Matching TAQ Trades and Quotes in the Presence of Multiple Quotes

Introduction

Suppose the following are the trades and quotes for symbol A on a given date around 10:00 am:

Trade – Quote Data

Panel A: Trades

CTID	SYMBOL	DATE	TIME	PRICE
1	A	1/2/1995	10:00:03	50.00
2	A	1/2/1995	10:00:04	50.00
3	A	1/2/1995	10:00:05	50.00

Panel B: Quotes

CQID	SYMBOL	DATE	TIME	BID	OFR
1	A	1/2/1995	10:00:00	49.95	51.00
2	A	1/2/1995	10:00:00	49.99	50.01
3	A	1/2/1995	10:00:00	49.00	50.25

We are interested in classifying trade with CTID=3 (Panel A: Trades) as a buy or a sell initated. Following Lee and Ready (1991), we want to perform a "quote test" that is to compare its trade price to quotes (Panel B: Quotes) that happened five-seconds before the trade report time. However, it turns out that there are three quotes exactly five seconds before the trade time. Thus, any one of these is a potential match for the trade. Which one should be used?

Discussion

The academic literature on matching trades to quotes is silent on which quote should be selected in the presence of multiple quotes. Perhaps, this is due to the fact that it is a relatively new problem. The number of quotes per trade has increased from less than two in the early 1990s to more than 13 in recent data. Our approach to this issue is to provide two sample procedures to our users each having a default algorithm for selecting the matching quote but each having the flexibility to accommodate user-programmed algorithms.

Our two approaches are 1. the Data Views approach and 2. the DOW Loop approach. The Data

Views approach is documented in WRDS (2009a). while the DOW Loop approach is documented in WRDS (2009b). Both approaches are faster and much more efficient than those advocated elsewhere (e.g., the approach advocated in Boehmer, Broussard, and Kallunki, 2002, pp. 119 - 129). The Data Views approach will match every trade to the last quote in a group of quotes that occur at the same time. Therefore, in the example above, the Data Views approach will match CTID=3 to CQID=3 classifying the trade as a buy since the trade price is above the quote midpoint. The DOW Loop approach will match every trade to the first quote in a group of quotes that occur at the same time. Therefore, in the example above, the DOW Loop approach will match CTID=3 to CQID=1 classifying the trade as a sell since the trade price is below the quote midpoint.

Users may choose also to create their own average bid-ask midpoint in these cases.

References

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Lee, Charles M. C. and Mark J. Ready, 1991, Inferring Trade Direction from Intraday Data, The Journal of Finance, 46 (2), pp. 733-746.

WRDS, 2009a, Lee and Ready (1991) Test (../_004Research%20Applications/_010Market%20Microstructure%20Study/lee_ready.cfm)

WRDS, 2009b, Efficient Merging of TAQ Trades and Quotes in SAS® Using the DOW Loop (https://wrds-web.wharton.upenn.edu/wrds/research/applications/microstructure/sas%20dow%20loop/)

3 Ways to use WRDS (https://wrds-web.wharton.upenn.edu/wrds/about/three_ways_to_use_WRDS.cfm)
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