

Forex

① **Forex** = Foreign Exchange $\rightarrow$ Currency of other country.
forex: US\$ is forex for Indians.

② **Forex rate** = Foreign exchange rate = The rate at which one country's currency can be exchanged for other country's currency.

③ ways of writing forex rates.

Direct Quote

$$\text{\$}1 = \text{₹}90$$

• It has '1' unit of foreign currency.

In India

$$\text{\$}1 = \text{₹}90$$

$$\text{1 CAD} = \text{₹}60$$

Indirect Quote

$$\text{₹}1 = \frac{\text{\$}1}{90} = \text{\$}0.0111$$

• It has 1 unit of domestic currency.

In India

$$\text{₹}1 = \text{\$}0.0111$$

$$\text{₹}1 = 0.0166 \text{ CAD}$$

④ Bid Ask Rates.

Case 1 Simple rate is given

$$\text{\$}1 = \text{₹}90$$

$\swarrow \searrow$
Bid rate (buying rate) Ask rate (selling rate)

Case ② when separate Bid-ASK rates are given.

$$\text{\$1} = \underset{\substack{\text{Bid rate} \\ \downarrow}}{\text{₹90}} - \underset{\substack{\text{ASK rate} \\ \downarrow}}{\text{₹92}}$$

Dealer/Bank will
Buy \$ at ₹90

Dealer/Bank will
Sell \$ at ₹92.

(Client's selling rate)

(Client's buying rate)

⇒ These rates are always favorable to bank/dealer.

⇒ These rates are written from Bank/dealer's point of view.

⑤ Bid-ASK Spread.

Ex: $\text{\$1} = \text{₹90/₹92}$

• Bid-ASK Spread = $92 - 90 = \text{₹2 per dollar}$

⇒ Gap between Bid-ASK rate

⇒ Bank's/Dealer's profit margin.

⑥ How to convert Direct quote to Indirect quote & vice-versa

one way quote

ex: $\text{\$1} = \text{₹90}$

$$\text{₹1} = \frac{\text{\$1}}{90}$$

Two way quote

ex: $\text{\$1} = \text{₹90 - ₹92}$

$$\text{₹1} = \frac{\text{\$1}}{92} - \frac{\text{\$1}}{90}$$

* → order has to be changed in two way quote

⑦ Appreciation/Depreciation of currency

ex: $\$1 = ₹90$

Case ① Dollar appreciates by 10%.

$$\$1 = ₹90(1+10\%)$$

$$\$1 = ₹99$$

Case ② Dollar depreciates by 10%.

$$\$1 = ₹90$$

$$\$1 = ₹90(1-10\%)$$

$$\$1 = ₹81$$

Case ③ ₹ appreciate by 10%.

$$\$1 = ₹90.$$

$$\$1(1+10\%) = ₹90$$

$$\$1.1 = ₹90$$

$$\$1 = \frac{₹90}{1.1}$$

$$\$1 = ₹81.81$$

Case ④ ₹ depreciate by 20%.

$$\$1 = ₹90 \text{ originally}$$

$$\$1(1-20\%) = ₹90$$

$$\$0.8 = ₹90$$

Rules:

① when a currency appreciates then we multiply the opposite currency with $(1+x\%)$

② ~~10% Appreciation~~ $\neq$ 10% Dep of ₹.

$$\$1 = \frac{\text{₹}90}{0.8}$$

$$\$1 = \text{₹}112.5$$

⑧ Presentations of exchange rate.

(i) $\$1 = \text{₹}90$ (Direct quote)

(ii) $90 \text{ ₹}/\$ \Rightarrow \frac{\text{₹}90}{\$1} \Rightarrow 1\$ = \text{₹}90$

(iii) ISO codes rates.

$$\text{USD/INR} = 88 \Rightarrow 1\text{USD} = 88\text{INR}$$
$$1\$ = 88 \text{ ₹}$$

Concept ① Interpretation of exchange rate

ex ① $\$1 = ₹90.4525 / 45$

$$\begin{array}{ccc} \$1 = ₹90.4525 & - & ₹90.4545 \\ \text{Bid rate} & & \text{Ask rate} \end{array}$$

ex ② $\$1 = ₹90.2735 \pm 0.0005$

$$\begin{array}{ccc} \$1 = ₹90.2730 & - & ₹90.2740 \\ \text{Bid rate} & & \text{Ask rate} \end{array}$$

ex ③ $\$1 = \text{RBI Quote} \pm 0.20$

$$\begin{array}{ccc} \$1 = ₹(\text{RBI Quote} - 0.20) & - & ₹(\text{RBI Quote} + 0.20) \\ \text{Bid rate} & & \text{ASK rate} \end{array}$$

Concept ② Price Interest Point (PIP)

It is the Smallest Value by which Exchange rate can move up or down.

