

Understanding Floating Rate Bonds, Structure, Analytical Framework & Investment Strategies

There has been a sudden spurt in investor interest in floating rate bonds (FRB) in CY21. Floating Rate Funds have received a net inflow of ~Rs. 21,000 crore in this calendar year so far, second-highest net inflow after Money Market Funds, signifying their interest. The Government of India (GOI) has also been quite active in supplying FRBs through scheduled auctions on periodic basis. There are four outstanding IGB FRBs with ~Rs. 3.8 trillion of outstanding face value with GOI 2033 FRB being auctioned on fortnightly basis. Recently, Power Finance Corporation Limited, a AAA-rated CPSE, issued a 3-year FRB linked to 3-month T-Bills, which drew strong investor interest. Many more FRB issuances are in the pipeline.

FRBs are popular among investors during periods of rising interest rates or upward trending bond yields. Investors view FRBs as a defensive play in their fixed income portfolio during such times. FRBs are designed to shield investors from vagaries of price volatility of fixed rate bonds during uptrend in bond yields.

In this note, we attempt to explore FRBs, their different type of structures, analytical framework of valuation of FRBs and suitable portfolio investment strategies.

FRBs encompasses issues whose coupons are tied to a benchmark or an index (Index). In general, a pure FRB has the following components:

- **Index:** They are liquid & widely followed benchmarks in the bond market such as MIBOR, 3M or 6M T-Bills, Reuter’s INBMK rates. The underlying Index remains the same through the life of the FRB. Selection of a suitable Index and its look-back period (such as closing levels of average number of days before the next reset date) are important determinants for the pay-off to investors.
- **Reset Frequency:** The Index is generally reset on periodic basis – daily (in case of MIBOR) or quarterly / six-monthly. Most FRBs reset on quarterly basis in India. FRBs with quicker reset frequency are generally preferred during potential upward trend in underlying Index while FRBs with longer reset frequencies are preferred when the underlying Index is expected to trend lower.
- **Quoted Margin (QM):** This is the spread the issuer is willing to offer over and above the Index level on annualized basis. In a pure FRB, QM remains constant during FRB’s tenor. QM can be viewed as either as Term Premium or Credit Spread the issuer offers to investors. QM is a function of issuer’s credit worthiness as well as tenor of the FRB.
- **Maturity Date:** Each FRB has a defined maturity date on which FRB investors receive the maturity value plus last tranche of coupon payment.
- **Payment Frequency:** Frequency at which coupons are going to be paid. This is generally same as Reset Frequency.

In Developed Markets, different variants of FRBs have been quite popular among investors. This includes FRBs collateralized by asset backed securities, mortgage-backed securities as well as FRBs with Cap & Floor structures, among many other structures.

Let’s analyze two pure FRBs to understand these components better:

FRB Characteristics	Issuer 1	Issuer 2
Issuer:	Power Finance Corporation Limited	GOI
Rating:	AAA	Sovereign

ISIN:	INE134E08LJ4	IN0020200120
Index:	3M T-Bill	6M T-Bill
Issue Date:	Aug 2, 2021	June 22, 2020
Maturity Date:	Aug 2, 2024	Sep 22, 2033
Quoted Margin:	0.67% pa	1.22% pa
Reset Frequency:	Quarterly	Semi-Annual
Payment Frequency:	Annual	Semi-Annual
Latest Coupon:	4.05% pa	4.70% pa
Outstanding Face Value:	Rs. 1,985 crore	Rs. 1,45,731.97 crore
Latest Bid-Offer:	100-100.15	101.10-101.15
Day-Count:	ACT/ACT	30/360

Source: Bloomberg LP, RBI, data as on Aug 13, 2021

As can be seen from the table above, Power Finance Corporation Limited, a AAA-rated CPSE, has recently issued this FRB and has raised Rs. 1,985 crore at 3M T-Bills + 0.67%, to be reset quarterly. This means, coupon rate for first three months (Aug 2, 2021 to November 1, 2021) is known & fixed at 4.05% pa. The next quarterly coupon (November 2, 2021 to Feb 1, 2022) is unknown and will be fixed at 0.67% above the 3M T-Bill Index calculations on November 1, 2021. This process will continue till Aug 1, 2022, when the issuer will pay cumulative interest accrued for four quarters based on the underlying 3M T-Bill Index + 0.67% pa. Quoted Margin (QM) in this case is 0.67%. This will remain fixed till the tenor of the FRB.

