# Designing a Sovereign Bond Index

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The secondary market for government securities is poised for various structural changes and the Gilts market is getting redefined from primarily a sovereign fiscal deficit financing process to a sound investment option. The depth of the market has been substantially enhanced, thanks to the policies adopted by RBI and Govt. of India to introduce more number of market players and to consolidate the existing secondary market mechanism. The policy measures taken by RBI to streamline the money and bond market as well as to improve transparency has helped to boost liquidity and market participants have started to look up to a longer horizon of the yield curve. There has been supporting roles from various un-biased bodies in the form of dissemination of reference rates to the market as for example the daily dissemination of the zero coupon yield curves developed by National Stock Exchange of India Ltd. (NSEIL) and Clearing Corporation of India Ltd (CCIL). Though liquidity has improved during last two years, most of the GOI bonds are illiquid in the sense that very few daily trades are executed in large number of outstanding securities.

With the development of market, it is paramount that data dissemination should be effective. CCIL has been playing a dominant role in disseminating data pertaining to Gilts market through various platforms like Reuters, Bloomberg, Moneyline Telerate, financial news papers and periodicals like Financial Express, Business Line and Economic & Political Weekly. Keeping in mind the need of the market participants, CCIL has put in efforts in bringing out sovereign bond indices that would take into account the most acceptable observable prices duly taking care of outliers. A good sovereign index should meet the following purposes:

a) a benchmark for portfolio management,
b) an indicator of market performance and development,
c) the basis on which market options and futures may be derived,
d) comparator for different markets.

A good index will have the following characteristics:

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a) **Representative:** The index should correctly represent the market scenario.
b) **Easily Replicable:** The total returns of the index must be replicable by the market participants, *i.e.* investors must be able to construct a portfolio with similar returns as the index.
c) **Transparent:** The index should be transparent. All changes should be easily understood and easily predictable. The computational methodology along with all required data should be made available in public domain.

The sovereign bond index is expected to track the changes in the market condition and provide hedging possibilities to market participants. A well constructed bond index is a good mirror of the economic policy changes of the government and structural reforms that will have bearing on the interest rate in the economy. Under these circumstances it will serve as a useful aid to predict the impact of macroeconomic policy decisions on interest rate movement.

The indices are regarded as a general indicator for market performance. Most financial and real asset markets usually monitor the performance of the market using indices designed to monitor the general health. They also form a crucial input to the design of security portfolio of investors. Economists and statisticians use these indices to study trends of growth pattern in economies.

The more common indices are those that analyse stock prices, viz. stock indices. These are usually price or quantity or both indices. Bonds on the other hand are usually monitored using return indices. This difference stems from the very nature of bond markets. Bond portfolios are held for their coupons as well as the appreciation of the asset. Under these circumstances a returns index that also factors the appreciation in price is most helpful.

While the term structure models are predictive in nature, the bond indices are a reflection of the macroeconomic factors. To fulfil these requirements they must be optimally designed to reduce the noise and give an indication of the real issues. At present there are few major entities that provide sovereign indices: I-Sec, JP Morgan, NSEIL, etc.

**GOI debt markets**

The government securities market, one of the most important components of the financial sector in a modern economy performs many important roles in a market economy. From the viewpoint of the government, it is the principal source for raising funds from the public and from the investors' viewpoint; it represents an investment free from default risk. It is also generally the most liquid form of a debt instrument. In most countries, commercial banks and other financial institutions like insurance companies and provident funds hold government securities as a substantial part of their portfolio for prudential reasons as they are regarded as safe investment. In developed countries, many banks also invest in government securities with a view to earning trading profit depending upon their expectations of future interest rates. In India, most of the private, public and foreign banks have their full fledged treasury desks that are focussed on trading in gilts.

**Market Structure**

The structure of a market is usually defined in terms of the elements constituting the market and their interconnections. The current structure of the market is more broad-based and integrated than it used to be in the pre-reform era in terms of the players in the market, the types of instruments available for trading and the forms of trading. For example, earlier trading activity both in the primary and secondary market used to be confined mainly to commercial banks and insurance corporations. Now financial institutions other than banks and private corporate sector have also become important players in the government securities market. As is the practice in many developed countries, in India too, leading private corporate entities have been allowed to deal on their own account through a system called subsidiary general ledger (SGL) II account. A significant development was the government decision on January 30, 1997, to permit foreign institutional investors to invest in government dated securities. Earlier, the market used to be quite illiquid due to the absence of market makers with almost all the institutions dealing on their own account. However, with the establishment of the primary dealers system, this problem got solved with trading volume in secondary market rising. With the introduction of the auction mechanism, we could witness many banks investing their surplus funds in government securities beyond their SLR in view of close to market rate of return and zero credit risk of the securities.

**Liquidity issues and structural reforms**

The Indian bond market is still illiquid since only a few securities get traded everyday. This necessitates the inclusion of few illiquid bonds in the calculation of term structure and duration, which form an input to the bond index. Moreover pre 1997 various anomaly existed which caused securities to be priced differently from the average pricing as determined by the term structure of interest rates. One such anomaly was in the form of accounting and performance measurement norms prevalent in the market. The performance of a trader is measured in terms of his trading profits as determined by the difference between the purchase and sale prices of a security. The coupon rate on the security played no role. Hence, there is an incentive for the traders to buy discount bonds to show a trading profit. Hence their prices were higher than the economic cost as determined from the term structure. This further led to illiquidity in the market. Under the given circumstances standard models for term structure estimation do not fit the bill.

With the introduction of reforms in 1997 there have been attempts to reduce these discrepancies. They include:

- A gradual shift to market-related rates of interest on Government borrowings by elimination of the automatic deficit financing route via phasing out of ad-hoc T-bills from 1997-98, and the replacement in its place of a system of Ways and Means Advances.
- Gradual reduction in statutory pre-emption via SLR prescriptions. The response has been overwhelming since most banks now maintain above 25% of their portfolio in these securities reflecting a conscious choice and also a positive response towards reforms.
- Elongating the maturity and re-issuance of the existing stocks for consolidation.
- The government and the RBI took several steps for promoting an active and deep secondary market in government securities. The steps included setting up of a network of primary dealers, introduction of electronic book keeping with a delivery versus payments system in respect of all transactions in government securities and introduction of inter-bank repo facility.

With these initiatives it was expected that the liquidity in the market would increase. Hence the market was likely to become more attractive to a number of investors

including retail. As a result at this point of time an index may perhaps serve to monitor and design portfolios for investors at large.

**Bond index**

A bond index is used to measure the performance of bond markets. The index can be used as a benchmark against which investment managers measure their performance. It can also be used as a measure to compare the performance of different asset classes. The sovereign bond market is the most liquid segment of the bond market. The main participants in the market include banks, financial institutions, primary dealers, provident funds, insurance companies, mutual funds, FIIs and high net worth individuals. Trading happens over-the-counter and reported to RBI NDS; besides trades are reported to WDM of the National Stock Exchange if it a broker driven trade. The residual maturity of outstanding bonds now range up to thirty years. A benchmark may facilitate measurement of the performance of bonds across maturities.

The return indices are primarily of two types:

Total Return: It is the absolute return that the bond offers and it includes both coupons and capital gains / (losses). The total return index for an individual bond is calculated each market day by increasing the previous market day' s index value by the percentage change in bond' s gross price. The gross price of a bond is its net price plus accrued interest. The gross price must be adjusted for loss of accrued interest on coupon payment day by adding the coupon value (C) to the gross price.

$$TRi,t = TRi,t-1 \times \{(GPi,t + Ci,t )/ GPi,t-1 \}$$

Principal Return: The principal return index pr t for an individual bond is calculated each market day by increasing the previous market day's index value pr t-1 by the percentage change in the bond's net price (clean price). The formula is:

$$PRi,t = NPi,t / NPi,0$$

**Methodology**

Methodology valuates the different instruments for assessing performance of bond markets. The first step in such an analysis should be to lay down the parameters for comparison.

**Selection of evaluation criteria:**

As discussed earlier to meet all its expectations an index must be possess the following characteristics:

**Representative**

An index should span and weight the appropriate markets, instruments and individual securities to reflect the opportunities available to investors.

