



The University of Chicago
Department of Statistics
Master's Seminar

TAEJIN KIM

Department of Statistics
The University of Chicago

Empirical Estimation of Distributions of Limit Order Book

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ABSTRACT

This paper studies time dependent variation of limit order book. In the stock market, traders submit limit orders with price and quantity that remain in the book until they are executed. Accordingly we can draw a distribution of limit orders across prices at each moment, for both bid and ask sides respectively. We investigate how the distributions evolve through time and what variables are effective in explaining the movement.

In order to estimate the time dependent distributions, we use a version of semi-parametric approach that facilitates economic interpretations. For covariates, we consider realized volatility, price changes, percentage spread and trading volume among others to see if they play a significant role in explaining the movement of mean and standard deviation.

The explanatory power of covariates appears to substantially depend on model specifications and not be very convincing in many cases, not the least due to sparseness of limit order book at each point of time. However, there is still plenty of room for improvement, which is in progress.