GOI, on the other hand, issued a 13-year FRB in June 2020 linked to 6M T-Bills + 1.22% to be reset & paid on semi-annual basis. Recently, the GOI has been re-issuing this FRBs to build a critical mass. Thus, the outstanding amount this FRB has increased to Rs. 1.45 trillion. The current coupon is 4.70% pa. That means, investors will be paid Rs. 2.35 per Rs. 100 as semi-annual interest on Sep 22, 2021. The Index will reset on Sep 22, 2021 at the prevailing 6M T-Bill levels + 1.22% pa for next six months (Sep 22, 2021 till March 21, 2022). As in the case above, while the Index level may keep varying, the QM remains static through the life of the GOI FRB 2033.

Understanding concept of Simple Margin & Discount Margin

When FRBs trade in the secondary market, they either trade at premium or discount to par, depending on market conditions, changes in investor expectations of credit spread or tenor of the FRB. Given that the cashflow of an FRB is unknown beyond the latest coupon, unlike fixed rate bonds, traditional measures such as YTM are not effective for FRBs. Global investors have developed following concepts for FRBs which are widely used:

1. Simple Margin (SM): $QM + \frac{(100 - Price)}{N}$

where, QM is Quoted Margin of an FRB (known), Price of FRB is Clean Price (known), N is residual maturity of an FRB in years (known)

- a. In case of PFC's example above, if the PFC bond trade at 100.10, for example, then Simple Margin will be 0.64%, down from 0.67%, as the bond is trading at premium
 - b. Similarly, in case of GOI FRB 2033, at the current bid price of 101, Simple Margin will be ~1.14%, down from 1.22%
2. Discount Margin (DM): It is the constant spread over the underlying Index that makes the present value of all future cashflows equal to the present Total Consideration of the FRB. DM's mathematical expression is a bit complex and not relevant for this discussion here. However, it is

conceptually easier to understand. FRBs trading at premium to par generally have their DM lower than QM and vice versa. That said, considering lack of visibility on future cashflows the following assumptions are generally made:

- a. The latest coupon is assumed to be the latest Index level + QM
- b. All future coupons are assumed to be same as the latest coupon rate

The following table prepared with help of Bloomberg may provide you with better idea of SM & DM:

PFC FRB 2-Aug-2024

Clean Price	98	99	99.5	100	100.5	101	102
QM (bp)	67	67	67	67	67	67	67
SM (bp)	141	104	86	67	49	31	-4
DM (bp)	142	107	90	72	55	39	5

Source: Bloomberg, data as on Aug 13, 2021 & rounded up

GOI FRB 22-Sep-2033

Clean Price	98	99	99.5	100	100.5	101	102
QM (bp)	122	122	122	122	122	122	122
SM (bp)	144	133	128	122	117	111	101
DM (bp)	146	136	132	127	122	118	108

Source: Bloomberg, data as on Aug 13, 2021 & rounded up

Changes in Discount Margin are caused by several factors. Some of them along with their rationale are mentioned below:

Factor affecting DM	Direction of Change	Rationale
Potential credit downgrade	Increase in DM	Higher credit risk means higher DM
Higher Demand	Lower DM	Higher demand in secondary market means tighter DM
Higher-than-expected increase in yield curve of underlying Index	Lower DM	Investors may demand lower DM in case of higher-than-expected upward shift in yield curve of underlying Index

