YANG LIU

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EDUCATION

Department of Economics, Rutgers University, New Brunswick, NJ — May 2024 (Expected)
Ph.D. in Econometrics and Quantitative Economics
PhD Dissertation: **Methods for Forecasting Using High Dimension and High Frequency Data**
Committee: **Norman R. Swanson (Chair), John Chao, John Landon-Lane, Xiye Yang**

Robert H. Smith School of Business, University of Maryland, College Park, MD — May 2018
Masters of Quantitative Finance: Asset Management and Risk Management

Capital University of Economics and Business, Beijing, China — June 2016
Bachelor of Management: International Human Resources Management

FIELDS OF INTEREST

- **Applied Econometrics, Forecasting, Machine Learning, Financial Economics, Empirical Asset Pricing**
- **Concentration: high-dimensional data, time series data, real-time data, factor model, variable selection**

RESEARCH

An Assessment of the Marginal Predictive Content of Economic Uncertainty Indexes and Business Conditions Predictors (Job Market Paper, R&R at *International Journal of Forecasting*)

- (with Norman R. Swanson)

▪ *Abstract*: In this paper, I evaluate the marginal predictive content of a variety of new business conditions (BC) predictors as well as nine economic uncertainty indexes (EUIs) constructed using these predictors. My predictors are defined as selected observable variables and latent factors extracted from a high dimensional macroeconomic dataset and my EUIs are functions of predictive errors from models that incorporate these predictors. Estimation of the predictors is based on a number of extant and novel machine learning methods that combine dimension reduction and shrinkage. When predicting 14 monthly U.S. economic series selected from 8 different groups of economic variables, the new indexes and predictors are shown to result in significant improvements in forecast accuracy, relative to predictions made using benchmark models. Moreover, while inclusion of either BC predictors or EUIs often yields forecast accuracy improvements, greater predictive gains accrue when using BC predictors with real economic activity type variables. Also, adding both BC predictors and EUIs together is particularly useful when forecasting housing market variables at short horizons.

Selecting the Relevant Variables for Factor Estimation in FAVAR Models (Working Paper, Submitted)

- (with John C. Chao and Norman R. Swanson)

▪ *Abstract*: In this paper, I propose a new variable selection method that allows researchers to distinguish between variables that are relevant in the sense that they provide useful information for estimating underlying latent factors and variables that are irrelevant in the sense that they do not load on underlying factors, in an FAVAR model. In my context, variable selection methods are needed because using too many irrelevant variables may lead to inconsistency in factor estimation. My procedure is designed to facilitate consistent factor estimation and can be viewed as the factor model analog of the type of multiple hypothesis testing or variable selection procedures that people use to select regressors when specifying linear regression. One key difference between my method and the typical multiple hypothesis testing procedure used in the literature is that rather than controlling the overall Type I error at some fixed non-zero level, my procedure is completely consistent in the sense that the probability of both Type I and Type II errors goes to zero asymptotically as sample sizes approach infinity. Monte Carlo evidence indicates that my method has very good finite

sample properties. Additionally, I analyze a real-time macroeconomic dataset, where it is shown that my method delivers factors that result in improved marginal predictive content, relative to cases where standard principal components as well as hard-thresholding methods are used in factor estimation.

Spillover Effect for Nine Sector ETFs in Bad News and Good News Conditions (Under Preparation)

▪ *Abstract*: Macroeconomic news announcements affect financial markets in multiple different ways. In this paper, I use a factor-augmented vector autoregressive model (FAVAR model) to examine spillover effects associated with three liquidity measures, including quoted spread, effective spread and market depth. This is done for nine sector ETFs under bad news and good news scenarios during the Covid-19 pandemic period. In order to carry out this analysis, I use high-frequency data from the well-known TAQ database. I find that there are stronger and clearer spillover effects for quoted spread and some spillover effects associated with the market depth. However, there are no clear and strong spillover effects for effective spreads. Also, spillover effects in bad news scenarios are larger and stronger than that in good news scenarios for all of my liquidity measures.

Can Stock Characteristics Lead the Forecasting for High-frequency Volatilities? (Work in Progress)

WORK EXPERIENCE

Internship (BNY Mellon)

- Data Modeler, Economic Forecasting Group, BNY Mellon, New York City, NY June 2022—Oct. 2022

▪ Re-estimated different models using updated new data for several financial assets or macroeconomic variables (such as ABS spreads variables, covered bonds and VIX) in order to find new drivers to improve their forecasting performances.

▪ Conducted CCAR stress tests for multiple macroeconomic variables in various aspects and recorded each of them in a complete document for model validation team.

▪ For each model: examined the coefficient stability, fitted in crisis era with calibration sample, conducted out-of-sample forecasting, plotted model fit condition in graph and conducted residual tests.