Deal between Bank (dealer)
and Customer (not bank/dealer)

Retail transaction

⇒ upto two decimal places

ex: $\$1 = ₹89.35 - ₹89.70$

$PIP = '0.01'$

Deal between Bank (dealer)
and Bank (dealer)

Wholesale transaction.

⇒ upto Four decimal places

ex: $\$1 = ₹89.2525 - ₹89.4055$

$PIP = '0.0001'$

Concept ③ How to solve foreign question in exam as per NG.

- Read Question Carefully.
 - Identify the given currency in question.
 - Focusing rates → Keep given currency as left hand side currency in rate.
- (Jiss currency mei question given hai, uss currency ko left hand side mei rakhteki hai for rate purpose.)
- Now solve the question.

ex①

you will get \$2,00,000 for export

Rate $\Rightarrow 1\$ = ₹90$ ✓

ex②

you have to pay ₹90,000 to someone in USA.

Rate $\Rightarrow 1\$ = ₹90$ ✗

$₹1 = \$\frac{1}{90}$ ✓

Concept (4) Cross rates.

when we calculate rate of desired pair of currencies using some intermediate currency.

ex: we need $\Rightarrow \text{₹/₹D} \Rightarrow \frac{\text{₹}}{\text{₹D}} = ?$

Solution

$$\frac{\text{₹}}{\text{₹D}} = \frac{\text{₹}}{\text{USD}} \times \frac{\text{USD}}{\text{₹D}}$$

ex: ① $\$1 = \text{₹}80$, $1\$ = 9.25 \text{ ₹D}$, find ₹/₹D .

Sol:

$$\frac{\text{₹}80}{\$1}$$

$$\frac{\text{₹D}}{\$1}$$

$$1 \text{ ₹D} = \frac{1}{9.25} \$$$

$$\frac{\$}{\text{₹D}} = \frac{1}{9.25}$$

$$\frac{\text{₹}}{\text{₹D}} = \frac{\text{₹}}{\$} \times \frac{\$}{\text{₹D}}$$

$$= \frac{\text{₹}80}{\$1} \times \frac{\$1}{\text{₹D} 9.25}$$

$$\frac{\text{₹}}{\text{₹D}} = 8.6486$$

$$\Rightarrow \boxed{1 \text{ ₹D} = \text{₹}8.6486}$$

Concept (5) Exchange Margin

This exchange margin is always unfavourable for client.

ex:	Exchange rate	x — y
	Exchange margin	2% — 2%
		Bid — Ask

$$\text{Effective exchange rate} \quad \underset{\text{Bid}}{x(1-2\%)} - \underset{\text{Ask}}{y(1+2\%)}$$

Note:

- ⇒ If we have to calculate cross rates, then
- margin is charged only once in any of the rates and
 - Not in all the rates.

QR ⇒ 1\$ = ₹90

3MFR 1\$ = ₹93

Premium on FR

$$\text{Prem}\% = \left(\frac{93-90}{90} \times 100 \right) \times \frac{12}{3}$$

Concept ⑥ Forward rate

Note ①

Spot rate

→ Forward rate applicable today if transaction is completed today.

$$\$1 = ₹90 - ₹92$$

Forward Rate

Rate is decided today to be used in future, when on a later date transaction will be completed.

$$3MFR \Rightarrow \$1 = ₹91 - ₹93.5$$

Note ②

Spot rate

$$\$1 = ₹90$$

Forward

$$\$1 = ₹93$$

Premium on FR

$$\$1 = ₹85$$

Discount on FR

Premium on exchange rate

If $FR > SR$

$$\% \text{ Premium} = \left(\frac{FR - SR}{SR} \times 100 \right) \times \frac{12}{n}$$



It will be positive

⇒ Premium % / Discount % is expressed

① In Annual Percentage.

② For deft hand side currency (Base currency)

③ % of Premium $\neq$ % of discount for same pair of currency.

④ Rate of Premium > Rate of discount.

Discount on exchange rate

If $FR < SR$

$$\% \text{ Discount} = \left(\frac{FR - SR}{SR} \times 100 \right) \times \frac{12}{n}$$



It will be negative

Concept ④ Swap Points.

