Tenor Index for Indian Bond Markets

The movement of price or yield is not uniform across all maturity segments. In order to capture such non-uniform yield impact on various maturity buckets all outstanding securities are divided into 5 buckets based on their residual maturities. Similar to the Bond Index, government securities having residual maturity less than 1.5 years and special securities are excluded. For each maturity bucket, the price movements are captured in the Principal Returns Index while the Total returns index provides the change due to both price movements and accrued interest.

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1. INTRODUCTION

The government securities market is considered as the backbone of the fixed income securities market and is the prime funding avenue for the government. In the Indian context, the government securities market singularly dominates the transactions in the fixed income market and is thus a prime source of information on the financial market's interest rate expectations. The Indian bond market has grown exponentially in the past few years and holds the fourth position with respect to the total outstanding government debt after Japan, China, and South Korea. As on March 31, 2018, the total outstanding government debt stood at Rs.51.86 trillion.

The central government and the state governments borrow through issuing sovereign securities and state development loans (SDLs). The central government also issues treasury bills with maturity less than a year. These securities are issued in the primary market through normal auctions. The RBI conducts the auctions of marketable dated securities through a pre-announced half-yearly indicative calendar. There exists an active secondary market for government securities and they are traded and reported on the Negotiated Dealing System-Order Matching segment (NDS-OM). The NDS-OM platform accounts for approximately 75% of the market share.

ABOUT CCIL

The Clearing Corporation of India Ltd. (CCIL) was set up in 2001 to provide an institutional infrastructure for the clearing and settlement of transactions in government securities, money market instruments, foreign exchange and other related products with the objective of bringing about efficiency to the transaction settlement process, and mitigating the systemic risk emanating from settlement related problems and counter party risk. CCIL is a payment system operator, authorized by the Reserve Bank of India (RBI) under PSS Act 2007 to provide guaranteed settlement in TREP, Securities, Forex and Rupee Derivatives market. In view of its critical importance to the Indian financial system, CCIL has been designated as a critical Financial Market Infrastructure (FMI) by the RBI and it has given CCIL the status of a Qualifying Central Counterparty (QCCP) on January 1, 2014. CCIL has also been accorded recognition as a "third party CCP" with effect from March 29, 2017 under the European Market Infrastructure Regulation ("EMIR").

CCIL offers guaranteed settlement services for government securities comprising of outright and repo and TREP markets in the money market segment. In the forex market, it offers guaranteed settlement to all interbank USD/INR forex transactions, inclusive of USD/INR forward transactions. It also offers settlement services to rupee derivative and cross currency transactions. CCIL through its subsidiary Clearcorp Dealing Systems (India) Ltd. (CDSL) manages trading platforms in the Money and G-Sec market on behalf of the RBI and also owns trading platforms in the fixed income, money, forex, and derivative markets. CCIL also manages the trade repository for the interest rate, forex and credit derivatives market in India, which has enhanced the level of transparency in the markets through data dissemination and publication. CCIL's wholly owned subsidiary Legal entity Identifier India Limited (LEIL) is the Local Operating Unit (LOU) in India for issuing globally compatible Legal Entity Identifiers (LEIs) in India.

2. RATIONALE

The sovereign bond market is the most liquid segment of the bond market. A sovereign bond index serves as a benchmark for portfolio management, an indicator of market performance and development, and forms the basis on which market options and futures may be derived. The bond portfolio performance which are driven by their coupons as well as the appreciation of the asset, are monitored by the indices. A well-constructed bond index mirrors the economic policy changes of the government and structural reforms, which have a bearing on the interest rate in the economy.

CCIL is the Central Counterparty for all transactions in the Indian Government Securities market and follows the process of netting through novation to provide guaranteed settlement for all secondary market transactions. The trading information is used to compute the volume weighted average prices of all traded securities. The theoretical price of the securities is also computed using an YTM Curve model developed internally.

The price to yield sensitivity is different for each bond. It is due to the fact that sensitivity depends on coupon and residual maturity of the bond. In order to capture tenor-wise sensitivity, CCIL has designed Tenor Indices. The outstanding securities are grouped into five buckets, representing five different indices. The five indices are:

1. Tenor 1: An index that comprises of securities having residual maturity falling between 1.5 years and 5 years.
2. Tenor 2: An index that comprises of securities having residual maturity falling between 5 years and 10 years.
3. Tenor 3: An index that comprises of securities having residual maturity falling between 10 years and 15 years.
4. Tenor 4: An index that comprises of securities having residual maturity falling between 15 years and 20 years.
5. Tenor 5: An index that comprises of securities having residual maturity greater than and equal to 20 years.

