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FOREIGN EXCHANGE EXPOSURE AND RISK MANAGEMENT

INTRODUCTION:

- Foreign currency risk arises when transaction takes place between 2 parties of different countries and settlement is to be made in foreign currency.

- Foreign currency transaction may be:
  - Export import of a product
  - Investment in foreign currency
  - Loan in foreign currency

- Risk is measured in terms of currency fluctuation which is also termed as standard deviation.
  - High currency fluctuation: High risk
  - Low currency fluctuation: Low risk
  - No currency fluctuation: No risk

  For calculation of risk (i.e. Standard deviation), refer portfolio management chapter.

- In this chapter our objective is to minimise currency fluctuation risk by taking corrective action which is also termed as hedging

  Following are some hedging techniques (or corrective action) to minimise risk:

  (i) forward contract Hedge
  (ii) money market hedge
  (iii) currency option
  (iv) currency future
  (v) leading and lagging
  (vi) LC arrangement Etc.

CONCEPT: REGULATOR OF A FOREIGN CURRENCY IN INDIA

All foreign exchange transaction made in India is being regulated either by RBI or FEDAI. In other words, we can say that a person doing transaction in foreign exchange has to follow RBI rule or FEDAI rule.

Regulator of Forex Market

RBI (Reserve Bank of India)	FEDAI (Foreign Exchange Dealers Association of INDIA)
⇨Established in accordance with the provisions of RBI Act 1934 ⇨Manage FEMA Act 1999 & maintain Foreign exchange market	⇨Established under Section-25 of Companies Act 1956 ⇨Regulate Inter-bank foreign exchange business

MAJOR FOREIGN CURRENCIES

SN	Country	Currencies	ISO Code*	Symbol	Fractional Unit	Rate in ₹ (Approx)	Regulator (Central Bank)#
1.	Kuwait	Kuwaiti Dinar	KWD	---	1000 fils	₹270	Central Bank of Kuwait
2.	United Kingdom	British pound	GBP	£	100 penny	₹110	Bank of England
3.	Switzerland	Swiss Franc	CHF	Fr	100 Rappen	₹95	Swiss National Bank
4.	Eurozone**	Euro***	EUR	€	100 Cent	₹90	European Central Bank (ECB)
5.	USA	US dollar	USD	$	100 Cent	₹80	Federal Reserve Bank (Fed)

6.	Canada	Canadian Dollar	CAD	$	100 Cent	₹60	Bank of Canada
7.	Australia	Australian Dollar	AUD	$	100 Cent	₹55	Reserve bank of Australia
8.	Malaysia	Malaysian Ringgit	MYR	Rm.	100 Sen	₹20	Bank Negara Malaysia
9.	China	Chinese Yuan Renminbi	CNY	¥	10 Jiao	₹10	People's Bank of China
10.	India	Indian Rupee	INR	₹	100 Paisa	---	Reserve bank of India
11.	Nepal	Nepalese Rupee	NPR	Rs.	100 Paisa	₹0.625	Nepal Rastra Bank (NRB)
12.	Japan	Japanese Yen	JPY	¥	100 Sen	₹0.60	Bank of Japan

* **ISO Code**: Internationally Standardized **three letter abbreviation**.

** The eurozone, officially called the euro area, is a monetary union of 20 member states of the European Union that have adopted the euro as their primary currency and sole legal tender.

*** Euro is an Official currency of 20 of the 27 Member States of the European Union.

⇨ Germany adopted EURO as its official currency on January 1, 2002, replacing the DEUTSCHE MARK (DM).

⇨ France adopted the EURO as its official currency on January 1, 2002, replacing the French Franc (FRF).

 # Role of Central Bank:

(i) Regulate currency;

(ii) Regulate commercial Bank;

(iii) Set Monetary Policy etc.

CONCEPT: MONETARY POLICY

- Monetary policy in India refers to the measures taken by the Reserve Bank of India (RBI) to regulate the money supply, interest rates, and credit conditions in the economy.
- RBI Sets interest rate [i.e., Repo rate and Reverse Repo rate] by keeping in mind: ⇨Inflation and ⇨GDP Growth

Inflation: Percentage increase (Change) in price of commodities is known in inflation

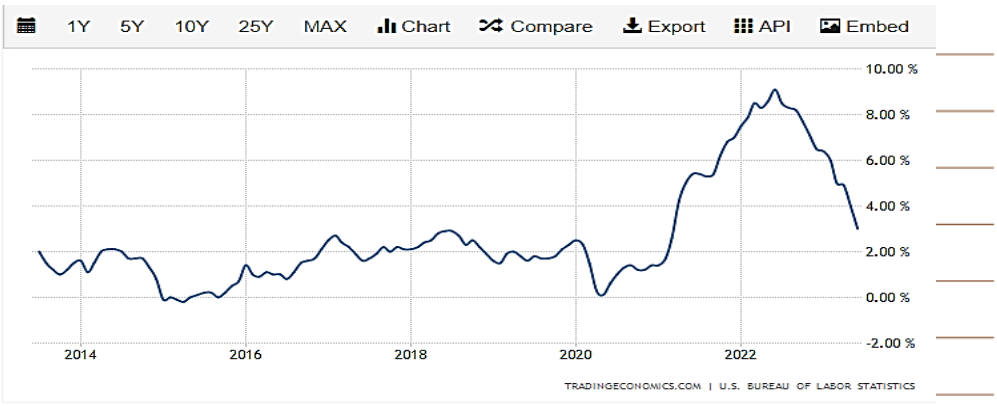
For Measurement, there are two types of Indices [i.e. Group of commodities]:

(i) **CPI:** Consumer price Index [Group of commodities traded in Retail Market]

(ii) **WPI:** Whole sale price Index [Group of commodities traded in wholesale market]

CPI (Inflation) History in India in Last 10 Years

CPI (Inflation) History in USA in Last 10 Years



GDP Growth Percentage increase in value of domestic production including services

- GDP ⇨ Gross Domestic Product (i.e. Value of goods and services produced in a country)

  India GDP (2022) ⇨ ₹ 272 Lakh cr. [i.e. $3.4 trill]

  China GDP (2022) ⇨ $18 trill

  US GDP (2022) ⇨ $25 trill

- GDP Growth increases when consumption /production of goods and services increases and for this we need money.

To Maintain Money Supply, Government Sets Interest rate so that Inflation and GDP can be balanced.

Government objective:

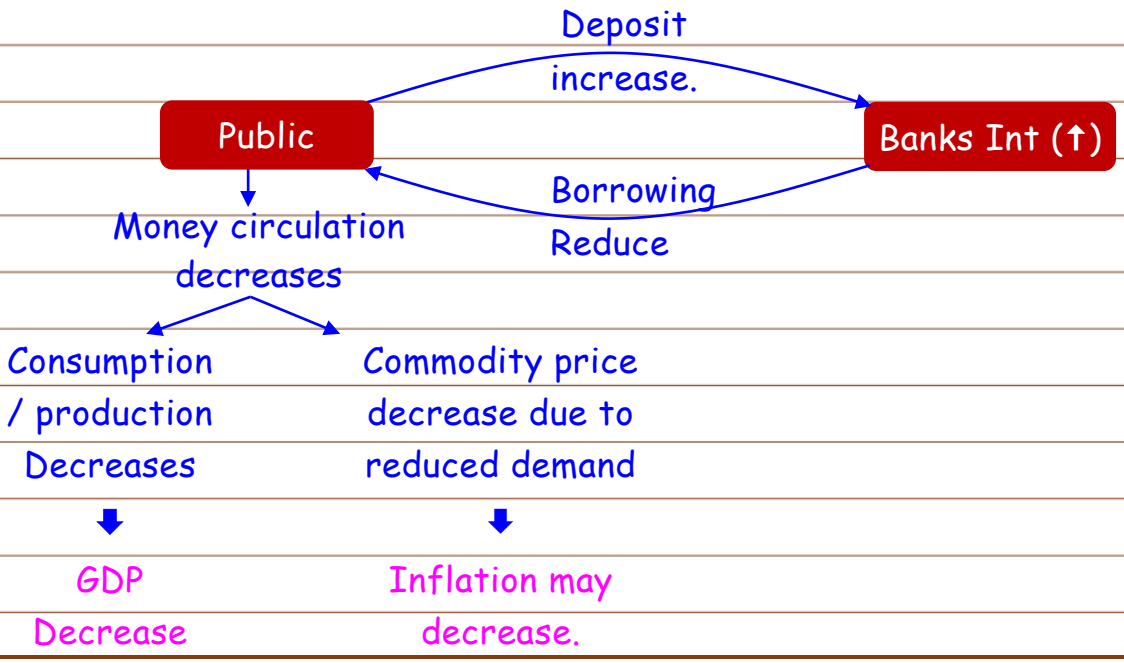
Keep Inflation ⇨ Low & Maintain GDP ⇨ High