**Investible and Replicable**

An index should include only securities in which an investor can deal at short notice. Firm prices should ideally exist for all constituent securities.

**Accurate and Reliable**

Index return calculations should accurately reflect the actual changes in the value of a portfolio consisting of the same securities.

**Transparent**

Investment managers should know which securities are included in an index and how it is constructed. The fund manager must be able to create his own benchmark index and track it.

**Daily and Timely**

Index values should be made available immediately after the close of the markets so managers can measure performance immediately, and make timely adjustments to investment strategy.

**Flexible**

The index should be flexible enough to accommodate the needs of individual portfolio managers.

- Weighing of returns: The index measures the changing value of an index portfolio by weighting the total return on each constituent bond by the market value on the previous day. Each weight is equal to the amount outstanding at the beginning of each month multiplied by the security's gross price (net price plus accrued interest). For principal return calculations, the weights do not

reflect accrued interest; instead, the outstanding amount is adjusted by the issue' s net price.

- Reinvestment assumptions: The index assumes that coupons received are immediately reinvested back into the bond index in proportion to the latest market values of the constituents. The index is *fully invested* at all times, which is only possible with daily indices.
- Base Date and Value: For the purpose of the present index, we have selected January 1, 2004 as the base date with a value of 1000.

Using the methodology defined as under we define our bond index. The stepwise procedure of estimation of the bond index is detailed as under:

The two indices computed are the Total Returns Index (TRI) and the Principal Returns Index (PRI). Before the procedure is detailed a note on the terminologies used in the document is given in the annexure – 1.

***Definition***

*Bond List :* The selection of bonds for the purpose of the index between two rebalancing dates. We have fixed the first day of the month as the rebalancing day.

*Market-cap of a bond:* It is the number of bonds outstanding times the market price. The market value of the total outstanding bond issue.

*Gross Price:* Gross Price of a bond = Market Price + Accrued Interest

*Net Price: Net Price of a bond = Market Price*

*Market-Cap Weight:* Market-cap of a bond = Par amount outstanding x Gross Price

Market-cap weight = Market-cap of a bond / Sum of all market-caps of bonds in the bond list

*Rebalancing:* The index automatically adjusts or rebalances for changes in the composition of the index portfolio so that the changes do not represent a capital gain or loss to the index.

***Indices***

**Individual bonds**

***Total return (TR)***

It is the absolute return that a bond offers and it includes both coupons and capital gains / (losses). The total return index for an individual bond is calculated each market day by increasing the previous market day' s index value by the percentage change in bond' s gross price (GP). The gross price of a bond is its net price plus accrued interest. The gross price must be adjusted for loss of accrued interest on coupon payment day by adding the coupon value (C) to the gross price.

$$TRi,t = TRi,t-1 \times \{(GPi,t + Ci,t )/ GPi,t-1 \}$$

***Principal Return (PR)***

It is simply the current net price divided by the net price on the base date.

$$PRi,t = NPi,t / NPi,0$$

***Interest Return***

The total return divided by principal return index.

$$IRi,t = TRi,t / PRi,t$$

**Market indices**

For a portfolio of bonds, the change in index value should mimic the change in the total market value of all the bonds belonging to the bond list. In case of principal returns index, this would be the change in the net prices weighted by the outstanding amounts. In case of total returns index, the change should capture interest accrued as well as coupons received in addition to the change in market prices.

Thus, Total Return (TR) of the index is,

**TRt = TRt-1 x Σ (for all bonds *i* belonging to bond list *l* {MCi,t}) / Σ (for all bonds *i* belonging to bond list) *l* {MCi,t-1 } * (Adjustment for coupons, change in bond list and outstanding amounts)**

where market cap is

$$MCi,t = Qi,t \times GPi,t$$

The bond index must be fully invested that is coupons, changes in the bond list and changes in principal amounts must be accounted for on a daily basis. The bond list could change when bonds enter or leave the index. Principal amounts could change owing to redemption or additional issue of further bonds.

The equivalent formula for the entire index would then reduce to

$$TRt = [\Sigma \text{ for all bonds i belonging to bond list l } \{ Qi,t \times GPi,t \}]$$

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**[Σ for all bonds i belonging to bond list l on base date { Qi,0 x GPi,0} x Adjustment factor]**

The adjustment factor is due to changes in bond list, outstanding amounts and coupons.

The adjustment factor can be delineated into three contributing factors

- The partial impact of a change in the composition of the bond list between two dates keeping amount outstanding (weights) constant at today' s values (Adjustment Factor1).
- The partial impact of a change in the amounts outstanding between the two dates keeping the yesterday' s bond list intact (Adjustment Factor2).
- The impact of coupons paid leaving both bond list and weights constant at yesterday' s value (Adjustment Factor3).

**Adjustment Factor1** = (Today' s list & Today' s weights)/ (Yesterday' s list & Today' s weights)

**Adjustment Factor2** = (Yesterday' s list & Today' s weights)/ (Yesterday' s List & Yesterday' s weights)

**Adjustment Factor3** = (Yesterday' s List & Yesterday' s weights)/ (Yesterday' s List & Yesterday' s weights & Today' s coupon)

The product of the adjustment factors from base to date is the adjustment factor in the denominator of the equation. Therefore the disaggregation explains how rebalancing at the beginning of the month and coupon reinvestment properly chain-link an index.

Similarly, the principal return (PR) of the index is

**PRt = PRt-1 x Σ for all bonds i belonging to bond list l {Qi * NPi,t} / Σ for all bonds i belonging to bond list l { Qi * NPi,t-1 } * (Adjustment for coupons, change in bond list and outstanding amounts)**

Equivalently

$$PRt = \Sigma \text{ for all bonds i belonging to bond list l } \{ Qi,t \times NPi,t \}$$

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**Σ for all bonds i belonging to bond list l on base date { Qi,0 x NPi,0} x Adjustment factor**

Where the adjustment factor accounts for Adjustment Factor1 and Adjustment Factor2 defined above.

Duration of the index would be calculated as the weighted average duration of individual bonds in the basket.

$$D = \sum_{i=1}^{n} D_i W_i$$

where $D_i$ is the duration of the component bond ***i*** and $W_i$ is the relevant weight based on market capitalization of bond ***i.***

**Calibration Issues:**

**Rules for bond inclusion**

The securities included in the Broad index for a month would consist of top 20 traded bonds (excluding bonds with maturities of less than 2 years, special bonds like OIL bonds, UTI capitalization bonds, Floating rate bonds, Bonds with Call and Put options, etc.) of the previous month. The securities included in the Liquid index for a month would consist of top 5 traded bonds (excluding bonds with maturities of less than 2 years, special bonds like OIL bonds, UTI capitalization bonds, Floating rate bonds, Bonds with Call and Put options) of the previous month. This criterion has been used to capture the liquidity aspect of the bonds in the market. The T-bills have been kept out of the index construction.

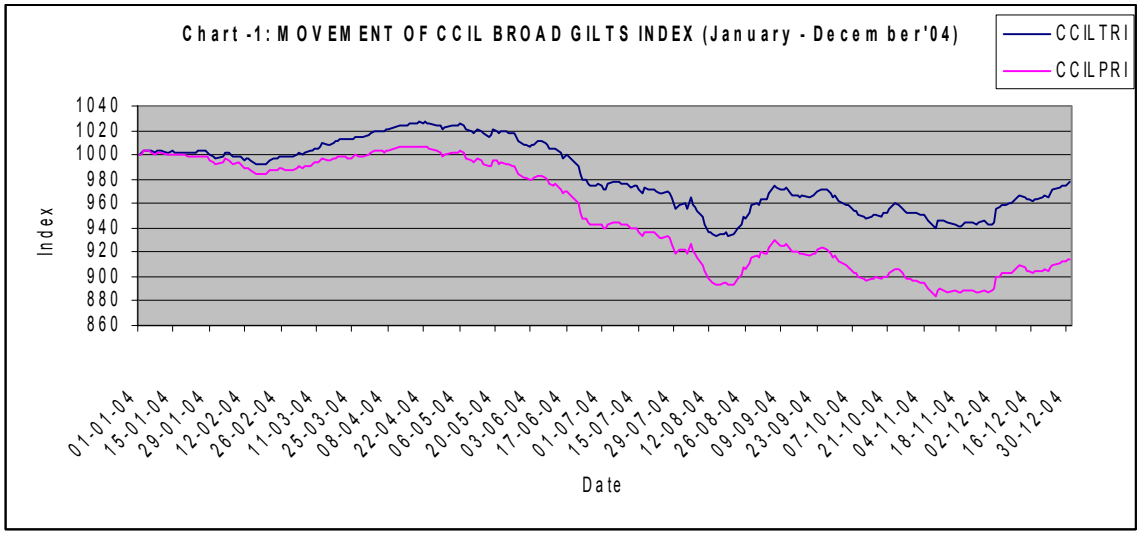
As can be seen from the Annexure-1I, top 5 bonds are most liquid ones as they constitute near about 50% of the total trades and top 20 constitute more than 85% of the total trades in the market. Hence we have confined our choice bonds to top 5 for construction of LIQUID index and top 20 for BROAD index.

