

## **Developing a Collateralized Benchmark Reference Rate for Indian Market**

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### **Introduction**

A benchmark reference rate gives an accurate indication of the market pulse. It should be the feel of the market and represent the general market condition. It should emanate from the actual reaction of the market participants. It should garner the respect of the market participants and used widely in the market. LIBOR (London Inter Bank Offer Rate) disseminated by British Banks' Association is one of the most important and widely used benchmark reference rate in the world. Many central banks also disseminate reference rates like Repo/Reverse Repo rates. The rates disseminated by central banks are generally policy rates and are oriented towards long term stability in managing interest rate structure in the economy. India banks also disseminate their prime lending rates (PLR) for benchmarking purpose. But these PLRs are for longer term loans and advances and can hardly serve the purpose of very short term benchmarks. These policy rates are less dynamic and change when broad policy framework changes. A dynamic benchmark reference rate is a very important infrastructural support to the market participants in financial markets.

Generally in the fixed income securities market, the benchmark reference rate is an interest rate that the market respects and closely follows while executing various transactions. An ideal benchmark rate plays a useful role not only in the short term market but also helps in pricing of complex products like derivatives. A benchmark reference rate is generally used to fulfill the following:

- Traders can take business decisions as offsets compared with the prevailing reference rate.
- Derivatives are based on cost of carry concept. This cost of carry is generally dependent on a short term market reference rate.

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- A variety of contracts can be structured on reference rate. A floating rate bond requires a benchmark rate which will be regarded as an index.

Apart from its accuracy, such a reference rate needs to have other qualities. The rate should be worked out for dissemination by an un-biased entity which does not have vested interest in the market. The methodology should be robust and transparent so that market participants can have confidence in using such rate. The methodology of collation and computation should be scientific, should eliminate noise, and resist manipulation. A benchmark rate coming from an unbiased source would be most acceptable as the entity responsible for collating such rate would have no direct interest in the market movement. The benchmark rate should be made available easily and regularly so that market participants can use it whenever they choose to do so. A good historical database is required so that past movements can be tracked with reference to cyclicity, volatility, etc. A benchmark reference rate, which embodies all these qualities, would be widely acceptable to the market as reliable benchmark rate.

### **Indian Scenario**

In India, the most widely used benchmark reference rate, MIBOR (Mumbai Inter Bank Offer Rate), is disseminated by National Stock Exchange since 1998 and has been most widely accepted benchmark rate. The MIBOR has been widely used in the IRS (Interest Rate Swaps) contracts. The same is popularly known as FIMMDA-NSE-MIBOR/MIBID. Many banks, finance companies and financial institutions have issued MIBOR-linked deposits/papers. NSE MIBOR has been designed to give the overnight clean reference rate and generally tracks the call market. The basic design behind the said rate is the polling methodology– rates are polled from the traders over phone as to what rate they would quote to borrow or lend Rs.500million in the overnight call money market. Thirty three banks and primary dealers are polled on daily basis at 9.30AM for overnight rate and at 11.30AM for term rates. The average rate with lowest standard deviation is taken as the reference rate for the market. However, a boot strapping is used if there are sufficient rates polled in order to derive multiple average rates with their respective

standard deviations. However, the traders can wrongly quote the rate as there is no compulsion on the polled trader to correctly give a quote and do a deal on the said rate.

NSEIL disseminates 4 MIBOR/MIBID rates daily: overnight, 14-day, 1-month and 3-month. However, only overnight benchmark is relevant and widely used while other rates are not relevant as most of the days, it receives very few rates from polled members. Since a term rate market does not exist in India, the traders find it difficult to provide any quote for the same and many times the quote comes as “As of Yesterday”. It seems such polled rates are stale as most of the time the poll does not yield success and NSE has to use old information provided by a polled entity as the relevant rate for the day. The reference rates that are released to the market have serious acceptability issue. NSE has been consistently using these MIBORs for various terms in pricing the derivatives contracts traded at the exchange.

