



Institute of Actuaries of India

Application of Interest Rate Swaps in Indian Insurance Industry

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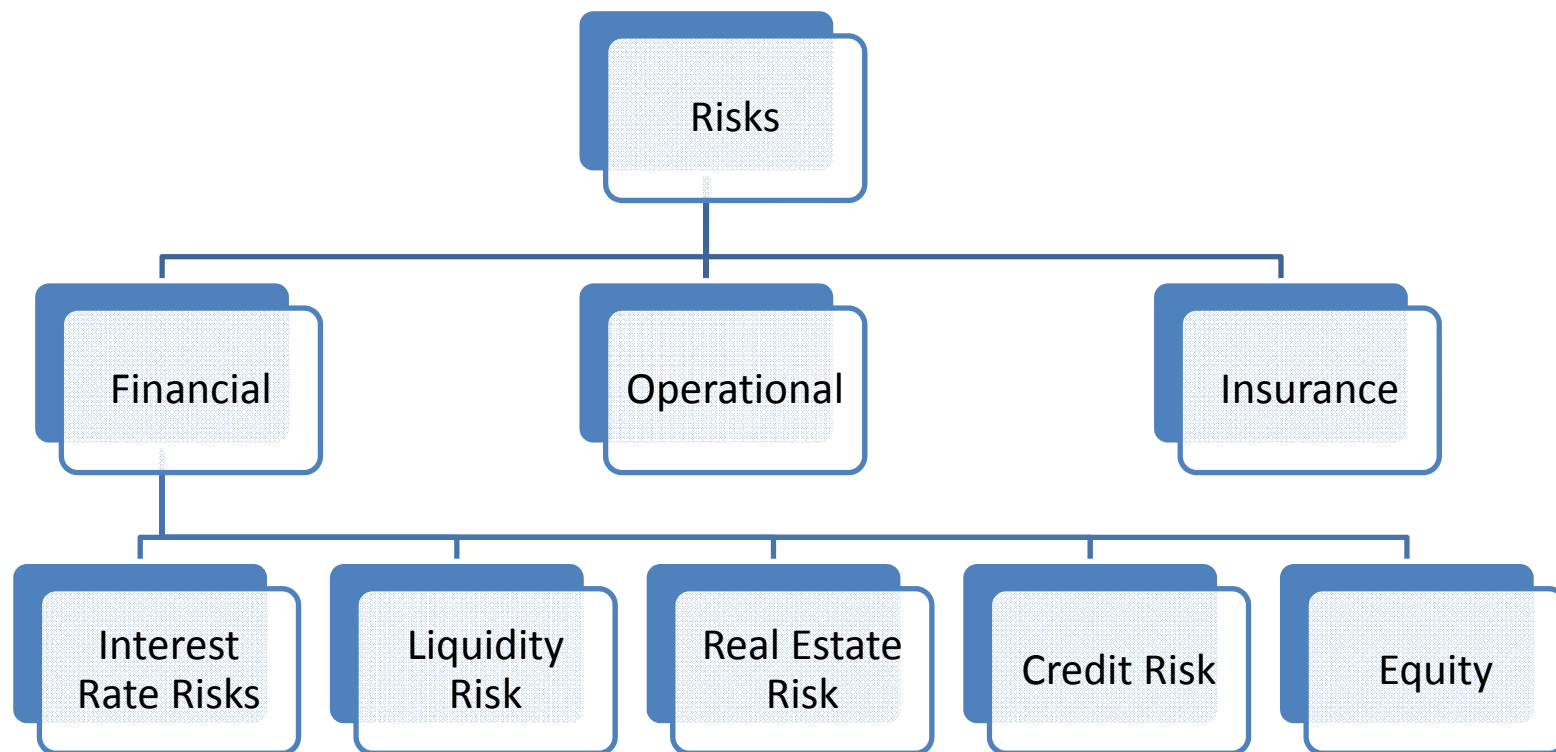
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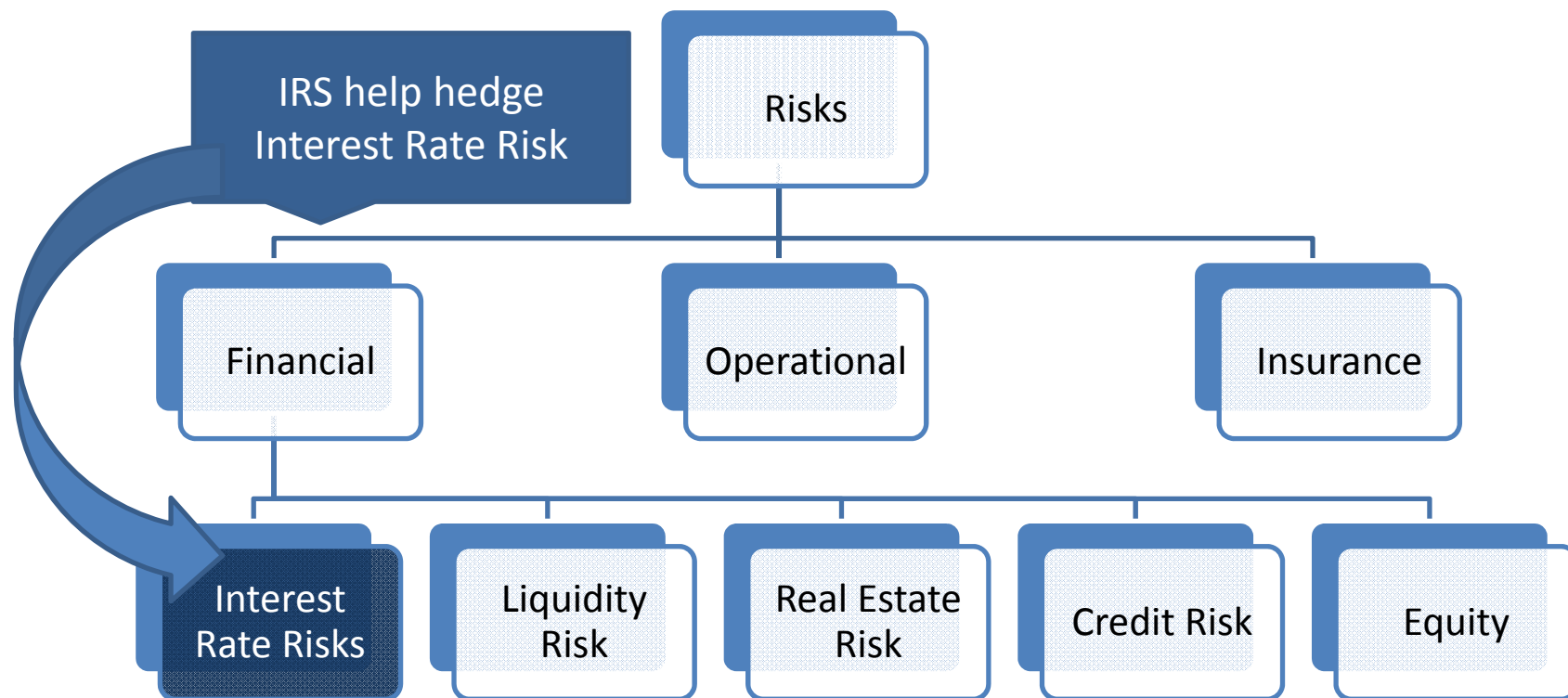
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- Interest Rate Swaps: Brief Overview
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- Interest Rate Risk and How IRS help
- Case Study
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- Risks Associated
- Other Issues
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- Summary