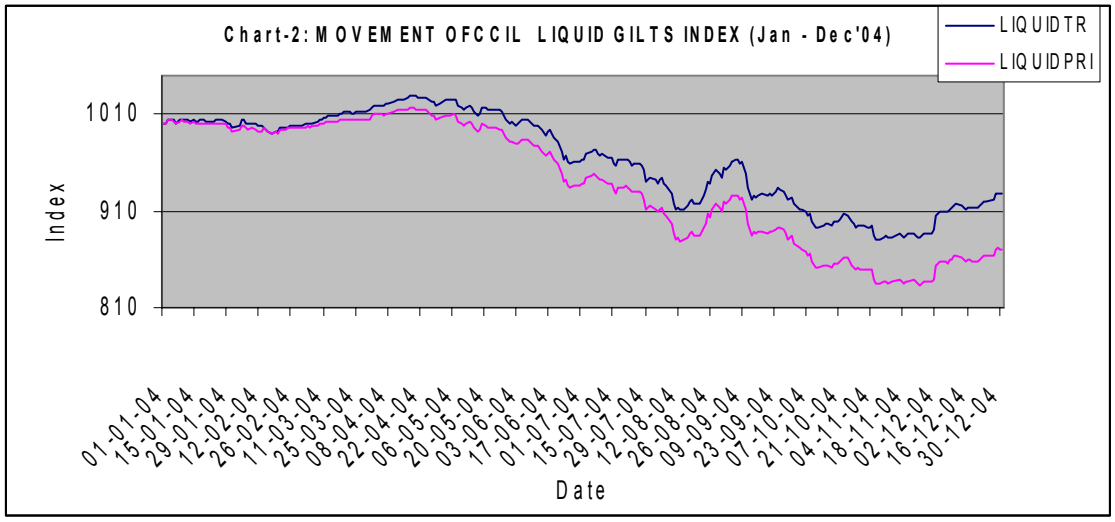
The sovereign index developed by NSE is calculated using only ZCYC based prices that leads to estimation issues as high price errors would bias the bond index. We have designed the bond index using the actual traded prices in the market. For that purpose, we

have used trades with a minimum face value of Rs.50million. The volume weighted average prices are calculated duly taking into account the outliers. If the traded prices are not available for bonds in the basket, we have used the prices using the ZCYC. The price data is fed into these equations to derive the values for the principal return and total returns index.

**Results**

To start with, CCIL will come out with two indices – **CCIL BROAD GILTS INDEX** and **CCIL LIQUID GILTS INDEX**. Annexure-III gives the values of both the indices from the base date January 1, 2004 while Annexure-IV gives the list of securities included in the index. The Annexure-V gives the examples of calculation of bond index. The CCIL BROAD GILTS INDEX and CCIL LIQUID GILTS INDEX movement during 2004 is given by the following Chart 1 and Chart-2 respectively.






For the purpose of comparison, we have taken Gilts index "IBEX" of ICICI Securities Ltd. (IBEX is a broad index) and have found that the correlation has been 0.995. The Chart-3 gives the comparison of both indices.

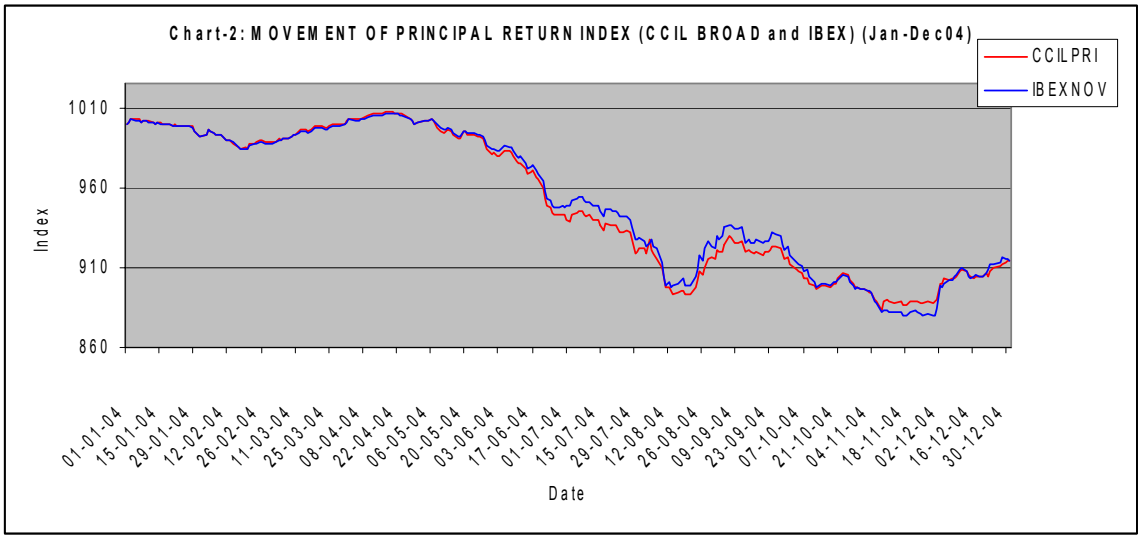
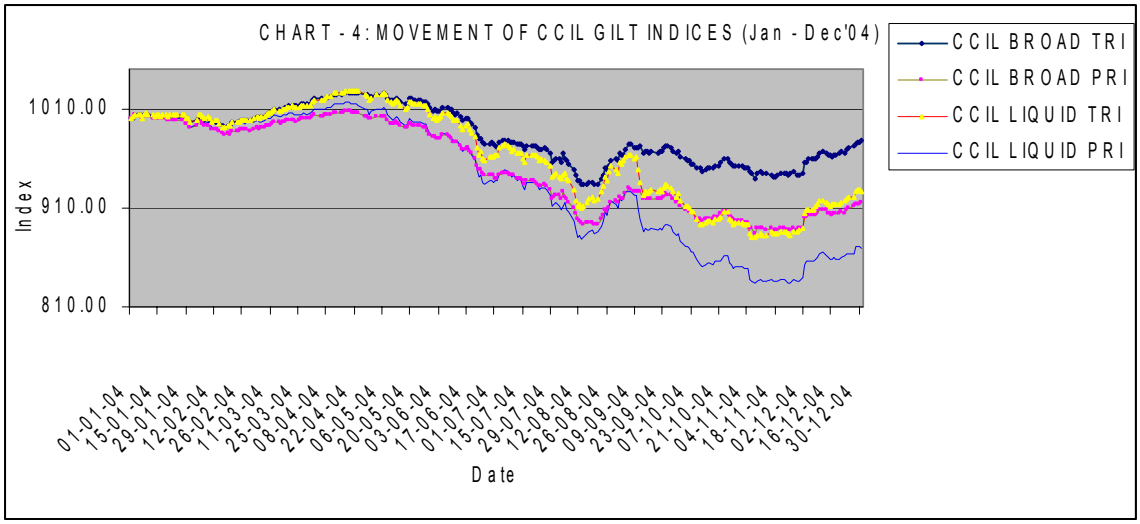



Chart-4 gives the movement of all CCIL indices during 2004.




We have also calculated the logarithmic daily returns of principal return indices as well as derived their correlations. The CCIL Broad and LIQUID indices and IBEX daily returns are correlated with about 88%.