▪ Made a presentation for model development progresses in the weekly team meeting and explained different models in economic concepts.

▪ Prepared slides for financial market news update and macroeconomic overview in the quarterly company conference.

Research Assistant, Rutgers University, New Brunswick, NJ

- Developing A New R Package "LavaCvxr" March 2021—June 2021

▪ Developed and published "LavaCvxr" package **in R** using CVXR for Lava method, which is introduced in Chernozhukov et al. (2017).

▪ Paper for Lava method: Chernozhukov, V., Hansen, C., & Liao, Y. (2017). A lava attack on the recovery of sums of dense and sparse signals. Annals of Statistics, 45(1), 39-76.

Research Assistant, University of Maryland, College Park, MD

- Analyzed transaction data for ESM10 and SPY in flash crash, May 6, 2010 Sep. 2017—Dec. 2017

▪ Run linear regression **using R** between log returns of ESM10 and SPY for three time periods (before/ during/ after flash crash) to analyze the arbitrage relationship and changes of average trade size for every minute.

▪ Analyzed bid-ask spread and market depth of SPY to see the changes of market liquidity. Used bar plots to analyze percentage changes of even tick and odds tick for SPY and ESM10 to see differences across data sets.

- Manufacturing Sector Oct. 2016—Dec. 2016

▪ Constructed linear regression with fixed effect **using SAS** to predict revenue growth for hundreds of companies within manufacturing sector to see the influences from firm level variables and macroeconomic variables.

▪ Did winsorization for outliers, used stepwise method and VIF results to select final regressors in model.

▪ Did two sample T test to compare the results between public companies and private companies; checked heteroscedasticity.

- Consumer Nondurables Sector and S&P 500 Index Oct. 2016—Dec. 2016

- Run linear regression **using MATLAB** to forecast return of consumer nondurables sector by using financial and macroeconomic variables.
- Used Dickey Fuller test to check data stationary; did backward discard and forward selection to do regressors selection.
- Durbin Watson test: check first-order-autocorrelation, White test: check heteroscedasticity, Jarque-Bera test: check normality.
- Forecast 1-step ahead variance for S&P 500 series by using GARCH(1,1) and GJR-GARCH(1,1,1) of 50 years daily data.

TEACHING EXPERIENCE

Lecturer, Department of Economics, Rutgers University, New Brunswick, NJ Summer 2021, 2022, 2023

- **Intermediate Microeconomics – Undergraduate course** (Summer 2021).
- **Econometrics – Undergraduate course** (Summer 2022).
- Prepared teaching notes, assignments, two exams and two review sessions for each of above two courses.
- Received the final overall evaluation as 4/5 for both of above two courses.
- **Introduction to R** (one-day workshop for the **first-year Ph.D. students** in Summer 2022 and Summer 2023).

Teaching Assistant, Department of Economics, Rutgers University, New Brunswick, NJ 2019—2023

- Econometrics II (Ph.D. students) Spring 2023
- Forecasting and Big Data Fall 2022
- Capital Markets Fall 2021, Spring 2022
- Advanced Statistics (Ph.D. students) Fall 2021
- Introduction to Microeconomics Spring 2021
- Economics of Taxation Fall 2020
- Introduction to Macroeconomics Fall 2019, Spring 2020

CONFERENCES, WORKSHOPS AND PRESENTATIONS

- Econometrics Seminar, Rutgers University Nov. 2023
- 2023 Annual Meeting of the International Society for Data Science and Analytics (ISDSA) July 2023
- 2023 The 37th Annual Conference of the Pennsylvania Economic Association (PEA) June 2023
- 2023 The Chinese Economists Society China Annual Conference (CES) June 2023
- The 18th CIREQ PhD Students Annual Conference at Concordia University (accepted) May 2023

HONORS AND AWARDS

- Alfred S. Eichner Economics Prize, Rutgers University Spring 2023
- Richard Lock Endowed Fund for Economics Award, Rutgers University Spring 2023
- Dorothy Rinaldi Fellowship, Rutgers University Spring 2023
- Conference Travel Award, Rutgers University Spring 2023
- MMI Market Structure Research Fellowship, Modern Market Initiative Spring 2022
- Teaching Assistantship, Rutgers University 2019-2022
- 2nd award in 2014 China Undergraduate Mathematical Contest in Modeling (CUMCM) 2014
- Scholarships for Academic Distinction, Capital University of Economics and Business 2012-2016

SKILLS AND ADDITIONAL INFORMATION

- **Passed CFA Level 1 Test**
- Programs: **R, MATLAB, Python, SQL, SAS**
- English (fluent), Mandarin (native)

REFERENCES

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