Ekaterina Seregina

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900 University Avenue, Riverside, CA

Education

University of California, Riverside — *Riverside, CA*

PhD in Economics — *Sep 2016 – Jun 2021*

National Research University Higher School of Economics — *Moscow, Russia*

MS Financial Economics — *Sep 2014 – Jun 2016*

BS Economics — *Sep 2010 – Jun 2014*

Research Area Financial Econometrics · Asset Management · Portfolio Optimization · Machine Learning

Research

[1]"Sparse Portfolio"*[Job Market Paper]*

[2]"Optimal Portfolio Using Factor Graphical Lasso" (*with TH Lee*)
Submitted to the Journal of Business & Economic Statistics

[3]"Learning from Forecast Errors: A New Approach to Forecast Combination" (*with TH Lee*)
Submitted to the International Journal of Forecasting

[4]"Fast and Efficient Data Science Techniques for Covid-19 Group Testing" *(with V. Kutateladze)*
2020 NABE Tech Economics Conference: Virtual Poster Session (Finalist)

[5]"Time-Varying Factor Graphical Models"

Presentations

14th International Conference on Computational & Financial Econometrics (*Paper [1]*)	*Dec 2020*
40th International Symposium on Forecasting (*Paper [3]*)	*Oct 2020*
2020 FMA Virtual Conference (Invited Discussant)	*Oct 2020*
Department of Economics, UCR (*Paper [1]*)	*Oct 2020*
Department of Finance, UCR (*Papers [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

National Research University Higher School of Economics — *Moscow, Russia*

Teaching Assistant — *Sep 2015 – Jun 2016*

Corporate Finance · Financial Econometrics

Honors & Awards

2020	Dissertation Year Program Award, UC Riverside	*Riverside, CA*
2019	Outstanding Teaching Assistant Award, 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 · TEX

Membership AFA · FMA · SoFiE · AEA · ASA · IIF · AMS

References

Jang-Ting Guo	Jean Helwege	Tae-Hwy Lee (Chair)	Aman Ullah
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Paper Abstracts

Sparse Portfolio *[Job Market Paper]* *Sep 2020*

The classical approach to portfolio optimization is notorious for (1) producing undesirable extreme long and short positions due to inaccurate estimation of asset weights and (2) its asset allocations are associated with non-negligible transaction costs, high turnover and large monitoring costs. To overcome these shortcomings, we develop a novel optimization approach which produces sparse wealth allocations. The proposed statistical method proceeds in two steps: first, it uses an ℓ_1-penalty on the weight vector to select stocks, second, we apply de-biasing and post-lasso to obtain the optimal asset allocation weights. The main contribution is twofold: from the theoretical perspective, this paper establishes unbiasedness and consistency of the optimal sparse allocations in a high-dimensional setting, when the number of assets exceeds the sample size. We demonstrate the importance of the de-biasing step that has been overlooked in previous studies. From the empirical perspective, the application to the constituents of the S&P500 reveals that compared to the common strategy of holding all assets, our sparse portfolio strategy leads to lower risk, lower turnover, and higher out-of-sample Sharpe ratio. We illustrate that during several economic downturns including the dot-com bubble of 2000 and the financial crisis of 2007-09, our sparse de-biased estimator was the only model that produced positive cumulative excess return (CER) and did not exceed the target level of risk. In contrast, all non-sparse models produced negative CER and violated the risk constraint.

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 ℓ_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 algoritm "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.