

BondWave's Transaction Quality Analysis (TQA)

Compares the total transaction cost of each trade to a peer benchmark that relates to that trade.

To calculate the benchmark total cost, BondWave utilizes several trade characteristics and bond attributes to cluster trades into peer groups over a contemporaneous timeframe. Additionally, the availability and quality of trade data are also considered within each of the peer trade clusters. TQA benchmarks are also designed to be specific to the PMP waterfall level at which data is found. Lastly, BondWave has observed there to be a categorical difference between riskless principal trades done at zero mark up and ones done with a positive mark up. This knowledge is applied to create separate TQA benchmarks for Riskless Principal Trades with No Mark Up and Riskless Principal Trades with Positive Mark Up.

TQA Benchmark Peer Group Definitions

The peer group definitions for TQA Benchmarks are based on some combination of the following features:

- **Trade Characteristics** – Par Traded, Side of Market, Type of Trade
- **Bond Attributes** – Asset Type, Rating, Maturity
- **PMP Waterfall Levels**
 - Firm Trades/Riskless Principal (RP) Trades
 - Same Bond Dealer-to-Dealer Trades
 - Same Bond Institutional Customer Trades
 - Same Bond Quotes
 - Similar Bonds Dealer-to-Dealer Trades
 - Similar Bonds Institutional Customer Trades
 - Similar Bonds Quotes
 - Economic Model
- **Data Quality** - The levels of the PMP waterfall are arranged in that order by FINRA as a tacit admission that the data at the higher levels is of more probative value than the data at the subsequent levels. While this is generally true, BondWave has scored the data quality of the benchmarks, and re-arranged levels based on the scoring.

TQA Benchmark Transaction Cost

Once peer trade clusters are defined, BondWave uses Tukey's fences method on transaction cost calculation to tag outliers within each cluster. **TQA benchmark transaction cost is arrived at by averaging the transaction cost of all trades within a peer trade cluster excluding the outliers.**

TQA Benchmark Calculation Frequency

At present, BondWave performs **monthly** Transaction Quality benchmark calculations for corporate bonds, tax exempt municipal bonds, taxable municipal bonds and agency securities. Trade data from three months preceding the calculation date is used for these calculations.

Transaction Quality

By comparing the transaction cost of a subject trade to its TQA benchmark BondWave derives a transaction quality metric. **A positive value for transaction quality represents lower trading costs than the peer average.**

Transaction Quality Relative to Peer Trades

Furthermore, BondWave evaluates transaction quality of the subject trade against the transaction quality of its peer trades (as defined by the bounds of related TQA benchmark). **Percentile ranking** is used as a measure of transaction quality of a trade relative to that of its peer group.