CONCEPT: INTEREST RATE DECISION OF CENTRAL BANK

SITUATION -1: INFLATION IS HIGH

Government Action: Increase interest rate to decrease Liquidity.

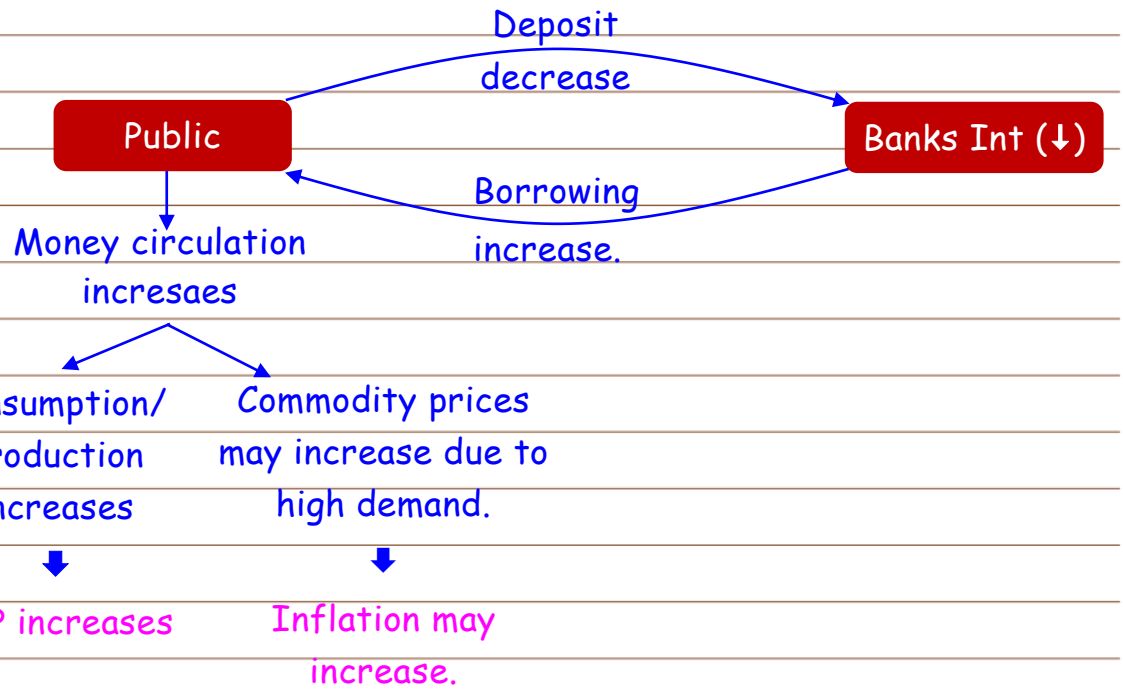
Effect: Inflation may decrease but GDP will be affected adversely (i.e. GDP may Decrease)



SITUATION -2: INFLATION IS LOW

Government Action: Decrease interest rate to increase Liquidity.

Effect: GDP may increase but inflation may be affected adversely.



CONCEPT: EXCHANGE RATE

Exchange Rate: Relationship between values of two currencies is known as Exchange Rate. Officially,

- Stronger currencies are quoted for **1 unit** of foreign currency and
- Weaker currencies are quoted for **100 units** of foreign currency.

Example:

In India			In Nepal	
(i) £1	= ₹110	Or,	£1	=Rs. 175
(ii) $1	= ₹80	Or,	$1	=Rs. 130
(iii) €1	= ₹90	Or,	€1	=Rs. 144
(iv)¥100	= ₹60	Or,	¥100	=Rs. 96
(v) Rs.100	= ₹62.5			

Here £, €, $ are stronger currencies. Hence, we find the exchange rate quoted in 1 unit term.

Similarly, Yen (¥) NPR (Rs.) are weaker currencies. Hence, we find the exchange rate quoted in 100 units term.

How to identify stronger currency & weaker currency?

- Stronger Currency ⇨Low Quantity
- Weaker Currency ⇨ High Quantity

Example

(i) £1= ₹110 ⇨ £ stronger & ₹ weaker

(ii) $1= ₹80 ⇨ $ stronger & ₹ weaker

(iii) ¥100 = ₹60 ⇨ ₹ stronger & ¥ weaker

In USD and GBP, which one is Stronger/Weaker

(i) (a) £1= ₹110

(b) ₹80 = $1

$$₹1 = \$\frac{1}{80}$$

$$₹110 = \$ \left(\frac{1}{80} \times 110\right)$$

₹110 = $ 1.375

∴ £1 = ₹110 = $1.375

Hence,

£1 = $ 1.375 ⇨ £ stronger and $ weaker

(ii) Similarly, we can Form exchange rate among any currency.

€1 = £ 0.82 ⇨ £ stronger and € weaker

CONCEPT: FORMATION OF EXCHANGE RATE AMONG ABOVE CURRENCIES (For General Knowledge only)

IF we can identify stronger currency and Weaker currency then we can form exchange rate among above currencies easily.

- Select the exchange rate Currencies (Say, £ and €)
- Take a Currency in per unit term (Say, £1 = €.....)
- Now check, another currency is stronger or weaker. (i.e. € is stronger than £ or weaker than £).
- If it is Stronger, then quantity should be lesser than 1
  If it is weaker, then quantity should be higher than 1.
- If quantity is >1, Proportion should be $\left(\frac{High\ Value}{Low\ Value}\right)$.
- If quantity is <1, Proportion should be $\left(\frac{Low\ Value}{High\ Value}\right)$.

Examples:

(1) £1 = € $\left(\frac{110}{90}\right)$ = € 1.2222; (2) ¥1 = € $\left(\frac{0.60}{90}\right)$ = € 0.0067

(3) $1 = ¥ $\left(\frac{80}{0.60}\right)$ = ¥ 133.3333 (4) CHF 1 = MYR $\left(\frac{95}{20}\right)$ = MYR 6.33

CONCEPT: PURCHASING POWER

Purchasing power refers to the amount of goods and services that can be acquired with a given amount of money. It is a concept used to measure the value of money and its ability to buy goods and services in an economy.

- High Inflation ⇨ Low Purchasing Power
- Low Inflation ⇨ High Purchasing Power

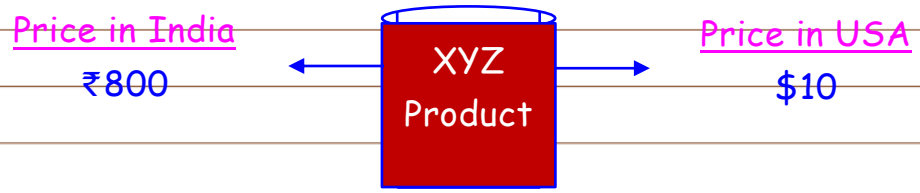
Purchasing power depends upon various factors. One main factor is Currency Circulation in country.