Table-1 gives the correlation of the indices.

**Table - 2: Correlation of Daily Logarithmic Returns on Principal Return Indices**

| | CCIL BROAD | IBEX | CCIL LIQUID |
|---|---|---|---|
| **CCIL BROAD** | 1 | | |
| **IBEX** | 0.8734 | 1 | |
| **CCIL LIQUID** | 0.8071 | 0.8862 | 1 |

## Concluding Remarks

The indices should be based on arithmetic calculation and the constituents should be weighted by the respective issue sizes that would help to emulate a portfolio. The indices calculated must allow for change by using a chain-link methodology (i.e. today's values are based on the previous value times the changes since the previous calculations). The basket should be reviewed every month to take liquid bonds into the index. In an illiquid market like ours, the prices used in the index should be weighted average price of all trades of face value of Rs.50million or more.

## References:

Subramanium, K.V. (2000); “Term Structure Esstimation in Illiquid Governemnt Bond Markets: An empirical Analysis for India”: Unpublished paper, ICICI Ltd.

Darbha, G., Roy, S.D., Pawaskar, V. (2000); “Estimating the Zero Coupon Yield Curve”: Unpublished paper, NSE India Ltd.

Nag, AK, Ghose, SK, (2000): “Yield Curve Analysis for Government Securities in India”: Economic and Political Weekly, January 29, 2000; pp 339-347.

Pitale Ashish(2002),Inroducing the Indian Government Bond Index, Bond Index Research JP Morgan securities Pvt. Ltd.

Pawaskar V ., Dutta Roy S., Darbha G.(September 2002), The NSE-Government Securities Index : Issues in Construction (www.nseindia.com)

Subramanian & Mohit Kumar (2000), A Bond Index for the Indian Government Bond Market,Working Paper,ICICI.

## Annexure - I

***Terminology:***

**$\bar{I}$** : List of bonds comprising the index
**i** : A bond in the bond list
**TR** : Total Return
**PR** : Principal Return
**TRi** : Total Return for a given bond i
**TRi,t** : Total Return for a given bond i today
**TRi,t-1** : Total Return for a given bond i yesterday
**TRi,0** : Total Return for a given bond I on base date
**PRi** : Principal Return for a given bond i
**PRi,t** : Principal Return for a given bond i today
**PRi,t-1** : Principal Return for a given bond i yesterday
**PRi,0** : Principal Return for a given bond i on base date
**IRi** : Interest Return for a given bond i
**IRi,t** : Interest Return for a given bond i today
**IRi,t-1** :Interest Return for a given bond i yesterday
**IRi,0** : Interest Return for bond i on base date
**GP** : Gross Price of a bond
**GPi** : Gross Price of a given bond i
**GPi,t** : Gross Price of a given bond i today
**GPi,t-1** : Gross Price of a given bond i yesterday
**GPi,0** :Gross Price of bond i on base date of the index
**NP** : Net price of a bond (Clean price less voucher)
**NPi** : Net Price of a given bond i
**NPi,t** : Net Price of a given bond i today
**NPi,t-1** : Net Price of a given bond i yesterday
**NPi,0** : Net Price of bond i on base date of the index
**C** : Coupon on a bond
**Ci** : Coupon on a given bond i
**Ci,t** : Coupon on a given bond i today
**Q** : Number of bonds outstanding
**Qi** : Number of bonds outstanding of a given bond i
**Qi,t** : Number of bonds outstanding of bond i today
**MC** : Market capitalization of a bond
**MCi** : Market capitalization of a given bond i
**MCi,t** : Market capitalization of a given bond i today
**D** : Duration of a bond
**Di** : Duration of a given bond i
**Y** : Yield of a bond
**Yi** : Yield of a given bond i

| Annexure – II: Market Share of Top 'n' Securities | | | | |
|---|---|---|---|---|
| **Month** | **Top 5** | **Top 10** | **Top 15** | **Top 20** |
| **Apr-03** | 43.86 | 66.26 | 80.07 | 86.98 |
| **May-03** | 44.23 | 65.39 | 79.59 | 89.08 |
| **Jun-03** | 43.87 | 68.13 | 80.74 | 88.19 |
| **Jul-03** | 39.41 | 59.72 | 74.23 | 84.79 |
| **Aug-03** | 44.29 | 64.97 | 77.41 | 87.47 |
| **Sep-03** | 41.85 | 64.72 | 77.92 | 86.53 |
| **Oct-03** | 42.34 | 65.69 | 78.19 | 85.68 |
| **Nov-03** | 46.67 | 68.50 | 80.6 | 87.81 |
| **Dec-03** | 44.51 | 63.46 | 75.14 | 83.81 |
| **Jan-04** | 50.09 | 69.16 | 77.84 | 85.25 |
| **Feb-04** | 46.87 | 68.02 | 77.48 | 84.08 |
| **Mar-04** | 42.56 | 60.86 | 71.93 | 79.78 |
| **Apr-04** | 50.37 | 71.20 | 80.23 | 87.26 |
| **May-04** | 59.79 | 74.93 | 82.11 | 87.51 |
| **Jun-04** | 55.06 | 71.66 | 80.03 | 84.80 |
| **Jul-04** | 68.07 | 79.45 | 84.25 | 88.21 |
| **Aug-04** | 64.94 | 80.27 | 86.51 | 90.10 |
| **Sep-04** | 56.25 | 74.73 | 83.75 | 87.76 |
| **Oct-04** | 77.82 | 87.88 | 92.25 | 94.46 |
| **Nov-04** | 83.66 | 88.55 | 91.17 | 93.37 |
| **Dec-04** | 73.63 | 79.72 | 83.98 | 87.45 |

| Annexure - III: CCIL BROAD AND LIQUID INDICES (JAN - DEC'04) | | | | |
|---|---|---|---|---|
| Date | **CCIL BROAD TRI** | **CCIL BROAD PRI** | **CCIL LIQUID TRI** | **CCIL LIQUID PRI** |
| 01-Jan-04 | 1000.00 | 1000.00 | 1000.00 | 1000.00 |
| 02-Jan-04 | 1000.98 | 1000.81 | 1001.08 | 1000.93 |
| 03-Jan-04 | 1003.51 | 1003.18 | 1004.48 | 1004.21 |
| 05-Jan-04 | 1003.42 | 1002.90 | 1004.41 | 1003.96 |
| 06-Jan-04 | 1003.19 | 1002.48 | 1003.81 | 1003.17 |
| 07-Jan-04 | 1001.37 | 1000.44 | 1000.72 | 999.86 |
| 08-Jan-04 | 1003.07 | 1001.97 | 1004.32 | 1003.34 |
| 09-Jan-04 | 1003.41 | 1002.13 | 1005.10 | 1003.96 |
| 10-Jan-04 | 1002.94 | 1001.46 | 1004.50 | 1003.17 |
| 12-Jan-04 | 1002.45 | 1000.77 | 1003.50 | 1001.98 |
| 13-Jan-04 | 1001.73 | 999.85 | 1002.36 | 1000.66 |
| 14-Jan-04 | 1002.74 | 1000.69 | 1003.98 | 1002.12 |
| 15-Jan-04 | 1002.34 | 1000.09 | 1003.42 | 1001.37 |
| 16-Jan-04 | 1001.97 | 999.52 | 1002.72 | 1000.50 |
| 17-Jan-04 | 1002.50 | 999.87 | 1003.71 | 1001.32 |
| 19-Jan-04 | 1002.43 | 999.61 | 1003.76 | 1001.20 |
| 20-Jan-04 | 1001.85 | 998.84 | 1002.75 | 1000.00 |
| 21-Jan-04 | 1002.26 | 999.05 | 1003.41 | 1000.50 |
| 22-Jan-04 | 1002.20 | 998.80 | 1003.30 | 1000.21 |
| 23-Jan-04 | 1002.40 | 998.81 | 1003.44 | 1000.17 |
| 24-Jan-04 | 1002.72 | 998.94 | 1003.73 | 1000.29 |
| 27-Jan-04 | 1002.61 | 998.64 | 1003.66 | 1000.04 |
| 28-Jan-04 | 1002.25 | 998.09 | 1003.30 | 999.50 |
| 29-Jan-04 | 999.54 | 995.15 | 1000.73 | 996.74 |
| 30-Jan-04 | 998.91 | 994.32 | 999.57 | 995.39 |
| 31-Jan-04 | 996.35 | 991.72 | 996.00 | 991.79 |
| 03-Feb-04 | 998.33 | 993.15 | 998.99 | 994.29 |
| 04-Feb-04 | 1001.97 | 996.64 | 1003.89 | 999.07 |
| 05-Feb-04 | 1001.11 | 995.59 | 1004.06 | 999.07 |
| 06-Feb-04 | 999.73 | 994.00 | 1001.26 | 996.06 |
| 07-Feb-04 | 998.84 | 992.91 | 999.72 | 994.34 |
| 09-Feb-04 | 999.37 | 993.07 | 1001.32 | 995.60 |
| 10-Feb-04 | 998.40 | 991.90 | 1000.13 | 994.23 |
| 11-Feb-04 | 996.11 | 989.39 | 997.34 | 991.23 |
| 12-Feb-04 | 996.39 | 989.49 | 998.01 | 991.73 |
| 13-Feb-04 | 996.46 | 989.37 | 997.57 | 991.12 |
| 14-Feb-04 | 995.16 | 987.87 | 995.48 | 995.48 |
| 16-Feb-04 | 992.53 | 984.83 | 991.52 | 991.10 |
| 17-Feb-04 | 991.67 | 983.77 | 990.53 | 989.91 |
| 19-Feb-04 | 992.90 | 984.63 | 992.57 | 991.64 |
| 20-Feb-04 | 992.89 | 984.43 | 991.99 | 990.88 |
| 21-Feb-04 | 995.67 | 987.05 | 995.58 | 994.35 |
| 23-Feb-04 | 996.67 | 987.68 | 996.58 | 995.02 |
| 24-Feb-04 | 997.09 | 987.92 | 997.17 | 995.44 |

