

DAY END VALUATION OF IIBs by FIMMDA

LEVEL I - (Based on actual Traded Prices)

For recognizing Actual Traded Prices FIMMDA would recognize the Last Traded Price and Yield provided there are minimum of 3 Trades for Rs. 15 Crs. traded on the Valuation Date. (as per Valuation Committee Meeting dated 1st June 2013)

LEVEL II - [Based on Market Observable Tradable (MOT) Quotes shown on the NDS OM]

The weighted average of the MOTs would be taken for valuation provided there are atleast Rs.5 Crs BID and Rs.5 Crs Offer observed at 12 noon and 4 pm on the NDS OM

LEVEL III - Interim Model Price (please see the following)

Interim LEVEL III "Model" Valuation Pending Finalization of a Mathematical Model after Observing Auctions and Traded Prices from June 2013 to August 2013

Valuations of a hypothetical IIB 1.25% II GS 2023 issued on April 30, 2013 and Valued on May 17, 2013, if:

Assumptions:

- i. No trade takes place on 17.05.2013 (Level I)
- ii. There are no Market Observable Tradable quotes on NDS-OM (Level II)
- iii. The IIB does not trade at all after the auction on 30.04.2013 OR
- iv. The IIB trades on 16.05.2013 at Rs. 101.00

1.25% II GS 2023

I. Issue Date	30-Apr-13
II. Maturity	30-Apr-23
III. Principal	100.00
IV. 10 yr Nominal Par Yield Rate as on issue date (Semi - annualized)	7.7849%
V. Auction Cut-off	1.25%
VI. Illiquidity Premium 'IP' + Inflation Expectation 'IE'	Nominal Yield - Auction Cut-off 7.7849 - 1.25 = 6.5349%

I. Calculation of Model Real Yield as on Valuation date (17.05.2013) (If no trade takes place after auction on 30.04.2013)

10 yr Nominal Rate as on 17.05.13 (Par Yield) = 7.1807% (Say)
IP + IE (as on 30.04.2013) = 6.5349%

Real Yield for discounting on 17.05.2013 =

$$\text{Real Yield} = \frac{(1 + \text{Par Yield})}{(1 + (\text{IP} + \text{IE}))} - 1$$

$$\begin{aligned} &= (1 + \text{Par Yield}) / (1 + (\text{IP} + \text{IE})) - 1 \\ &= (1 + 0.0718) / (1 + 0.0653) - 1 \\ &= 0.6102\% = 0.61\% \end{aligned}$$

Valuing 1.25% II GS 2023 at a yield of 0.61% and by using the excel Price formula we get, the day-end Valuation at **Rs.106.17**.

The above factor (IP + IE) would be frozen and used for calculation "Real Yield" for valuing the bond on 17-May-2013 and also for subsequent days till another trade or Auction of 1.25% II GS 2023 takes place.

II. Calculation of Model Real Yield as on Valuation date (17.05.2013) (If trade takes place on 16.05.13)

If 1.25% II GS 2023 has traded at a price of **101.00** on 16-May-2013, the real yield (inclusive of Illiquidity Premium + Inflation expectation) would be **1.1434%** as follows:

Trade Date	16-May-13
Settlement Date	17-May-13
Maturity Date	30-Apr-23
Coupon	1.25%
Traded Price	101.00
Redemption	100.00
Nominal Yield (for 16.05.13)	7.4258%
Traded Real Yield	1.1434%
IP + IE = (1+Nominal Yield) / (1+Real Yield) - 1	(1+0.0743) / (1+0.0114) = 6.2114%

Therefore, IP + IE = 6.2114% (as on 16.05.2013)

The above factor (IP + IE) would be frozen and used for calculation "Real Yield" for valuing the bond on 17-May-2013 and also for subsequent days till another trade or Auction of 1.25% II GS 2023 takes place.

If the Nominal Yield for 17.05.13 is 7.1807%

Then, Model Real Yield for 17.05.13 =

$$\text{Real Yield} = \frac{(1 + \text{Par Yield})}{(1 + (\text{IP} + \text{IE}))} - 1$$

$$= [(1+\text{Par Yield}) / \{1 + (\text{IP} + \text{IE})_{16 \text{ May } 2013}\}] - 1$$

$$= [(1+0.0718) / (1+0.0621)] - 1$$

$$= 0.91\%$$

Thus, 1.25% II GS 2023 would be discounted at a “Model Real Yield” of 0.91% and the Model Price will be **Rs.103.20**.

The following work sheet shows the movement of model prices, using the actual par yield as per traded G sec data for the period 30.04.2013 to 29.05.2013. The **bold** prices and yields indicate **Auctioned** and **Traded Prices & Real Yield**.

Calculation of Price & Real Yield (2-May-2013 and 16-May-2013 to 29-May-2013) using Fisher Equation

Date	Nominal Yield		Illiquidity Premium + Inflation Expectation (IP + IE)		Real Yield		Price
	Par Yield in %	1+ (Par Yield)	IP + IE	1+ (IP +IE)	Real Yield	1+ (Real Yield)	
	A	B= 1+ A	C	D= 1+ C	E = 1+ F	F	G
Auction Day (30 APRIL 2013)	7.78%	1.0778	(B/ F) - 1 = 6.4436		1.0125	1.25%	100.00
2-May-13	7.77%	1.0777	6.4436%	1.0644	1.0125	1.25%	100.00
16-May-13	7.43%	1.0743	6.2114%	1.0621	1.0114	1.14%	101.00
17-May-13	7.18%	1.0718	6.2114%	1.0621	1.0091	0.91%	103.20
20-May-13	7.18%	1.0718	6.2114%	1.0621	1.0091	0.91%	103.25
21-May-13	7.17%	1.0717	6.2114%	1.0621	1.0091	0.91%	103.26
22-May-13	7.18%	1.0718	6.0757%	1.0608	1.0104	1.04%	102.00
23-May-13	7.16%	1.0716	6.0757%	1.0608	1.0103	1.03%	102.11
24-May-13	7.13%	1.0713	6.0757%	1.0608	1.0099	0.99%	102.42
27-May-13	7.14%	1.0714	6.0365%	1.0604	1.0104	1.04%	102.00
28-May-13	7.15%	1.0715	6.0365%	1.0604	1.0105	1.05%	101.89
29-May-13	7.18%	1.0718	6.0365%	1.0604	1.0108	1.08%	101.62

*After observing Market Auctions and Trading from June to August 2013 and receiving feedback on the provisional model, **FIMMDA will put in place a final Mathematical Model by September 2013.***

*The **Final Model** will take into account various parameters and the valuation process will be documented in consultation with the market participants and put in place.*