

# Ekaterina Seregina

✉ ekaterina.seregina@email.ucr.edu • 🌐 seregina.info • 📞 ekat92

📍 900 University Avenue, Riverside, CA

## Education

### University of California, Riverside

PHD IN ECONOMICS

Riverside, CA

Sep 2016 – Jun 2021

### National Research University Higher School of Economics

MS FINANCIAL ECONOMICS

Moscow, Russia

Sep 2014 – Jun 2016

BS ECONOMICS

Sep 2010 – Jun 2014

**Research Area** Econometric Theory · Financial Econometrics · Asset Management · Forecasting · Machine Learning

## Research

[1] “A BASKET HALF FULL: SPARSE PORTFOLIOS” [Job Market Paper]

Under Review

[2] “OPTIMAL PORTFOLIO USING FACTOR GRAPHICAL LASSO” (with TH Lee)

Under Review

[3] “LEARNING FROM FORECAST ERRORS: A NEW APPROACH TO FORECAST COMBINATION” (with TH Lee)

Under Review

[4] “FAST AND EFFICIENT DATA SCIENCE TECHNIQUES FOR COVID-19 GROUP TESTING” (with V. Kutateladze)

Revise and Resubmit, Journal of Data Science

[5] “TIME-VARYING FACTOR GRAPHICAL MODELS”

[6] “PROJECTED FACTOR GRAPHICAL MODELS”

## Presentations

- |   |          |   |          |
|---|----------|---|----------|
| • Southwestern Finance Ass’n Conference [1] | Mar 2021 | • Vilnius University (Dpt of Finance) [2] | Jan 2021 |
| • 14th Int’l CFENetwork 2020 [1]            | Dec 2020 | • EWM of the Econometric Society [2]      | Dec 2020 |
| • World Finance and Banking Symp. [2]       | Dec 2020 | • 2020 NABE Tech Economics [4]            | Nov 2020 |
| • 40th Int’l Symp. on Forecasting [3]       | Oct 2020 | • 2020 FMA Conference (Discussant)        | Oct 2020 |
| • Department of Economics, UCR [1]          | Oct 2020 | • Department of Finance, UCR [1]-[2]      | Jun 2020 |

## Teaching

### University of California, Riverside

INSTRUCTOR

Summer 2019, 2020

Stock Market (35 students, Eval: 4.77/5) · Intermediate Macroeconomic Theory (40 students, Eval: 4.89/5)

TEACHING ASSISTANT

Sep 2017 – Jun 2021

Econometrics (PhD) · Macroeconomics (PhD) · Stock Market · Statistics · Intermediate Macroeconomics

## Honors & Awards

- |      |   |                |
|------|---|----------------|
| 2020 | Dissertation Year Program Award for Excellence in Research, UC Riverside      | Riverside, CA  |
| 2019 | Outstanding Teaching Assistant Award for Excellence in Teaching, UC Riverside | Riverside, CA  |
| 2016 | University of California Dean’s Distinguished Fellowship                      | Riverside, CA  |
| 2015 | Research Grant from German Research Foundation (GR 4781/1-1)                  | Moscow, Russia |
| 2015 | Presidential Grant for Support of Young Russian Scientists                    | Moscow, Russia |

## Additional Information

**SOFTWARE** R · Python · Matlab · SAS · STATA · MySQL · BigQuery · Bloomberg Terminal · Datastream · T<sub>E</sub>X

**MEMBERSHIP** AEA · AFA · AMS · ASA · FMA · IIF · SFS · SoFIE · SWFA

## References

Jang-Ting Guo Professor, UCR Department of Economics 📞 +1 951 827-1588 ✉ guojt@ucr.edu	Jean Helwege Professor, UCR Department of Finance 📞 +1 951 827-4284 ✉ jean.helwege@ucr.edu	Tae-Hwy Lee (Chair) Professor, UCR Department of Economics 📞 +1 951 827-1509 ✉ tae.lee@ucr.edu	Aman Ullah Distinguished Professor, UCR Department of Economics 📞 +1 951 827-1591 ✉ aman.ullah@ucr.edu
--	--	--	--

## Paper Abstracts

---

### A BASKET HALF FULL: SPARSE PORTFOLIOS [*Job Market Paper*]

Oct 2020

The existing approaches to sparse wealth allocations (1) are suboptimal due to the bias induced by  $\ell_1$ -penalty; (2) require the number of assets to be less than the sample size; (3) do not model factor structure of stock returns in high dimensions. We address these shortcomings and develop a novel strategy which produces unbiased and consistent sparse allocations. We demonstrate that: (1) failing to correct for the bias leads to low out-of-sample portfolio return; (2) only sparse portfolios achieved positive cumulative return during several economic downturns, including the dot-com bubble of 2000, the financial crisis of 2007-09, and COVID-19 outbreak.