| | | | | |
|---|---|---|---|---|
| 25-Feb-04 | 998.61 | 989.26 | 999.00 | 997.13 |
| 26-Feb-04 | 998.69 | 989.16 | 999.09 | 997.05 |
| 27-Feb-04 | 997.93 | 988.20 | 997.64 | 995.40 |
| 28-Feb-04 | 998.09 | 988.17 | 998.19 | 995.78 |
| 01-Mar-04 | 998.45 | 987.97 | 998.69 | 995.89 |
| 03-Mar-04 | 999.61 | 988.77 | 999.58 | 996.39 |
| 04-Mar-04 | 1001.45 | 990.43 | 1001.17 | 997.79 |
| 05-Mar-04 | 1000.69 | 989.48 | 1000.57 | 996.98 |
| 06-Mar-04 | 1002.14 | 990.75 | 1001.13 | 997.35 |
| 08-Mar-04 | 1002.85 | 991.09 | 1002.91 | 998.54 |
| 09-Mar-04 | 1003.87 | 991.93 | 1003.97 | 999.41 |
| 10-Mar-04 | 1005.27 | 993.12 | 1005.25 | 1000.49 |
| 11-Mar-04 | 1005.65 | 993.34 | 1005.59 | 1000.64 |
| 12-Mar-04 | 1007.16 | 994.67 | 1006.93 | 1001.78 |
| 13-Mar-04 | 1009.06 | 996.40 | 1008.55 | 1003.22 |
| 15-Mar-04 | 1008.73 | 995.69 | 1008.31 | 1002.57 |
| 16-Mar-04 | 1008.20 | 994.97 | 1007.82 | 1001.87 |
| 17-Mar-04 | 1009.95 | 996.54 | 1009.35 | 1003.22 |
| 18-Mar-04 | 1010.87 | 997.27 | 1010.05 | 1003.72 |
| 19-Mar-04 | 1011.91 | 998.13 | 1011.20 | 1004.68 |
| 20-Mar-04 | 1012.72 | 998.76 | 1011.99 | 1005.28 |
| 22-Mar-04 | 1013.30 | 998.97 | 1012.40 | 1005.28 |
| 23-Mar-04 | 1012.20 | 997.49 | 1011.28 | 1003.95 |
| 24-Mar-04 | 1012.27 | 997.37 | 1011.29 | 1003.75 |
| 25-Mar-04 | 1013.01 | 997.92 | 1011.89 | 1004.16 |
| 26-Mar-04 | 1014.70 | 999.43 | 1012.46 | 1004.53 |
| 27-Mar-04 | 1014.71 | 999.26 | 1013.03 | 1004.90 |
| 29-Mar-04 | 1015.07 | 999.25 | 1013.23 | 1004.29 |
| 31-Mar-04 | 1015.65 | 999.64 | 1013.93 | 1004.82 |
| 01-Apr-04 | 1018.21 | 1002.02 | 1016.99 | 1007.73 |
| 02-Apr-04 | 1019.61 | 1003.24 | 1019.25 | 1009.83 |
| 05-Apr-04 | 1019.61 | 1002.68 | 1019.36 | 1009.80 |
| 06-Apr-04 | 1019.42 | 1002.30 | 1018.92 | 1008.60 |
| 07-Apr-04 | 1020.68 | 1003.37 | 1020.68 | 1010.19 |
| 08-Apr-04 | 1021.35 | 1003.85 | 1021.47 | 1010.82 |
| 10-Apr-04 | 1022.41 | 1004.53 | 1022.90 | 1011.91 |
| 12-Apr-04 | 1024.42 | 1006.17 | 1025.84 | 1014.52 |
| 13-Apr-04 | 1024.83 | 1006.39 | 1026.12 | 1014.64 |
| 15-Apr-04 | 1024.85 | 1006.04 | 1025.91 | 1014.08 |
| 16-Apr-04 | 1025.26 | 1006.25 | 1026.70 | 1014.70 |
| 17-Apr-04 | 1026.44 | 1007.24 | 1028.69 | 1016.52 |
| 19-Apr-04 | 1026.45 | 1006.87 | 1028.69 | 1016.18 |
| 20-Apr-04 | 1026.60 | 1006.83 | 1028.52 | 1015.83 |
| 21-Apr-04 | 1026.25 | 1006.29 | 1027.76 | 1014.90 |
| 22-Apr-04 | 1026.58 | 1006.43 | 1028.18 | 1015.15 |
| 23-Apr-04 | 1026.35 | 1006.01 | 1027.45 | 1014.25 |
| 24-Apr-04 | 1026.15 | 1005.63 | 1027.34 | 1013.97 |