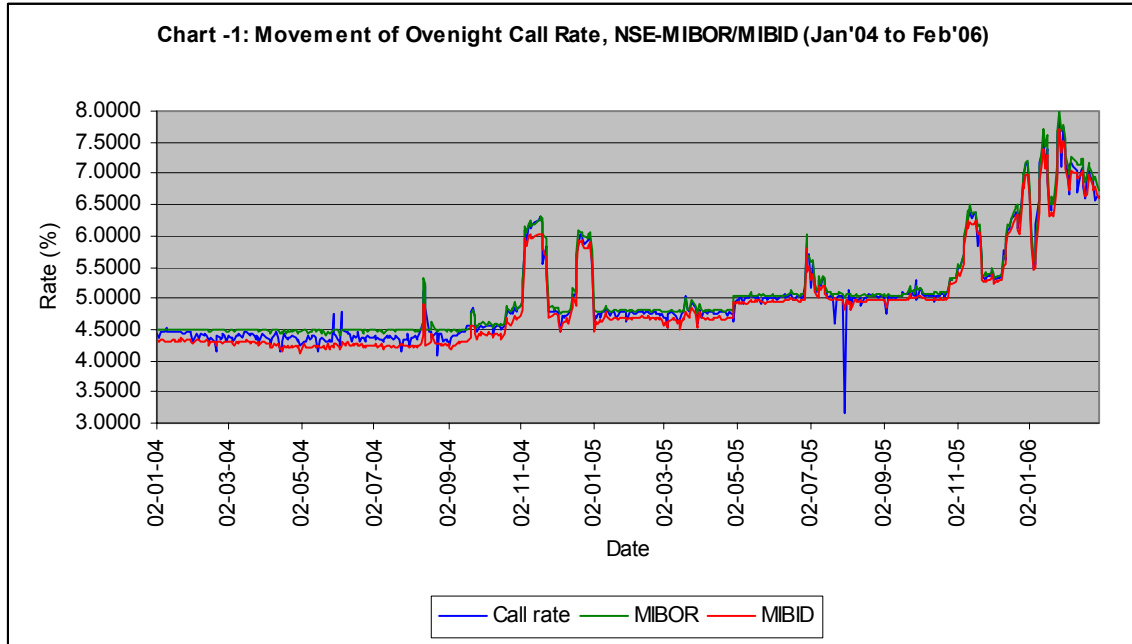
However, currently FIMMDA is seeking an alternative for overnight NSE-MIBOR as the same is not serving much purpose as consistently it has been above the RBI repo rate and “making the cost of carry negative in swap contracts” (Exhibit I). It is expected that MIBOR should be within the band of short term policy rates (Repo and Reverse Repo). There is a requirement of a respectable reference rate for the market. It is reported that FIMMDA is looking at other options like CBLO (Collateralized Borrowing and Lending Obligations) rate or the weekly Treasury Bills cut-off rates. The CBLO market, started in 2003, has stabilized and in terms of trading value it has surpassed the Repo market since March’05 and in recent months, combined volume of Repo and overnight call is lower than the CBLO volume. Since CBLO dealing platform relies on an order driven system, it has its own advantages. Since a large number of deals are executed in the early morning session, the CBLO rates can fulfill the requirement of a benchmark reference rates. These rates would give the true picture of happenings in the collateralized short term market. It can be disseminated in the morning (at 10.00AM) for the comfort of the market participants.

To quote from an article by Dr. R H Patil\*: “Since both the borrowers and lenders of funds are afraid to take position on interest rates for different durations, the Indian market has failed to develop an active money market. Currently, NSE has been publishing its MIBID/MIBOR for various durations up to 90 days. These rates are based on a polling method and not on the willingness of the market players to lend/borrow even modest amount of funds at the rates indicated by them in the polls. Hence NSE’s MIBID/MIBOR rates for different durations have failed to develop confidence in the market players to actually lend/borrow funds at these rates. Today market participants consider that these rates as purely indicative in nature. Despite availability of MIBID/MIBOR for periods upto 90 days since 1999 the market has not witnessed a term money market at which funds are actually lent on even a modest scale. The main reason is that market does not consider these rates as not being dependable for entering into actual transactions but more speculative/indicative in nature. But once CBLOs of varying maturities start getting traded actively the market in CBLOs would effectively help in the discovery of bid/offer rates for different maturities. This will help in the development of a real term money market.”