High currency circulation ⇨ Weak currency

Low currency circulation ⇨ Strong currency

CONCEPT: HOW DOES EXCHANGE RATES DECIDE?

Exchange rate between two countries depends upon price of a product in two countries (i.e., Purchasing Power).



In this case, exchange rate quoted in India should be

$10 = ₹ 800

$1 = $\frac{800}{10}$ = ₹80

$1 = ₹80 ⇨ Exchange rate quoted in India

Similarly, we can derive rate to be adopted in USA also:

₹800 = $10

₹1 = $ $(\frac{10}{800})$

₹100 = $ $(\frac{10}{800} \times 100)$

∴ ₹100 = $ 1.25 ⇨ Exchange rate quoted in USA.

CONCEPT: APPRECIATION AND DEPRECIATION OF A CURRENCY (FORWARD PREMIUM & DISCOUNT)

Appreciation of Currency (Premium):

A currency appreciates when the price of that currency increases.

Spot rate: $1 = ₹80
Future rate: $1 = ₹85

Appreciation on $ = ₹5	Depreciation on Rupee ≠ ₹5

Here, $ currency appreciates by ₹5.

Similarly, we can say ₹currency depreciates but we can't quantify depreciation amount unless we convert above rate in terms of ₹1 [i.e. ₹1 = $xxx]

Depreciation of a Currency (Discount):

A currency depreciates when price of that currency decreases.

Spot rate: $1 = ₹80
Future rate: $1 = ₹77

Depreciation on $	Appreciation on Rupee
= ₹3	≠ ₹3

Here, $ currency depreciates by ₹3.

Similarly, we can say ₹ currency appreciates but we can't quantify the appreciation amount unless we convert above rate in terms of ₹1.

Conclusion

- When a currency appreciates price of that currency increases (i.e. quantity of other currency increases)
- Similarly. When a currency depreciates the price of that currency decreases (i.e. quantity of other currency decreases.)

Note: We will Study Calculation of % Premium / % Discount on a currency later on.

CONCEPT: REASON BEHIND APPRECIATION & DEPRECIATION OF CURRENCY

There are so many factors due to which currency appreciates or depreciates. Some of them are:

(i) Daily demand & supply
(ii) Economy condition [i.e., GDP]
(iii) Interest rate [Normally T-bill rate]
(iv) Inflation rate

- Daily demand and supply are linked with economy condition, Interest rate and inflation.

- When inflation is high. ⟶

Gov Set Interest rate	(↑)
Impact on GDP	(↓)

⇩

Impact on Currency ⇨ Dep

- When inflation is low. ⟶

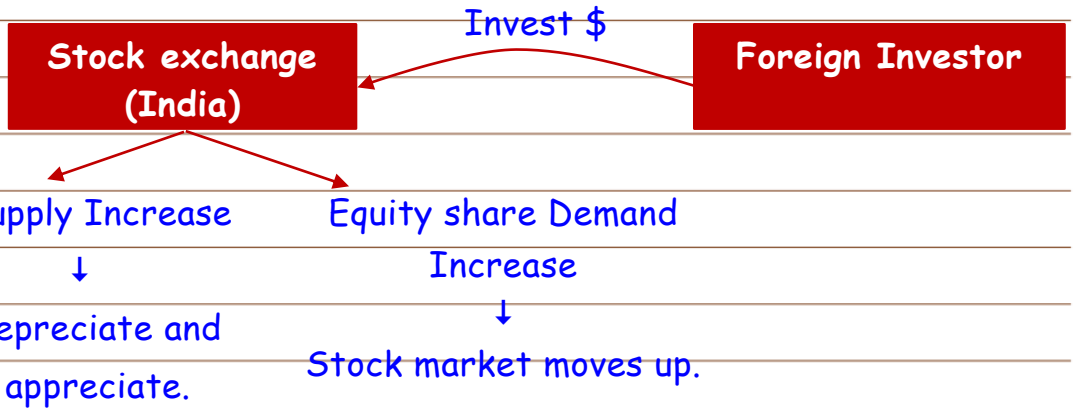
Gov Set Interest rate	(↓)
Impact on GDP	(↑)

⇩

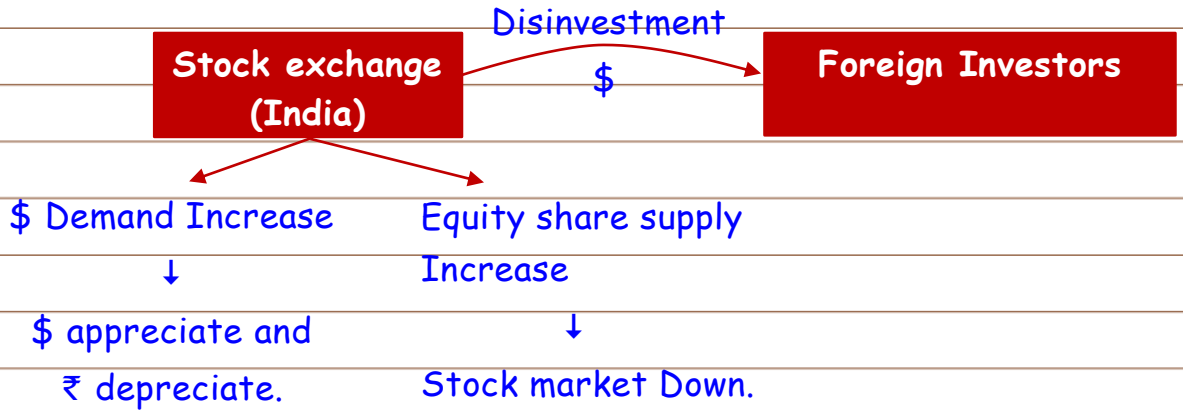
Impact on Currency ⇨ App

- We can link it with stock market also; (i.e., Demand & supply of Equity are also linked with currency appreciation/Depreciation)

(i) Indian Economy is expected to grow more

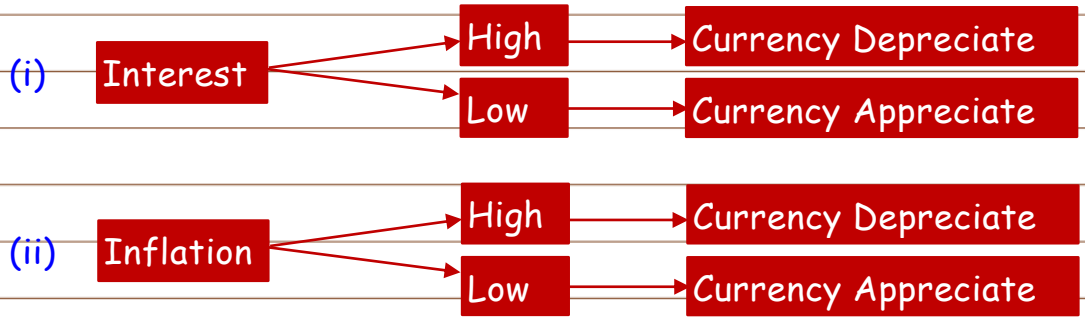


(ii) Indian Economy is Expected to grow less (or, slow down/Recession)



Note:- From above, we can say Indian Stock Market movement is inversely related to Foreign currency fluctuation.