Risks to Insurance Companies



Risks to Insurance Companies

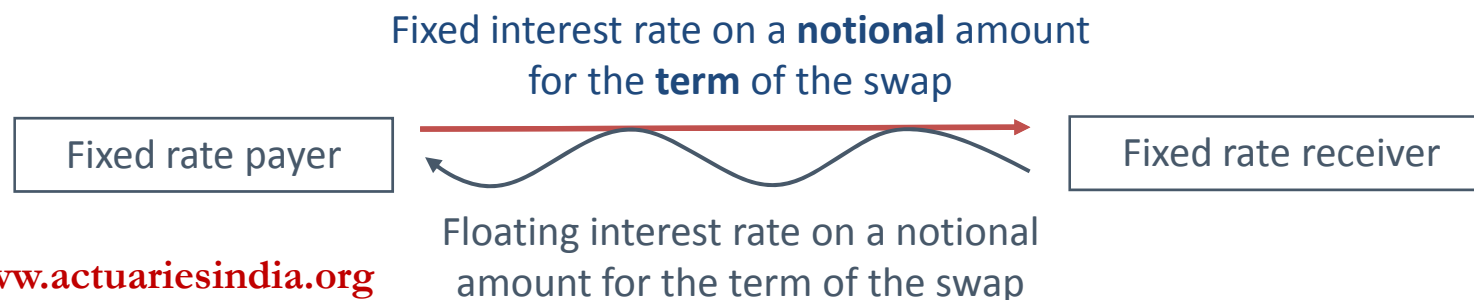


Interest Rate Swaps: Brief Overview

An Interest Rate Swap (IRS) is a bilateral agreement in which floating interest payments are exchanged for fixed interest payments on a given notional amount. Floating rate is typically a benchmark rate such as LIBOR/MIBOR

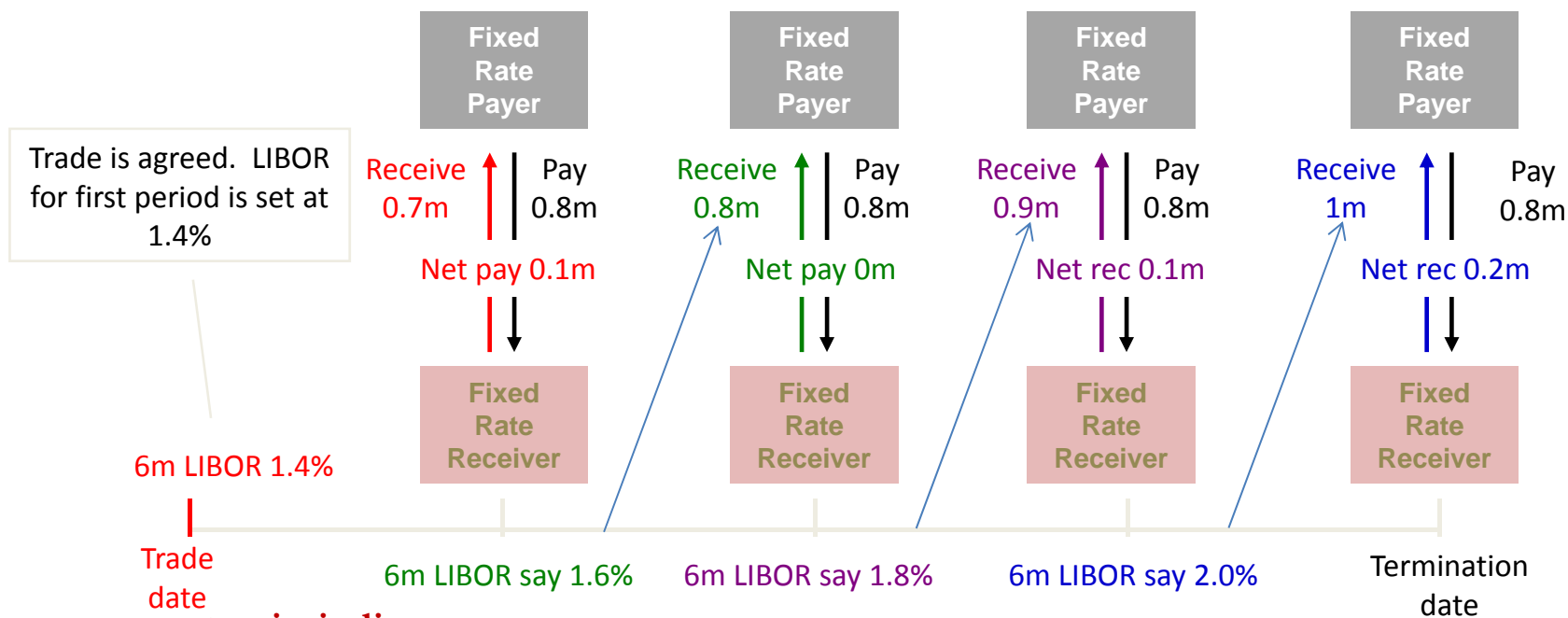
An IRS will have four basic features:

- The term or tenor – this is the length of time the swap lasts for
- The notional amount – this is the size of the swap. The notional is a reference amount and generally not exchanged
- The frequency – this is how often each year the payments are exchanged
- A swap rate – this is the fixed rate component of the swap & is quoted in the market



Interest Rate Swaps: Brief Overview

- Example:** A bank is quoting the two year swap against six month floating as against a fixed rate of 1.6%:
 - Supposing we choose to pay fixed and receive floating.
 - Lets also say that the notional amount is 100mn and the floating rate is 6M LIBOR and floating rate cashflows are based on LIBOR at previous time point
- Below are the cash flows we would pay and receive over the swap's term:



Interest Rate Swaps: Pricing

The main principle behind swap pricing is that the swap has **zero value** when it is traded i.e. the present value of the floating payments will equal the present value of the fixed payments.

Suppose we enter into 3 year annual swap with notional N and swap rate r

Let the spot curve with discount factors be DF_i and forward rates f_{ij} . Then,

$$\underbrace{(N * r * DF_1) + (N * r * DF_2) + (N * r * DF_3)}_{\text{PV Fixed Leg}} = \underbrace{(N * f_{01} * DF_1) + (N * f_{12} * DF_2) + (N * f_{23} * DF_3)}_{\text{PV Floating Leg}}$$

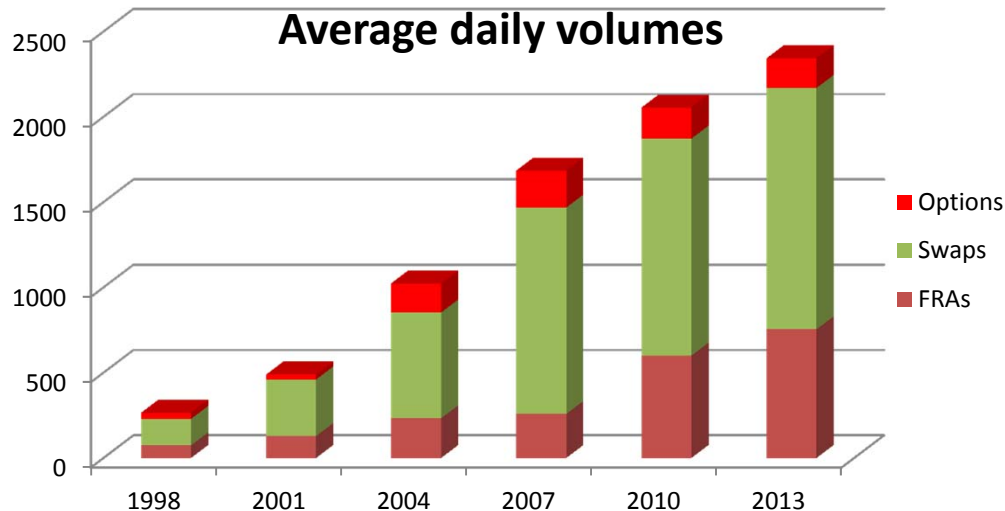
Which allows us to re-arrange to solve for r :

$$r = \frac{(f_{01} * DF_1) + (f_{12} * DF_2) + (f_{23} * DF_3)}{(DF_1 + DF_2 + DF_3)}$$