Understanding concept of Index Duration & Spread Duration

As applicable in fixed-rate bonds, duration is a concept to measure price sensitivity of a plain vanilla bond to a small change in YTM. Modified Duration or Macaulay Duration are widely used by investors to understand price sensitivity of their fixed income assets. However, the same may not be applicable to FRBs as all future cashflows are unknown at the time of investment. However, it is important to understand price sensitivity of FRBs to changes in the underlying Index as well as Discount Margin (DM). This can be determined by the following two measures:

1. Index Duration: Index Duration is a measure of price sensitivity of an FRB to changes in the underlying Index. Since the Index of the FRB resets on periodic basis, price sensitivity of an FRB is

different as compared to a fixed rate bond. Therefore, Index Duration of an FRB is generally equal to the residual maturity of the underlying Index to the next reset date.

2. Spread Duration: Spread Duration is a measure of price sensitivity to changes in DM (credit spread) assuming there is no change in the underlying Index. This concept is similar to the concept of Modified Duration for fixed-rate bond. Based on that, Spread Duration on an FRB is generally equal to the Modified Duration of a fixed rate bond with identical coupon rate and maturity date.

The following table captures Index Duration & Spread Duration of the above-mentioned two FRBs:

Issuer	PFC FRB 2-Aug-2024	GOI FRB 22-Sep-2033
ISIN	INE134E08LJ4	IN0020200120
Clean Price	100	101
Index Duration (years)	0.25	0.11
Spread Duration (years)	2.7	7.8

Source: internal, data as on Aug 13, 2021

Price Sensitivities of FRBs: As compared to a fixed-rate bond of the same issuer with identical maturity, a pure FRB generally exhibits lower price sensitivity. This is generally because of periodic reset of the underlying Index. **However, it is not correct to assume that FRBs will revert to par on the next reset date.** Price of an FRB can be volatile for several reasons. Some of them are summarized below:

- Index selection: a MIBOR-based FRB will exhibit lower price sensitivity vs an INBMK-based FRB of same maturity
- Index Reset Frequency: Faster resets are preferred during hardening of interest rates. While slower resets are preferred during declining rate cycles
- Residual maturity of FRBs: an FRB with longer maturity will experience greater price volatility as compared to an FRB with lower maturity of the same issuer and identical Index Resets
- Credit perception of the issuer: Weakening of credit perception will result in widening of DM, thus resulting in lower price of FRBs even when Index cash flows remain unchanged.

Investment Strategies involving FRBs

As mentioned earlier, FRBs are generally preferred by Fund Managers during periods of upward moving interest rate cycle. Secular increase in the underlying Index (MIBOR, 3M/6M T-Bills, INBMK, etc.) on periodic reset dates helps investors in capturing higher coupons. This helps in generating higher returns for investors.

FRBs are also generally seen as better yielding alternative to short-term CP/CDs with maturities identical to the next reset date of the underlying Index. This is because of credit spread in form of Quoted Margin (QM) is generally higher than credit spreads of short-term CP/CDs.

During periods of stable interest rates, FRBs are generally used to optimize Barbell portfolio strategies as an alternative to short-term allocation.

Short maturity Inverse Floaters, whose pay-off is inversely linked to the movement in the underlying Index, are quite effective as substitute of short-term assets during periods of rapid decline in the underlying Index.

Indian Debt Fund Managers have been quite versatile in their use of FRBs since 2005. MIBOR-linked FRBs with daily put/call options and their variants gained popularity as substitute of cash deployment. Steeper yield curves introduced INBMK-based FRBs to optimize portfolio returns. In 2012, the GOI introduced Indian version of TIPS linked to India's Wholesale Price Index (WPI), which was well received by investors.