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|---|---|---|---|---|
| 27-Apr-04 | 1023.94 | 1002.86 | 1023.41 | 1009.53 |
| 28-Apr-04 | 1023.41 | 1002.14 | 1022.60 | 1008.54 |
| 29-Apr-04 | 1020.68 | 999.24 | 1018.57 | 1004.35 |
| 30-Apr-04 | 1022.36 | 1000.72 | 1021.11 | 1006.71 |
| 03-May-04 | 1024.25 | 1002.05 | 1024.48 | 1009.56 |
| 05-May-04 | 1024.19 | 1001.63 | 1024.28 | 1009.02 |
| 06-May-04 | 1025.55 | 1002.80 | 1026.15 | 1010.71 |
| 07-May-04 | 1024.29 | 1001.37 | 1024.38 | 1008.77 |
| 08-May-04 | 1020.77 | 997.69 | 1019.20 | 1003.42 |
| 10-May-04 | 1018.70 | 995.28 | 1016.57 | 1000.45 |
| 11-May-04 | 1017.79 | 994.19 | 1015.38 | 999.08 |
| 12-May-04 | 1018.82 | 995.04 | 1016.84 | 1000.37 |
| 13-May-04 | 1020.47 | 996.49 | 1018.76 | 1002.12 |
| 14-May-04 | 1019.09 | 994.94 | 1016.54 | 999.73 |
| 15-May-04 | 1017.08 | 992.77 | 1012.72 | 995.74 |
| 17-May-04 | 1015.20 | 990.54 | 1009.59 | 992.27 |
| 18-May-04 | 1015.45 | 990.61 | 1011.26 | 993.76 |
| 19-May-04 | 1020.24 | 995.16 | 1017.08 | 999.40 |
| 20-May-04 | 1020.04 | 994.79 | 1016.92 | 999.07 |
| 21-May-04 | 1018.28 | 992.86 | 1014.36 | 996.34 |
| 22-May-04 | 1018.83 | 993.22 | 1014.96 | 996.77 |
| 24-May-04 | 1018.91 | 992.94 | 1015.77 | 997.24 |
| 25-May-04 | 1018.35 | 992.20 | 1014.63 | 995.92 |
| 26-May-04 | 1017.63 | 991.31 | 1013.93 | 995.05 |
| 27-May-04 | 1016.96 | 990.46 | 1013.77 | 994.71 |
| 28-May-04 | 1014.02 | 987.37 | 1009.15 | 989.93 |
| 29-May-04 | 1011.08 | 984.28 | 1004.61 | 985.22 |
| 31-May-04 | 1008.07 | 981.12 | 1000.56 | 981.00 |
| 01-Jun-04 | 1008.82 | 981.68 | 1002.39 | 982.64 |
| 02-Jun-04 | 1006.76 | 979.45 | 999.03 | 979.12 |
| 03-Jun-04 | 1007.58 | 980.07 | 1000.22 | 980.13 |
| 04-Jun-04 | 1008.46 | 980.75 | 1001.44 | 981.18 |
| 05-Jun-04 | 1011.02 | 983.09 | 1005.18 | 984.74 |
| 07-Jun-04 | 1010.95 | 982.64 | 1005.18 | 984.39 |
| 08-Jun-04 | 1010.27 | 981.78 | 1003.93 | 982.96 |
| 09-Jun-04 | 1008.49 | 979.84 | 1001.12 | 979.99 |
| 10-Jun-04 | 1005.27 | 976.47 | 998.59 | 977.30 |
| 11-Jun-04 | 1004.44 | 975.46 | 998.45 | 976.98 |
| 12-Jun-04 | 1004.82 | 975.65 | 999.06 | 977.42 |
| 14-Jun-04 | 1001.32 | 971.82 | 993.67 | 971.70 |
| 15-Jun-04 | 997.68 | 968.05 | 988.37 | 966.24 |
| 16-Jun-04 | 999.32 | 969.47 | 992.52 | 970.21 |
| 17-Jun-04 | 1000.47 | 970.42 | 994.34 | 971.85 |
| 18-Jun-04 | 996.92 | 966.73 | 989.87 | 967.22 |
| 19-Jun-04 | 995.13 | 964.78 | 985.51 | 962.70 |
| 21-Jun-04 | 990.71 | 960.04 | 981.18 | 958.04 |
| 22-Jun-04 | 983.66 | 952.91 | 970.96 | 947.68 |

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|---|---|---|---|---|
| 23-Jun-04 | 978.92 | 948.06 | 964.00 | 940.57 |
| 24-Jun-04 | 979.01 | 947.95 | 966.87 | 943.26 |
| 25-Jun-04 | 975.60 | 944.41 | 960.05 | 936.29 |
| 26-Jun-04 | 973.90 | 942.54 | 958.04 | 934.12 |
| 28-Jun-04 | 974.54 | 942.79 | 961.05 | 936.77 |
| 29-Jun-04 | 975.52 | 943.57 | 961.31 | 936.85 |
| 30-Jun-04 | 975.13 | 943.00 | 960.47 | 935.84 |
| 01-Jul-04 | 971.57 | 939.29 | 962.97 | 938.16 |
| 02-Jul-04 | 971.46 | 938.99 | 962.66 | 937.67 |
| 03-Jul-04 | 976.24 | 943.49 | 970.11 | 944.91 |
| 05-Jul-04 | 977.18 | 944.03 | 971.89 | 946.34 |
| 06-Jul-04 | 978.14 | 944.77 | 973.42 | 947.69 |
| 07-Jul-04 | 978.63 | 945.07 | 973.08 | 947.18 |
| 08-Jul-04 | 976.90 | 943.17 | 970.18 | 944.12 |
| 09-Jul-04 | 975.96 | 942.06 | 967.85 | 941.62 |
| 10-Jul-04 | 976.62 | 942.50 | 969.67 | 943.26 |
| 12-Jul-04 | 973.82 | 939.37 | 964.22 | 937.49 |
| 13-Jul-04 | 974.41 | 939.76 | 965.29 | 938.39 |
| 14-Jul-04 | 974.27 | 939.42 | 964.65 | 937.57 |
| 15-Jul-04 | 971.79 | 936.79 | 959.67 | 932.44 |
| 16-Jul-04 | 967.91 | 932.79 | 955.98 | 928.62 |
| 17-Jul-04 | 972.62 | 937.22 | 962.60 | 934.99 |
| 19-Jul-04 | 972.25 | 936.47 | 962.83 | 934.87 |
| 20-Jul-04 | 972.30 | 936.47 | 963.70 | 935.56 |
| 21-Jul-04 | 972.03 | 936.17 | 963.04 | 934.73 |
| 22-Jul-04 | 970.62 | 934.59 | 961.30 | 932.84 |
| 23-Jul-04 | 968.38 | 932.21 | 957.55 | 928.97 |
| 24-Jul-04 | 968.82 | 932.45 | 959.58 | 930.80 |
| 26-Jul-04 | 969.84 | 933.05 | 958.34 | 929.22 |
| 27-Jul-04 | 968.39 | 931.44 | 956.56 | 927.29 |
| 28-Jul-04 | 964.68 | 927.61 | 952.01 | 922.62 |
| 29-Jul-04 | 956.32 | 919.22 | 940.70 | 911.28 |
| 30-Jul-04 | 957.64 | 920.32 | 942.94 | 913.32 |
| 31-Jul-04 | 959.10 | 921.74 | 945.39 | 915.74 |
| 02-Aug-04 | 959.68 | 921.92 | 941.66 | 911.71 |
| 03-Aug-04 | 956.20 | 918.31 | 938.55 | 908.45 |
| 04-Aug-04 | 965.26 | 927.00 | 942.27 | 911.94 |
| 05-Aug-04 | 958.99 | 920.65 | 944.95 | 914.41 |
| 06-Aug-04 | 956.97 | 918.47 | 938.58 | 907.94 |
| 07-Aug-04 | 954.14 | 915.50 | 936.66 | 905.88 |
| 09-Aug-04 | 949.02 | 910.09 | 927.28 | 896.26 |
| 10-Aug-04 | 943.11 | 904.10 | 917.68 | 886.63 |
| 11-Aug-04 | 936.78 | 897.70 | 910.90 | 879.76 |
| 12-Aug-04 | 936.56 | 897.29 | 914.03 | 882.66 |
| 13-Aug-04 | 934.47 | 895.04 | 910.49 | 879.00 |
| 14-Aug-04 | 932.80 | 893.21 | 911.35 | 879.66 |
| 16-Aug-04 | 934.12 | 894.11 | 915.67 | 883.38 |