Difference between Forward rate and Spot rate

$$\text{Swap Points} = \text{Forward rate} - \text{Spot rate}$$

ex:

$$3M \text{ FR} \Rightarrow \$1 = ₹83.30 - ₹84.50$$

$$\text{SR} \Rightarrow \$1 = ₹83.10 - ₹84.10$$

$$\text{Swap Points} = 00.20 - 00.40$$

Basic assumption:

- ① If swap points are increasing $\rightarrow$ Premium on FR
- ② If swap points are decreasing $\rightarrow$ Discount on FR

* If question says otherwise, you should follow the question.

ex: Spot rate $\$1 = ₹90.4525 - ₹90.9025$

① Swap points $\Rightarrow 60/90$

② Swap points $\Rightarrow 90/60$

③ Swap points for discount $60/90$.

Sol: @ SR $\$1 = ₹90.4525 - ₹90.9025$

+ Swap points $+ .0060 \quad .0090$

Forward rate $\$1 = ₹90.4585 - ₹90.9115$

Case of Premium
Swap points

(Swap points are increasing)

④ SR $\$1 = ₹90.4525 - ₹90.9025$

- Discounted Swap points $= -.0090 \quad -.0060$

Forward rate $\$1 = ₹90.4435 - ₹90.8965$

Case of Discounting
Swap points

(Swap points are decreasing)

© Swap points 60/90 $\rightarrow$ are discounted as question specify.

$$\begin{aligned} \text{QAR} &= \$1 = \text{₹ } 90.4525 - \text{₹ } 90.9025 \\ \text{Swap points} &\quad \quad \quad .0060 \quad \quad \quad .0090 \\ \text{Forward rate } \$1 &= \text{₹ } 90.4465 - \text{₹ } 90.8935 \end{aligned}$$

Concept (8) Interest Rate Parity Theory. (IRPT)

$$\frac{\text{Forward rate } \left(\frac{\text{₹}}{\$} \right)}{\text{Spot rate } \left(\frac{\text{₹}}{\$} \right)} = \frac{(1 + \text{Interest rate in ₹})}{(1 + \text{Interest rate in \$})}$$

$\rightarrow$ If a country has higher interest rate then its currency will be discounted in future.

(PPPT) Concept (9) Purchasing Power Parity Theory

$$\frac{\text{Forward rate } \left(\frac{\text{₹}}{\$} \right)}{\text{Spot rate } \left(\frac{\text{₹}}{\$} \right)} = \frac{(1 + \text{Inflation rate in ₹})}{(1 + \text{Inflation rate in \$})}$$

① Note if Continuous Compounding

$$\frac{FR \left(\frac{\text{₹}}{\$} \right)}{QR \left(\frac{\text{₹}}{\$} \right)} = \frac{e^{r_1 t}}{e^{r_2 t}}$$

r_1 = Inflation rate in India

r_2 = Inflation rate in USA

Note 2 Spot rate $\left(\frac{\text{₹}}{\text{\$}}\right) = \frac{\text{Price of commodity in ₹}}{\text{Price of commodity in \$}} = \frac{\text{₹180}}{\text{\$2}}$

$$\left(\frac{\text{₹90}}{\text{\$1}}\right)$$

Note 3 If inflation period is more than 1 year

$$\frac{FA}{SA} = \frac{(1+i_1)^n}{(1+i_2)^n}$$

Note 4 If inflation rate is changing over years.

$$\frac{FA}{SA} = \frac{(1+I_1)(1+I_2) \dots (1+I_n)}{(1+I_1)(1+I_2) \dots (1+I_n)}$$

Concept 10 How to Calculate Forward Rate

① using Premium% or Discount%

② using Swap Points.

③ using Interest Rate Parity Theory

④ Purchasing Power Parity

$$\text{Premium \%} \oplus \text{or Discount \%} \ominus = \left(\frac{FR - SR}{SR} \right) \times 100 \times \frac{12}{n}$$

⑤ Spot rate = + Premium swap points or - Discount swap points <u>Forward rate</u>	xxx + - ✓	- + - -	xxx + - ✓	
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$$\text{Forward rate } (\text{₹/₹}) = \frac{(1 + \text{Interest rate in ₹})}{(1 + \text{Interest rate in \$})}$$

$$\text{Forward rate } (\text{₹/₹}) = \frac{(1 + \text{Inflation rate in ₹})}{(1 + \text{Inflation rate in \$})}$$

Concept (11) How to Read & Interpret floating rate.



ex: Floating rate = MIBOR (6m reset period)

- $\Rightarrow$ $Mibor_0 \Rightarrow$ It will be used for 6 months.
 $\Rightarrow$ During this '6m' period rate is fixed.
 $\Rightarrow$ Rate will only change at end of 6 months.
- $\Rightarrow$ $Mibor_1 =$ It will be used for next 6 months.

