Program App

2025 NBER-NSF Time Series Conference

Friday-Saturday, September 19-20
Rutgers University

Local organizers and program committee (Rutgers University):
Rong Chen, Yaqing Chen, Koulik Khamaru, Yuan Liao, Kenwin Maung, Norman Swanson, Han Xiao, Xiye Yang

Ongoing organizers:
Richard Davis (Columbia), Serena Ng (Columbia), Ruey Tsay (Chicago)

The conference web site is Conference Website.

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Program

Friday, September 19

Venue: Rutgers University College Ave Student Center Main Lounge and Multipurpose Main. Address: 126 College Avenue, New Brunswick, NJ 08901.

08:15 – 08:50 Registration and Breakfast (lobby of main venue)

08:50 – 09:00 Welcome (main venue)
2025 NBER-NSF Time Series Conference, Rutgers University
Chair: Rong Chen (Department of Statistics)
• Juli Wade (Executive Dean, School of Arts and Sciences)
• Norman Swanson (Department of Economics)

09:00 – 10:30 Oral Session 1 (main venue)
<u>Vector Autoregression, Univariate, and Multivariate Time Series</u>
Chair: Xiaohong Chen (Yale University)
• *Bootstrap Prediction Inference of Non-linear Autoregressive Models*
Dimitris N. Politis (University of California, San Diego), with Kejin Wu.
• *Score-type Tests for Markov Switching Models*
Enrique Sentana (CEMFI), with Dante Amengual, Xinyue Bei, Marine Carrasco.
• *Estimating Invertible Processes in Hilbert Spaces, with Applications to Functional ARMA Processes*
Alexander Aue (University of California, Davis), with Sebastian Kuehnert, Gregory Rice.

10:30 – 11:00 Coffee Break

11:00 – 12:30 Oral Session 2 (main venue)
<u>Panel Data</u>
Chair: Xu Cheng (University of Pennsylvania)
• *Global Identification of Dynamic Panel Models with Interactive Effects*
Jushan Bai (Columbia), with Pablo Mones.
• *Analysis of Multiple Long-Run Relations in Panel Data Models with Applications to Financial Ratios*
Alexander Chudik (Federal Reserve Bank of Dallas), with M. Hashem Pesaran, Ron P. Smith.
• *Conditional Nonparametric Variable Screening by Neural Factor Regression*
Weining Wang (University of Bristol), with Jianqing Fan, Yue Zhao.

12:30 – 14:00 Lunch and Poster Session 1 (lobby of main venue)

1. *The Identification Problem for Linear Rational Expectations Models*
   Majid M. Al-Sadoon (Durham University) with Piotr Zwiernik.
2. *High-Dimensional IV Multicointegration Estimation and Inference*
   Igor L. Kheifets (University of North Carolina at Charlotte) with Peter C.B. Phillips.
3. *Stability and Performance Guarantees for Misspecified Multivariate Score-Driven Filters*
   Simon Donker van Heel (Erasmus University Rotterdam) with Rutger-Jan Lange, Dick van Dijk, Bram van Os.
4. *High-dimensional Oaxaca–Blinder Decomposition with an Application to Gender and Hukou Discrimination in the Chinese Labor Market*
   Jun Cai (Huazhong University of Science and Technology) with Jian Zhang, Yahong Zhou.
5. *Can Central Banks Integrate Climate Risk into Monetary Policy amid Geopolitical Tensions*
   Fredj Jawadi (University of Lille) with Karim Cheffou, Philippe Rozin.