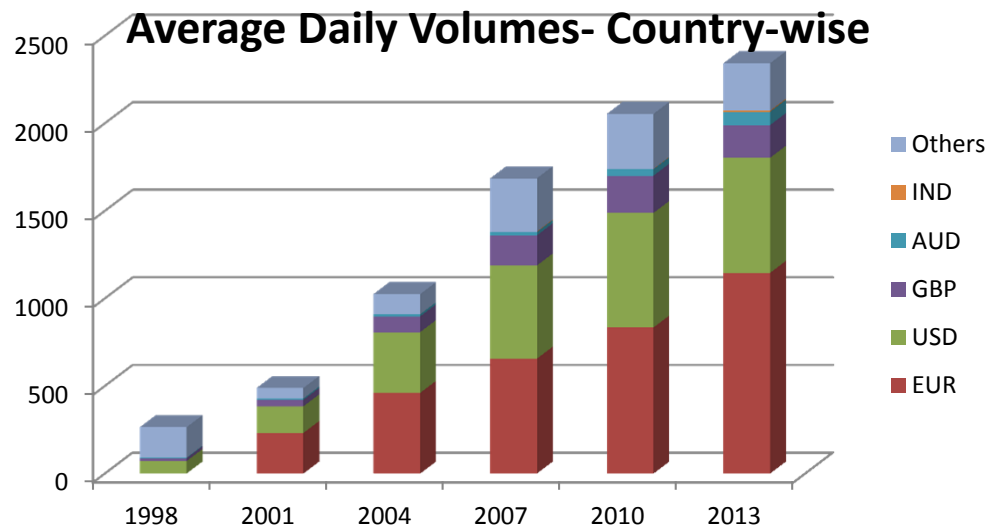
Assuming same underlying curve for discounting, this can be further simplified:

$$r = \frac{(1 - DF_3)}{(DF_1 + DF_2 + DF_3)}$$

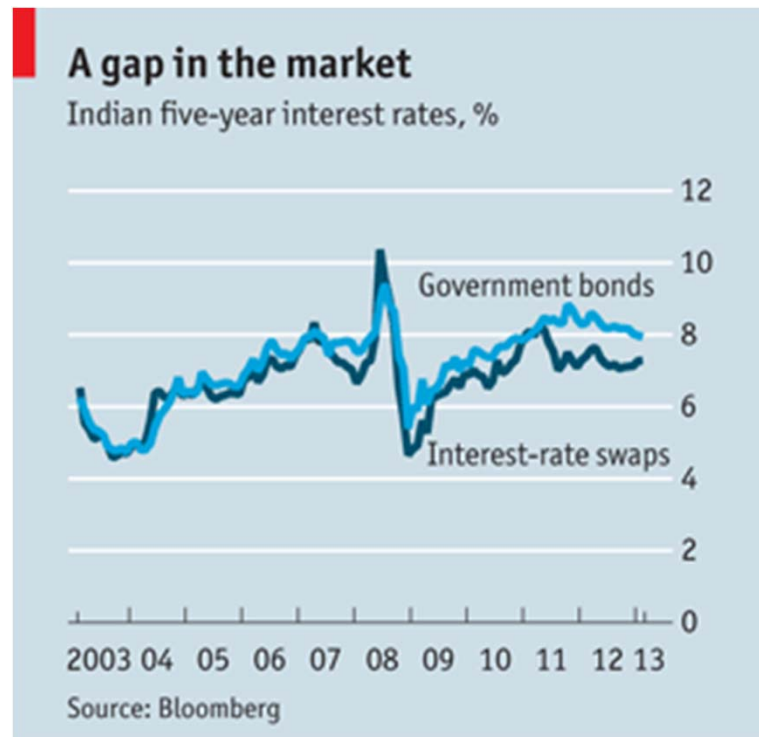
Interest Rate Swap Markets And India



- Swaps form highest percentage of interest rate derivatives
- Daily turnover increased significantly over the years
- Developed markets main contributors
- India share stands at less than 0.1% of the total turnover