Note: • Rate will be fixed between two reset dates.
• Floating rate is changed on each reset date.
• Percentages given are always annual %'s unless otherwise stated in question.

Concept 12 Hedging Strategies.

① Forward Contract Hedging (Concept 13)

② Futures Hedging

③ Options Hedging

④ Money Market Hedging (Concept 14)

⑤ other methods

⑥ Leading/Lagging

⑦ Invoicing in home currency

⑧ Netting positions.

} These are preventive measures.

Concept 13 Forward Contract Hedging.

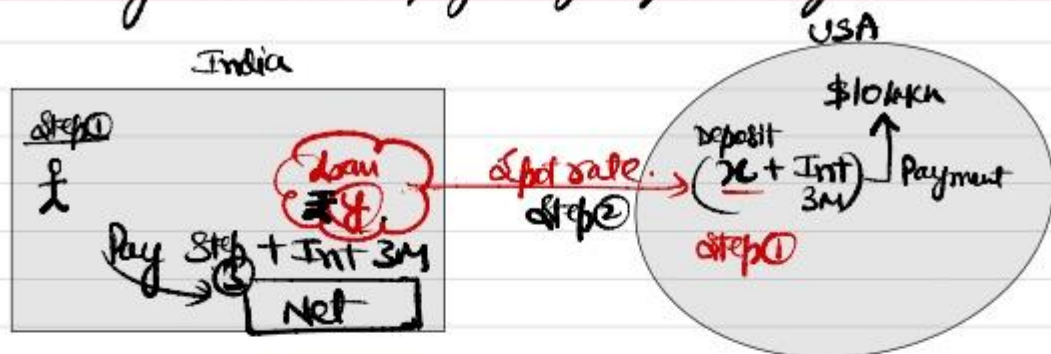
- If you want to reduce foreign exchange risk, you may enter into a forward contract with Bank (or dealer) to avoid uncertainties.

① For exporter → you will receive '\$' in future period.
→ So, you will sell foreign currency forward

② For Importer → you will buy foreign currency forwards.

Concept (14) Money Market Hedge

Case (a) If we have to pay in foreign currency in 3 months.

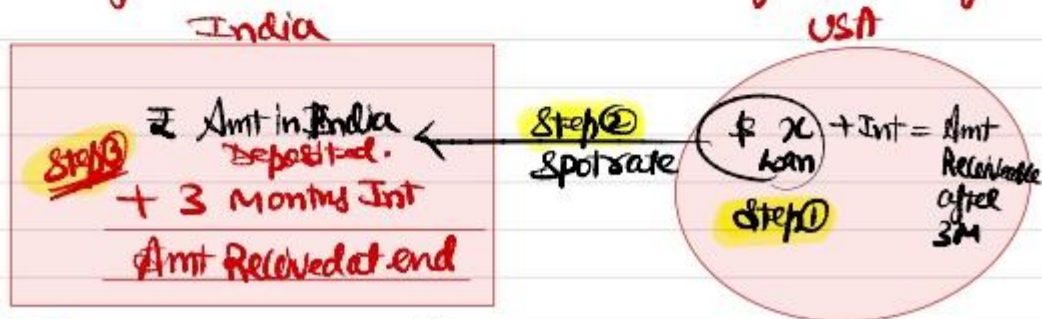


Step 1 Calculate deposit in USA $₹x$ So, that $₹x + \text{Int} = \text{Amt Payable after 3M} (\$10Lakh)$

Step 2 Calculate loan required in $(₹)$ today to get $(\$x)$
(cap 'y' ka loan lekar usse '\$x' mei convert karoge at spot rate.)

Step 3 Payback $(₹y)$ loan along with Int.

Case (b) If we have to receive amount in foreign currency



Step 1 Calculate loan of '\$x' such that $x + \text{Int} = \text{Amt receivable after 3M}$

Step 2 Convert \$X into ₹ using spot rate
α deposit amount in India.

Step 3 Deposit in ₹ in India
+ Interest for 3m
Amount received at end of 3m.

concept 15 Hedging using Currency Futures

Step 1 understand your position (or dot currency)

- If you are a seller for debt side currency, futures short.
- If you are a buyer for debt side currency, futures long.

Step 2

Calculate Number of futures = $\frac{\text{Value of position to be hedge}}{\text{Value of one lot (contract)}} = n$
To be bought & sold

→ If Numerator and denominator are of different currencies.