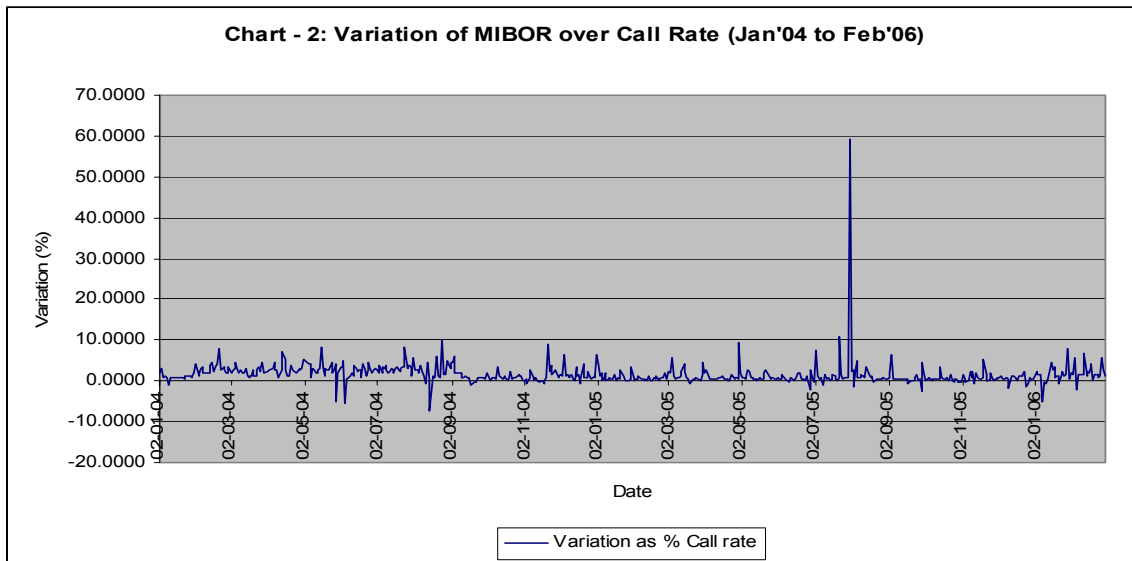
Currently NSE’s MIBID/MIBOR is designed to track the overnight call money market. MIBOR should be very close to the actual call lending rates in the market. In reality, the NSE MIBOR is generally higher than the actual call rates. An analysis of 26 months of data (Jan’04 to Feb’06) reveals that out of 627 business days, NSE MIBOR was higher than overnight weighted average call rate in 576 instances and only on 16 instances, MIBOR was exactly equal to weighted average call rate and in remaining 35 cases, MIBOR was lower than weighted average call rate. Hence, NSE MIBOR has an upward bias. Chart – 1 gives the movement of MIBOR/MIBID and Overnight weighted average Call Rate between Jan’04 and Feb’06.

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\* Patil, R H, (2003), Derivatives Market in India 2003 (edited by Susan Thomas) pp.221-242