6. *A Framework for Common Long Cycles*
   Vadim Marmer (University of British Columbia) with James A. Duffy, Da (Natasha) Kang, Jérôme R. Simons.
7. *Dynamics of U.S. Tax Progressivity Across the Income Distribution*
   Kun Ho Kim (Concordia University) with Wentao Hu, Wei Biao Wu, Jiheum Yeon.
8. *Forecasting Volatility of Currencies and Oil with Brown Firms: A Mixed-Frequency Approach*
   Weijia Peng (Sacred Heart University) with Lorán Chollete, Keener Hughen, Ching-Chih Lu.
9. *A General Randomized Test for Alpha*
   Pierluigi Vallarino (Erasmus University Rotterdam) with Daniele Massacci, Lucio Sarno, Lorenzo Trapani.
10. *The Flexibility and Labor Supply of the Gig Economy: Based on Micro Big Data of the Ride-Hailing Market*
    Pingfang Zhu (Shanghai Academy of Social Sciences).
11. *Fitting Dynamically Misspecified Models: An Optimal Transportation Approach*
    Jean-Jacques Forneron (Boston University) with Zhongjun Qu.
12. *Estimation of Nonlinear DSGE Models through Laplace Based Solutions*
    Roberto Leon-Gonzalez (National Graduate Institute for Policy Studies) with Elnura Baiaman kyzy.
13. *On Recovering (Sum of) Sparse and Dense Signals*
    CY (Chor-yiu) Sin (National Tsing Hua University).
14. *Dimension-agnostic Change Point Detection*
    Runmin Wang (Texas A&M University, St. Louis) with Hanjia Gaoa, Xiaofeng Shao.
15. *Change-Point Detection for Object-valued Time Series*
    Yi Zhang (University of Illinois Urbana-Champaign).
16. *A Dynamic Copula Model for Probabilistic Forecasting of Non-Gaussian Multivariate Time Series*
    John Zito (Duke University) with Daniel Kowal.
17. *Riemannian Factor Model: Dimension Reduction for Manifold-Valued Time Series*
    Shuo-Chieh Huang (Rutgers University).
18. *Regularized Estimation of Loading Matrix in Factor Models for High-Dimensional Time Series*
    Xialu Liu (San Diego State University) with Xin Wang.
19. *Factor Analysis for Causal Inference on Large Non-Stationary Panels with Endogenous Treatment*
    Ruoxuan Xiong (Emory University) with Junting Duan, Markus Pelger.
20. *Gaussian Maximum Likelihood Estimation of Static and Dynamic State-Space Factor Models*
    Peter A. Zadrozny (Bureau of Labor Statistics).
21. *A Deep Generative Model for High-resolution, Multi-day Wind Speed Data*
    Mingshi Cui and Zern Ke (Rutgers University) with Justin Greene, Kevin Eng, Arash Sodagartojgi, Zhiqiu Xia, Gemma Moran, Michael Stein.
22. *Dynamic Spectral Co-clustering of Directed Networks to Unveil Latent Community Paths in VAR-type Models*
    Younghoon Kim (Cornell University) with Changryong Baek.
23. *A Network Regression Approach for Forecast Reconciliation*
    Feng Li (Peking University) with Jiaxin Shi, Hansheng Wang.

14:00 – 15:30 Oral Session 3 (main venue)

<u>Forecasting</u>

Chair: Laura Liu (University of Pittsburgh)

• *Diffusion Index Forecast with Tensor Data*
Bin Chen (University of Rochester), with Yuefeng Han, Qiyang Yu.

• *Nowcasting with Neural State Space Models*
Yikai Zhang (One River Asset Management), with Jiahe Lin, George Michailidis, Anderson Schneider.

• *Forecasting and Managing Correlation Risks*
Sophia Zhengzi Li (Rutgers University), with Tim Bollerslev and Yushan Tang.

15:30 – 16:00 Coffee Break

16:00 – 18:00 Oral Session 4 (main venue)
<u>High Dimensional Modelling and Factor Models</u>
Chair: Kenwin Maung (Rutgers University)
• *Covariance-Adjusted Deep Causal Learning for Heterogeneous Panel Data Models*
Yuefeng Han (University of Notre Dame), with Guanhao Zhou, Xiufan Yu.
• *Sparsity Tests for High-Dimensional Linear Regression Models in Time Series*
Daniel Gutknecht (Goethe University), with Valentina Corradi, Jack Fosten.
• *Regularized Partial Least Squares Estimation of an Approximate Envelope Model for Supervised Dimension Reduction in Time Series Forecasting*
John C. Chao (University of Maryland), with Norman R. Swanson.
• *How Weak Are Weak Factors? Uniform Inference for Signal Strength in Signal Plus Noise Models*
Anna Bykhovskaya (Duke University), with Vadim Gorin, Alexander Sodin.