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|---|---|---|---|---|
| 17-Aug-04 | 935.17 | 894.93 | 918.98 | 886.46 |
| 18-Aug-04 | 935.90 | 895.45 | 920.95 | 888.22 |
| 19-Aug-04 | 933.62 | 893.02 | 916.75 | 883.90 |
| 21-Aug-04 | 934.28 | 893.28 | 918.19 | 884.95 |
| 23-Aug-04 | 939.28 | 897.78 | 925.74 | 892.03 |
| 24-Aug-04 | 943.31 | 901.53 | 931.60 | 897.63 |
| 25-Aug-04 | 949.58 | 907.48 | 940.60 | 906.32 |
| 26-Aug-04 | 947.97 | 905.71 | 937.54 | 903.12 |
| 27-Aug-04 | 952.79 | 910.24 | 946.40 | 911.67 |
| 28-Aug-04 | 958.54 | 915.67 | 951.93 | 916.94 |
| 30-Aug-04 | 959.93 | 916.63 | 947.97 | 912.70 |
| 31-Aug-04 | 958.28 | 915.04 | 945.15 | 909.94 |
| 01-Sep-04 | 964.33 | 920.72 | 955.35 | 919.80 |
| 02-Sep-04 | 963.07 | 919.28 | 953.61 | 917.91 |
| 03-Sep-04 | 963.40 | 919.39 | 957.11 | 921.17 |
| 04-Sep-04 | 968.61 | 924.24 | 961.95 | 925.71 |
| 06-Sep-04 | 974.67 | 929.71 | 962.67 | 926.05 |
| 07-Sep-04 | 973.61 | 928.47 | 962.61 | 925.81 |
| 08-Sep-04 | 971.06 | 925.78 | 959.57 | 922.66 |
| 09-Sep-04 | 971.30 | 925.81 | 960.57 | 923.46 |
| 10-Sep-04 | 971.36 | 925.65 | 947.70 | 910.56 |
| 11-Sep-04 | 972.42 | 926.47 | 935.01 | 897.84 |
| 13-Sep-04 | 965.96 | 919.78 | 922.49 | 885.29 |
| 14-Sep-04 | 967.20 | 920.77 | 926.67 | 889.19 |
| 15-Sep-04 | 966.40 | 919.78 | 924.74 | 887.13 |
| 16-Sep-04 | 965.10 | 918.31 | 925.56 | 887.76 |
| 17-Sep-04 | 966.43 | 919.39 | 927.43 | 889.41 |
| 20-Sep-04 | 965.75 | 918.11 | 925.51 | 887.01 |
| 21-Sep-04 | 967.32 | 919.42 | 927.26 | 888.54 |
| 22-Sep-04 | 967.58 | 919.46 | 926.56 | 887.69 |
| 23-Sep-04 | 969.77 | 921.38 | 930.22 | 891.08 |
| 24-Sep-04 | 972.24 | 923.56 | 933.18 | 893.78 |
| 25-Sep-04 | 972.04 | 923.16 | 932.29 | 892.74 |
| 27-Sep-04 | 971.22 | 921.94 | 930.92 | 891.06 |
| 28-Sep-04 | 967.73 | 918.34 | 925.61 | 885.72 |
| 29-Sep-04 | 965.25 | 915.73 | 921.32 | 881.36 |
| 30-Sep-04 | 966.77 | 916.99 | 924.32 | 884.11 |
| 01-Oct-04 | 961.98 | 912.12 | 916.77 | 876.57 |
| 04-Oct-04 | 959.14 | 908.73 | 911.81 | 871.21 |
| 05-Oct-04 | 958.43 | 907.82 | 911.71 | 870.93 |
| 06-Oct-04 | 957.49 | 906.69 | 909.82 | 868.91 |
| 07-Oct-04 | 954.30 | 903.39 | 905.60 | 864.64 |
| 08-Oct-04 | 954.61 | 903.47 | 906.26 | 865.10 |
| 09-Oct-04 | 950.54 | 899.32 | 899.13 | 858.00 |
| 11-Oct-04 | 949.60 | 898.33 | 893.17 | 851.86 |
| 12-Oct-04 | 947.28 | 896.86 | 892.58 | 851.10 |
| 14-Oct-04 | 949.32 | 898.42 | 894.87 | 852.97 |

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| 15-Oct-04 | 950.06 | 898.93 | 895.87 | 853.76 |
| 16-Oct-04 | 950.51 | 899.15 | 896.17 | 853.87 |
| 18-Oct-04 | 949.49 | 897.74 | 894.70 | 852.10 |
| 19-Oct-04 | 951.67 | 899.64 | 898.76 | 855.82 |
| 20-Oct-04 | 952.39 | 900.12 | 899.13 | 856.01 |
| 21-Oct-04 | 956.02 | 903.42 | 900.40 | 857.05 |
| 23-Oct-04 | 959.65 | 906.50 | 906.33 | 862.40 |
| 25-Oct-04 | 959.48 | 905.92 | 905.96 | 861.68 |
| 26-Oct-04 | 955.10 | 902.50 | 898.24 | 854.07 |
| 27-Oct-04 | 953.89 | 899.60 | 896.05 | 851.78 |
| 28-Oct-04 | 952.61 | 898.14 | 892.96 | 848.64 |
| 29-Oct-04 | 952.23 | 897.57 | 895.45 | 850.85 |
| 30-Oct-04 | 951.86 | 897.00 | 894.78 | 850.02 |
| 01-Nov-04 | 951.96 | 896.89 | 895.23 | 850.27 |
| 02-Nov-04 | 951.02 | 895.78 | 893.75 | 848.66 |
| 03-Nov-04 | 950.28 | 894.86 | 893.77 | 848.50 |
| 04-Nov-04 | 950.22 | 894.60 | 893.93 | 848.47 |
| 05-Nov-04 | 945.86 | 890.20 | 883.71 | 838.43 |
| 06-Nov-04 | 944.74 | 888.92 | 880.98 | 835.62 |
| 08-Nov-04 | 939.82 | 883.78 | 879.89 | 834.20 |
| 09-Nov-04 | 945.47 | 889.00 | 881.87 | 835.93 |
| 10-Nov-04 | 946.74 | 890.01 | 883.74 | 837.54 |
| 11-Nov-04 | 945.63 | 888.73 | 882.06 | 835.74 |
| 13-Nov-04 | 944.96 | 887.67 | 882.80 | 836.09 |
| 16-Nov-04 | 942.90 | 888.48 | 885.52 | 838.16 |
| 17-Nov-04 | 941.03 | 886.49 | 883.85 | 836.37 |
| 18-Nov-04 | 941.57 | 886.80 | 883.12 | 835.48 |
| 19-Nov-04 | 943.09 | 888.05 | 884.29 | 836.43 |
| 20-Nov-04 | 943.90 | 888.62 | 885.70 | 837.60 |
| 22-Nov-04 | 944.81 | 889.07 | 886.48 | 837.98 |
| 23-Nov-04 | 944.17 | 888.25 | 885.37 | 836.73 |
| 24-Nov-04 | 943.45 | 887.35 | 883.38 | 834.63 |
| 25-Nov-04 | 943.93 | 887.61 | 881.98 | 833.10 |
| 27-Nov-04 | 946.00 | 889.16 | 886.61 | 837.19 |
| 29-Nov-04 | 942.39 | 887.83 | 886.34 | 836.56 |
| 30-Nov-04 | 943.49 | 888.68 | 886.73 | 836.76 |
| 01-Dec-04 | 944.98 | 889.89 | 889.69 | 839.40 |
| 02-Dec-04 | 955.49 | 899.73 | 904.41 | 853.26 |
| 03-Dec-04 | 956.43 | 900.41 | 906.94 | 855.48 |
| 04-Dec-04 | 959.02 | 902.67 | 908.74 | 857.02 |
| 06-Dec-04 | 959.22 | 902.43 | 908.68 | 856.58 |
| 07-Dec-04 | 960.34 | 903.29 | 908.57 | 856.29 |
| 08-Dec-04 | 960.31 | 903.05 | 911.47 | 858.88 |
| 09-Dec-04 | 961.47 | 903.94 | 912.84 | 859.99 |
| 10-Dec-04 | 965.00 | 907.10 | 916.48 | 863.28 |
| 11-Dec-04 | 966.83 | 908.63 | 917.93 | 864.48 |
| 13-Dec-04 | 965.84 | 907.25 | 915.67 | 861.95 |

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| 14-Dec-04 | 963.63 | 904.92 | 912.93 | 859.15 |
| 15-Dec-04 | 962.84 | 903.95 | 911.89 | 857.97 |
| 16-Dec-04 | 961.81 | 902.75 | 912.99 | 858.83 |
| 17-Dec-04 | 964.05 | 904.67 | 914.07 | 859.67 |
| 18-Dec-04 | 963.82 | 904.24 | 913.07 | 858.53 |
| 20-Dec-04 | 964.61 | 904.57 | 913.52 | 858.60 |
| 21-Dec-04 | 966.39 | 906.06 | 915.67 | 860.45 |
| 22-Dec-04 | 964.84 | 904.36 | 917.69 | 862.20 |
| 23-Dec-04 | 969.01 | 908.13 | 919.83 | 864.05 |
| 24-Dec-04 | 970.93 | 909.75 | 920.10 | 864.12 |
| 27-Dec-04 | 973.22 | 911.30 | 920.82 | 864.25 |
| 28-Dec-04 | 974.71 | 912.50 | 927.23 | 870.18 |
| 29-Dec-04 | 975.25 | 912.80 | 928.52 | 871.23 |
| 30-Dec-04 | 976.79 | 914.07 | 927.85 | 870.40 |
| 31-Dec-04 | 977.26 | 914.51 | 927.17 | 869.75 |

