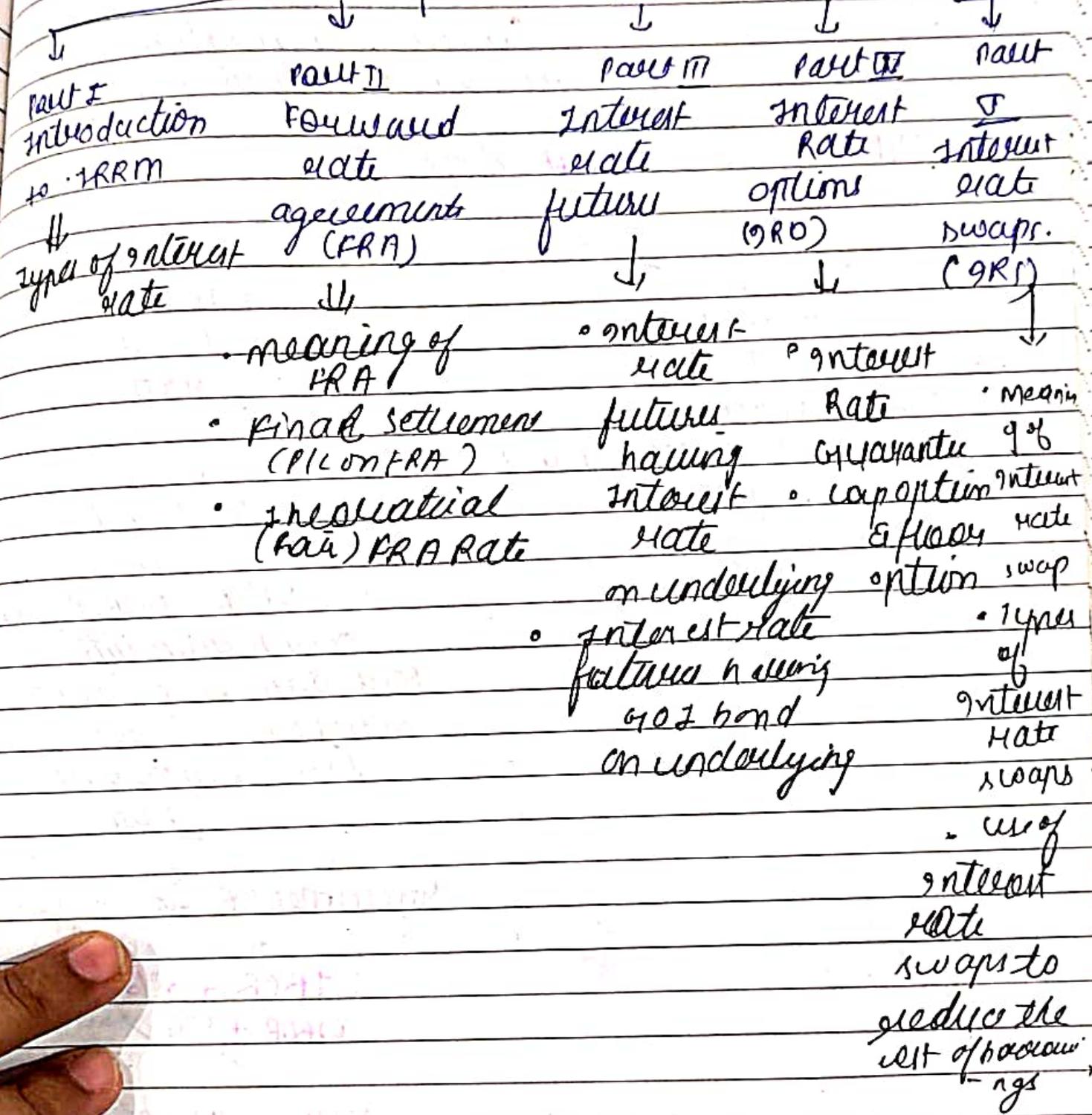


# Interest rate risk management



Part I Introduction to GRM  
 This chap covers interest rate derivative concepts (i.e. of variations for hedging of interest rate risk)

1 Types of Interest Rates

① Fixed Interest Rate

(FR Remain same in whole life span)  
 eg 2% , 10%

② Floating Interest Rate

eg 9% varies w.r to benchmark rate  
 (eg BPLR, MRROR, TBROR)  
 Rest date on menu date  
 provided to benchmark rate

Sometimes GR can be given as follows

$L\text{TBOR} + 3\%$   
 $MRROR + 5\%$

Now eg  $L\text{TBOR} = 10\%$

$10 + 3 \Rightarrow 13\%$   
 $10 + 5 \Rightarrow 15\%$

Part II Forward Rate Agreement (FRA)

I meaning of FRA

II Final settlement (i.e. on rate)

Final settlement amt =  $N \times (RR - FR) \times T$

$1 + (RR \times T)$

contract with bank for setting interest rate for a loan of certain maturity after a specified period (cash settlement)

→ If as per our calculations

in cash as follows

TR(F) in future

no upside betting on FR (Buy FRA)

no downside betting on FR (sell FRA)

Note → Interpretation of FRA when 2 rates are given

$3\% \text{ FRA} \rightarrow 5.4\% - 5.4\%$   
 (coupon rate) (coupon rate)

III Final settlement (i.e. on rate)