Summary:



(iii) News for Indian Economy

- Good
  - Demand of share ↑ → Share price ↑
  - Supply of $ ↑ → $ Price ↓
- Bad
  - Supply of share ↑ → Share price ↓
  - Demand of $ ↑ → $ Price ↑

◉ Refer IRPT (Interest Rate Parity Theory) and PPPT (Purchasing Power Parity Theory) concepts for details.

HISTORY OF DOLLAR AND RUPEE EXCHANGE RATE

BREXIT IMPACT ON POUND CURRENCY (2016)


XE.com - GBP/EUR Chart
www.xe.com/currencycharts/?from=GBP&to=EUR&view=1W
21 Jun 2016 22:15 UTC
GBP/EUR close:1.30280
1.300
1.280
1.260
1.240
1.220
Jun 19
20
21
22
23
24
25
12h
1D
1W
1M
1Y
2Y
5Y
10Y


XE.com - GBP/INR Chart
www.xe.com/currencycharts/?from=GBP&to=INR&view=1W
21 Jun 2016 15:30 UTC
GBP/INR close:99.29875
105
100
95
90
85
Jun 19
20
21
22
23
24
25
12h
1D
1W
1M
1Y
2Y
5Y
10Y


XE.com - GBP/JPY Chart
www.xe.com/currencycharts/?from=GBP&to=JPY&view=1W
21 Jun 2016 22:45 UTC
GBP/JPY close:153.50680
155
150
145
140
135
Jun 19
20
21
22
23
24
25
12h
1D
1W
1M
1Y
2Y
5Y
10Y


XE.com - GBP/NPR Chart
www.xe.com/currencycharts/?from=GBP&to=NPR&view=1W#
21 Jun 2016 03:30 UTC
GBP/NPR close:158.02736
160
155
150
145
140
Jun 19
20
21
22
23
24
25
12h
1D
1W
1M
1Y
2Y
5Y
10Y

CONCEPT: FOREIGN EXCHANGE EXPOSURE

An Exposure can be defined as a Contracted, Projected or Contingent Cash Flow whose magnitude is not certain at the moment.

The foreign exchange exposure may be classified under three broad categories:

(i) Transaction Exposure

(ii) Translation Exposure

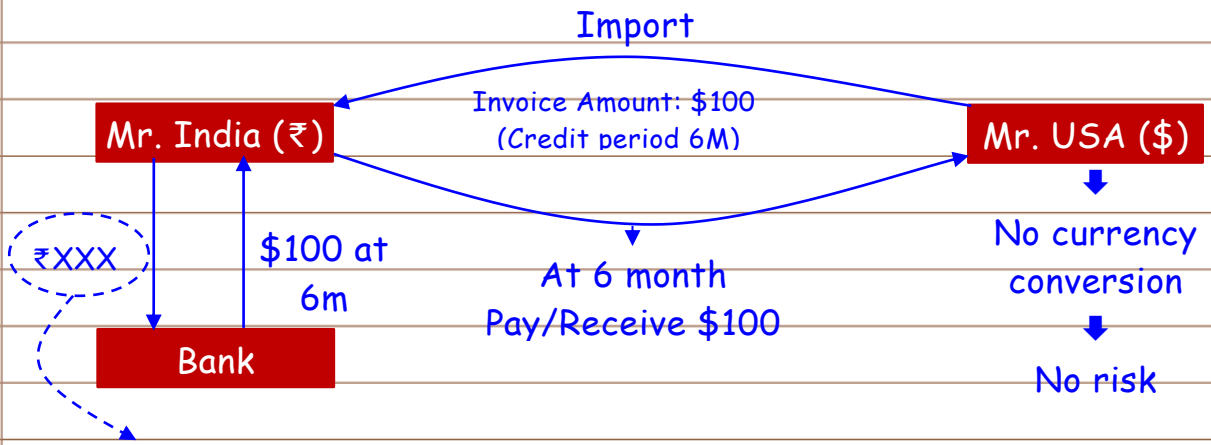
(iii) Operating exposure / Economic Exposure

(I) TRANSACTION EXPOSURE

- Transaction exposure relates to the potential impact of exchange rate fluctuations on individual transactions involving foreign currencies.
- It is most common ones amongst all the exposures.

Situation-i [when invoice is in $]

For transaction between Mr. India and Mr. USA.



Risk of Mr. India:

⇨ Risk of high outflow in ₹, It happens when $ currency appreciates in 6 months time.

⇨ In this transaction, Mr. India has to take corrective action (i.e. Hedge) to minimize Currency fluctuation risk.

Verification with journal Entry:

(a) **Mr. USA (Books of Account in $):**

(i) Mr. India A/c Dr. $100
To Export A/c $100
[As on today]

(ii) After 6m
Bank A/c Dr. $100
To Mr. India A/c $100

⇨ No loss/gain to Mr. USA

⇨ No risk of currency fluctuation

(b) **Mr. India (Books of Account in ₹):**

Spot rate: $1 = ₹ 80 [Custom Dept /RBI Rate)

Rate at 6m: $1 = ₹85

(i) **As on Today**:

Import A/c Dr. ₹8000
To Mr. USA A/c ₹8000
[Import recorded today @80]
$1 = ₹80
$100 = ₹80 × 100 ₹8000

(ii) **After 6 Month:**

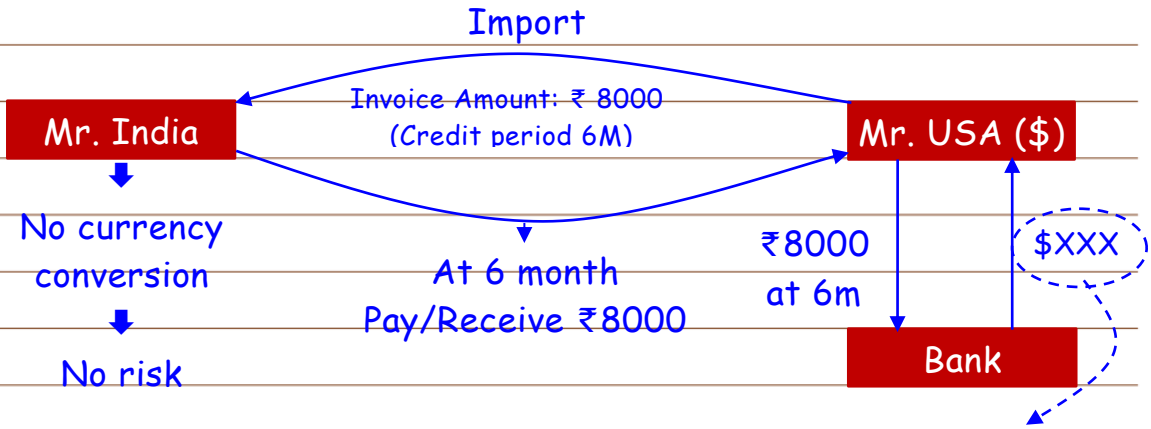
Equivalent amount at ₹85 (6m rate)
$1 = ₹85
$100 = ₹85 × 100 ₹8500

Our objective is to minimize this loss.

Mr. USA A/c Dr. ₹8000
Exchange loss Dr. ₹500
To Bank A/c ₹8500
(Payment Recorded @₹85]

Situation – ii [When Invoice is in ₹]

For Transaction between Mr India and Mr USA



Risk of Mr. USA:

⇨ Risk of Low inflow in $.

⇨ It will happen when ₹ currency will depreciate after 6 months.

⇨ Here, Mr. USA has to take corrective action (hedge) to minimize risk.

Verification with Journal Entries:

(a) For Mr India (Books of Account in ₹)

(i) As on today

Import A/c Dr. ₹ 8000

To Mr. USA A/c ₹8000

(ii) At 6m time:

Mr. USA A/c Dr. ₹8000

To Bank A/c ₹8000

⇨ No loss/gain to Mr. India

⇨No Risk associated with currency fluctuations.