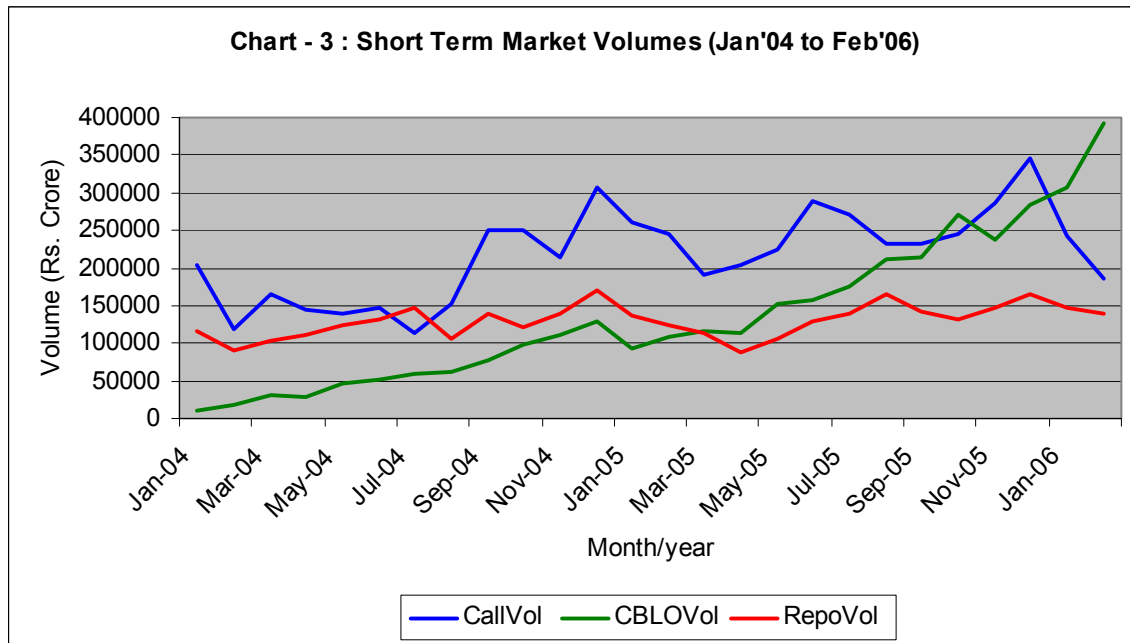
The spread of MIBOR over actual weighted average overnight call rate is at times substantial as given in Chart-2.



### Collateralized Market in India

Currently, the new collateralized market, CBLO, has become highly liquid and is dominating the short term market in terms of volume of transactions. Most of the days during last couple of months, the trading volume of CBLO segment is higher than the

combined trading volume of overnight call and market repo. Chart-2 gives the historical trading volume of short term market in India.



While the CBLO is gaining more acceptability the repo is getting increasingly less liquid day by day with lower trading volume. The order driven concept of CBLO market brings an onus on the traders who put the deals on the system as each deal has a fair chance of being matched if both side of the deal are in sync with each other. There is a need to develop a collateralized reference rate which can fill the void at present. The collateralized benchmark rate can be used to price the OIS (overnight indexed swaps).

The impact cost gives the indication of liquidity in the system. Lower impact cost indicates higher liquidity. The average impact cost of the CBLO market is about 1.32% which indicates ample liquidity. The average bid impact cost is 1.2572% while average offer impact cost is 1.3581% indicating general surplus liquidity in the system.

<b>Table - 1: Some facts about Impact Cost (Feb'05 to Jan'06)</b>					
Day	Avg_ic_bid	Avg_ic_offer	Std_Dev_ic_bid	Std_Dev_ic_offer	Avg_IC
Monday	1.0126	1.0364	0.9075	0.9344	1.0245
Tuesday	1.2702	1.3478	1.5341	1.4758	1.3090

Wed'day	0.8753	1.0156	0.6866	0.8364	0.9455
Thursday	1.4113	1.4413	1.6303	1.5284	1.4263
Friday	1.5818	1.7042	1.4281	1.4618	1.6430
Saturday	1.4266	1.7413	1.0001	1.1003	1.5839

Currently, CBLOs can be traded upto 91days at present and can be extended to one year. But if standardized CBLOs can be introduced for fixed tenures like 7 days, 14days, 1 month, 3 month, etc. it would lead to development of a term money market and those orders for various maturities on daily basis can be used to create term benchmark reference rates for the market.