- ① You will change currency in numerator (not denominator)
- ② Rate used will be contracted rate of futures (not actual SR)

→ If Number of lots is in decimal. ex: 8.30 lots.

- we will buy/sell 8 lots of futures
- Remaining position (of 0.30 lots) will be hedged using forward contract.

Step 3 Calculate Initial margin paid = $n \times \text{margin per lot}$
(Initial margin is not an expense, it is like an advance)

Step 4 on maturity date.

① Amt Paid / Received in foreign currency
on maturity date At spot rate on maturity

XXX

⑥ Cash Settlement of futures contract

$$\left(\frac{\text{Sell rate}}{\text{rate}} - \frac{\text{Buy rate}}{\text{rate}} \right) \times \text{lot size} \times \text{No of lots} \times \begin{matrix} \text{spot rate} \\ \text{on} \\ \text{maturity date} \\ \text{(if required)} \end{matrix}$$

xxx

(if lot size is in domestic currency).

⑦ Int paid on Initial Margin

xxx

$$\left(\frac{\text{Initial margin}}{\text{per lot}} \times \frac{\text{Number}}{\text{of lots}} \times \frac{m}{12} \times \text{Rate} \right)$$

Total Amount receivable & payable

✓

Concept (16) Hedging using Currency options.

Step (1) Understand your position.

check currency of lots.

→ If you have to buy lots currency (left side currency) then long call option.

→ If you have to sell lot currency (left side currency) then long put option.

Key Note: we don't short call & put for hedging.

Step (2) Number of lots = $\frac{\text{Value of position to be hedged.}}{\text{Value of one lot.}}$

(Same rules as covered in Concept (15))

Step (3) Calculate option Premium = $n \times \text{option Premium Per lot.}$
Number of lots

Step (4) on date of maturity

(a) Buy/sell foreign currency on maturity date using (spot rate or exercise rate) whichever is beneficial for you. ✓

(b) option Premium & Int on it
(yani option Premium bhi ayega aur uska interest bhi ayega.) (→)

Net Amount received & Paid

xxx

Futures Hedging

①

Decision $\rightarrow$ long futures
~~short~~ futures

②

No. of lots = $\frac{\text{Position to be hedged}}{\text{One lot value}}$

③ Initial Margin Calculate

④ on Maturity

Actual transaction at
Spot rate $\times \times \times$

Profit/loss of futures contract $+/-$

- Int on Initial Margin (✓)

Options Hedging

①

Decision $\rightarrow$ long Call option
long Put option.

②

No. of lots = $\frac{\text{Position to be hedged}}{\text{One lot value}}$

③ Option Premium Calculate

④ on Maturity

Buy & Sell \$ (SR or
Exercise Price) favorable for
us.

OP & Int on OP = (✓+✓)

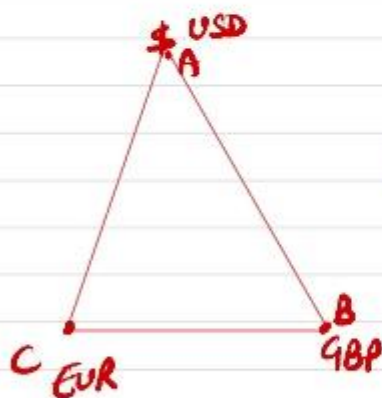
Concept (17) Leading / Lagging

- ① Leading → Making early payment
→ To get discount (cash discount on early payment)
→ May get benefit of cheaper spot rate than expensive forward rate.
- ② Lagging → Making delayed payments
→ using forward rate

Concept (18) Triangular Arbitrage

It involves Three Currencies

Riskless profits



Option ① Clockwise Direction

- Step ① Start with US\$ (assume \$10000)
Step ② Convert \$ into £
Step ③ Convert £ into €
Step ④ Convert € into \$
Step ⑤ Now Calculate Profit/Loss in \$.

Option ② If we don't get profit in clockwise direction, we will try and move in anticlockwise direction.

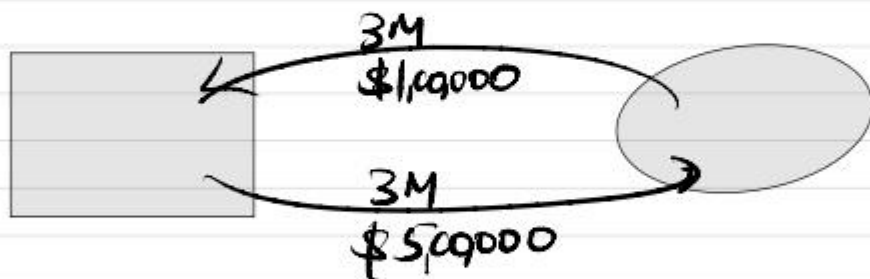
If we don't get profit in clockwise and anticlockwise
Then arbitrage is not possible.