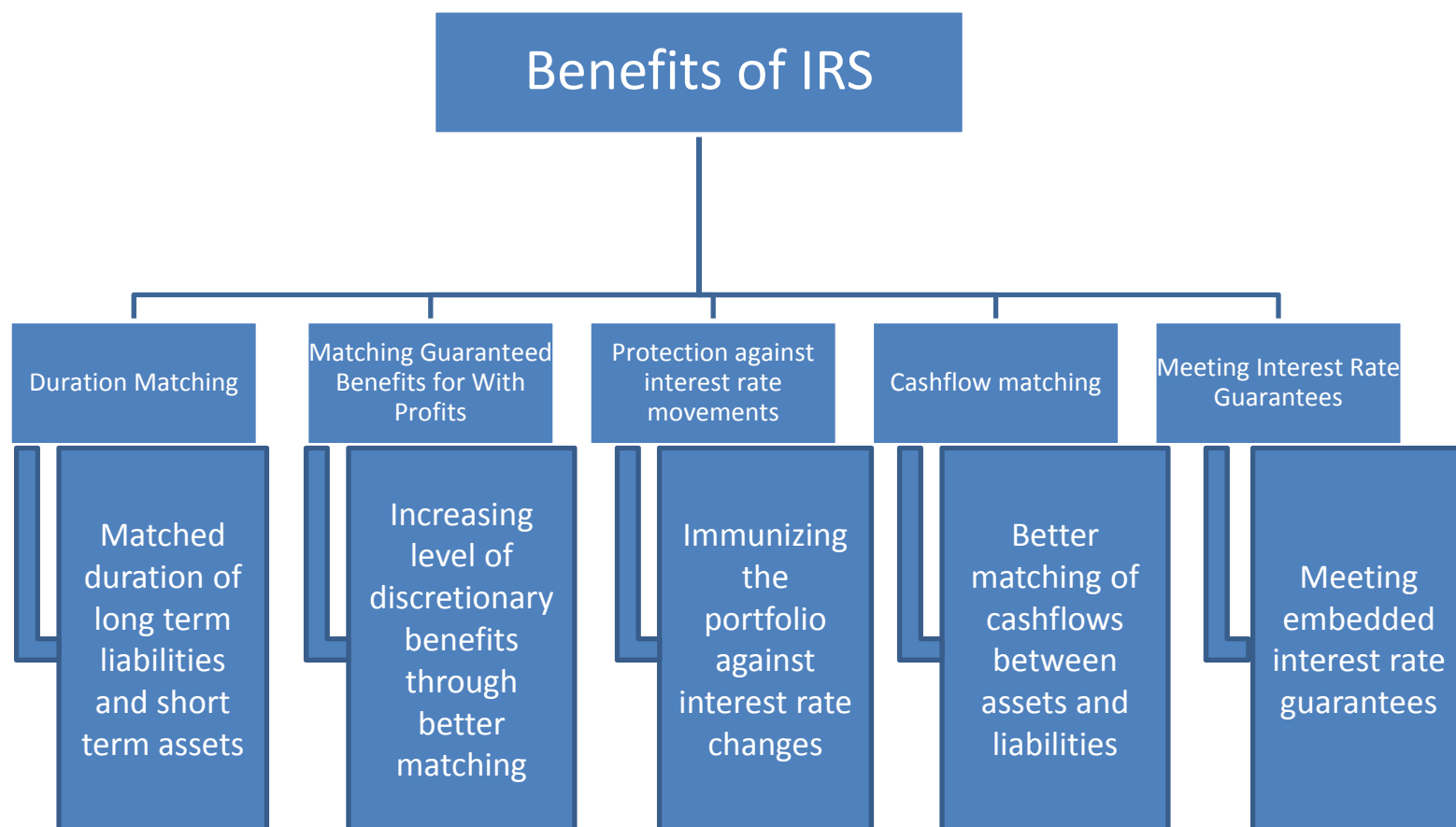


Interest Rate Swap Markets in India

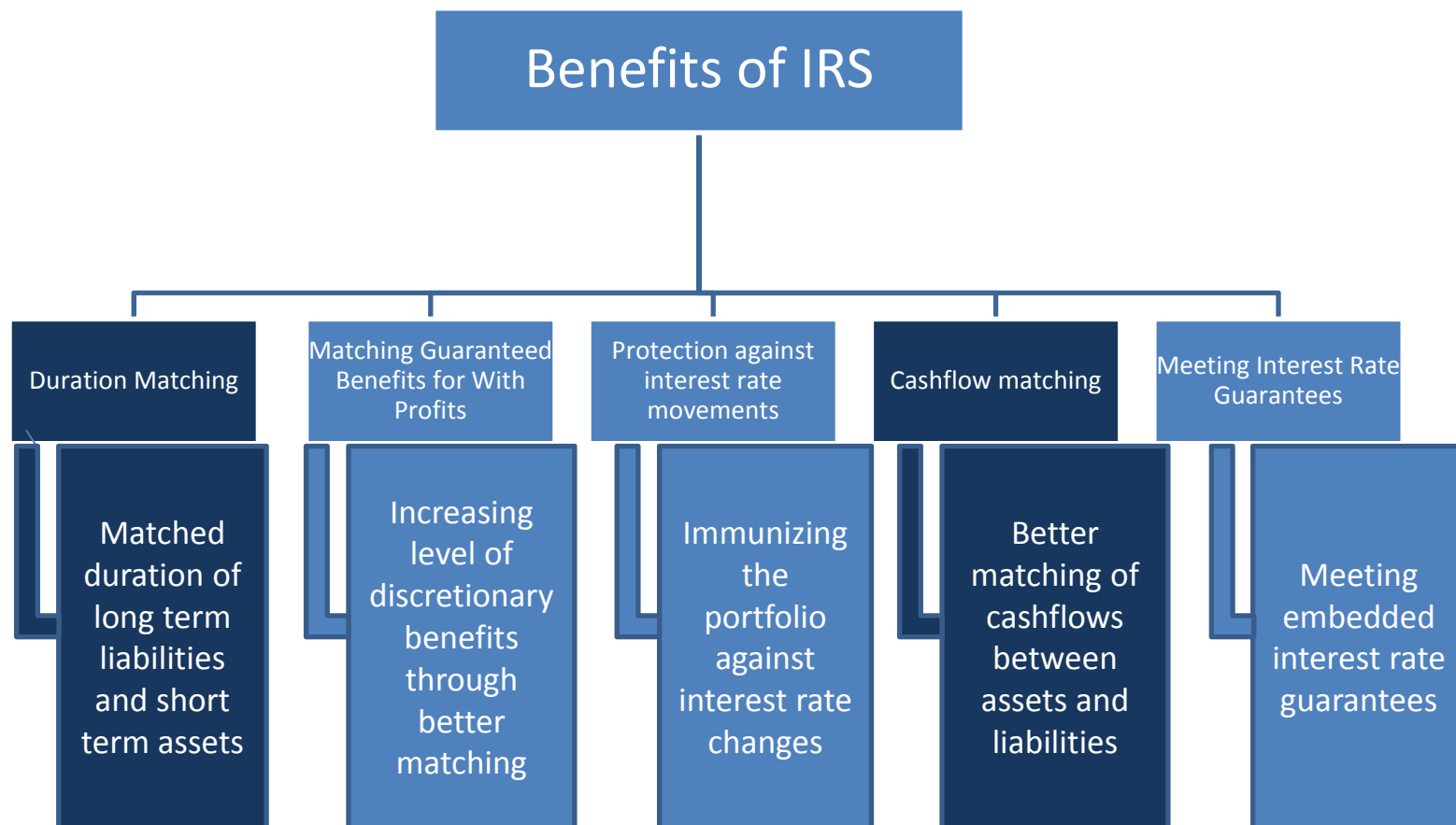


- Significant gaps in the market as evident from the swap spreads
- Bond trading done by local banks and insurers while swap markets are dominated by foreign banks
- Gap would reduce if banks and insurers trade actively in derivatives
- Exposure Draft in June 2013 by IRDA, could have addressed the same.