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However, the abrupt switch by the RBI from WPI to CPI as official inflation gauge caused premature demise of the program. The ongoing Sovereign Gold Bond Scheme by the GOI is a variant of a 8-year sovereign FRB whose pay-off is linked to the change in INR price of .999 purity gold while its QM is fixed at 2.5% pa. Complex structured FRBs have also been spotted wherein QM, along with Index, are variable.

However, as they say, there is no free lunch in financial markets. Investors of FRBs need to understand the following key issues:

1. **Tactical Investment:** FRBs are generally useful as tactical play during a short period of time when the underlying Index is likely to trend higher. Therefore, it is important to time the entry and exit of FRBs to optimize returns. Long-term / Hold-To-Maturity investors are generally better off investing in a fixed rate bond of similar maturity than an FRB.
2. **Liquidity in the Secondary Market:** Since FRBs gain popularity during upward trend in Index levels, their secondary market liquidity is quite important. Liquidity generally improves when the Index is ready to trend higher or on the uptrend. Liquidity generally dries down when Index levels are at peak or closer to peak.
3. **Price Sensitivity:** Long-term FRBs will exhibit higher price volatility than short-term FRBs. This point has been explained in detail above.
4. **Structures:** FRBs come in different types of structures. FRBs with cap & floors, step-up structures, Inverse structures, etc. tend to behave differently. Therefore, it is important to pay attention to their structures and factors driving their valuations.
5. **Issuer Preference:** It is generally cheaper for any issuer to issue an FRB as it tends to reduce their aggregate borrowing costs. As a result, any indication of higher demand of FRBs is generally met with increased primary supply. This tends to put upward pressure on Discount Margin (DM), thus reducing valuations of other FRBs in theory and affecting secondary market liquidity as well.

Theoretical Valuation of an FRB with T-Bill as underlying Index

There are multiple ways to value a pure FRB with T-Bills (3M or 6M) as underlying Index. The theoretical aspect involves bootstrapping the sovereign yield curve in the following manner in order to gauge theoretical value of future cash flows:

- Upward sloping sovereign par yield curve is the starting point
- From that, spot yield curve (ZCB yield curve) is derived, spot curve sits above the par curve
- Based on the selection of 3M T-Bills or 6M T-Bills, forward rates are derived at the intervals matching the reset dates of the underlying Index
- These forward rates along with Quoted Margin are used as future coupons
- These future coupons are then discounted with the same forward rates as derived above plus DM.
- In case of $DM = QM$, the theoretical valuation of an FRB will be closer to par
- In case of $DM > QM$, the theoretical valuation of an FRB will be below par
- In case of $DM < QM$, the theoretical valuation of an FRB will be above par

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Example of an upward sloping sovereign yield curve, spot curve and 1Y forward curve:

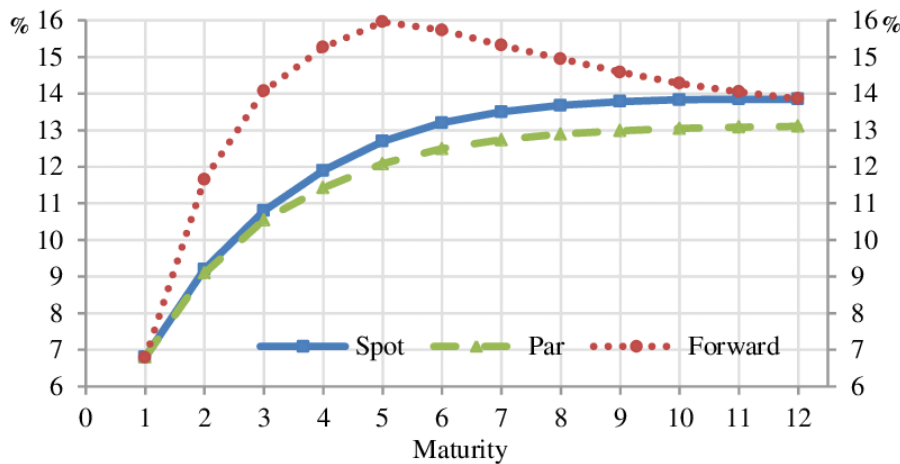


Chart courtesy Researchgate.net

Link between Theoretical & Actual cashflow of an FRB & Decision-Making Process

Although valuation of an FRB may require a forward curve of the underlying Index, it is important to note that there is no link between the theoretical cashflow projected by the forward curve and actual cashflow received by the investors of an FRB. This is very important for the investors. Let me explain with an example:

- If the current levels of 6M T-Bills is 3.5% pa and 1Y T-Bill is 3.75% pa, then 6M forward rate of 6M T-Bill can be calculated as ~3.93% pa based on the following formula:
 - $(1 + \frac{3.50\%}{2}) \times (1 + \frac{(3.93\%)}{2}) = (1 + 3.75\%)$
- This does not mean that investors of an FRB with 6M T-Bill as an Index will be able to capture 6M T-Bill coupon rate of 3.93% on the next reset.
- The next reset level of the Index will be based on the actual level of 6M T-Bills at the time of next reset of the Index.
- Investors will be able to capture the 3.93% level only if they are long on 1Y T-Bill at 3.75% pa and short on 6M OIS at 3.5% pa or lower.
- Based on the above, it should be noted that investors of FRBs may receive actual coupon flows which may be sharply lower than what is projected by the forward curve at the time of investments, thus resulting in potentially lower Total Returns.

Long-only investors are generally better off investing in a fixed-rate bond of similar maturity that offer clarity of cashflows and better secondary market liquidity. The holding period returns are higher as compared to total returns in an FRB, in our opinion.

The following comparison of GOI FRB 2033 with may illustrate this point better:

Details	Fixed Rate Bond	Floating Rate Bond
Instrument	6.57% GS 2033	GOI FRB 22-Sep-2033
ISIN #	IN0020160100	IN0020200120
Coupon:	6.57% pa	6M T-Bill + 1.22% (4.70% pa current coupon)
Maturity Date:	5-Dec-2033	22-Sep-2033
YTM/Price:	6.67%/99.10 + AI	- / 101.15 + AI

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Data as on Aug 13, 2021, Source: CCIL, RBI

Assuming an investor is indifferent between the above two IGBs and is willing to hold the bond till maturity. A simple back-of-the-envelope calculation may be helpful in decision-making.

Coupon of Fixed Rate Bond – QM of FRB = Average level of all future cashflow of 6M T-Bills

Therefore, 6.57% - 1.22% = 5.35% pa.

That means, an investor will be better off holding an GOI FRB 2033 only if she believes that the average level of 6M T-Bills on each of reset dates of March 22 & Sep 22 between Sep 22, 2021 (next reset date) and March 22, 2033 (last reset date) will be higher than 5.35% pa as compared to the current 6M T-Bill level of 3.5% pa.

On the other hand, if she believes that average level of 6M T-Bill between now and March 2033 is unlikely to be higher than 5.35%, then she is better off holding the fixed rate bond of similar maturity.

For simplicity, we have ignored the actual prices and have assumed that both bonds are priced at par.

Summary

FRBs offer an interesting investment option to investors during expected upturn in bond yields or policy rates. Current macroeconomic landscape offers one such environment in which the RBI is expected to commence normalization of monetary policy in CY22 onwards. Based on that, bond investors have embraced FRBs as a defensive positioning in their portfolios.

That said, steeper yield curves and expectations of slower-than-expected or delayed normalization of monetary policy could result in lower-than-expected pay-off for FRB investors and induce unwanted price volatility in their portfolios.

FRB investors are also exposed to multiple factors affecting prices of FRBs through the cycle. Deeper understanding of these factors will make them take an informed investment decision during their entry and exit strategies.

More importantly, FRB investors will be better-off determining their holding period first and evaluating their options based on the simple yet effective break-even analysis of expected increase in the Index and comparing the same with market expectations as shown above.

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