(b) For Mr. USA (Books of Account in $):

Spot rate: ₹100 = $1.25

Rate at 6m: ₹100 = $1.18

(i) **As on Today:**

Equivalent $ @ Spot rate

₹100 = $1.25

₹8000 = $($\frac{1.25}{100}$ x 8000) = $100)

Mr. India A/c Dr.	$100	
To Export A/c		$100

(ii) **After 6 Month:**

Equivalent amount at 6m rate

₹100 = $1.18

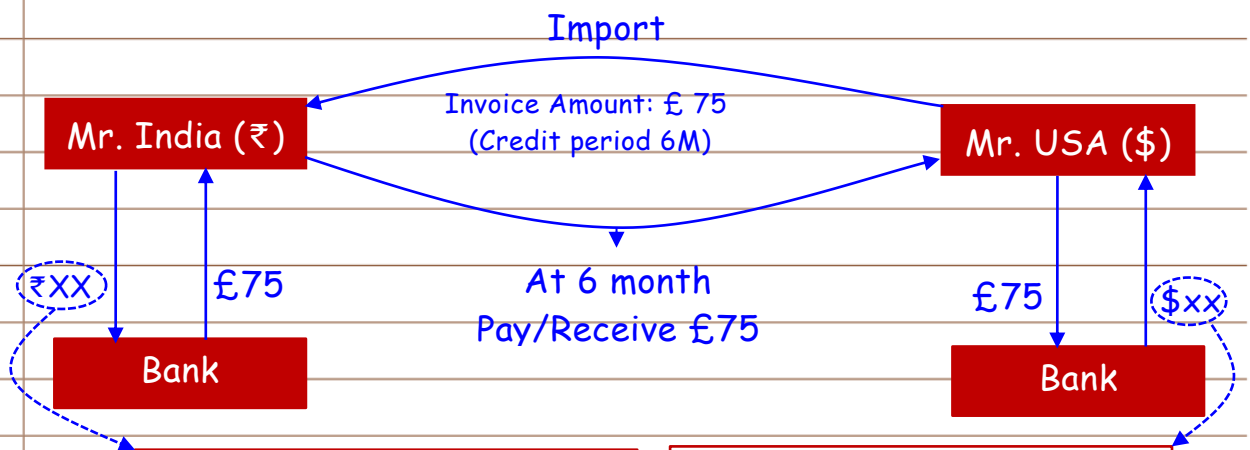
₹8000 = $($\frac{1.18}{100}$ x 8000) = $94.4

Our objective is to minimize this loss.

Bank A/c Dr.	$94.4	
Exchange loss A/c Dr.	$5.60	
To Mr. India A/c		$100

Situation-iii [invoice in £]

For transaction between Mr. India and Mr. USA.



Risk of Mr. India

- Risk of High outflow in ₹
- It will happen when £ currency will appreciate.

Risk of Mr. USA

- Risk of Low inflow in $
- It will happen when £ currency will depreciate.

CONCLUSION:

- No body can hold foreign currency as Government does not allow it.

  Exception: Foreign currency Bank Account. We can hold foreign currency in Foreign currency bank account.

  If the question is silent, assume we don't have foreign currency Bank A/C.
- Unless otherwise stated, Settlement should be made in invoice currency only.
- Do not get confused to identify foreign currency and home currency. Identify invoice currency (i.e. settlement currency) and conclude that it is foreign currency. After that identify the party for whom it is foreign currency and take corrective action for that party to minimize risk (or, Hedge).
- Loss/Gain currency should be the home currency.

(II) TRANSLATION EXPOSURE

- The translation exposure is also called accounting exposure or balance sheet exposure.
- It is basically the exposure on the assets and liabilities shown in the balance sheet

(III) ECONOMIC EXPOSURE / OPERATING EXPOSURE

- It is the overall impact of exchange rate changes on the value of the firm
- Operating exposure is more complex than transaction and translation exposures as it deals with broader strategic implications

CONCEPT: EXCHANGE RATE QUOTATION

(I) BID, ASK & SPREAD

a) **Bid Rate**: Bid rate is that rate at which bank buys a currency.

b) **Ask rate**: Ask rate is that rate at which bank sells a currency.

c) **Spread:** The difference between Ask and Bid rate is called the spread.

Spread = Ask rate – Bid rate

$$\% \text{ Spread} = \frac{\text{Ask rate} - \text{Bid rate}}{\text{Bid Rate}} \times 100$$

$$\text{OR, } \% \text{ Spread} = \frac{\text{Ask rate} - \text{Bid rate}}{\text{Ask Rate}} \times 100$$

Example

£1 = NPR 160/168

Here,

NPR 160 is Bid rate of £

NPR 168 is Ask rate of £

NPR 8 is Spread

$$\% \text{ Spread} = \frac{168 - 160}{160} \times 100 = 5\%$$

Alternatively,

$$\% \text{ spread} = \frac{168 - 160}{168} \times 100 = 4.76\%$$

(II) ONE WAY QUOTE (SINGLE RATE QUOTE)

When bid rate (i.e. buying rate) and ask rate (i.e. selling rate) are same, it is called one way quote.

For example: £ 1 = $ 1.50

It means bank will buy £ at $ 1.50 and also sale £ at $ 1.50

(III) TWO WAY QUOTE

- When bid rate (i.e. buying rate) and ask rate (i.e. selling rate) are different, it is called Two way quote.
- Bid rate should be lesser than ask rate.

- Market convention regarding two way quote is

  First rate ⇨ Bid rate [Low rate]

  Second rate ⇨ Ask rate [High Rate]

Example

£1 = ₹110/ 115

(Here, £1 is base currency and ₹ is Price Currency. ₹110 is Bid rate and ₹115 is Ask rate of £)

Note: Sometimes we may find exchange rate quoted in **wrong** way (i.e., First rate is higher than second rate).

$1 = ₹62.72/62.68 [ICAI SM-2023 Illustration-7]

In this case take higher rate as ask rate and lower rate as bid rate.

(IV) PIP (PRICE INTEREST POINT)

- Smallest value of an exchange rate is known as PIP.
- If exchange rate is quoted up to 2 digits after decimal, then value of 1 PIP is "0.01".
- If exchange rate is quoted up to 4 digits after decimal, then value of 1 PIP is "0.0001".

Example:

(a) Spot rate $1 = ¥130.0210

6m Future Rate $1 = ¥130.0215

here, $ appreciate by 5 pip [i.e. ¥0.005]

(b) Spot rate $1 = £ 0.7270

6m Future Rate $1 = £ 0.7272

Appreciation on $ ⇨ 2 pip (or, £ 0.0002)

(c) Spot rate $1 = ₹ 75.25

6m Future Rate $1 = ₹ 75.22

Depreciation on $ ⇨ 3 pip (or, ₹ 0.03)

Note:

(i) One Bank (Forex dealer) deals with another bank using exchange rate up to 4 digits after decimal. [i.e. $1 = ₹85.2520/85.2580]

