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*Nonparametric Observed Standard Errors for High Frequency Data*

**Wednesday, March 1, 2023**

**11:50 AM**

**110 Frelinghuysen Road, Hill Center, Room 552**

**Zoom Meeting: Meeting ID: 99075124232**

**Password: 952486**

<https://rutgers.zoom.us/j/99075124232?pwd=UDdPVjRncXZFcXpvbFE0OWJyMVdsUT09>

**Light refreshments will be served**

**Abstract:** High frequency financial data has become an essential component of the digital world, giving rise to an increasing number of estimators. However, it is hard to reliably assess the uncertainty of such estimators. The Observed Asymptotic Variance (observed AVAR) is a non-parametric (squared) standard error for high-frequency-based estimators. We have earlier developed such an AVAR with time-discretization and two tuning parameters (per dimension). The current paper shows that these two parameters are confounded, and one can move to a single tuning parameter. This is shown by passing to continuous time (which is natural since observations are usually irregularly spaced). We show that the new time-continuous observed AVAR is a limit of the original observed AVAR. We also obtain a central limit theory for the new time-continuous observed AVAR, and the latter permits a sharper definition of our standard error. The device is conceptually related to observed information in likelihood theory, but in this case, it is non-parametric and uses the high-frequency data structure. [With Lan Zhang, University of Illinois at Chicago.]

**Bio:** Robert M. Hutchins Professor of Statistics and Finance, and Scientific Director of the Stevanovich Center, The University of Chicago

Per Mykland is Robert M. Hutchins Distinguished Professor of Statistics and Finance at the University of Chicago, where he is also Scientific Director of the Stevanovich Center for Financial Mathematics. He has held appointments at Oxford and Princeton.

Mykland is a leader in the field of statistics and econometrics for time dependent processes, including time series and continuous processes. Highlights include the development of likelihood and expansion methods for martingales (fair games), especially in the context of estimating equations. The results have wide applications, including the construction of new nonparametric likelihoods in time series and survival analysis.

His recent focus is high-frequency data, mainly in finance. In one breakthrough, he has shown how to connect the analysis of such data with classical statistical techniques, using contiguity. He has contributed to the theory of estimation under microstructure, including the development of the two-scales and pre-averaging estimators of volatility and other intra-day quantities. He has also developed an approach for integrating statistical and market information in the pricing and hedging of options, with a particular view to hedging against statistical uncertainty. Most recently, he has developed the “observed asymptotic variance”, which sets nonparametric standard errors for estimators based on high frequency data.

A long-run research goal is for a unified theory of continuous-time finance and high-frequency data. The former reasons through hypothetical high-frequency data; now these data are no longer hypothetical but very real.

Professor Mykland is Associate Editor for the Journal of the American Statistical Association, and the Journal of Financial Econometrics. He is a fellow of the Institute of Mathematical Statistics, the American Statistical Association and the Society for Financial Econometrics (SoFiE). He is a member of the Council of the SoFiE and has previously served on the Council of the Institute of Mathematical Statistics. Mykland was President of the Society for Financial Econometrics from 2017 to 2019.

He has supervised nineteen PhD students, who are now spread between academia and industry.