#### **Methods:**

In a CBLO deal, there are two rates – a bid rate and an offer rate. When both the rates match, a trade is generated. As soon as the market opens, market participants input their orders into the CBLO system for both borrowing and lending. If a reference rate is to be estimated, it is required to take cognizance of the reaction of the market participants through their orders in the CBLO market. If the market is at equilibrium, the average rate in bid side will match the average rate in offer side. The wider difference between bid and offer rate would imply disharmony and substantial variance.

The benchmark reference rates should be disseminated for both sides of the deal - Average Bid and Average Offer Rate. For brevity, these rates can be referred as CCIL Collateralized Benchmark Bid Rate (**CCBID**) and CCIL Collateralized Benchmark Offer Rate (**CCBOR**). These rates should be arrived and disseminated at 10.10AM on the basis of orders received in CBLO segment upto 10.00AM. The orders would be collated and the weighted average rate would be derived for both Bid and Offer quotes. The standard deviation of rates would be calculated and disseminated with the benchmark rates to make the market aware about the level of divergence in quotes. If the difference between weighted average Bid and Offer rates arrived is substantial (more than 100bps), then the weighted average of traded rate would be the rate for both BID/Offer rates. Only on 5 occasions during the period from Feb'05 to Jan'06, the difference between average Bid and offer rate was more than 1%.

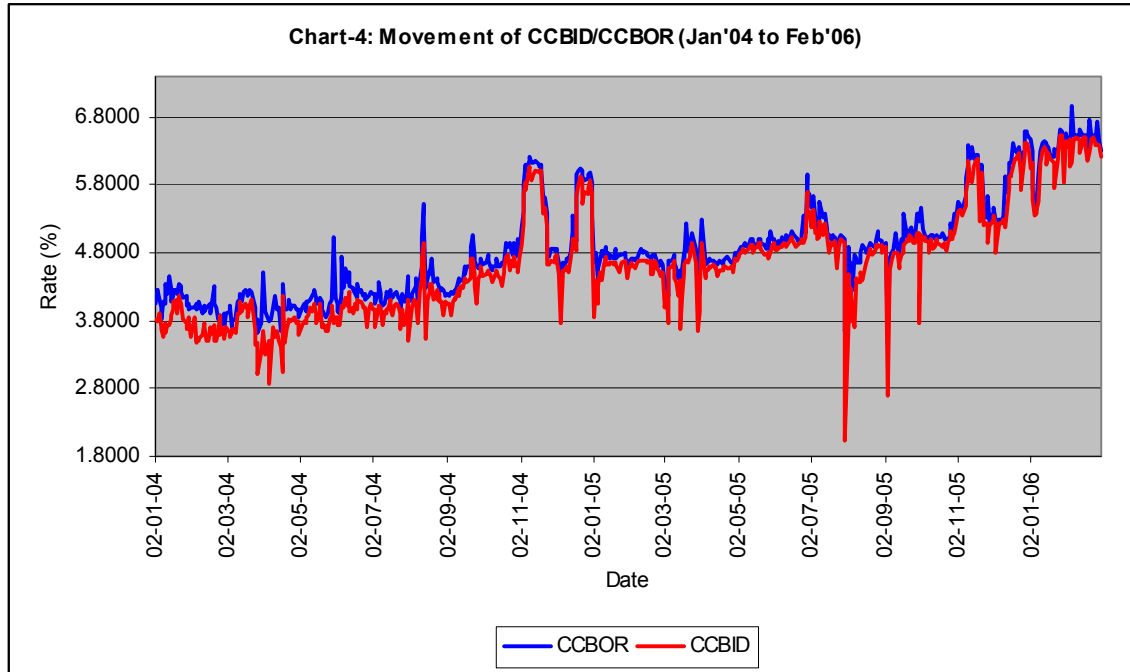
If for a particular day, both average bid and offer rates are not available because no CBLO quotes have come to the system or only few quotes (less than 5 quotes in both sides from different participants), then the previous available Bid/Offer rate would be disseminated to the market as the rates for the day. However, this issue is a theoretical one as normally CBLO system receives large number of orders before 10:00:00AM. The Table-2 gives the information of order arrivals in CBLO system before 10:00:00AM for last 26 months. The outliers in the quotes should be identified and the estimation should be done sans outliers.