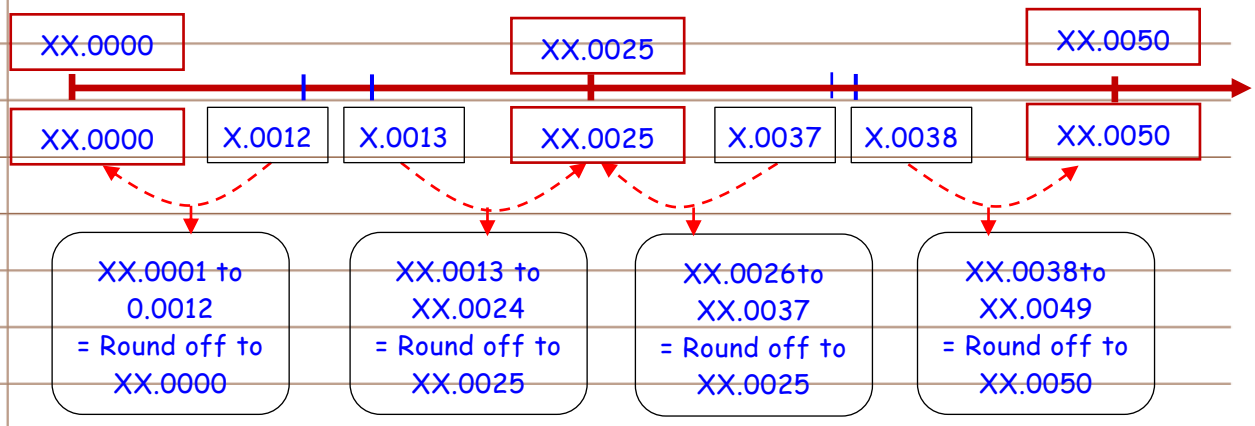
(ii) Bank/Forex dealer deals with retail customer using exchange rate up to 2digits after decimal. [$1 = ₹85.50/85.90]

[However, Institute ignores it in question]

(v) Rounding of an Exchange Rate in Multiple of 0.0025(Or, 25 Pip)

It means we have to round off all exchanges rates in following:

(a) XX.0000
(b) XX.0025
(c) XX.0050
(d) XX.0075
(e) XX.0100
(f) XX.0125

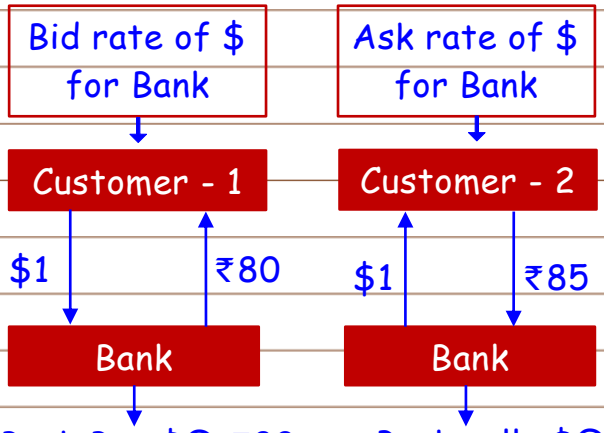


Similarly, we can round off exchange rate in multiple of 0.05 or any other values using same logic.

CONCEPT: INTERPRETATION OF TWO WAY QUOTE AND SELECTION OF BID RATE AND ASK RATE TO CONVERT CURRENCY: (MOST IMPORTANT)

Suppose Exchange rate is quoted by Bank is: $1 = ₹80/85

$1 = ₹80 / ₹85



- Bank Buy $@ ₹80
- Customer sells $ @₹80
- Bank sells $@₹85
- Customer buy $ @₹85

- Benefit to Bank = 85-80 = ₹5
- Loss to customer (combined) = ₹5

Summary:

If $1 = ₹80/85 ⇨ $ is base currency and ₹ is Price currency)

(i) At Bid Rate ⇨ Bank Buys Base Currency

⇨ Customer Sells Base Currency

(ii) At Ask Rate ⇨ Bank sells Base Currency

⇨ Customer buys Base Currency

Alternatively we can say,

(i) Bank pays less quantity and receives high quantity of price currency.

(ii) Customer pays high quantity and receives low quantity of price currency.

Example-1

Mr. USA exported a product to Mr. UK at £50. Credit period is 6 months. Calculate equivalent $ amount using exchange rate of 6 months time.

Exchange rate quoted by Bank:

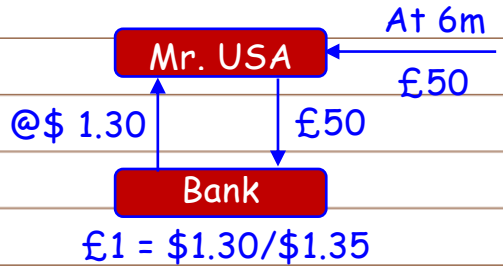
(i) US Bank: £1 = $1.30/ 1.35

(ii) UK Bank: $1 = £ 0.76/ 0.79

Solution:

- Invoice currency ⇨ £
- £ is foreign currency for Mr. USA. Hence Mr. USA converts currency
- Receivable at 6M = £50 (for Mr. USA) and Given rate is also for £ Currency. Hence, Mr USA sells £ at bid rate.

(i) Equivalent $ using U.S. bank rate



Here, bank buys £ @ $ 1.30

£1 = $1.30

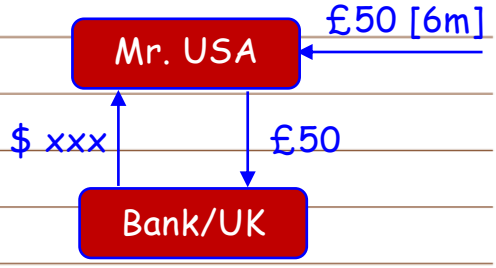
£50 = $(1.30 X 50) = $65

Hence: Equivalent amount = $65

(ii) Equivalent $ using UK Bank rate:

Here, UK bank quoted exchange rate of $ currency (i.e. Base currency) hence we must have to find requirement of Mr. USA in $ currency

Here, Mr. USA must buy $ Currency at Ask rate.



$1 = £ 0.79

£ 0.79 = $1

£ 1 = $ $\frac{1}{0.79}$

£ 50 = $ ($\frac{1}{0.79}$ x 50) = $ 63.29

Hence: Equivalent amount = $63.29

Example-2:

Mr Japan exported a product to Mr USA at $100. Credit period is 6 months. Calculate equivalent amount in ¥ currency using 6 months time exchange rate: ¥1 = $0.0075 / 0.0085 (US Bank)

Solution:

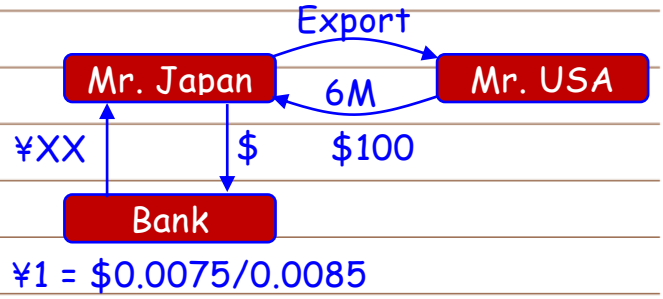
As bank quoted rate of ¥ currency we have to see whether customer buy or sell ¥ currency. As Mr Japan has to buy ¥ currency ask rate is applicable. Or, Select higher cash flows between $0.0075 or $ 0.0085 as customer pays higher amount.

¥1 = $0.0085

$1 = ¥ $\left(\frac{1}{0.0085}\right)$

$100 = ¥ $\left(\frac{1}{0.0085}\right)$ ×100

= ¥ 11764.71



¥1 = $0.0075/0.0085

Hence Equivalent amount: = ¥ 11764.71

Example-3

Mr UK imported a product at £100 from Mr USA. It is payable after 6 months. Calculate equivalent amount in $ currency using following rate quoted at 6 months time: £1 = $1.30/ 1.35

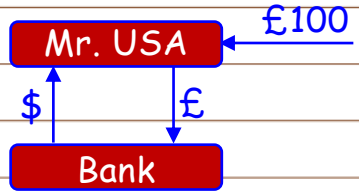
Solution

- Invoice currency ⇨ £
- £ is foreign currency for Mr. USA. Hence Mr. USA converts currency
- Receivable at 6M = £100 (for Mr. USA) and Given rate is also for £. Hence, Mr USA has to sell £ at bid rate for conversion.

