



THE UNIVERSITY OF  
**CHICAGO**

Department of Statistics

**FIRST YEAR PHD MINI SEMINARS**

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**Determining Integrated Volatility with Noisy  
High-Frequency Data**

**FRIDAY, May 24, 2013, at 4:00 PM**  
110 Eckhart Hall, 5734 S. University Avenue

**ABSTRACT**

It is a common practice in finance to estimate volatility from the sum of frequently sampled squared returns. However, market microstructure poses challenges to this estimation approach, as evidenced by recent empirical studies in finance. The present work attempts to lay out theoretical grounds that reconcile continuous-time modeling and discrete-time samples. We propose an estimation approach that takes advantage of the rich sources in tick-by-tick data while preserving the continuous-time assumption on the underlying returns. Under our framework, it becomes clear why and where the usual volatility estimator fails when the returns are sampled at the highest frequencies. If the noise is asymptotically small, our work provides a way of finding the optimal sampling frequency. A better approach, the two-scale estimator, works for any size of the noise.

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