**Annexure - IV: List of Stocks included in Index for various months in 2004**

| January'04 | February'04 | March'04 | April'04 | May'04 | June'04 |
|---|---|---|---|---|---|
| 8.07% 2017 | 8.07% 2017 | 8.07% 2017 | 7.46% 2017 | 8.07% 2017 | 8.07% 2017 |
| 7.46% 2017 | 7.49% 2017 | 7.46% 2017 | 8.07% 2017 | 7.46% 2017 | 7.46% 2017 |
| 6.25% 2018 | 7.46% 2017 | 6.25% 2018 | 7.49% 2017 | 6.25% 2018 | 7.37% 2014 |
| 7.49% 2017 | 6.25% 2018 | 7.49% 2017 | 6.25% 2018 | 7.49% 2017 | 6.25% 2018 |
| 7.40% 2012 | 7.38% 2015 | 7.40% 2012 | 5.64% 2019 | 6.05% 2019 | 7.49% 2017 |
| 7.37% 2014 | 7.40% 2012 | 7.37% 2014 | 7.40% 2012 | 6.35% 2020 | 7.40% 2012 |
| 9.39% 2011 | 7.37% 2014 | 9.39% 2011 | 11.99% 2009 | 6.17% 2023 | 6.05% 2019 |
| 7.27% 2013 | 9.39% 2011 | 11.99% 2009 | 7.37% 2014 | 7.37% 2014 | 6.35% 2020 |
| 6.01% 2028 | 9.85% 2015 | 7.27% 2013 | 6.05% 2019 | 7.40% 2012 | 11.99% 2009 |
| 6.85% 2012 | 7.27% 2013 | 9.81% 2013 | 10.95% 2011 | 7.38% 2015 | 6.17% 2023 |
| 9.81% 2013 | 6.05% 2019 | 6.35% 2020 | 9.39% 2011 | 9.85% 2015 | 9.39% 2011 |
| 6.35% 2020 | 8.35% 2022 | 6.05% 2019 | 6.35% 2020 | 11.99% 2009 | 7.27% 2013 |
| 6.72% 2014 | 6.01% 2028 | 7.55% 2010 | 7.38% 2015 | 5.64% 2019 | 7.55% 2010 |
| 11.99% 2009 | 11.40% 2008 | 6.85% 2012 | 6.85% 2012 | 8.35% 2022 | 7.38% 2015 |
| 6.05% 2019 | 9.81% 2013 | 7.38% 2015 | 9.81% 2013 | 9.39% 2011 | 9.85% 2015 |
| 9.85% 2015 | 11.99% 2009 | 9.85% 2015 | 6.72% 2014 | 6.72% 2014 | 6.72% 2014 |
| 7.38% 2015 | 10.95% 2011 | 6.72% 2014 | 11.50% 2011 | 7.27% 2013 | 9.81% 2013 |
| 10.95% 2011 | 6.72% 2014 | 5.64% 2019 | 7.27% 2013 | 6.01% 2028 | 10.95% 2011 |
| 7.55% 2010 | 6.35% 2020 | 10.95% 2011 | 9.85% 2015 | 9.81% 2013 | 8.35% 2022 |
| 11.19% 2005 | 6.85% 2012 | 9.40% 2012 | 7.55% 2010 | 6.85% 2012 | 11.40% 2008 |
| **July'04** | **August'04** | **September'04** | **October'04** | **November'04** | **December'04** |
| 8.07% 2017 | 7.38% 2015 | 7.38% 2015 | 7.38% 2015 | 7.38% 2015 | 7.55% 2010 |
| 7.38% 2015 | 8.07% 2017 | 7.37% 2014 | 6.65% 2009 | 6.65% 2009 | 7.38% 2015 |
| 5.59% 2016 | 7.37% 2014 | 8.07% 2017 | 12.32% 2011 | 7.37% 2014 | 6.65% 2009 |
| 7.46% 2017 | 7.46% 2017 | 7.40% 2012 | 8.07% 2017 | 12.32% 2011 | 7.95% 2032 |
| 7.37% 2014 | 9.39% 2011 | 9.39% 2011 | 7.37% 2014 | 9.39% 2011 | 11.90% 2007 |
| 7.40% 2012 | 7.40% 2012 | 11.99% 2009 | 7.40% 2012 | 7.40% 2012 | 7.40% 2012 |
| 7.49% 2017 | 9.85% 2015 | 12.32% 2011 | 9.39% 2011 | 8.35% 2022 | 12.00% 2008 |
| 6.25% 2018 | 9.81% 2013 | 7.46% 2017 | 8.35% 2022 | 8.07% 2017 | 11.99% 2009 |
| 9.85% 2015 | 11.90% 2007 | 10.95% 2011 | 11.99% 2009 | 11.90% 2007 | 9.39% 2011 |
| 9.39% 2011 | 4.83% 2006 | 12.00% 2008 | 10.95% 2011 | 10.95% 2011 | 11.30% 2010 |
| 13.85% 2006(INST) | 6.13% 2028 | 6.85% 2012 | 11.83% 2014 | 12.00% 2008 | 7.37% 2014 |
| 6.13% 2028 | 7.55% 2010 | 11.40% 2008 | 7.46% 2017 | 11.99% 2009 | 12.29% 2010 |
| 14.00 % 2006 | 6.85% 2012 | 11.90% 2007 | 12.00% 2008 | 7.27% 2013 | 10.95% 2011 |
| 6.05% 2019 | 9.40% 2012 | 11.68% 2006 | 11.90% 2007 | 9.85% 2015 | 11.68% 2006 |
| 9.81% 2013 | 7.49% 2017 | 7.27% 2013 | 11.50% 2008 | 11.40% 2008 | 5.87% 2010 |
| 12.29% 2010 | 11.99% 2009 | 9.81% 2013 | 9.85% 2015 | 7.55% 2010 | 11.40% 2008 |
| 7.27% 2013 | 11.40% 2008 | 7.55% 2010 | 11.68% 2006 | 7.46% 2017 | 11.83% 2014 |
| 11.99% 2009 | 10.95% 2011 | 12.29% 2010 | 9.81% 2013 | 12.29% 2010 | 11.03% 2012 |
| 6.01% 2028 | 6.35% 2020 | 11.03% 2012 | 11.40% 2008 | 11.50% 2011 | 8.35% 2022 |
| 10.95% 2011 | 10.71% 2016 | 7.49% 2017 | 7.55% 2010 | 4.83% 2006 | 11.00% 2006 |

**Annexure-IV**

**Examples:**

The following examples would give the broad idea about our index computation.

EX-1: Suppose we have a sovereign index that gives a value of 1110 as on 31-December-20004. The index has now have only 5 bonds after reconstruction on 1-January-2005 that have same issue size of Rs.100millions each. The prices of these bonds are 105.65, 115.98, 119.78, 145.63 and 91.00 as on 31st December 2004 and 105.29, 114.78, 118.99, 145.23 and 90.85 as on 1st January 2005.

The value of the index on 1st January 2005 would be

$$I = 1110 * \frac{(105.29*100 + 114.78*100 + 118.99*100 + 145.23*100 + 90.85*100)}{(105.65*100 + 115.98*100 + 119.78*100 + 145.63*100 + 91.00*100)} = 1104.43$$

As we can see, the index has fallen since the prices have moved southward.

Suppose one of the bonds has gone through a re-issuance process and the issue size has increased to Rs.200million on 1st January 2005. The index for 1st November would not change and would remain on 1104.43 as calculated above but the index for 2nd January 2005 would be

$$I = 1110 * \frac{(105.29*100 + 114.78*100 + 118.99*200 + 145.23*100 + 90.85*100)}{(105.65*100 + 115.98*100 + 119.78*200 + 145.63*100 + 91.00*100)} = 1098.59$$