<b>Table-2: Average Number of Orders Coming to CBLO system before 10:00:00AM</b>		
<b>Month/Year</b>	<b>OFFER Orders</b>	<b>BID Orders</b>
Jan-04	9	7
Feb-04	11	9
Mar-04	15	12
Apr-04	20	13
May-04	26	18
Jun-04	24	20
Jul-04	27	21
Aug-04	29	25
Sep-04	38	31
Oct-04	36	28
Nov-04	43	34
Dec-04	51	36
Jan-05	46	36
Feb-05	45	37
Mar-05	52	43
Apr-05	47	41
May-05	46	46
Jun-05	49	48
Jul-05	60	58
Aug-05	61	70
Sep-05	64	61
Oct-05	64	69
Nov-05	77	89
Dec-05	63	82
Jan-06	70	102
Feb-06	64	103
Average	44	44

### **Empirical of CCBID/CCBOR**

We have extracted the order data of CBLO segment from 9.00AM to 10.00AM on daily basis from Jan '04 to Feb'06 for our analysis. All orders arrived in the system (excluding

cancelled ones) upto the cut-off time are considered for our analysis. The weighted average rates for both bid and offer are estimated alongwith their respective standard deviations. Chart-4 gives the movement of CCBID and CCBOR during last 26 months.



We have also used NSE-MIBID/MIBOR for comparison purposes. The Table-3 gives the descriptive statistics of the four benchmark reference rates.

<b>Table-3: Descriptive Statistics of Benchmark Reference Rates</b>				
Parameters	<i>CCBOR</i>	<i>CCBID</i>	<i>MIBOR</i>	<i>MIBID</i>
Mean	4.866	4.654	5.082	4.911
Median	4.769	4.619	4.810	4.690
Mode	4.075	3.800	4.500	4.250
Standard Deviation	0.743	0.800	0.753	0.755
Kurtosis	-0.124	-0.098	2.304	1.761
Skewness	0.759	0.485	1.710	1.514
Range	3.523	4.510	3.590	3.610
Minimum	3.444	2.034	4.410	4.110
Maximum	6.967	6.543	8.000	7.720
Observations	629	629	628	628

The t-test results are given in Table-4:

<b>Table – 4 : T-Tests</b>			
Difference	DF	t Value	Pr >  t
CCBOR - MIBOR	627	-19.89	<.0001

CCBID - MIBID	627	-20.77	<.0001
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The t-test results show that the difference is significantly from zero statistically as expected from collateralized and clean rates. However, the rates have very high correlation as given in Table-5.

	CCBOR	CCBID	MIBID	MIBOR
CCBOR	1.00000			
CCBID	0.97518	1.00000		
MIBID	0.94629	0.92356	1.00000	
MIBOR	0.93547	0.90729	0.99637	1.00000

### **Conclusion**

A benchmark reference rate should be representative of the market activity. NSE MIBOR/MIBID, being polled rates; do not satisfy the need of a benchmark rate as stated by FIMMDA. However NSE MIBID/MIBOR rates are expected to track the uncollateralized market like overnight call. Once a electronic call market is put in place, we may have true uncollateralized benchmark rates as the current mechanism proposed in this paper can be used to estimate the daily NDS-MIBID/MIBOR as the proposed electronic call market system is going to be a part of NDS of RBI.

For a collateralized benchmark reference rate, there is no alternative but to look at CBLO market for obtaining the required benchmark rates. Since CBLO is a real-time based order driven system, the actual activity is captured through the order book. The CBLO being a commitment oriented and order driven market (any order has a possibility of resulting into a trade) would have added advantage over a system that rolls out benchmark rate on the basis of a poll. A polled rate system has possibility of manipulation and traders may quote a rate but may not be willing to do a deal at that rate. Hence, CBLO driven benchmark reference rates may be considered as effective benchmark rates.