£1 = $1.30

£100 = $(1.30 X 100)

= $130



Hence Equivalent amount: = $130

Example-4

Mr Malaysia exported a product at MYR 1000 to Mr UK (credit 6 month). Calculate equivalent amount in £ using following exchange rate quoted at 6 month time. £1 = MYR 7.00/ 8.00 (Malaysian Bank)

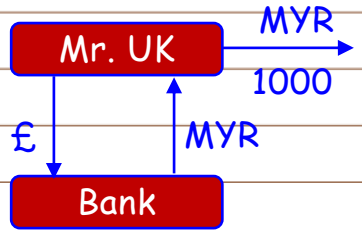
Solution:

- Invoice currency ⇨ MYR
- MYR is foreign currency for Mr. UK. Hence Mr. UK converts currency
- Payable at 6M = MYR 100 (for Mr. UK)
- Here, Mr UK buys MYR and Sells £. As exchange rate is given for £ Currency, Mr UK has to sell £ at bid rate.

£1 = MYR 7.00/ 8.00

MYR 7 = £1

MYR 1000 = £ $\left(\frac{1}{7} X\ 1000\right)$ = £142.86



Hence Equivalent amount: = £ 142.86

CONCEPT: EXCHANGE RATE QUOTATION (Continued…)

(VI) DIRECT QUOTE

The price in home currency for 1 unit or 100 unit of foreign currency is known as **direct quote**.

Example:

(i) $1 = ₹80 is a direct quote of $ currency in India.

(ii) £1 = NPR 175 is a direct quote of £ currency in Nepal.

(iii) MYR 1 = ¥ 25 is a direct quote of MYR currency in Japan.

(iv) ¥100 = ₹64 is a direct quote of ¥ currency in India.

(VII) INDIRECT QUOTE

The Price in foreign currency for 1 unit or 100 unit of home currency is known as **indirect quote**.

Officially, we never find indirect quote in bank.

Example:

(i) ₹1 = $ 0.0143 is an indirect quote of $ in India
(We can also say it is direct quote of ₹ in USA).

(ii) ¥100 = £ 0.65 is an indirect quote of £ in Japan
(We can also say it is direct quote of ¥ in UK).

Note:

(i) In other ways, we can say an exchange rate is direct quote of that currency which is expressed in 1 unit or 100 units term and indirect quote of that currency which is expressed in other than 1 unit term.

(ii) In real life we find only direct quotes in Bank/ forex dealer.

(VIII) INTERNATIONAL QUOTE / CROSS CURRENCY QUOTE

An exchange rate where both currencies are foreign currencies is known as **an international quote**.

Example:

(i) $1 = CHF 1.05 is a cross currency quote in India or, Nepal or, Japan etc (Except USA and Switzerland)

(IX) AMERICAN TERM AND EUROPEAN TERM

American Term: Rates quoted in amounts of U.S. dollar per unit of foreign currency. For Example: ₹1 = $ 0.0143; £1 = $ 1.3750

European Term: Rates quoted in amounts of Foreign currency per unit of U. S. Dollar . For Example: $1 = ₹80; $1 = €1.125; $1 = ¥135 etc.

Most foreign currencies in the world are quoted in the European term.

CONCEPT: CONVERSION OF DIRECT QUOTE INTO INDIRECT QUOTE OR VICE-VERSA

(A) FOR ONE WAY QUOTE:

Reciprocal of direct quote of one currency is an indirect quote of same currency.

$$\text{Direct quote} = \frac{1}{\text{Indirect quote}} \quad \text{OR,} \quad \text{Indirect quote} = \frac{1}{\text{Direct quote}}$$

Example: Direct quote of $: $ 1 = ₹ 75

Indirect quote of $: ₹ 1 = $ $\frac{1}{75}$

(B) FOR TWO-WAY QUOTE:

Reciprocal of bid rate of one currency becomes ask rate of another currency or vice versa.

Example:

Direct quote: $1 = ₹ 75 / ₹ 80

Indirect quote: ₹ 1 = $ $\frac{1}{80}$ / $ $\frac{1}{75}$

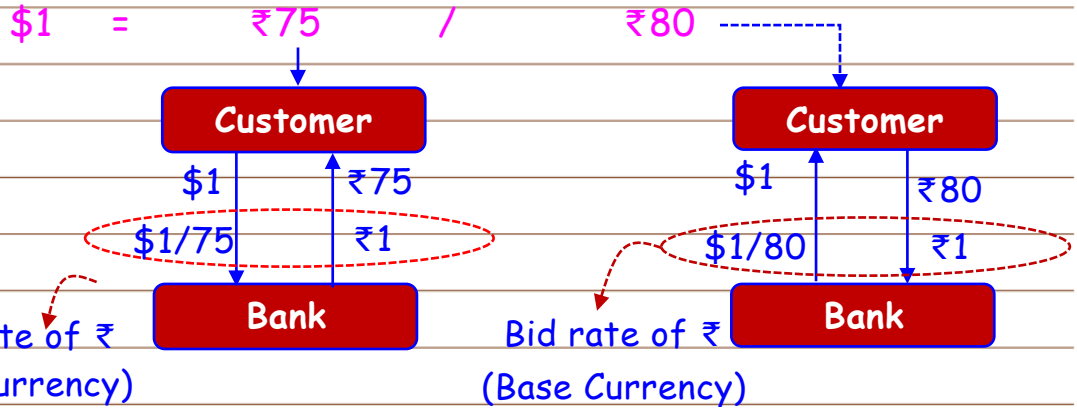
i.e. ₹1 = $0.0125 / 0.0133

Logic of above conversion:

- At same time, one party buys one currency and sells another currency. Hence, bid rate of one currency becomes ask rate of another currency or vice versa.

Verification:

Suppose: $ 1 = ₹75/₹80



Hence, we can say: ₹1 = $\frac{1}{80}$ / $\frac{1}{75}$

∴ ₹1 = $ 0.0125 / 0.0133

Note:

Equivalent amount calculated using Direct quote or, Indirect quote remain same if we use single bank rate.

CONCEPT: EXCHANGE AND OTC

(1.) EXCHANGE:

Market where price negotiation is made publicly among various parties is known as Exchange (i.e. through bidding)

For example: -

NSE	⇨	National Stock Exchange
BSE	⇨	Bombay Stock Exchange
MCX	⇨	Multi Commodity Exchange
NCDEX	⇨	National Commodity and Derivative Exchange
NEPSE	⇨	Nepal Stock Exchange

(2) OTC (OVER THE COUNTER):

OTC transactions are those transactions where price is decided privately between two parties.

