

The statistical laws of order intervals in London stock market

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We show statistical laws of order intervals by analyzing order books in London stock market from July 2004 to December 2004 and from May 2007 to July 2008. We first investigate intervals of buy-limit-order L_b . Fig.1 displays the cumulative distribution of the order intervals. For intervals shorter than about 120 seconds, the distribution does not follow the exponential function. We introduce an empirical model that explains this non-trivial distribution.

Let us consider the probability that a buy-limit-order occurs at discrete time step t , $p(t)$. We find that this probability is not a constant but it depends on the number of buy-limit-orders occurred in the time interval from $t-T$ to time t , $N(t;T)$,

$$p(t) \approx a + b \cdot \frac{N(t;T)}{T}, \quad (1)$$

where $a=0.018$, $b=0.63$ and $T=120$ seconds in the case of buy-limit-order L_b . We numerically simulate the occurrence of buy-limit-order using Eq.(1) and observe the distribution of intervals. As shown in Fig.1, we can confirm that the distribution of order intervals is nicely reproduced by this simulation. Such statistical properties are also found for buy-market-order M_b , sell-limit-order L_s and sell-market-order M_s .

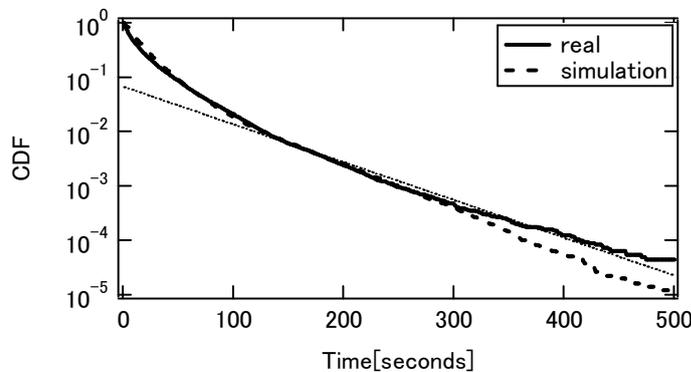


Fig.1 Cumulative distribution of intervals of order L_b for the stock AVIVA. The line shows an exponential function.

Keywords: stock market; order book; order interval