

TO ALL MEMBERS & OTHER INTERESTED PERSONS

Securities Settlement Segment **Note on Valuation of Floating Rate Bonds**

CCIL has been examining the possibility of developing a process for valuing Floating Rate Bonds. A method has since been developed to address these issues.

A note containing the suggested processes is being put up in CCIL website for information of its members and other interested persons and also for seeking their suggestions / feedbacks on the subject. The feedback may kindly be forwarded to us by the 25th March, 2005. Based on the feedback, we are aiming at implementation of the same from 31st March, 2005.

Vice President
(Risk Management)

14th March '05

Encl.

VALUATION OF FLOATING RATE BONDS

Presently there are 10 nos of Floating Rate Bonds (FRBs) issued by Government of India which are traded in the Govt Securities market [details as per Annexure – I]. Of these, FRB 2013, FRB 2015 I & II (2 securities) and FRB 2016 securities are periodically traded whereas the other FRBs are traded very rarely. There are however significant volume of repo trades involving these securities.

2. As per current CCIL valuation system, the value of FRBs, irrespective of their coupons, are taken at Rs. 100 (equal to face value) as on the date of next reset. *For valuation of a FRB, this amount is discounted to the date of valuation using the applicable zero rate.* In addition, the *known interest cash flow for the current interest period is also discounted to the date of valuation.* [other interest cash flows are ignored].

3. The existing FRBs vary widely in terms of spread over average of 364 day T-bill rates (spread varies from -5 basis point to +50 basis point) even though repricing periodicity-wise and maturity-wise these FRBs are more or less alike [except FRB 2006 & FRB 2009 which are of relatively shorter maturity]. Floating leg of the FRBs are linked to average of cut off yields of last 3 or 6 auction of 364 Day T-Bill. Hence valuing all these FRBs at Rs. 100 on reset dates actually result in the failure of the valuation process to capture the extra return with each cash flow over normally expected market return for a government security of the respective tenor. In the market, FRBs like FRB 2013, FRB 2014, FRB 2015 and FRB 2017 are priced by the market at a level which are significantly higher than the respective model prices.

4. It has therefore been felt that the valuation process for FRBs needs to be altered to ensure that the theoretical price (i.e. Model Price) of the FRBs reflect the price more accurately. It is also felt that the solution lies in allowing all cash flows to be computed like a normal bond using estimated forward to forward rate for each interest period derived from the sovereign zero curve on the day of valuation. As the FRBs are linked to average of cut off yield of 364 day T-bill auctions and as 364 day T bills are issued every fortnight based on auction on Wednesdays, it is possible to create 364 day strips as on each future alternate Wednesdays from the sovereign zero curve on the day of valuation (presumption is that the cut off yield would be at the prevailing market yield). The rates for these strips can then be used to estimate the future cash flows on these bonds. After all the cash flows are estimated, these values are to be discounted to the date of valuation using normal zero rates to arrive at the correct theoretical values (Model Prices) of the FRBs. [detailed process described in Annexure II].

5. It has been felt that this method of valuation would be uniformly applicable for valuation of all types of FRBs irrespective of the type of benchmark or the level of spread over the benchmark. The same process of valuation of Floating leg has also been proposed by CCIL for valuation of floating leg of Interest Rate Swaps. In case these FRBs continue to be relatively illiquid, the actual prices in the market would be less than the theoretical prices of these FRBs. To take care of this, Liquidity

Adjustment Factor (LAF) may be worked out for these securities based on the past trend of the difference between the traded values and the Model Prices.

6. A list of the theoretical prices as on 07.03.05 derived using the proposed process is appended below for a better understanding of the expected Model Prices after the new processes are brought into use:

ISIN	Particulars	Model Prices as on 07/03/2005		Last traded	
		Current method	Proposed method	Price	Date
IN0020012012	FRB 2006	100.10	100.26	99.50	01-02-05
IN0020012020	FRB 2009	100.14	100.64	* 100.00	05-03-05
IN0020032028	FRB 2011	99.88	100.86	101.67	04-02-05
IN0020032036	FRB 2012	100.27	101.20	101.54	07-03-05
IN0020042043	FRB 2013	100.17	103.34	103.67	07-03-05
IN0020032010	FRB 2014	99.94	101.37	101.48	08-02-05
IN0020042027	FRB 2015 I	99.92	101.84	102.38	08-02-05
IN0020042035	FRB 2015 II	100.03	104.14	104.62	07-03-05
IN0020042019	FRB 2016	99.94	100.85	101.34	04-02-05
IN0020022011	FRB 2017	100.32	104.07	* 99.99	07-10-04

* No Outright trade of above Rs. 5 crores in last 3 months- price mentioned is for the last repo trade.