19:00 – Dinner at Catherine Lombari (this restaurant is across the street from the Heldrich at 3 Livingston Ave., New Brunswick, NJ 08901)

Saturday, September 20

Venue: Rutgers University College Ave Student Center Main Lounge and Multipurpose Main. Address: 126 College Avenue, New Brunswick, NJ 08901.

08:30 – 09:00 Breakfast (lobby of main venue)

09:00 – 10:30 Oral Session 5 (main venue)
<u>Exogeneity, Instrumental Variables and Causal Model Estimation</u>
Chair: Yaqing Chen (Rutgers University)
• *Identification and Estimation of Causal Effects in High-Frequency Event Studies*
Adam McCloskey (University of Colorado), with Alessandro Casini.
• *Unifying Regression-Based and Design-Based Causal Inference in Time-Series Experiments*
Zhexiao Lin (University of California, Berkeley), with Peng Ding.
• *The Relevance of Temporal Aggregation for the Propagation of Macroeconomic Shocks*
Tatevik Sekhposyan (Texas A&M University University), with Yeon Jik Lee.

10:30 – 11:00 Coffee Break

11:00 – 12:30 Oral Session 6 (main venue)
<u>Financial Econometrics</u>
Chair: Zhijie Xiao (Boston College)
• *Connectedness-Driven Risk*
Umut Akovali (Koc University), with Kamil Yilmaz.
• *The Permanent and Temporary Effects of Stock Splits on Liquidity in a Dynamic Semiparametric Model*
Linqi Wang (Queen Mary, University of London), with Christian M. Hafner, Oliver B. Linton.
• *IVX Tests for Return Predictability and the Initial Condition*
Sam Astill (University of Essex), with Tassos Magdalinosb, A.M. Robert Taylor.

12:30 – 14:00 Lunch and Poster Session 2 (lobby of main venue)

1. *Conformal Prediction with Time-Series Data via Sequential Conformalized Density Regions*
   Kung-Sik Chan (University of Iowa) with Max Sampson.