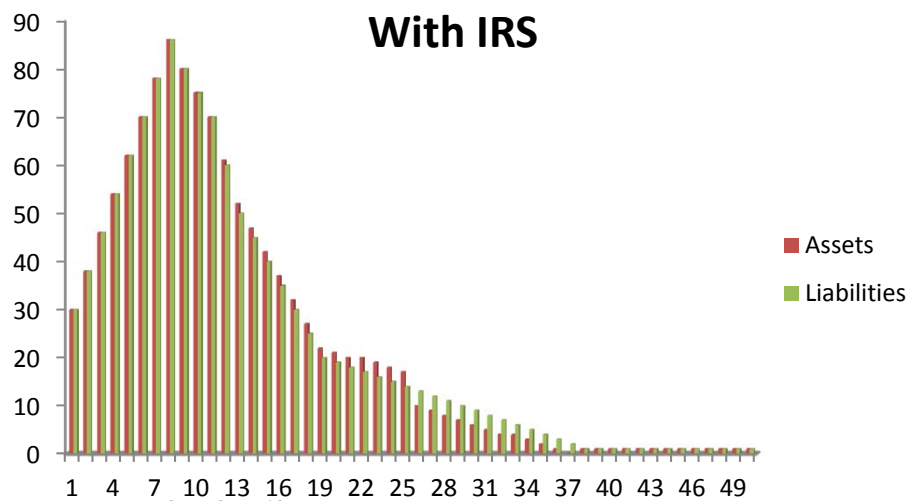
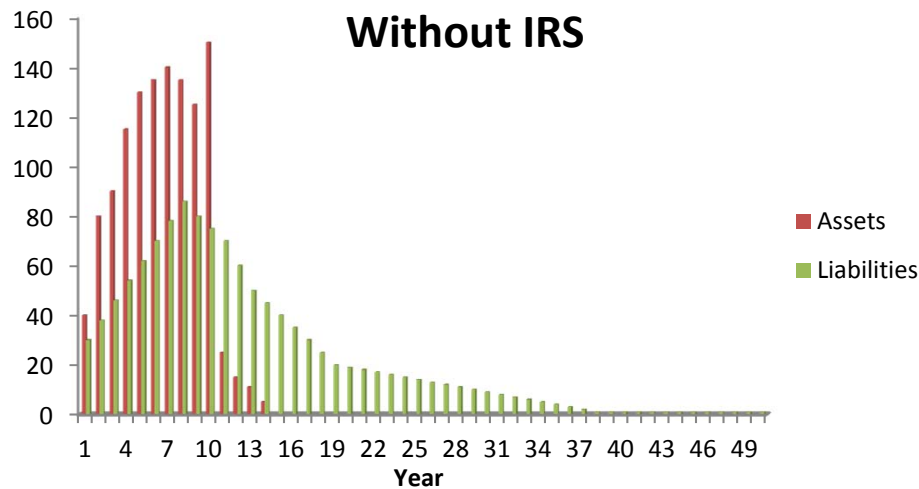
Interest Rate Risk and How IRS help



