

# Reference Rates on Dealer Markets

## Frequently Asked Questions

Ajay Shah

Wed Aug 19 15:51:16 IST 1998

### 1 Motivation

**Q: Where do dealer markets fit into the landscape of India's financial markets?**

A: India's equity market is dominated by anonymous trading on electronic exchanges. India's commodity markets use open outcry on floor-based exchanges. It is the fixed income and currency markets which are presently dealer markets. ////

**Q: Why do we need information from a dealer market?**

A: Information about prices and liquidity is obviously a basic input into research and policy analysis. Noisy data would yield erroneous research and policy formulation.

In addition, financial contracting, including derivative products, requires accurate data about prices or liquidity as a foundation – if the accuracy of the data was suspect, then economic agents would be less comfortable, and require risk premia for entering into contracts. Hence market development rests upon the confidence that users of the market have in the rates. ////

**Q: What is difficult about knowing the price or knowing the spread on a dealer market?**

A: A dealer market is distributed across numerous individuals spread across the country. At any instant in time, it is not possible to know the price of the most-recent trade. When an order is placed on a dealer market, it is not assured the best price – it is not possible to know the best buy and best sell prices in the economy at any point in time. The answer is buried somewhere inside the minds of the dealers who make up the market – their trades or trading intentions are not externally observable.

This is in contrast with an electronic exchange, where all these problems are absent. The latest trade price is effortlessly observed. Electronic exchanges have a property called “price-time priority” whereby every order is guaranteed to be matched against the best price available. Liquidity is also observed on an electronic exchange: best-buy and best-sell prices are observed at a glance on the screen, and transactions costs at all transaction sizes can be computed using publicly revealed information. ////

**Q: Can policy makers simply work towards ensuring that the currency and fixed income markets become anonymous electronic exchanges?**

A: This is undoubtedly possible. However, market development need not wait for this to happen. Specifically, if good reference rates are observed, they can be the foundation of efficient cash-settled futures markets. These new markets would involve anonymous trading on an exchange.

Significant gains in market efficiency can be obtained on the cash market through the operation of an efficient and liquid futures market, where price discovery is likely to take place. Hence reference rates are a way to obtain incremental improvements in the efficiency of the cash market without undertaking basic improvements to the cash market. ///

## **2 Techniques**

**Q: So how do we make progress in obtaining data from a dealer market?**

A: External observers have no way of observing prices and liquidity on a dealer market. *Each dealer has an idea (though an inaccurate one) of the best buy or sell prices that are then prevalent, but external observers do not.*

The simplest scheme consists of asking 10 dealers what the best bid price is. Each of the dealers has an (inaccurate) reading of the true best-bid price. When we average the 10 numbers, we get an estimate of the true best-bid price that is then prevalent. ///

**Q: Does this mean gathering the bid and offer prices from market makers that presently exist?**

A: The bid and offer prices that any one dealer puts out pertains to *his* trading intentions, which may or may not be the best rates available.

The relevant question to ask a dealer is not “what is your buy/sell rate?” but “what is the best buy / best sell rate available right now?”. To make the question concrete some fixed transaction size should be adopted. Natural transaction sizes are Rs.10 crore on the call money market, \$1 million on the currency markets, etc. ///

**Q: What are the things that can go wrong?**

A: Every procedure based on a few samples is intrinsically imprecise. Hence, it is important to additionally report measures of statistical imprecision of reported rates, so that users of the market can factor this noise into their thinking.

The major problem that any such problem faces is market manipulation. When a dealer is polled to find out *his perception* of the best buy price ruling on the market, he may be tempted to shade his report in a way that suits his commercial interests. Cartels of dealers can try to significantly distort the price in this fashion. ///

## Q: How can manipulation be checked?

A: Several features of the polling process can be tuned so as to reduce the incentives towards manipulation:

- The rates reported by each dealer should not be publicly disclosed. This is based on the idea that on anonymous markets, cartel formation is harder. With anonymity, any one cartel member is not able to see that other cartel members are living up to their end of a manipulative scheme.
- A fixed set of dealers should not be polled; a random subset of a large panel should be polled on any one day. If  $k$  dealers agree to report distorted rates on the next day, not all  $k$  of them will be sampled.
- The sample size should be as large as possible. This helps reduce sampling noise, and additionally reduces the rate of return to cartel formation.
- Finally, a “robust estimator” should be applied in reducing  $n$  numbers into a single reported rate. A robust estimator is one which is less influenced by observations that lie far away from the center.
- Dealers who consistently report inaccurate values should be sampled less frequently, or they should be dropped from the panel altogether.