2. *Time Varying Heterogeneous Treatment Effect in Event Studies*
   Laura Liu (University of Pittsburgh) with Irene Botosaru.
3. *Efficient Estimation of Nonlinear DSGE Models*
   Sean McCrary (Ohio State University) and Eva F. Janssens.
4. *Noise-cancelling Location Models*
   Jannik Steenbergen (Aarhus University) with Leopoldo Catania.
5. *Data-Secure Dual Transfer Learning from Heterogeneous Low-Rank and Sparse Panel VAR Model*
   Yuchen Xu (University of California, Los Angeles) with George Michailidis.
6. *Online Conformal Model Selection for Nonstationary Time Series*
   Yao Zheng (University of Connecticut) with Shibo Li.
7. *Smoothing Variances Across Time: Adaptive Stochastic Volatility*
   Jason B. Cho (Cornell University) with David S. Matteson.
8. *Types of Distribution-free Methods for Forecasting Financial Volatility*
   Kejin Wu (Loyola University Chicago) with Sayar Karmakar, Rangan Gupta.
9. *Risk in a Data-Rich Model*
   Molin Zhong (Federal Reserve Board) with Dario Caldara, Haroon Mumtaz.
10. *Beyond Returns: A Candlestick-Based Approach to Covariance Estimation*
    Yasin Simsek (Duke University).
11. *Restricted Large Bayesian Vector Autoregressions*
    Eva F. Janssens (University of Michigan) with Robin L. Lumsdaine.
12. *Estimation and Inference in Large Dimensional Threshold Factor Models with Weaker Loadings*
    Daniele Massacci (King's College London).
13. *Localized Sparse Principal Component Analysis of Multivariate Time Series in Frequency Domain*
    Jamshid Namdari (Emory University) with Amita Manatunga, Fabio Ferrarelli, Robert T. Krafty.
14. *Partial Envelope and Reduced-Rank Partial Envelope Vector Autoregressive Models*
    S. Yaser Samadi (Southern Illinois University), with Wiranthe B. Herath.
15. *Two-Way Factor Model for Matrix Time Series.*
    Elynn Chen (New York University) with Yuefeng Han, Jiayu Li, Ke Xu
16. *Dynamic Factor Model with Sparse Factor Transitions*
    Arash Sodagartojgi (Rutgers University).
17. *Estimation of Large Approximate Dynamic Matrix Factor Models Based on the EM Algorithm and Kalman Filtering*
    Luca Trapin (University of Bologna) with Matteo Barigozzi.
18. *(When and Why) State Dependent Local Projections Work*
    Valentin Winkler (Columbia University)
19. *Nonparametric GARCH: A Deep Learning Approach*
    Ngai Hang Chan (City University of Hong Kong) with Ruizhi Deng, Guohao Shen.
20. *Integer-Valued GARCH Modelling with the Gamma-Poisson Distribution*
    Molly Chou (Northwestern University) with Beth Andrews.
21. *Asymptotic Theory of QMLE of the Multiple-regime Threshold GARCH(1,1) Model*
    Shiqing Ling (Hong Kong University of Science and Technology) with Yaxing Yang, Dong Li.
22. *It's All About the Tails: The Benefits of Variance-Targeted, Non-Gaussian, Quasi-Maximum Likelihood Estimation of GARCH Models*
    Todd Prono (Federal Reserve Board).
23. *Long Memory in Dynamic Factor Models with Infinite-Dimensional Factor Spaces*
    Qin Wen (New York University) with Clifford M. Hurvich.
24. *Time-Varying High Quantile Estimation for Nonstationary Tail Dependent Time Series*
    Ting Zhang (University of Georgia) with Yu Shao.

Abstracts

Connectedness-Driven Risk

Sep 20
11:00am

Umut Akovali
Koc University

This study proposes a non-diversifiable connectedness-driven risk measure for a portfolio of fi- nancial assets. The model incorporates the connectedness table with the conditional variances of financial assets to obtain the conditional covariance matrix decomposition, which enables us to estimate the connectedness-driven portfolio variance taking into account the heterogeneity in asset return variances. Accounting for complete, directed, and weighted connectedness net- works, the proposed risk measure provides an improvement over popular systemic risk measures. Taking into account shocks to both market risk and the connectedness matrix it detects the systemic events at the tails. The empirical analysis of the 2008-2009 Global Financial Crisis and the Taper Tantrum episode of 2013 demonstrates the model's robustness in detecting systemic events and differentiating between volatility and connectedness shocks.

IVX Tests for Return Predictability and the Initial Condition

Sep 20
12:00pm

Sam Astill
University of Essex

The popular IVX test for asset return predictability of Kostakis et al. (2015) is based on the assumption that the initial condition (the deviation of the first sample value from the unconditional mean) of the putative predictor is asymptotically negligible. More realistically, it will be of the same stochastic order of magnitude as the rest of the predictor data. We show that the IVX statistic retains a standard normal limiting distribution under the no predictability null in this scenario. However, simulation results show that for strongly persistent predictors with a large initial condition, the test can display very low power to detect predictability. To rectify this, we propose a modification to the initialisation of the IVX instrument. The resulting IVX statistic also has a standard normal limiting null distribution, but delivers far superior finite detection power for large initial conditions. An empirical application highlights the practical usefulness of the new tests.

