Hyeonseok PARK	Dongbei University of Finance and Economics
Jun Yi PENG ZHOU	Dongbei University of Finance and Economics
Yingfei QI (Chair)	Dongbei University of Finance and Economics
Yutao SUN	Dongbei University of Finance and Economics
Jinjing TIAN	Dongbei University of Finance and Economics

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Conference Guide

Venue

Registration: Lounge next to Auditorium

Presentations: University Library Auditorium

Coffee Break: Lounge next to Auditorium

Lunch: Central Dining Hall (next to University Library)

There is a map on the next page for your reference.

Lunch

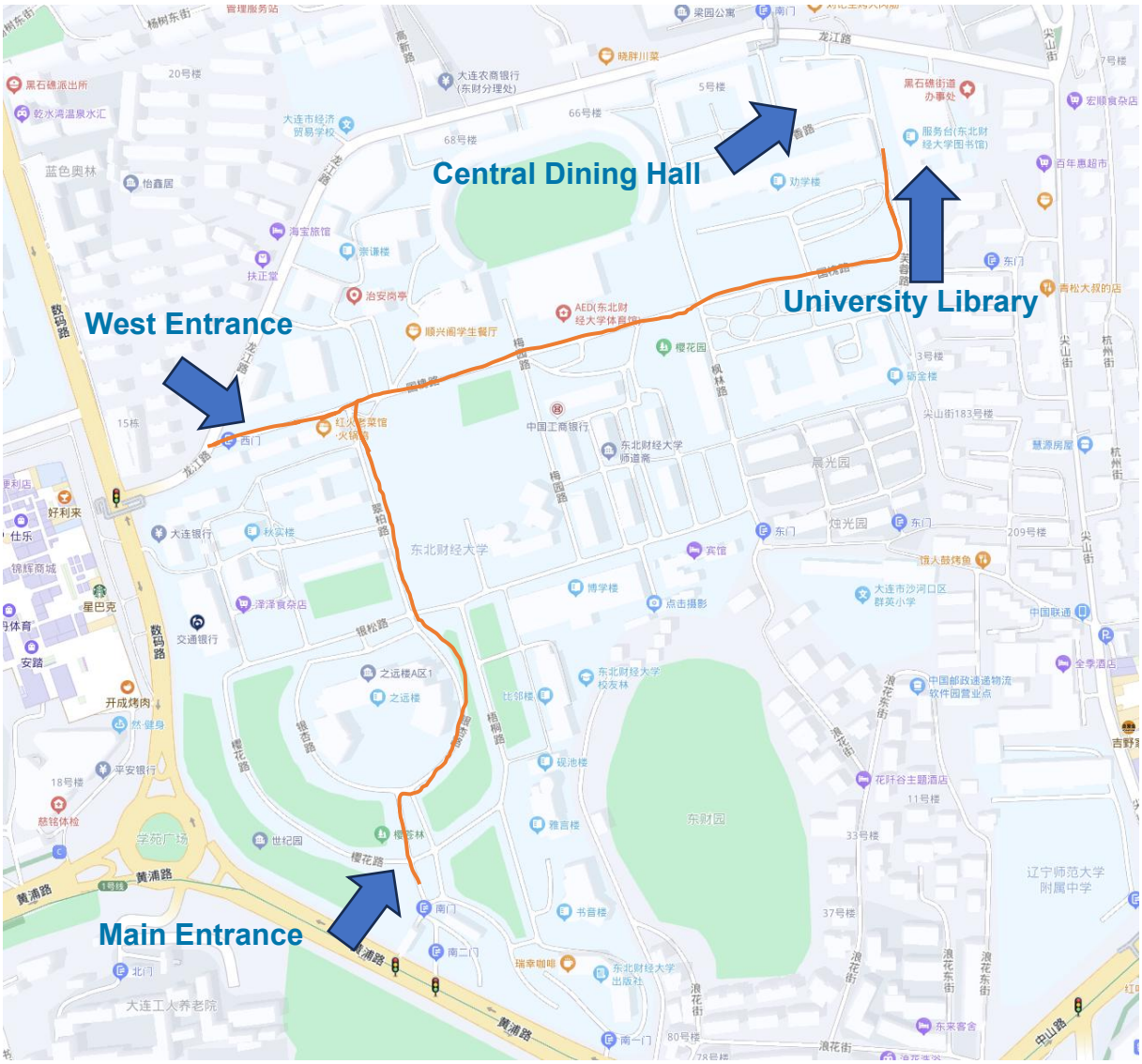
The buffet lunch is provided at the Central Dining Hall, which is next to University Library. **Please show your conference badge to the staff at the entrance.**

Contact

If you need any assistance, please contact the local organizer:

Email: contact@workshop.iaer.dev
Phone: +86-139-9866-1449

Map



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