Bayesian analysis of duration data

Tomoki Toyabe

Kanazawa Gakuin University

This research focuses on the development and application of Bayesian statistical estimation methods for time-related data, specifically inter-event intervals and survival times. For the analysis of inter-event intervals, we employ the Stochastic Conditional Duration (SCD) model and apply it to tick data from stock and commodity futures markets. Our particular interest lies in the phenomenon known as intraday seasonality—a common trading behavior observed daily where trading activity intensifies after market open and before market close. This results in a U-shaped pattern in volatility and an inverted U-shaped pattern in inter-trade intervals.

We extend the SCD model to account for intraday seasonality and apply it to stock market data, demonstrating improved modeling of trading behaviors. Additionally, we enhance the estimation methods and apply them to commodity futures markets, showcasing the versatility and effectiveness of our approach.