Estimating Invertible Processes in Hilbert Spaces, with Applications to Functional ARMA Processes

Sep 19
10:00am

Alexander Aue
University of California, Davis

Invertible processes are central to functional time series analysis, making the estimation of their defining operators a key problem. While asymptotic error bounds have been established for specific ARMA models on L2[0,1], a general theoretical framework has not yet been established. This paper fills in this gap by deriving consistent estimators for the operators characterizing the invertible representation of a functional time series with white noise innovations in a general separable Hilbert space. Under mild conditions covering a broad class of functional time series, we establish explicit asymptotic error bounds, with rates determined by operator smoothness and eigenvalue decay. These results further provide consistency and rate estimates for operators in Hilbert space-valued causal linear processes, including functional MA, AR, and ARMA models of arbitrary order.

Global Identification of Dynamic Panel Models with Interactive Effects

Sep 19
11:00am

Juanshan Bai
Columbia University

This paper examines the problem of global identification in dynamic panel models with interactive effects, a fundamental issue in econometric theory. We focus on the setting where the number of cross-sectional units (N) is large, but the time dimension (T) remains fixed. While local identification based on the Jacobian matrix is well understood and relatively straightforward to establish, achieving global identification remains a significant challenge. Under a set of mild and easily satisfied conditions, we demonstrate that the parameters of the model are globally identified, ensuring that no two distinct parameter values generate the same probability distribution of the observed data. Our findings contribute to the broader literature on identification in panel data models and have important implications for empirical research that relies on interactive effects.

How Weak Are Weak Factors? Uniform Inference for Signal Strength in Signal Plus Noise Models

Sep 19
5:30pm

Anna Bykhovskaya
Duke University

The paper analyzes four classical signal-plus-noise models: the factor model, spiked sample covariance matrices, the sum of a Wigner matrix and a low-rank perturbation, and canonical correlation analysis with low-rank dependencies. The objective is to construct confidence intervals for signal strength that are uniformly valid across all regimes – strong, weak, and critical signals. We demonstrate that traditional Gaussian approximations fail in the critical regime. Instead we propose a universal transitional distribution that enables valid inference across the entire spectrum of signal strengths. The approach is illustrated through applications in macroeconomics and finance.

Regularized Partial Least Squares Estimation of an Approximate Envelope Model for Supervised Dimension Reduction in Time Series Forecasting

Sep 19
5:00pm

John C. Chao
University of Maryland

This paper considers time series forecasting in the context of a many-predictor regression model that has a so-called "approximate envelope" structure. An interesting aspect of the envelope framework considered here is that it allows for dimension reduction in an inherently supervised or targeted manner that takes into account possible relationships between the predictor variables and the target variable of interest. Moreover, given the approximate envelope structure, we show that the conditional mean function of the many-predictor regression is asymptotically equivalent to the conditional mean function of a diffusion index forecast equation, when the latter is the true underlying model. This and other results given in the paper help to explain why partial least squares (PLS) type procedures can be effective in estimating the conditional mean function of both of these types of models. We also introduce new PLS-type estimators, which we call regularized PLS estimators, and give asymptotic results showing their consistency and rate of convergence. These regularized estimators have the benefit that they are more adaptive to alternative statistical environments than the original unregularized PLS estimator, as they can take advantage of both parameter sparsity and eigenvalue sparsity.

Diffusion Index Forecast with Tensor Data

Sep 19
2:00pm

Bin Chen
University of Rochester

In this paper, we consider diffusion index forecast with both tensor and non-tensor predictors, where the tensor structure is preserved with a Canonical Polyadic (CP) ten- sor factor model. When the number of non-tensor predictors is small, we study the asymptotic properties of the least-squared estimator in this tensor factor-augmented regression, allowing for factors with different strengths. We derive an analytical for- mula for prediction intervals that accounts for the estimation uncertainty of the latent factors. In addition, we propose a novel thresholding estimator for the high-dimensional covariance matrix that is robust to cross-sectional dependence. When the number of non-tensor predictors exceeds or diverges with the sample size, we introduce a multi- source factor-augmented sparse regression model and establish the consistency of the corresponding penalized estimator. Simulation studies validate our theoretical results and an empirical application to US trade flows demonstrates the advantages of our approach over other popular methods in the literature.