Concept (19) Concept of Netting.

If we have ^(a) multiple exposures in a ^(b) same foreign currency maturing in same time intervals, then we can do netting of transactions and do hedging of only final net amount.

$$\text{Net Exposure} = \text{outflow} - \text{Inflow}.$$

- we only hedge net exposure to save expenses.



Netting is possible only when:

- (a) when currency is same and
- (b) when time period is same

Concept (20) Treasury Department

Decentralised

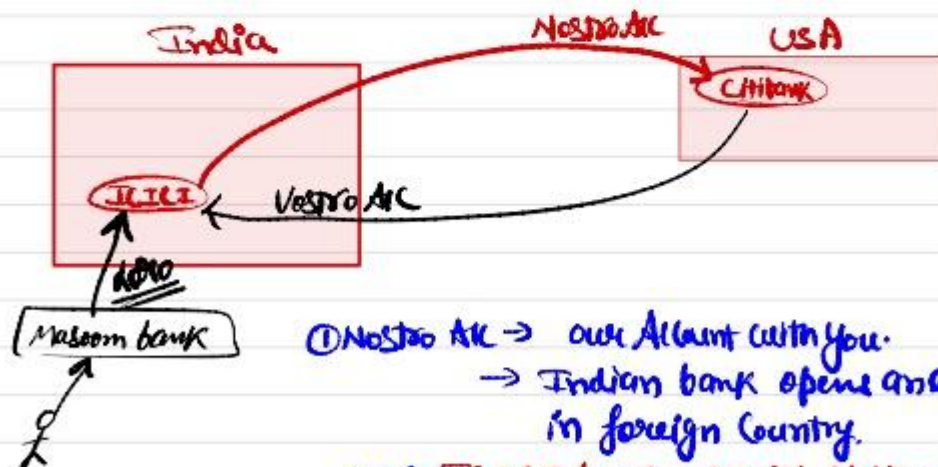
- when subsidiaries in foreign country are allowed to manage their cash/investment/borrowing in their own currency and at end convert & send money to head office.

Centralised

- when all cash (+ & -) from or to subsidiaries is converted into home currency at the start date and managed by head office.

(Branches/subsidiaries don't decide fate of cash/borrowing/investments etc., whereas it is decided by head office)

Concept (21) Nostro, Vostro & Loro A/c



① Nostro A/c → our Account with you.
→ Indian bank opens an account in foreign country.

ex: ICICI bank operates Nostro A/c with Citibank in USA

② Vostro A/c → Your Account with US.

- when Foreign bank (or entity) opens an account in our country in our currency
- Russia's bank opens Vostro account in India

③ Loro A/c → A small bank does not have own Vostro A/c so, uses another bank's Vostro A/c for transaction, then it is called Loro A/c.

Types of Accounts to be maintained.

Particulars	① <u>Nostro A/c</u>	
	Inflow ↓ Credit (\$)	outflow ↑ Debit (\$)
Spot Purchase of \$	✓	
Spot Sale of \$		✓
	≡	≡
Balance in Nostro A/c	(B/S) Debit balance	(B/S) Credit balance
	Total ✓	✓ Total

This Account records only Actual outflow/inflow, not accrued outflow/inflow.

Particulars	② <u>Exchange position A/c</u>	
	Long position (\$ Purchase)	Short position (Sale of \$)
All transaction recorded		
→ Cash basis. ✗	≡	≡
→ Accrual basis	≡	≡

Example of entries

Particulars	Nostro A/c credit	A/c Debit	Exchange diff A/c long \$	Short \$
① Spot Sell \$	-	✓	-	✓
② Forward Sell \$	-	-	-	✓
③ Spot Buy \$	✓	-	✓	-
④ Forward Buy \$	-	-	✓	-
⑤ Forward sell \$ (cancelled)	-	-	✓	-
⑥ Forward Buy \$ (cancelled)	-	-	-	✓
⑦ Bill Receivable \$ Purchased (Premium)	-	-	✓	-
⑧ Bill Receivable \$ Discounted	-	-	-	✓
⑨ Foreign Currency \$ Draft made (not yet presented for payment)	-	-	-	✓
⑩ Foreign Currency \$ Draft Cancelled	-	-	✓	-
⑪ Remittance of \$ abroad	-	✓	-	✓
⑫ Remittance received from abroad	✓	-	✓	-

Steps for closing A/c's

Step ① we should close Nostro A/c primarily.