Interest Rate Risk and How IRS help

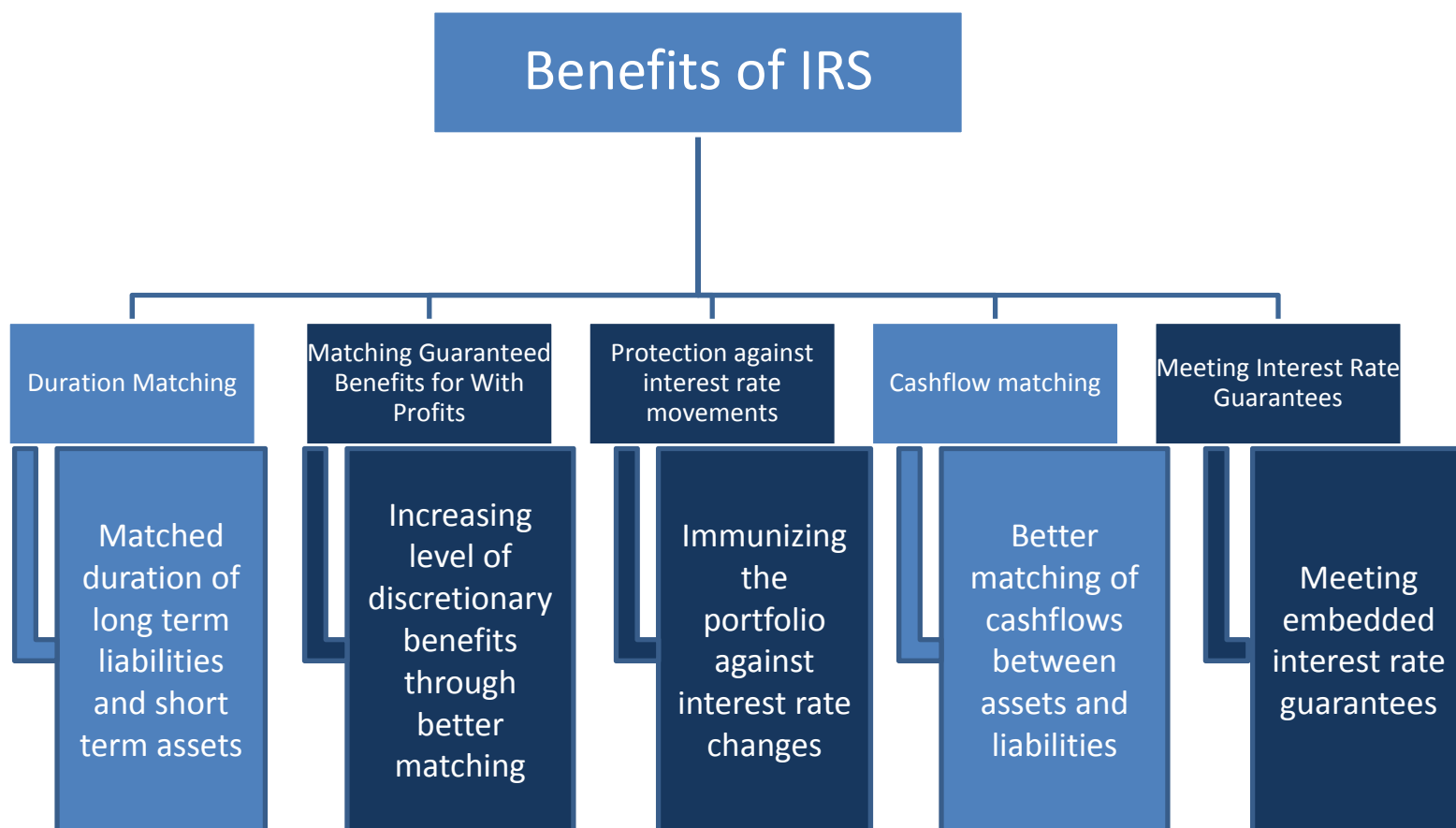


Interest Rate Risk and How IRS help



- Insurance company liabilities are generally long duration e.g. pension and annuities
- Available assets such as bonds and fixed interest instruments have <20 year maturity and markets are illiquid in India
- Swap duration can be to the tune of 50 years and are tailor made
- Can provide closer duration matching by reducing the impact of interest rate volatilities
- Mitigate reinvestment cost and reduce reinvestment risk by better matching of cashflows
- Long-dated bond synthetically constructed from a shorter-dated bond plus forward starting interest rate swap. The swap essentially hedges the rate at which the maturing shorter-dated bond can be reinvested i.e “duration extension”

Interest Rate Risk and How IRS help



Interest Rate Risk and How IRS help



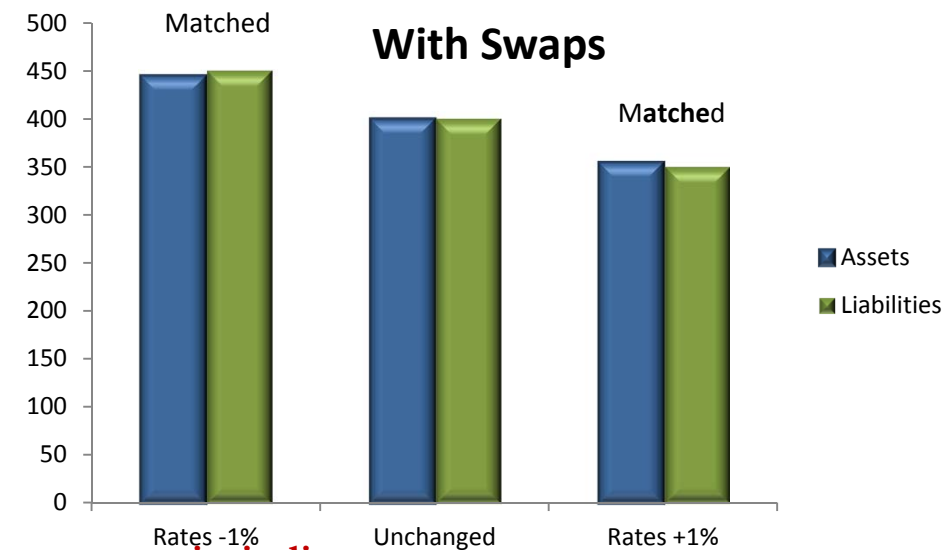
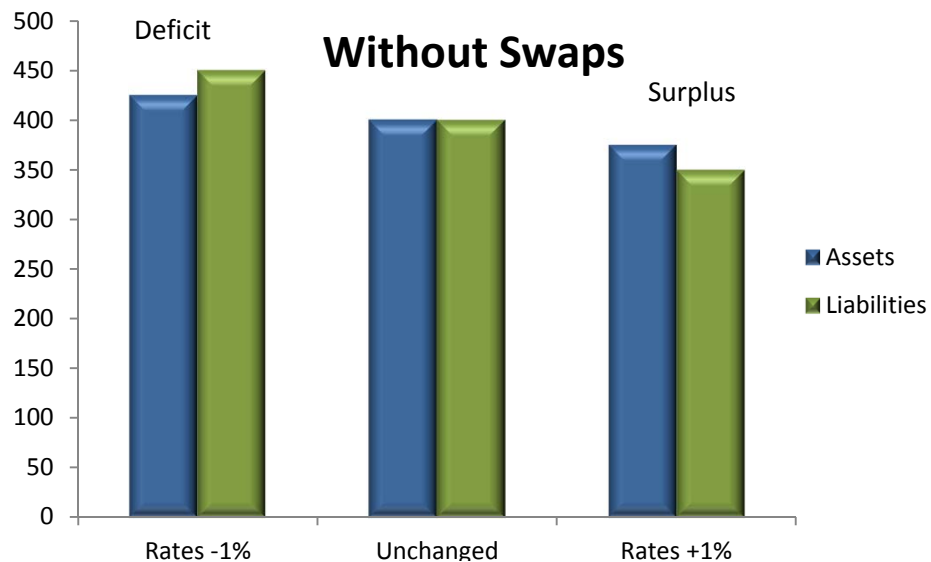
- With Profit Contract in Life Insurance have discretionary benefits which are linked to yields that the underlying investments earn
- Yield enhancing strategies can be used with the help of IRS to increase the level of discretionary benefits
- Guaranteed benefits under a contracts can be hedged using IRS by ensuring assets are locked into the yield by receiving the fixed leg of the swap
- Balance Sheet volatility can be reduced by ensuring assets earn a fixed rate through swaps
- Provides an alternative to re-position portfolio and avoid asset sale / realize capital gains
- Capital restrictions are present in India and also the available capital is scarce. It can be efficiently managed by ensuring duration / cashflow matching resulting in reduced sensitivity to interest rate volatility.