Analysis of Multiple Long-Run Relations in Panel Data Models with Applications to Financial Ratios

Sep 19
11:30am

Alexander Chudik
Federal Reserve Bank of Dallas

This paper provides a new methodology for the analysis of multiple long run relations in panel data models where the cross section dimension, n, is large relative to the time series dimension, T. For panel data models with large n researchers have focused on panels with a single long run relationship. The main difficulty has been to eliminate short run dynamics without generating signiÖcant uncertainty for identiÖcation of the long run. We overcome this problem by using non-overlapping sub-sample time averages as deviations from their full-sample counterpart and estimating the number of long run relations and their coe¢ cients using eigenvalues and eigenvectors of the pooled covariance matrix of these sub-sample deviations. We refer to this procedure as pooled minimum eigenvalue (PME) and show that it applies to unbalanced panels generated from general linear processes with interactive stationary time e§ects and does not require knowing long run causal linkages. To our knowledge, no other estimation procedure exists for this setting. We show the PME estimator is consistent and asymptotically normal as n and $\to \infty$ jointly, such that $T \approx n^d$, with $d > 0$ for consistency and $d > 1/2$ for asymptotic normality. Extensive Monte Carlo studies show that the number of long run relations can be estimated with high precision and the PME estimates of the long run coefficients show small bias and RMSE and have good size and power properties. The utility of our approach is illustrated by investigating long run relationships between key variables in two unbalanced panels one micro and one macro. The micro application uses merged CRSP-Compustat Önancial data on 2; 000 plus US Örms over the period 1950–2021. The macro application uses Penn World Table macroeconomic data on up to 177 countries over the period 1950–2019.

Sparsity Tests for High-Dimensional Linear Regression Models in Time Series

Sep 19
4:30pm

Daniel Gutknecht
Goethe University

Penalised Regression methods and in particular the Least Absolute Shrinkage and Selection Operator (LASSO) have become common tools in time series analysis. As the performance of LASSO crucially hinges on the assumption of sparsity, we propose a Hausman type test for exact sparsity. The null hypothesis is that there are at most k0 regressors with non-zero coefficients. A key distinction between our test and existing methods, such as Information Criteria, is that we allow the number of regressors to be (much) larger than the sample size. We further establish the first order validity of block bootstrap based critical values. We provide two applications for our test. The first one is as a specification test to assess the validity of standard Gaussian inference in out-of-sample forecast comparisons with LASSO, the second application is to the gauge the validity of Gaussian inference on Impulse Response Functions in high-dimensional (Structural) Vector Autoregressions.

Covariate-Adjusted Deep Causal Learning for Heterogeneous Panel Data Models

Sep 19
4:00pm

Yuefeng Han
University of Notre Dame

This paper studies the task of estimating heterogeneous treatment effects in causal panel data models, in the presence of covariate effects. We propose a novel CovariateAdjusted DEep CAusal Learning (CoDEAL) for panel data models, that employs flexible model structures and powerful neural network architectures to cohesively deal with the underlying heterogeneity and nonlinearity of both panel units and covariate effects. The proposed CoDEAL integrates nonlinear covariate effect components (parameterized by a feed-forward neural network) with nonlinear factor structures (modeled by a multi-output autoencoder) to form a heterogeneous causal panel model. The nonlinear covariate component offers a flexible framework for capturing the complex influences of covariates on outcomes. The nonlinear factor analysis enables CoDEAL to effectively capture both cross-sectional and temporal dependencies inherent in the data panel. This latent structural information is subsequently integrated into a customized matrix completion algorithm, thereby facilitating more accurate imputation of missing counterfactual outcomes. Moreover, the use of a multi-output autoencoder explicitly accounts for heterogeneity across units and enhances the model interpretability of the latent factors. We establish theoretical guarantees on the convergence of the estimated counterfactuals, and demonstrate the compelling performance of the proposed method using extensive simulation studies and a real data application.