→ If desired cl. bal is Debit → we put it on Credit side.

→ If desired cl. bal is Credit → we put it on Debit side.

Step ②

Now the balancing figure is shown as Spot Buy & Spot Sell and this entry is also shown in exchange position A/c.

Step ③ Now we close Exchange position A/c.

→ If desired cl. bal is overbought → Short Column.

→ If desired cl. bal is oversold → Long Column.

Step 9 Balancing figure of exchange position All
will be forward sell or forward buy.

Concept 22 Fate of Forward Contract.

I Delivery

II Cancellation of Contract

III Extension of Contract

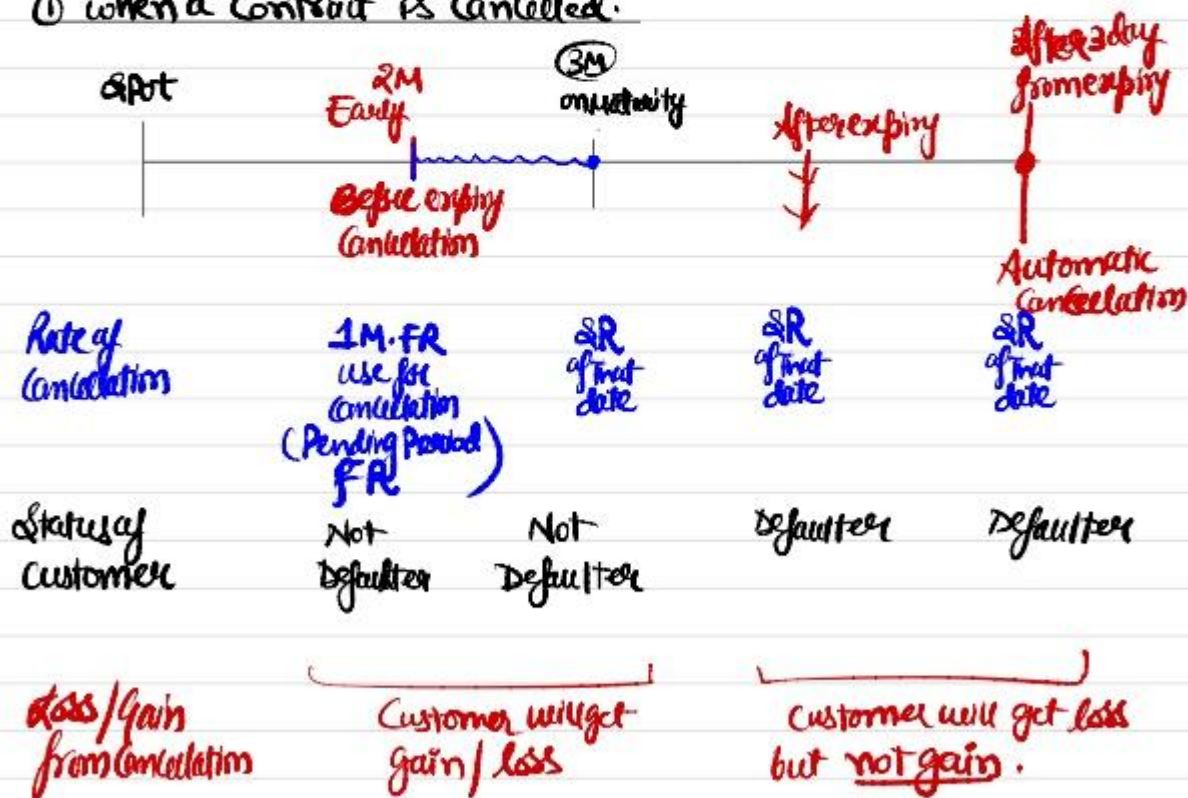
- a) Early Delivery
- b) On time Delivery
- c) Late Delivery

- a) Early Cancellation
- b) Cancellation on due date
- c) Late Cancellation

- a) Early extension
- b) on due date extension
- c) late extension.

Cancellation under Forward Contract.

① When a Contract is Cancelled.



Extra Note: FR given in question is assumed to be after all margin.

Amount to be charged from customer in case of cancellation.

- ① Cancellation gain/loss (as shown above)
(original Forward Contract Rate
- Cancellation Rate (as discussed above))

→ Profit is not shared with client if client is a Defaulter.

- ② Swap gain/loss. (after expiry (cancel/extension/delivery)
(early delivery)

(or early delivery)

The day when original contract is cancelled, bank will enter into two transactions one at Spot rate and one at forward rate & difference between these transactions is called Swap gain/loss.

