



Contribution ID: 32

Type: Poster

Bias reduction in covariance matrices and its effects on high-dimensional portfolios.

Friday, 2 July 2021 17:03 (1 minute)

The current world keeps evolving, and in our era the challenge of “too much data” keeps popping up, in particular in the world of portfolio optimization, therein lies the opportunity of providing more accurate results through the use of the relatively new tools developed in the random matrix theory literature to reduce the bias in the sample covariance matrix of some financial data (real or simulated). In this poster we will present a couple of these tools and a brief summary of the results that can be achieved with them.

In this work we will apply the clipping, Tracy-Widom, linear shrinkage and non linear shrinkage techniques as our bias reduction mechanisms, and then to compare their efficacy we will compare them by using the resulting estimators of the underlying covariance matrix to optimize our financial portfolios.

The financial portfolio model we use is the classic Markowitz model with fixed returns of one for all our assets and we use two variants, the first one with the only restriction that we must assign all of our capital into our selected assets, and the second one with the same restriction plus a second one in which we do not consider short selling or more specifically that we can only buy assets.

The data that we use also consists of synthetic and real data, the synthetic data consists of two types the first one is structured gaussian and the second one is from a simulated GARCH time series, while the real data consists of two portfolios one considering only traditional stocks and the other with a mix of stocks and cryptocurrencies.

We hope to determine the efficacy of the bias reduction techniques to optimize financial data under multiple scenarios.

Primary author: RODRIGUEZ CAMEJO, Benito (CIMAT Monterrey)

Co-author: Dr GARCÍA MEDINA, Andrés (CIMAT Monterrey)

Presenter: RODRIGUEZ CAMEJO, Benito (CIMAT Monterrey)

Session Classification: Poster session