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## Q: What are the issues in the choice of an estimator?

A: The extreme choices in estimators are the sample mean, which is most efficient under normal circumstances but vulnerable to manipulation, and the sample median, which is least efficient under normal circumstances but least vulnerable to manipulation. Every procedure for making a reference rate must choose a tradeoff which lies somewhere in between.

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## Q: What robust estimators are presently used internationally?

A: The commonest estimator presently in use is the “symmetric trimmed mean” (STM). This consists of rejecting the  $k$  highest and  $k$  lowest observations and averaging the rest. This is used at the Chicago Mercantile Exchange in the Eurodollar futures contract, the Chicago Board of Trade in the municipal bond futures contract, the British Bank Association in calculating LIBOR, etc. Each of these involves setting a fixed  $k$ .

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## Q: How can the “trimmed mean” be implemented better?

A: The number of observations deleted need not be fixed once and for all; perhaps an “optimal”  $k$  can be chosen for each dataset. This is called the “adaptive trimmed mean” (ATM).

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## Q: How does the ATM fare on questions of manipulation and efficiency

A: The ATM is more efficient than both polar extremes, and is less vulnerable to manipulation than the sample mean. The ATM is superior on both counts when compared with common STMs. The existing empirical evidence suggests that the ATM is a good tradeoff in terms of obtaining best efficiency while not being highly vulnerable to manipulation.

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**Q: How is the imprecision of these estimators measured?**

A: Standard statistical methods are oriented around large samples. Reference rates typically use small samples. A statistical method called “the bootstrap” is likely to be more useful in inference procedures. ///

### **3 Applications**

**Q: How does the NSE MIBID/MIBOR (rates for the call money market) work?**

A:

1. On a typical day, 20 dealers are polled at random from a panel of 30.
2. Each dealer is asked to report the best borrow/lend rates at Rs.10 crore. Some dealers, e.g. UTI, only report best lend rates.
3. The bootstrap is used to obtain inference for trimming zero to four extreme observations. This is used to choose a “best”  $k$ . The bootstrap additionally gives a sampling standard deviation.
4. Two rates are reported: MIBID and MIBOR, and each is accompanied by a standard deviation. Implicit in these is an additional time–series for the bid–ask spread at Rs.10 crore on the call money market.

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**Q: What are the regulatory concerns involved in these reference rates?**

A: RBI should work towards ensuring that all aspects of this methodology is functioning soundly. Specifically, three important regulatory checks are:

- Ex–post, it is possible to measure the quality of rates reported by each dealer. These should be examined by the RBI in confirm that dealers who persistently report poor information are, indeed, dropped from the panel of dealers.
- RBI should establish data reporting to calculate the volume weighted average (VWA) of trades of the day (ex–post). Episodes where the VWA and the reference rate diverge should be investigated to determine if manipulation was present.
- RBI should publicly signal its interest in a well functioning reference rate; this would serve to act as a deterrent against dealers who would then know that cartels and manipulation would not be viewed benignly by the regulatory authorities.

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**Q: What applications does an accurate reference rate on the call money market make possible?**

A:

1. Banks can offer borrowing or lending contracts which are linked to MIBID or MIBOR. For example, companies can be offered an overdraft product at a floating interest rate  $MIBOR + \Delta$  where  $\Delta$  depends upon the credit risk of the borrower. More complex contracts could bundle a floating rate based on MIBOR with floors and ceilings.
2. RBI could issue short-dated securities, for the purpose of short-term liquidity management, at a floating rate, or at a rate which is the smaller of MIBID and the bank rate.
3. Exchange-traded cash-settled futures could come about on the one-day and fourteen-day rates.
4. Interest-rate swaps could involve exchange fixed interest rates for either the overnight or the 14-day reference rate.

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**Q: Where else can this methodology be applied?**

A: These methods could be used on the dollar-rupee spot and forward markets, which are also dealer markets.

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ajayshah@mayin.org

<http://www.mayin.org/~ajayshah>