

## **Market Liquidity Indicators – Technical Document**

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### **Introduction**

Market Liquidity Indicators are important determinants of quality of market developments as well as used by the market to determine bond premiums. The liquidity indicators are considered to be important tools used to determine bond spreads in most countries.

### **Important Liquidity Indicators**

1. Bid-Ask Spreads for
  - a. Liquid Securities
  - b. Semi-Liquid securities
  - c. Illiquid securities
2. Average number of trades per unit of time in a month
3. Order book size
4. Impact cost
5. Turnover ratios
6. Number of securities traded in a month

### **Explanation of Key Liquidity Indicators:**

- **Bid – Ask Spread**
  - Daily order book of outright market in NDS-OM will be used for the purpose. The classification of securities in the liquidity buckets (Liquid/Semi-liquid/Illiquid) is done on the basis of the classification of the securities in the security wise multiplicants for margin factors in the Securities Settlement segment released by CCIL's Risk Management Department for the month. In addition to this, the traded volumes of each security and its trading behaviour through the month are also other factors which determine the inclusion of a security in the respective liquidity buckets. In the liquid category, 4 securities are selected; for semi-liquid category, 3 securities; for illiquid category, 2 securities are considered for the liquidity analysis.
  - The order book snapshot will be picked up at periodic intervals and the spread will be computed as bid quote minus offer quote in terms of price. Additionally the information on bid-ask spread ratio to the mid-quote (Absolute (Offer Price - Bid Price) / (MID QUOTE) for each security) will also be given. Further, the bid-ask spread will also be given using Modified Duration of the security (in bps). Then it will be averaged for each security for the day and then finally for each category. Example of the same is given below. The working example is given below for 7.17% 2028 security for trading s on 27-Dec-2018 (settlement on 28-Dec-2018):

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### Order Book Snapshot

Security	7.17% GS 2028										
Coupon	7.17%										
Maturity Date	08-01-28										
Settlement Date	28-12-18										
<b>Bid</b>				<b>Offer</b>							
<b>Nos.</b>	<b>Amt.</b>	<b>Yield</b>	<b>Price</b>	<b>Amt</b>	<b>Yield</b>	<b>Price</b>	<b>Nos.</b>	Mid-quote	=(99.1525+99.1425)/2	99.1475	
2	10	7.3008	99.1425	5	7.2993	99.1525	1	Yield	=(7.2993+7.3008)/2	7.30005	
2	15	7.3012	99.14	5	7.2989	99.155	1	<b>Bid-Ask Spread (ps)</b>	<b>=99.1525-99.1425</b>	<b>0.01 ps</b>	
1	5	7.3016	99.1375	5	7.2985	99.1575	1	<b>Spread (Ratio)</b>	<b>=0.01/99.1475</b>	<b>0.01%</b>	
3	15	7.302	99.135	10	7.2981	99.16	2	Mduration		6.33281	
2	10	7.3024	99.1325	10	7.2978	99.1625	2	<b>Spread Mduration (bps)</b>	<b>=(0.01/6.3328)*100</b>	<b>0.1579 bps</b>	

The monthly average of Bid-Ask spread will be computed by taking daily average spreads for each category separately.

▪ **Average Number of Trades**

- Number of daily trades will be taken for the computation. At the end of the month, all daily data to be summed and divided by number of business days to get the month's data.

▪ **Order Book Size**

- Total Orders received in the system will be taken for computation of the Order Book size excluding cancelled orders by dealers. All outstanding orders not matched till the close of business hours will be taken into account for both buy and sell side. This will be totaled for the day and then averaged for the month by adding all daily orders and dividing the same by the number of business days for the month.

▪ **Impact Cost**

- Using the order book information of NDS-OM, the impact cost will be computed for executing a standard Rs.25 crore (FV) worth of a bond for both buy and sell side positions separately. IC is estimated for 5 most liquid bonds at every 30 minutes interval. At the end of the day, IC is averaged for both bid and offer side separately and then averaged together for the day. Bid IC is likely to be used by a trader having an open Buy position in the market and if she has to take an offsetting Sale deal to close out her open position, she will have to trade (take the price) with the price offered by a buyer (bidder) to fulfill the order. The Offer IC is likely to be used by a trader having an open Sale position.
- IC is calculated as the ratio of (Ideal Price – Effective Executable Price) / Ideal Price. Ideal price is the mid-quote ((best buy order price and best sell order price)/2). Bid and Offer Prices are the executable weighted average prices for executing Rs.25 crore of order in each side separately.

### Impact Cost Calculation

Bid				Offer							
Nos.	Amt.	Yield	Price	Amt.	Yield	Price	Nos.				
2	10	7.3008	99.1425	5	7.2993	99.1525	1	Mid-Price	$=(99.1525+99.1425)/2$	99.1475	
2	15	7.3012	99.14	5	7.2989	99.155	1	Bid Price	$=(10*99.1425+15*99.14)/25$	99.141	
1	5	7.3016	99.1375	5	7.2985	99.1575	1	Offer Price	$=(5*99.1525+5*99.155+5*99.1575+10*99.16)/25$	99.157	
3	15	7.302	99.135	10	7.2981	99.16	2	IC (Bid)	$=ABS((99.141-99.1475)/99.1475)$	0.0066%	
2	10	7.3024	99.1325	10	7.2978	99.1625	2	IC (Offer)	$=ABS(99.157-99.1475)/99.1475$	0.0096%	

▪ **Turnover Ratio (TR)**

- The data will be computed separately for outright and Repo deals.
- For outright market daily turnover will be daily trades value multiplied by 2. The TR will be computed as a ratio of Daily Turnover / Face Value of outstanding securities as available in RBI website.
- For Repo market, the turnover will be trades value multiplied by 4. The TR will be computed as a ratio of Daily Turnover / Face Value of outstanding securities.

▪ **Number of Securities Trades in a Month**

- All ISINs traded in the outright market during a month will be considered for this data. If a security is traded for a day, it will be included in the data.

**Data Source**

- NDS-OM order book
- Deals executed and reported in NDS-OM
- Deals executed and reported in CROMS
- Outstanding Database of RBI
- CCIL's Security-wise multiplicants for margin factors

**Release**

The data will be released on the first business day of the month for releasing previous month's data.

**Archives**

CCIL will maintain the historical database.