### **Exhibit – 1: Press Report**

## BANKING NOTES

**SIB follow-on issue of Rs 150 cr to open on Feb 10**

South India Bank (SIB) Ltd announced on Monday that its follow-on issue of Rs 150 crore will open on February 10, 2006 and will close on February 15, 2006. The price band will be announced on February 8, 2006. The issue is expected to increase the capital adequacy ratio of the bank to 12% from the current level of 10.2%. Post issue, ICICI Bank's stake in SIB is expected to come down to 7% from the current level of 9%. Sources also said that the bank has interest in M&A activities. It is also carefully watching the market conditions and would accordingly decide to increase the lending and deposit rates.

**Irda says motor detariffing by '07**

Irda chairman CS Rao said, "Motor insurance will be detariffed from January 2007. The insurers are putting in place underwriters," he said an unplaced motor insurance pool will also be put in place next year, which would enable insurers to transfer their risks of insuring old vehicles. The risks will thus be spread among all by transferring them to the common pool, which will eliminate the possibility of a single insurer taking a big hit while insuring motors.

**Corporation Bank to open offices offshore**

Corporation Bank on Monday said it plans to open representative offices offshore. The bank's CMD VK Chopra said "The proposal is to set up an office in Dubai soon and subsequently in Hong Kong, China and USA within five years."

**BoM, United India strike a deal**

Close on the heels of its tie-up with LIC, Bank of Maharashtra (BoM) has entered into an agreement with United India Insurance Company Ltd to distribute its products. BoM is in the process of obtaining an agency from United India Insurance Co Ltd.

**SBT to raise Rs 140 crore**

State Bank of Travancore (SBT) plans to raise Rs 140 crore through issue of subordinated bonds on private placement basis for augmenting its Tier-II capital. The bonds would be for a period of 111 months at 7.80% coupon rate payable annually. The issue would close on February 13.

## Fimmda seeks an alternative for Mibor rates

## HOVERING PRESENCE

Sunita Jyoti

Mumbai, Feb 6

Mibor rates have been hovering at 7.725%

An alternative is being found for improving hedge effectiveness in interest rate swap deals

Rising interest rate scenario leads to negative cost of carry for banks and corporates

Mibor should move between the reverse repo rates and repo rates

With rising interest rates changing the market dynamics, the Fixed Income Money Markets and Derivatives Association (Fimmda) is now looking out for an alternative benchmark to Mumbai inter-bank offer rate (Mibor) for improving hedge effectiveness in interest rate swap transactions.

Mibor rates have been hovering at 7.725%, following the redemption of India Money Market Deposits (IMDs) and the Reserve Bank of India (RBI) hiking the reverse repo rate and repo rate to 5.5% and 6.3%, respectively in its third quarterly review of annual monetary policy for the year 2005-06. The market participants have been voicing concerns on viability of Mibor benchmark for overnight indexed swaps. The rising interest rate scenario has resulted into negative cost of carry for banks and corporates entering into interest rate swap transactions, which have hit their profitability adversely.

Explaining the same, Fimmda's chief executive officer CES Azarian said, "Typically, Mibor is expected to move between the reverse repo rates and repo rates. However, the tight liquidity condition has resulted it to touch 7.25%, which is much higher than the repo rate at 6.5%. Hence, one needs to review the viability of Mibor as a benchmark. He further added that as an alternative to Mibor, one can consider having the collateralised borrowing and lending obligations (CBLO) rates or the Treasury bill cut-off released by the RBI weekly, as a benchmark for swap transactions.

Meanwhile, Fimmda is organising a conference in Singapore on March 17, wherein it has invited representatives from the RBI and representatives of the Monetary Authority of Singapore. The overseas meet plans to discuss the various issues concerning the benchmark used in interest rate swap transactions and thereafter find alternative benchmarks for the same.