### OPTIMAL PORTFOLIO USING FACTOR GRAPHICAL LASSO [*with Tae-Hwy Lee*]

Sep 2020

This paper develops a framework for estimating a high-dimensional precision matrix which combines the benefits of exploring the factor structure of the stock returns and the sparsity of the precision matrix of the factor-adjusted returns. The proposed algorithm is called *Factor Graphical Lasso* (FGL). We study a high-dimensional portfolio allocation problem when the asset returns admit the approximate factor model. We demonstrate that FGL consistently estimates the optimal portfolio in high dimensions, even when the covariance matrix is ill-behaved. Our theoretical results and simulations demonstrate that the method is robust to heavy-tailed distributions. The empirical application uses daily and monthly data for the constituents of the S&P500 to demonstrate superior performance of FGL compared to the equal-weighted portfolio, index and some prominent precision and covariance-based estimators.

### LEARNING FROM FORECAST ERRORS: A NEW APPROACH TO FORECAST COMBINATION [*with Tae-Hwy Lee*]

Sep 2020

This paper studies forecast combination using the precision matrix estimation of forecast errors when the forecast errors admit the approximate factor model. This approach incorporates the facts that experts often use common sets of information and hence they tend to make common mistakes. This premise is evidenced in many empirical results. For example, the European Central Bank's Survey of Professional Forecasters (SPF) on Euro-area real GDP growth demonstrates that the professional forecasters tend to *jointly* understate or overstate GDP growth. Motivated by this type of stylized facts on forecast errors, we develop a novel framework which exploits the factor structure of forecast errors and the sparsity in the precision matrix of the idiosyncratic components of the forecast errors. An empirical application to forecasting macroeconomic time series in big data environment highlights the advantage of our approach in comparison with the existing methods of forecast combination.

### FAST AND EFFICIENT DATA SCIENCE TECHNIQUES FOR COVID-19 GROUP TESTING (*with V. Kutateladze*)

Oct 2020

Researchers and public officials tend to agree that until a vaccine is developed, stopping SARS-CoV-2 transmission is the name of the game. Testing is the key to preventing the spread, especially by asymptomatic individuals. With testing capacity restricted, group testing is an appealing alternative for comprehensive screening and has recently received FDA emergency authorization. This technique tests pools of individual samples, thereby often requiring fewer testing resources while potentially providing multiple folds of speedup. We approach group testing from a data science perspective and offer two contributions. First, we provide an extensive empirical comparison of modern group testing techniques based on simulated and real, laboratory data. Second, we propose a simple one-round method based on  $\ell_1$ -norm sparse recovery, which outperforms current state-of-the-art approaches at certain disease prevalence rates.

### TIME-VARYING FACTOR GRAPHICAL MODELS

Sep 2020

At the beginning of COVID-19 outbreak, stock market was volatile, exhibiting sudden trend switches. As a result, using a long history of the past performance leads to large estimation errors. One efficient way to overcome this difficulty is to use the information extracted from higher frequency returns, e.g. daily data, to make longer term predictions of lower frequency returns, e.g. monthly data. Such strategy naturally augments the information set for the monthly data leading to decreased estimation errors and improved performance. This paper proposes to estimate the lower frequency precision matrix using higher frequency returns. In addition, we allow the dependence structure between stocks to change over time, which makes the proposed model more flexible. We call the proposed algorithm "Time-Varying Factor Graphical Model". Our model is solved using the alternating directions method of multipliers (ADMM), we derive closed-form solutions for the ADMM subproblems to further speed up the runtime.

### PROJECTED FACTOR GRAPHICAL MODELS

Sep 2020

Fundamental analysis and the mean-variance portfolio optimization are traditionally viewed as two alternative approaches to portfolio allocation. In this paper we develop a novel precision matrix estimator that integrates these approaches. The proposed algorithm is called "Projected Factor Graphical Models". Our method allows incorporating the information on the companies' fundamentals, such as current earnings, growth in net operating assets and growth in financing, when deciding which stocks to include in the portfolio and how much to invest in these stocks. Using the fact that, at some point, the stock's market value will converge to its intrinsic value, we use the partial equilibrium returns model that governs the behavior of stock returns as a linear function of firm's characteristics. The latter is used to construct a precision matrix estimator for portfolio weights.