7. CCIL proposes to implement the changes from 31st March '05. Members and other interested persons are requested to forward their suggestions/feedback in regard to the proposed processes to Vice President (Risk management), The Clearing Corporation of India Ltd. latest by the 25th March '05. In case any clarification is required, members may contact Shri. Siddhartha Roy / Mr. V. Swamynathan / Mr. Sunil Kapoor at 24902445 / 56639327 / 56639326.

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ANNEXURE - I

Floating Rate Bonds - Particulars of Coupons and Applicable Maturity Dates 09-03-2005										
Sr. No.	ISIN NO.	DESCRIPTION	ISSUE DATE	CURRENT PERIOD COUPON	BENCHMARK INDEX	SPREAD	MATURITY DATE	Previous Interest Reset Date	Next Interest Reset Date	RESET PERIODICITY (in months)
1	IN0020012012	GOI FLOATING RATE BOND 2006	22-Nov-01	5.37	364 DTB_6A *	-0.05	22-Nov-06	22-Nov-04	23-May-05	6
2	IN0020012020	GOI FLOATING RATE BONDS 2009	6-Dec-01	5.52	364 DTB_6A *	-0.01	6-Dec-09	6-Dec-04	6-Jun-05	6
3	IN0020032028	GOI FLOATING RATE BONDS 2011	8-Aug-03	4.75	364 DTB_3A	0.13	8-Aug-11	7-Aug-04	8-Aug-05	12
4	IN0020032036	GOI FLOATING RATE BOND 2012	10-Nov-03	5.60	364 DTB_3A	0.09	10-Nov-12	10-Nov-04	10-Nov-05	12
5	IN0020042043	GOI FLOATING RATE BOND 2013	10-Sep-04	5.47	364 DTB_3A	0.45	10-Sep-13	10-Sep-04	10-Sep-05	12
6	IN0020032010	GOI FLOATING RATE BOND 2014	20-May-03	4.59	364 DTB_3A	0.14	20-May-14	20-May-04	20-May-05	12
7	IN0020042027	GOI FLOATING RATE BOND 2015 I	2-Jul-04	4.71	364 DTB_3A	0.19	2-Jul-15	2-Jul-04	2-Jul-05	12
8	IN0020042035	GOI FLOATING RATE BOND 2015 II	10-Aug-04	5.12	364 DTB_3A	0.5	10-Aug-15	10-Aug-04	10-Aug-05	12
9	IN0020042019	GOI FLOATING RATE BOND 2016	7-May-04	4.49	364 DTB_3A	0.04	7-May-16	7-May-04	7-May-05	12
10	IN0020022011	GOI FLOATING RATE BOND 2017	2-Jul-02	5.99	364 DTB_6A *	0.34	2-Jul-17	3-Jan-05	2-Jul-05	6

* 364 DTB_6A indicates average of cut off yields for 364 day T-Bill in past six auctions.

A. Process common to all FRBs

- The first step is to list down all the 364-DTB Auction dates with minimum 6 previous auction dates as on the date of valuation. It will extend upto next 11 years (upto the maturity of FRB 2016). We take alternate Wednesdays as the Auction dates. [*As each auction date is passed, the result would be stored and one more Wednesday would be added to the list of future auction dates*].
- *At the time of valuation,*
 - (i) using CCIL N & S parameters, zero rates are computed for periods upto each Auction date and each Auction Date + 364 days (from the date of valuation).
 - (ii) Forward to forward rates are then computed between each Auction date & Auction date + 364 days. These rates are then to be used for computation of expected cash flows in respect of each of the reset dates.(or for intervening cash flows i.e. to take care of cases like half yearly interest payments with annual reset)

B. Process specific to the FRBs

- The Reset dates for each floating rate bonds are to be stored in the master (or recomputed everyday at the time of valuation).
- *At the time of valuation*
 - (i) For the first cash flow, the coupon is known and hence taken as such
 - (ii) For each future Reset date, previous three(or six) auction dates are listed.
 - (iii) The coupon for these Reset date would be simple average of the estimate forward to forward rates on above three (or six) auction dates plus the applicable spread.
 - (iv) For the past period for which auction rates are known, such actual rates are taken into consideration (this may happen when next reset date is closer to the date of valuation).
 - (v) The estimated cash flows (including the redemption value on the date of maturity) are discounted using the zero rates for the periods upto the respective Cash flow dates.
 - (vi) Sum of the present values of all the cash flows are taken as the Model Price of the bond.
 - (vii) LAF for the FRB, if any are then adjusted from the Model Price to arrive at the Adjusted Model Price

Steps (i) to (vii) are repeated for valuation of each bond.

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