Formula:

eg 9% applies for term period - 1

above calculated (p/c) is added

Answer will come in decimals

if initially bought FRH (upside betting)

$RR > FR = FT$   
 $RR < FR = \text{loss}$

if initially sell FRH (downside betting)

$RR > FR = \text{loss}$   
 $RR < FR \Rightarrow \text{Profit}$



### (Pauri-TP) Interest rate futures (GRF)

Interest rate futures  
 ↓  
 having interest rates underlying  
 ↓  
 Interest rate  
 ↓  
 future having zero bond underlying

(view of GRF on a particular date = 100 - interest rate on that date)  
 • It is available on stock exchange to Buy or sell zero bond on a particular future date at a price fixed

#### Steps to be followed to solve the ques:-

Step 1 Decide whether GRF to be bought or sold

Step 2  
 100 is lender / 100 is buyer  
 CTD bond :- available bond that to be delivered

sell GRF at Buy GRF at  
 quoted price Buy at price  
 (because value of GRF is 100 - interest rate)  
 (because value of GRF is 100 - interest rate)

Step 3 Calculate number of GRF contract to be bought or sold  
 view of Bond on maturity



1000 amount × bond duration  
 future contract size  
 months  
 Future contract size  
 period in months  
 Y0 V

Step 4 calculate net interest paid / received maturity  
 interest rate (paid) / received on bond duration / period

1000 amount × Actual GR × bond duration  
 in months  
 12  
 X  
 X  
 profit amount which exceeds minimum  
 profit amount which exceeds minimum

Net interest paid / (Received) X  
 Net (loss) more contracts (Referred) X  
 Net interest paid / (Received) X

Note  
 100 of GRF contracts × contract size  
 (gain/loss) on GRF contracts  
 X  
 (loss/gain) X contract size  
 X  
 X

If initially GRF contract sold are will buy it at GRF price on future contract maturity date of (maturity)

Step 5 Calculate net interest rate locked by company due to Hedging  
 net interest rate locked by company due to Hedging  
 1000 duration  
 in months

Rate Options (9R0):

part IV Interest

↓  
interest rates  
↓  
contant with Bank  
no buy the right-  
to take loan at  
FRB Rate  
↓  
resy premium is  
paid to bank at  
beginning for buying  
this right to take  
loan at strike (FRB)  
rate  
↓  
if after specified  
period

calculation of  
total and payable  
on loan:-  
total interest and  
xxx  
FRB Rate  
↓  
total  
rate on FRB  
date - strike  
rate  
↓  
rate of FRB  
9R > 0R  
Benchmar  
rate on FRB  
date - strike  
rate  
↓  
rate of FRB  
9R > 0R

contant with Bank  
no buy the right-  
to take loan at  
FRB Rate  
↓  
resy premium is  
paid to bank at  
beginning for buying  
this right to take  
loan at strike (FRB)  
rate  
↓  
if after specified  
period

actual interest  
rate > SR (strike)  
↓  
exercise  
option & take  
loan at SR

actual interest  
rate < SR  
↓  
no not  
exercise  
option & take  
loan at actual  
rate

actual interest  
rate < SR  
↓  
no not  
exercise  
option & take  
loan at actual  
rate



option from all over the world, payment part of 100  
option from part of 100  
PWF @ fixed int rate (100)  
currency date 100

interest rate collar  
buy call option and sell floor option  
payoff received on each payment date  
payoff paid on one payment date

part V Interest Rate swaps (9R0)

meaning of interest rate swap  
exchange of interest rate  
payments on basis  
principal amt

① plain vanilla swaps  
② zero interest rate swaps  
③ currency swaps  
of interest rate  
swap to reduce the cost

steps to calculate interest  
payment by fixed rate buyer  
Nx NCR no of days till  
settlement date  
310  
additional feature  
that interest payment

steps to calculate interest  
payment by fixed rate buyer  
Nx NCR no of days till  
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additional feature  
that interest payment

steps to calculate interest  
payment by fixed rate buyer  
Nx NCR no of days till  
settlement date  
310  
additional feature  
that interest payment

Step ② Calculate net-  
payment by floating  
rate buyer  
floating int rate x  
no of days till  
settlement  
by floating  
rate  
payer  
be  
computed  
on daily  
basis

Step ① Calculate  
net-settlement  
(Step ① - step ②)

steps:-  
Step ① determine whether  
a beneficial swap  
can be arranged  
if both parties take  
swap loan directly  
total  
int-  
rate  
%

if net-  
beneficial swap  
can be arranged  
if net-  
swap  
if both parties go  
for swap  
(ie out-rightly for other  
party)  
Total gain (flow)  
Total gain (flow)  
swap commission  
Net gain (flow)  
if both parties  
in swap deal

Step ① Calculate net-interest-  
rate cost of swap with  
- Party who wants to take loan at  
fixed int rate  
- Party who wants to take floating  
int rate loan :-  
(floating int rate - fixed int rate)  
81, 83, 85, 87, 89, 91, 93.

① Primary difference between an interest rate  
swap contract and a forward contract can  
be of → (1) No of exchanges  
② contract involves the national principal  
for purpose of risk = Plain vanilla  
swap.

③ A contract is entered into an interest rate  
swap with a national principal of  
₹ 10,000,000. At the beg of the swap  
the initial net sum of the counterparties  
must exchange  
P → settlement should be made at predetermined  
interval rate on forthcoming rate date (30x)