

Methodology Document – FBIL – MIBOR-OIS Curve¹

The FBIL MIBOR-OIS Curve will be constructed on the basis of trades executed in the market. All MIBOR-OIS transactions reported to CCIL upto 5 pm are used for computation of MIBOR-OIS Curve. The Curve will be constructed for 6, 9, 12, 24, 36, 48 and 60 months Tenors.

The OIS Curve will be constructed using the following methodology:

1. The rates will be based on traded data for each Tenor. The minimum threshold criteria for each tenor will be three surviving trades aggregating ₹75crore in value after removing the outliers calculated using the criteria of +/-3SD.
2. The rate for each Tenor will be calculated as the volume weighted average rate of the surviving trades.
3. Rates will be constructed for 6 Month, 9 Month, 1 Year, 2 Year, 3 Year, 4 Year and 5 Year Tenors.
4. Market trades on Annualized rate basis upto 1 year and trades on semi-annual basis for Tenors more than 1 Year. For consistency of the continuous curve construction, all semi-annual rates will be converted into annualized basis using the formula:

$$\text{Annualized Rate} = \left(1 + \frac{\text{Semi-Annual Rate}\%}{2}\right)^2 - 1$$

5. After converting all the traded rates into standardized annualized rates, all missing Tenors (where threshold criteria of 3 surviving trades aggregating ₹ 75 crores in value is not met) will be interpolated/extrapolated based on adjacent tenors or nearest Tenors as the case may be if minimum 3 traded points are available between 6 Month and 5 Year (Annexure 1).
6. If only two traded points are available, then the rate is computed for the missing Tenors as the previous day's OIS rate of the Tenor and the average spread over the previous day of two adjacent Tenors or the nearby spread over previous day as the case may be. The spread is based on the standardized rates as mentioned above (Annexure 2).

¹ The document has been prepared by Dr. Golaka C Nath for FBIL.

7. Final rates will be disseminated as per the respective market convention for the various Tenors. 6M, 9M and 1YR will be shown as Annualized rates while 2Y, 3Y, 4Y and 5Y will be shown as Semi-annual Rate after reconvertng them from Annualized Rates to Semi-Annual Rates.
8. If only one traded point is available, then the previous day's OIS rates are repeated for rest of the Tenors keeping only the traded point.
9. If no OIS rates for any Tenor can be calculated on a day due to lack of traded points, then the previous day's OIS rates are repeated.
10. All Rates will be calculated by rounding off upto 4 decimals. The display will be upto 2 decimals.
11. The display format is given in Annexure – 3.

The Benchmark FBIL MIBOR-OIS curve for the day will be published by 5.45 PM on all business days excluding Saturday, Sunday and Mumbai Holidays.

Reference: OIS Curve – A concept on Methodology by Dr. Golaka C Nath

Annexure 1: Calculation Process for the Missing Values Based On Interpolation/Extrapolation

Computation of Missing Rates using interpolation/extrapolation for October 11, 2017									
	A	B	C	D	E	F	G	H	I
1	Date	Tenor	6M	9M	1Y	2Y	3Y	4Y	5Y
2			6	9	12	24	36	48	60
3	11-Oct-17	Traded	6.1032	BLANK	6.1241	BLANK	6.1054	6.2083	6.2872
4	11-Oct-17	Standardized to Annual	6.1032	-	6.1241	-	$=(((1+G3\%/2)^2)-1)*100$	$=(((1+H3\%/2)^2)-1)*100$	$=(((1+I3\%/2)^2)-1)*100$
5							6.1986	6.3047	6.3860
6	11-Oct-17	Traded/Computed Rate	6.1032	$=C4+((E4-C4)/(E2-C2))*(D2-C2)$	6.1241	$=E4+((G4-E4)/(G2-E2))*(F2-E2)$	6.1054	6.2083	6.2872
7				6.1137		6.1613			
8	11-Oct-17	Final Rates	6.1032	6.1137	6.1241	$=((1+F7\%)^{(1/2)}-1)*2*100$	6.1054	6.2083	6.2872
9						6.0692			

Annexure 2: Calculation Process for the Missing Values Using Adjacent/Nearby Tenor(S)

Computation of Missing Rates using Previous day's OIS Rate and Spread for July 18, 2017									
	A	B	C	D	E	F	G	H	I
1	Date	Tenor	6M	9M	1Y	2Y	3Y	4Y	5Y
2			6	9	12	24	36	48	60
3	17-Jul-17	Disseminated Rates	6.1763	6.1915	6.2066	6.1721	6.1375	6.189	6.2467
4	17-Jul-17	Standardized Rates	6.1763	6.1915	6.2066	$=((1+F3\%)^{(1/2)}-1)*2*100$	$=((1+G3\%)^{(1/2)}-1)*2*100$	$=((1+H3\%)^{(1/2)}-1)*2*100$	$=((1+I3\%)^{(1/2)}-1)*2*100$
5						6.0797	6.0461	6.0961	6.1521
6	18-Jul-17	Traded	BLANK	BLANK	6.2125	BLANK	BLANK	BLANK	6.2517
7	18-Jul-17	Standardized to Annual	-	-	6.2125	-	-	-	$=(((1+I6\%/2)^2)-1)*100$
8									6.3494
9	18-Jul-17	Traded/Computed Rate	$=C4+(E9-E4)$	$=(D4)+((C10-C4)+(E9-E4))/2$	6.2125	$=(F5)+((E9-E4)+(I9-I5))/2$	$=(G5)+((F10-F5)+(I9-I5))/2$	$=(H5)+((G10-G5)+(I9-I5))/2$	6.2517
10			6.1822	6.1974		6.1813	6.1956	6.2695	
11	18-Jul-17	Final Rates	6.1822	6.1974	6.2125	$=((1+F10\%)^{(1/2)}-1)*2*100$	$=((1+G10\%)^{(1/2)}-1)*2*100$	$=((1+H10\%)^{(1/2)}-1)*2*100$	6.2517
12						6.0886	6.1025	6.1742	

Annexure 3: Display Format for FBIL MIBOR – OIS (All rates in %)

Date	Time	6M	9M	1Y	2Y	3Y	4Y	5Y	Comments
3/5/2018	17:45	6.35	6.45	6.54	6.55	6.68	6.79	6.88	
3/6/2018	17:45	6.10	6.11	6.12	6.07	6.11	6.21	6.29	