Forecasting and Managing Correlation Risks

Sep 19
3:00pm

Sophia Zhengzi Li
Rutgers University

We propose a novel and easy-to-implement framework for forecasting correlation risks based on a large set of salient realized correlation features and the sparsity-encouraging LASSO technique. Considering the universe of S&P 500 stocks, we find that the new approach manifests in statistically superior out-of-sample forecasts compared to commonly used procedures. We further demonstrate how the forecasts translate into significant economic gains in the form of higher pairs trading profits, better equity premium predictions, more accurate portfolio risk targeting, and superior overall risk control and minimization.

Unifying Regression-Based and Design-Based Causal Inference in Time-Series Experiments

Sep 20
9:30am

Zhexiao Lin
University of California, Berkeley

Time-series experiments, also called switchback experiments, play increasingly important roles in modern applications and are a fundamental experimental design in practice. In this paper, we examine the design-based properties of regression-based methods for estimating treat- ment effects in such settings. We demonstrate that the treatment effect of interest can be con- sistently estimated using ordinary least squares (OLS) with an appropriately specified working model. Our analysis extends to estimating a diverging number of treatment effects simulta- neously, and we establish the asymptotic properties of the resulting estimators. Additionally, we show that the heteroskedasticity and autocorrelation consistent (HAC) estimator provides a conservative estimate of the variance. Importantly, while our approach relies on OLS regression, our theoretical framework accommodates misspecification of the regression model.

Identification and Estimation of Causal Effects in High-Frequency Event Studies

Sep 20
9:00am

Adam McCloskey
University of Colorado

We provide precise conditions for nonparametric identification of causal effects by high-frequency event study regressions, which have been used widely in the recent macroeconomics, financial eco- nomics and political economy literatures. The high-frequency event study method regresses changes in an outcome variable on a measure of unexpected changes in a policy variable in a narrow time window around an event or a policy announcement (e.g., a 30-minute window around an FOMC an- nouncement). We show that, contrary to popular belief, the narrow size of the window is not sufficient for identification. Rather, the population regression coefficient identifies a causal estimand when (i) the effect of the

policy shock on the outcome does not depend on the other variables (separability) and (ii) the surprise component of the news or event dominates all other variables that are present in the event window (relative exogeneity). Technically, the latter condition requires the ratio between the variance of the policy shock and that of the other variables to be infinite in the event window. Under these conditions, we establish the causal meaning of the event study estimand corresponding to the regression coefficient and the consistency and asymptotic normality of the event study estimator. Notably, this standard linear regression estimator is robust to general forms of nonlinearity. We apply our results to Nakamura and Steinsson's (2018a) analysis of the real economic effects of monetary pol- icy, providing a simple empirical procedure to analyze the extent to which the standard event study estimator adequately estimates causal effects of interest.

Bootstrap Prediction Inference of Non-linear Autoregressive Models

Sep 19
9:00am

Dimitris N. Politis

University of California, San Diego

The non-linear autoregressive (NLAR) model plays an important role in modeling and predicting time series. One-step ahead prediction is straightforward using the NLAR model, but the multi-step ahead prediction is cumbersome. For instance, iterating the one-step ahead predictor is a convenient strategy for linear autoregressive (LAR) models, but it is suboptimal under NLAR. In this paper, we first propose a simulation and/or bootstrap algorithm to construct optimal point predictors under an L1 or L2 loss criterion. In addition, we construct bootstrap prediction intervals in the multi-step ahead prediction problem; in particular, we develop an asymptotically valid quantile prediction interval as well as a pertinent prediction interval for future values. In order to correct the undercoverage of prediction intervals with finite samples, we further employ predictive—as opposed to fitted—residuals in the bootstrap process. Simulation and empirical studies are also given to substantiate the finite sample performance of our methods.

