Tick Size and HFT Activity on Russian Stock Market
Vyacheslav Arbuzov
Risk Lab, PROGNOZ
Microstructure of markets depends on relative tick size...

\[ \text{relative tick size} = 10000 \times \frac{\text{tick size}}{\text{price}} \]
Distribution of order’s volume is like power law...

\[ p(v) = (\alpha - 1) \cdot v^\alpha \]

where \( \alpha \) slope of distribution
3 main parts of distributions:
• Effective limit orders – orders in the depth of order book (left part)
• Effective market orders – orders in opposite side (right part)
• Orders with the best price (zero value)

d = (p − pb)/ticksize for buy orders

d = (ps − p)/ticksize for sell orders

DISTRIBUTION OF PRICE DISTANCE
Heavy tails and large orders

Small orders

$y = 561.66x^{-4.185}$

$R^2 = 0.8482$

Slope of power law in distribution of volumes
Small number of best price orders

High number market orders

Small number market orders

High number of best price orders

RELATIVE TICK SIZE – PRICE FRACTION

\[ y = 4954.8x^{5.0359} \]
\[ R^2 = 0.9545 \]

\[ y = 0.0063x^{-5.758} \]
\[ R^2 = 0.8708 \]
With decreasing of tick size, number of HFT trades is increasing.

**Kirilenko – Kyle methodology**

\[ y = 280.22x^{-0.959} \]
\[ R^2 = 0.2638 \]

**IIROC methodology**

\[ y = 23428x^{-1.697} \]
\[ R^2 = 0.3097 \]

**ASIC methodology**

\[ y = 815.47x^{-1.168} \]
\[ R^2 = 0.2724 \]
With decreasing of tick size, turnover of HFT is increasing..
Thank you for your attention!

Q&A

arbuzov@prognoz.ru