Interest Rate Risk and How IRS help



- The reduction of interest rate risk can significantly reduce the Risk Based Capital (RBC) requirement under Solvency II
- Insurance companies can be protected against downside in the interest rates by locking into the fixed leg of the swaps for long-dated products like annuities which are extremely sensitive to interest rates
- CFO Forum specifies discounting of liabilities at a swap rate. Basis risk is removed liabilities and value of derivatives at swap rate
- Non-Hedgeable Risk (NHR) / Time Value of Financial Options & Guarantees (TVFOG) reduced by using duration matching/extension strategies
- All these strategies do however give rise to risk of change in swap spreads impacting the hedge effectiveness

Case Study



- Assume a pension fund which has long term liabilities and assets predominantly invested in bonds and fixed income securities
- With no duration matching with swaps the fund is exposed to significant surplus/deficit because of interest rate movements
- With IRS, the fund exposure to movements in interest rates is reduced and it ensures a better matched position by locking into a fixed interest rate by receiving fixed and paying floating on the swap

Regulations and Impact

- IRDA allowed the use of interest rate swaps in Jan 2004 with a maximum tenure of 1 year
- Given this limited allowance, Indian Insurers do not have active presence in Derivatives Market
- By June 2013, felt need to increase the maximum tenure to 10 years resulting in a IRDA draft circular
- IRS markets in India not developed because of the lack of participation of the Insurers who can be big buyers for IRS
- If allowed, banks can hedge their floating rate liabilities and insurers their fixed interest liabilities by entering into IRS
- Effective supply/demand mechanism can help IRS markets to grow and ensure better asset liability matching for insurers

Regulations and Impact

- Currently insurers as mentioned have limited scope for entering into swap deals
- Based on Jan 2004 guideline, the insurers can enter into 1 year IRS deals on the underlying assets which have to be rolled over each year to ensure better asset liability matching
- Increasing the duration to 10 years will likely reduce the roll-over costs / risks

Regulations and Impact

Regulatory Impact of allowing IRS:

- Counterparty exposure needs to be set out / monitored
- Counterparties need to be limited based on credit rating
- Collateral management
- Hedging vs Speculation: Difficult to ensure that IRS are only being used as hedges and not speculative
- Notional amount exposed to IRS needs to be curtailed to a fixed percentage of underlying assets
- Accounting / disclosure requirements
- Legal issues / ISDA documentation

Risks Associated



- Basis Risk: The underlying asset on which IRS is based may be inherently different from the underlying of the liability
- Counterparty Risk: The counterparty may default on the transaction
- Liquidity Risk: In India the derivative markets for IRS are not developed. As such it may be difficult/expensive to unwind the swap if need arises
- Market Risk: Swap spread may move unfavorably resulting in MtM losses
- Insurance Specific Risk: Persistency of life insurance policies may be significantly different from what is assumed in liabilities leading into unmatched locked in positions in swap contracts. Disintermediation risk in the event of higher interest rates

Other Issues

- Basel 3 Capital / Leverage Ratio requirements have resulted in banks charging clients for capital, funding and counterparty credit exposure. Less appetite to do very long-dated or exotic trades
- Mandatory clearing of swaps via exchange. While it mitigates counterparty risk, its expensive given independent margin (Treasury/cash) and variation margin (cash) requirements
- **Collateral Adjusted Valuation** introduces complexity in valuation as we have two curves to consider in the approach
 - Floating leg cash flows of swap determined using a forward LIBOR/MIBOR projection curve
 - All cash flows discounted using an OIS (Fed Funds, EONIA etc.) discounting curve

China - An Example

- In July 2010, the Chinese Regulator allowed insurance companies to trade in swaps to hedge interest rate risks
- Trial program before allowance for the same carried out
- Allowed at first for the biggest 5 insurers
- Monitored the impact before opening up for rest of the industry
- Exposure limits in place
- Can only be used for hedging and not speculation

Alternatives

- Liability Driven Investment (LDI) strategies are widely adopted by some companies as an alternative to reduce interest rate risks though they can be expensive
- Total Return Swaps to exchange the entire portfolio. Not used in India and disallowed by regulation
- Reinsurance agreements to transfer interest rate risk to reinsurers
- FRA's can be used on the underlying assets and rolled over each time to replicate the interest rate swap cashflows
- Exchange Traded Interest Rate Futures can also be used

Summary

- Interest Rate Swap Market under-developed in India
- Allowance for Insurance companies will help meet demand/supply gap
- Hedging of interest rate risk is achieved through IRS by better matching of assets and liabilities and helping meet guaranteed payouts.
- Additional set of regulations pertaining to disclosure and counterparty exposures
- Chinese methodology can be used on a pilot basis
- Alternatives can be explored

Questions?

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