The Relevance of Temporal Aggregation for the Propagation of Macroeconomic Shocks

Sep 20
10:00am

Tatevik Sekhposyan

Texas A&M University University

High-frequency identification, which derives exogenous variation in macroeconomic variables from financial market surprises during narrow time windows around policy announcements, has become an appealing approach for studying causal effects in macroeconomics. However, while these market surprises are measured at high frequencies, often daily, macroeconomic variables like output and inflation are typically measured at lower frequencies, either monthly or quarterly. Causal identification, therefore, often requires aggregating high-frequency surprises into lower- frequency measures. This paper demonstrates that, in the context of monetary policy and oil supply news shocks, the choice of aggregation method impacts the documented causal effects in a non-trivial manner. Specifically, using a data-driven aggregation approach, we find no evidence of an output puzzle (information channel) in a standard monthly monetary vector autoregression (VAR). Similarly, this aggregation method substantially alters the qualitative and quantitative results in a quarterly monetary VAR and changes the relevance of oil-supply news shocks for inventory dynamics when studying the oil-market dynamics.

Score-type Tests for Markov Switching Models

Sep 19
9:30am

Enrique Sentana
CEMFI

Testing the null of a single regime in Markov switching models is complex because some parameters become increasingly underidentiÖed along alternative paths to the null, others are inequality constrained, and several higher-order derivatives are 0. These problems make the maximum of the alternative model log-likelihood function numerically unreliable. We propose score-type tests asymptotically equivalent to the likelihood ratio as the largest of two simple statistics computed under the null hypothesis treating symmetrically all ways of approaching it without excluding any region of the parameter space. Our simulation results conÖrm the power of our proposed tests.

The Permanent and Temporary Effects of Stock Splits on Liquidity in a Dynamic Semiparametric Model

Sep 20
11:30am

Linqi Wang
Queen Mary, University of London

We develop a dynamic framework to detect the occurrence of permanent and transitory breaks in the illiquidity process. We propose various tests that can be applied separately to individual events and can be aggregated across di!erent events over time for a given firm or across di!erent firms. We use this methodology to study the impact of forward and reverse stock splits on the illiquidity dynamics of the S&P 500, S&P 400 and S&P 600 index stock constituents. Our empirical results show that stock splits have a positive and significant e!ect on the permanent component of the illiquidity process while a majority of the stocks engaging in reverse splits experience an improvement in liquidity conditions.

Conditional Nonparametric Variable Screening by Neural Factor Regression

Sep 19
12:00pm

Weining Wang
University of Bristol

High-dimensional covariates often admit linear factor structure. To effectively screen correlated covariates in high-dimension, we propose a conditional variable screening test based on non-parametric regression using neural networks due to their representation power. We ask the question whether individual covariates have additional contributions given the latent factors or more generally a set of variables. Our test statistics are based on the estimated partial derivative of the regression function of the candidate variable for screening and a observable proxy for the latent factors. Hence, our test reveals how much predictors contribute additionally to the non-parametric regression after accounting for the latent factors. Our derivative estimator is the convolution of a deep neural network regression estimator and a smoothing kernel. We demonstrate that when the neural network size diverges with the sample size, unlike estimating the regression function itself, it is necessary to smooth the partial derivative of the neural network estimator to recover the desired convergence rate for the derivative. Moreover, our screening test achieves asymptotic normality under the null after finely centering our test statistics that makes the biases negligible, as well as consistency for local alternatives under mild conditions. We demonstrate the performance of our test in a simulation study and two real world applications.

Nowcasting with Neural State Space Models

Sep 19
2:30pm

Yikai Zhang
One River Asset Management

Nowcasting arises in various application domains such as economics, finance and healthcare. For a dynamical system comprising of multiple time series, under a nowcasting setting, one has access to the most recent observed values corresponding to a (potentially arbitrary) subset of the series, and the goal is to leverage such partially observed information to optimally infer the currently unobserved values. In this work, we propose a nowcasting method leveraging neural state space models. The proposed method has a state space backbone which promotes interpretability and resonates with some widely adopted modeling frameworks in econometrics (such as the dynamic factor models), and it allows for flexible parameterization of the dynamics. With a VAE-based training pipeline, by masking the unobserved values properly, the method can readily process missing values, while simultaneously learn to consume guidance information. The effectiveness of the proposed method is demonstrated through synthetic data settings. Ongoing work involves applying the method to real-world macroeconomic nowcasting and illiquid bond pricing settings.

Author Index