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LIQUIDITY PROTECTION RULE

The purpose of the CODA Block Liquidity Protection Rule¹ (LPR) is to prevent a CODA Block auction from moving a stock's price an unreasonable distance based on the size of the print and the liquidity profile of the stock. The rule is driven by an equation that is calibrated individually for every stock based on the pattern of its trades over the last 20 trading days. The calibration methodology is designed to reflect the typical price variance of each stock as a function of its notional turnover. The LPR takes the size of a CODA Block print as an input and returns the maximum distance the CODA Block engine will allow the auction to go up outside the NBBO as the output.

1

Trade Data Filtering

The calibration acts on all regular way trades reported to the SIP during regular market hours, exclusive of opening and closing auction volume as well as other trades that appear to be reported out of sequence or are otherwise unrelated to the prevailing market conditions.

2

Data Point Generation

For every trade, 5 windows are randomly created spanning sequential trades summing to a notional value of \$100k - \$250MM. The price variance of the trades in the window is measured, creating a large set of (window size, price variance) data point pairs.

3

Regression Calibration

All data point pairs spanning the most recent 20 trading days are aggregated and organized into bins of similar notional value. A regression runs upon the median price variance for each notional bin to generate an equation that characterizes price variance as a function of notional turnover.

4

Optimizations

Several rules are applied to ensure that the results don't offend our common sense, including but not limited to: a. Enforce monotonicity - the equation curve is flattened out if necessary to guarantee that it never has a negative slope, i.e., it never gives a smaller answer for a larger number of shares b. Not enough data - if a symbol does not trade enough to generate a statistically significant number of data points, we default to logic that hardcodes the LPR value at twice the average daily range of the stock, regardless of auction size. In such stocks, the minimum CODA Block auction size is large relative to the stock's ADV so a more granular determination of a reasonable distance to move the stock's price cannot be made.



Open: Price and size of opening print from primary market for prior trading day; 5 and 20 days averages of size only.

Close: Price and size of closing print from primary market for prior trading day; 5 and 20 days averages of size only.

VWAP: Volume Weighted Average Price of regular way trades during regular market hours (exclusive of opening & closing volume).

NBBO Median: Typical size found on one side of the NBBO. Calculated as follows: all exchange quotes are aggregated and the total size (bid size + offer size at the NBBO). The median value is divided by two and reported in shares and notional terms.

NBBO Spread: Typical NBBO spread width. Calculated as follows: all exchange quotes are aggregated and the NBBO spread width is calculated for each unique state of the NBBO. The median value is reported in dollar and notional terms.

NBBO Midpt Change: Likelihood the NBBO midpoint will change in a random 100ms window of time. Calculated by dividing the trading day into 100ms segments and counting what % of them contain NBBO midpoint change.

Please visit www.codamarkets.com & register to access the CODA Block Liquidity Protection Rule Calculator.

¹The Liquidity Protection Rule is the result of data analysis performed by ALISA (Advanced Liquidity Studies and Analytics), a data platform operated by PDQ Enterprises, LLC.

CODA Block Liquidity Protection Rule Calculator

Ticker:

Type number of shares:

Minimum Initiation Size (shares):

Assumed Stock Price:

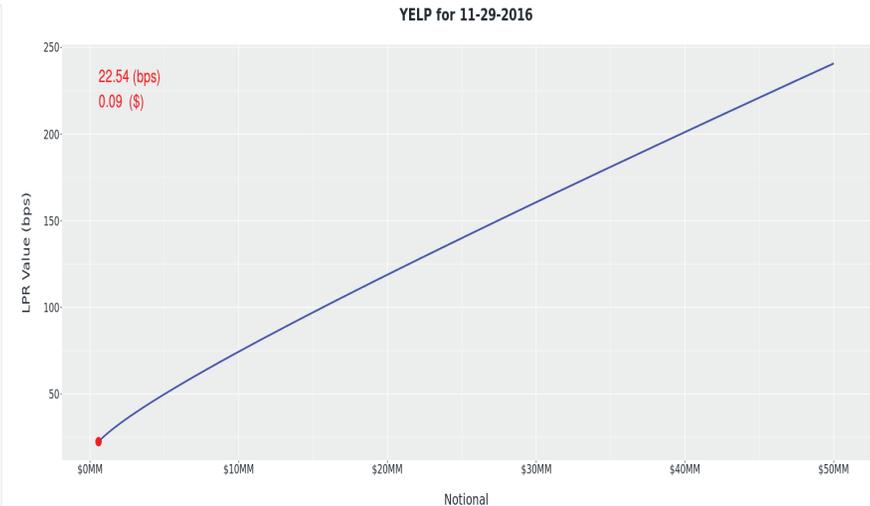
Notional Value:

Symbol Data	11-29-2016	5-days	20-days
Open	11,448 @ \$38.10	size: 16,372	size: 20,557
Close	30,982 @ \$38.31	size: 53,050	size: 85,250
VWAP	\$38.30	\$38.19	\$32.57
Price Range	\$0.86 / 224.26 bps	\$1.09 / 284.64 bps	\$1.44 / 394.99 bps
Largest Print	9,300	9,826	127,000
Volume	964,17K	1,08MM	2,31MM
Notional	\$36.93MM	\$41.5MM	\$83.6MM
Trades	8,524	9,052	16,750
NBBO Median	480@18.5k	500@19.5k	600@22k
NBBO Spread	\$0.02 / 5.24 bps	\$0.03 / 7.39 bps	\$0.02 / 5.63 bps
NBBO Midpt Change	1.11% (100ms)	1.10% (100ms)	1.36% (100ms)

Welcome to the CODA Block Liquidity Protection Rule (LPR) Calculator!
This webpage allows you to see how the LPR will work inside CODA Block.

Note: All of the following statistics are calculated on regular way trades and quotes reported by the SIP during regular market hours (exclusive of opening and closing volume)

Instructions: enter the ticker and the number of shares you are interested in, and the calculator will display the maximum distance outside the NBBO that LPR would allow a block of that size to print both in basis points and in dollar terms.



Disclaimer:
Your use of this website and accompanying calculator is provided on an 'as is' and 'as available' basis. The content of this website is subject to change at any time without notice, and is provided for the sole purpose of education and assistance in making independent investment decisions. We have taken reasonable measures to ensure the accuracy of the information contained herein; however, we do not guarantee its accuracy, and are not liable for any loss or damage which may arise directly or indirectly from the site, its content or from an inability to access such information, for any delay in or failure of the transmission or the receipt of any instruction or notification in connection therewith.

In this example, a trader has queried the Liquidity Protection Rule value for 15,000 shares of YELP. Based on an analysis of all trades in YELP over the past 20 days, the LPR Calculator has returned the answer that maximum distance outside the NBBO that the LPR will allow CODA Block to print 15,000 shares of YELP is 22.54 basis points or \$0.09.