- ③ Interest on outlay →

on date of cancellation (or early delivery), then bank has two actual transactions ① Buy
② sell

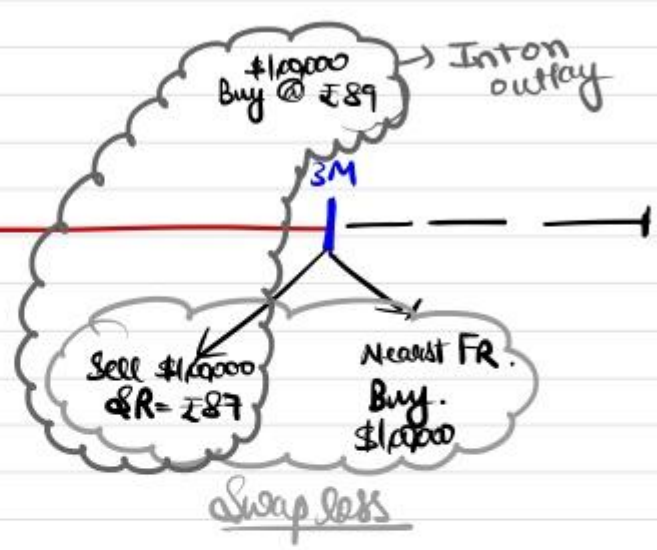
where bank has actual outflow and inflow of cash.

Interest is charged on the difference of outflow/
Inflow.

Investor
Buy \$1,000,000 3M
FR $\Rightarrow 1\$ = \pounds 90$

Bank
Sell \$1,000,000 3M
FR $1\$ = \pounds 90$

Buy \$1,000,000 3M
FR $1\$ = \pounds 89$
Inter bank market



Concept 24 Covered Interest Arbitrage Arbitrage with IRPT

Step 1 Calculate Fair Forward rate using IRPT

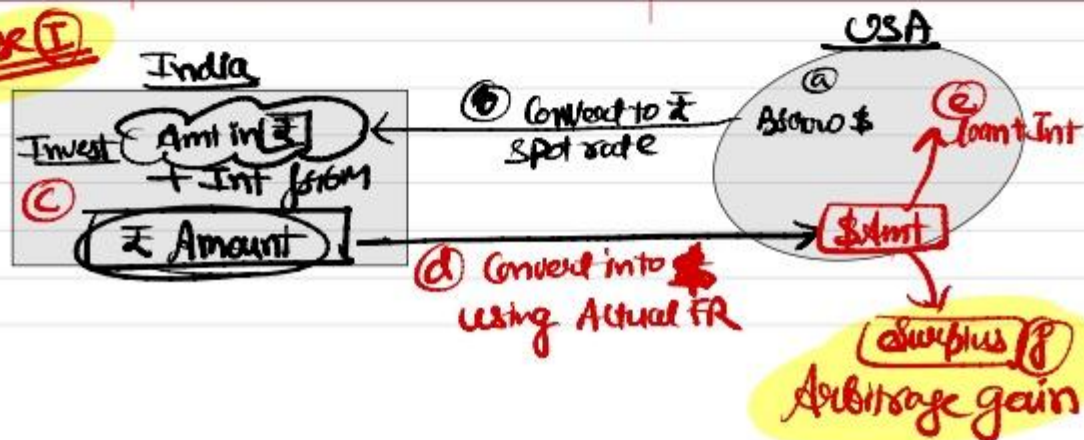
$$\frac{\text{Forward rate } (\text{₹}/\$)}{\text{Spot rate } (\text{₹}/\$)} = \frac{(1 + \text{Int in ₹})}{(1 + \text{Int in \$})}$$

Step 2 Compare fair forward rate with Actual FR.

Possibilities

↓	<u>Case I</u>	↓	↓
Fair FR = Actual FR	Fair FR > Actual FR		Fair FR < Actual FR
No Arbitrage	So, \$ is underpriced in market		So, \$ is overpriced in market
	⇒ Strategy: Borrow (Buy) \$ and invest amount in ₹ (Sell)		⇒ Strategy: Sell \$ (Invest in \$) and Borrow (Buy) in ₹.

Case I



Case I steps

Step (a) Borrow in US \$ (assume \$10000)

Step (b) Convert into ₹ using spot rate

Step (c) Deposit Amount of ₹ in a bank to earn Interest.

Step (d) Convert final Amount ($P + \text{Int}$) in \$ using Actual FR.

Step (e) Payback \$ loan along with Int, Surplus which you have will be arbitrage gain.