

Spectral analysis of high-dimensional time series
with applications to the mean-variance frontier

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In this talk the limiting spectral behavior of the covariance and symmetrized autocovariance matrices of a class of high-dimensional linear time series is discussed, where the asymptotic regime is such that dimensionality and sample size grow proportionally. The results extend the classical Marcenko-Pastur law to the time series case. The form of the limiting spectral distribution is exploited to estimate the mean-variance frontier, an important measure of the minimum risk required for a fixed expected return in a portfolio of financial assets. The results may help alleviate the risk underestimation of the mean-variance frontier well documented in the finance and econometrics literature. The talk is based on joint work with Haoyang Liu (UC Berkeley) and Debashis Paul (UC Davis).