3. DATA DETAILS

- **Data Source**

Trades executed and reported on the NDS-OM platform are considered for index computation.

- **Issuer**

Only securities issued by Government of India are considered.

- **Price Details**

Volume weighted average market price (VWAP) of securities are considered for the computation of the index. In case VWAP is not available for any particular day for any security, the model price of the corresponding security is used.

4. INDEX LOGIC

- **Bond inclusion criteria**

All government securities that have at least three remaining coupon cycles are considered for inclusion in the index. Here, it is ensured that at least one security of each available maturity year is included irrespective of the trading behavior.

- **Bond Exclusion criteria**

Special securities like OIL bonds, Inflation Indexed bonds, Fertilizer bonds, Floating rate bonds, and bonds issued to specific organization(s) are excluded from the broad and liquid index constituents. Also, securities having residual maturity of less than 1.5 years are not a part of the index composition.

- **Base Date and Value**

For the calculation of the Tenor Index, December 31, 2003 has been selected as a base date with a base value of 1000.

- **Weighting Scheme**

Market capitalization based weighting scheme is applied to each security in each tenor bucket. The weight assigned to each security is determined as the ratio of the individual security's market capitalization to the total market capitalization of all securities in the respective tenor bucket.

$$w_i = \frac{Price_i * Outstanding\ Amount_i}{\sum_{i=1}^{n} Price_i * Outstanding\ Amount_i}$$

- **Calculation Details**

The tenor indices reflect the change in the value of the index of each bucket due to the price movements and accrued interest through the Total Return Index (TRI) and Principal Return Index (PRI). The dirty price and clean price of a bond are weighed depending on the share of the security's market capitalization in the market capitalization of the portfolio. In addition, the market capitalization weighted duration, yield and coupon of the entire portfolio are also computed.

Total Return Index: The total return index is the absolute return that the tenor bucket offers and it includes coupon accrued and capital gains (losses). In this index, the coupon accrued for a security in the portfolio is distributed on the coupon payment date among the other securities as per their weight in the index based on their market capitalization. The total return index is calculated every day by multiplying the previous day's index value with the ratio of the portfolio's weighted average gross price to the previous day's weighted average gross price. The gross price is adjusted for the loss of accrued interest on the coupon payment day.

$$TR_{I,t} = TR_{I, t-1} \times \{(\Sigma^n_{I=1} WGP_{i,t})/ \Sigma^n_{I=1} WGP_{i, t-1}\}$$

where, WGP is the weighted average dirty price of all the securities in the portfolio and also includes the distribution of the coupon accrued in case of a coupon payment on a security on a particular day. TR is the Total Return Index as of that day.

Principal Return Index: The principal return index is calculated every day by multiplying the previous day's index value with the ratio of the portfolio's weighted average clean price to the previous day's weighted average clean price.

$$PR_{I,t} = PR_{I, t-1} \times \{ \Sigma^n_{I=1} WCP_{i,t} / \Sigma^n_{I=1} WCP_{i, t-1}\}$$

where, WCP is the weighted average clean price of all the securities in the portfolio. PR is the Principal Return Index as of that day.

Duration: Duration is used to measure the effective life of the bond and is an indicator of the interest rate risk of each tenor bucket. The duration of each tenor bucket is calculated as the sum of the weighted duration of individual bonds in the bucket.

$$D = \Sigma^n_{I=1} D_i W_i$$

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.

Coupon: The coupon of the each tenor bucket is the weighted average coupon of the outstanding of all the bonds in the respective tenor.

$$C = \Sigma^n_{I=1} C_i W_i$$

where, C_i is the coupon of the bond i and W_i is the relevant weight based on market capitalization of bond i.

5. INDEX REBALANCING
Tenor indices are rebalanced at the start of new month i.e. on first day of the month.

6. TREATMENT OF HOLIDAYS / NON-WORKING DAYS
Tenor index values are estimated for all calendar days. The immediate previous working day's prices are used to estimate index values for holidays/ non-working days.

7. INDEX RELEASES
- Index values are released at the end of each working day. For holidays/ non-working days, the index values get released on the immediate next working day.
- Index value is available each working day on CCIL web portal www.ccilindia.com
- The CCIL index values are also available on Bloomberg (ticker).

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