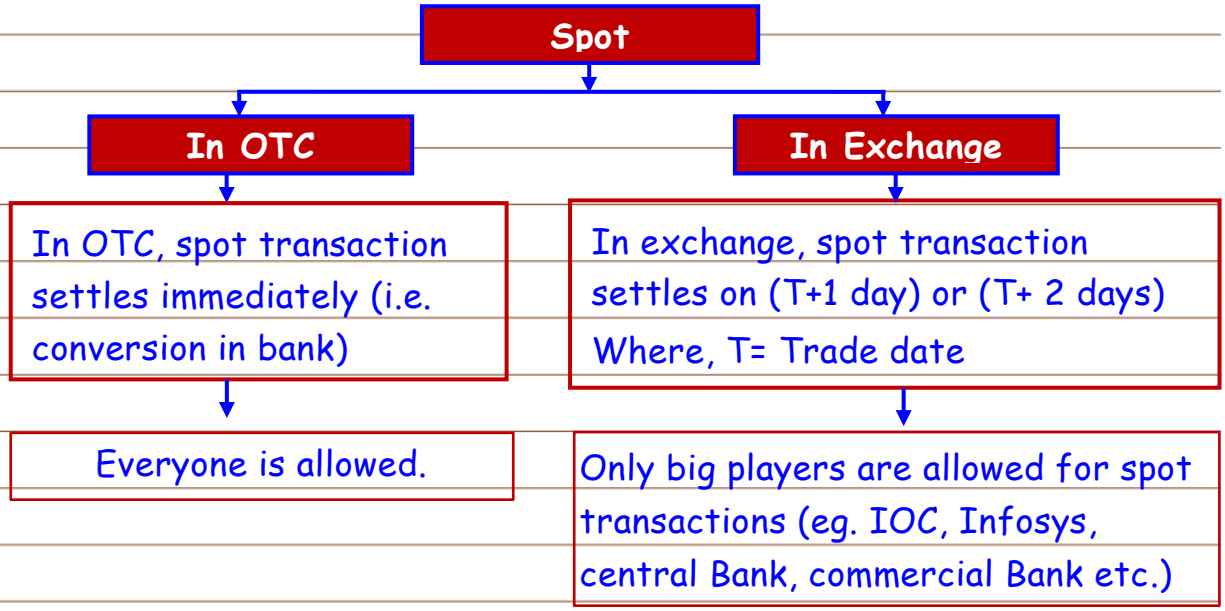
For example:

(i) Conversion of currency in Bank

(ii) OTCEI (Over the counter Exchange of India; www.otcei.net),

(iii) NASDAQ (National Association of dealers' Automated quotation system; www.nasdaq.com)

CONCEPT: SPOT TRANSACTION: -

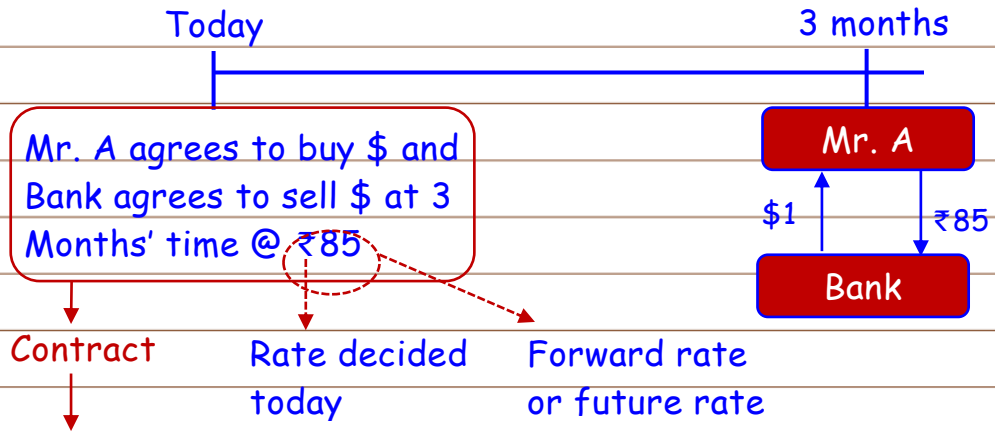


Example:

- On Monday: Buy $ on exchange
- Delivery of $ will take palace on Tuesday (For T+1 day) or Wednesday (For T+2 days)

CONCEPT: FORWARD/ FUTURE CONTRACTS

- Today's transaction for future settlement is known as forward/ future transaction.
- Under this transaction/ contract two parties agrees for settlement of currency at some future date for which rate fixed today.



- Forward contract or
- Future contract

- Today's contract for future settlement on OTC ⇨ Forward contract
- Today's contract for future settlement on exchange ⇨ Future contract
- In India, we find forward / future rate for maximum one year period.
- In Nepal, we find forward/future rate for maximum 6 months period.
- We can use forward contract to hedge currency fluctuation risk as settlement of currency takes place on future date at today's agreed rate (i.e. Today's forward rate).
- Forward rate/ future rate is different from spot rate.

Note:

- We will calculate fair forward rate/ fair future rate later on using IRPT (i.e. Interest Rate Parity Theory) or PPPT (Purchasing Power Parity Theory).
- Future contract/ future transaction is derivative instrument and we will discuss it in details in derivative chapter.

CONCEPT: PERCENTAGE PREMIUM / DISCOUNT ON A CURRENCY

- Appreciation of a currency is also termed as premium on a currency and depreciation of a currency is also termed as discount on a currency.
- At same time when one currency appreciates another currency depreciates but % Appreciation and % Depreciations differs due to different base used to calculate %
- % appreciation is calculated using lower value base and % depreciation is calculated using higher value base.
- Forward premium or discount is generally reported on an annualised basis.

Formula:

(i) % premium/ discount on base currency (or using direct quote)

$$= \left[\frac{F-S}{S} \times 100\right] \times \frac{12}{\text{Period}}$$

(ii) % premium/ discount on price currency (or using indirect quote)

$$= \left[\frac{S-F}{F} \times 100\right] \times \frac{12}{\text{Period}}$$

Where, F = Forward rate or future rate

S = Spot rate

+ve value indicates premium and

-ve value indicates discount

Example:

Spot rate : $1 = ₹80

6m FR : $1 = ₹84

Calculate % premium/ discount on both currencies in annual term.

Solution:

1) Using formula (Alternative -1)

a) % Premium/ discount on $ (Base currency)

$$= \left[\frac{F-S}{S} \times 100\right] \times \frac{12}{6}$$

$$= \left[\frac{84-80}{80} \times 100\right] \times \frac{12}{6} = \textbf{10\% p.a. (i.e. Premium)}$$

b) % premium/ discount on ₹ (price currency)

$$= \left[\frac{S-F}{F} \times 100\right] \times \frac{12}{6}$$

$$= \left[\frac{80-84}{84} \times 100\right] \times \frac{12}{6} = [-4.76\% \times 2]$$

= **-9.52% (i.e. Discount on ₹ 9.52%)**

2) Using logic (Alternative-2)

a) % Premium/ discount on $ (Base currency)

Spot rate : $1 = ₹80

6m FR : $1 = ₹84

$ Price increased from ₹80 to ₹84

Hence, % increase = $\frac{₹\,4}{80} \times 100$ = 5% in 6m

Annual % increase = 5% x 2 = 10% p.a. (Premium)

b) % premium/ discount on ₹

To calculate % increase/ decrease of ₹ currency, first we need to calculate rate of ₹ (i.e. Price of ₹).

Spot rate: ₹1 = $ $\frac{1}{80}$ ₹1 = $ 0.0125

6m FR: ₹1 = $ $\frac{1}{84}$ ₹1 = $ 0.011905

Price of ₹ decreased from $0.0125 to $0.011905 (i.e. By $0.000595)

Hence, % decrease in price of ₹

$$= \left[\frac{\$0.000595}{\$0.0125} \times 100\right]$$

= 4.76 % in 6m

Annual % decrease = (4.76 x 2) = **9.52%** (same as alternative 1)

Note:

We know% premium of one currency is not exactly equal to % discount of another currency (also verified in above example) but institute (sometimes) uses % premium of one currency as % discount of another currency or, vice versa.

CONCEPT: PERCENTAGE PREMIUM / DISCOUNT ON A CURRENCY USING TWO WAY QUOTE:

Unless otherwise stated, premium or discount is to be calculated based on mid- rate which is the simple average of bid rate and ask rate.

That is, Mid-Rate = (Bid rate + Ask rate)/2

CONCEPT: CALCULATION OF FORWARD RATE USING % PREMIUM & DISCOUNT RATE

- When a currency appreciates price of that currency increases and when a currency depreciates, price of that currency decreases.
- Hence, always try to increase/ decrease price currency quantity by given % premium/ discount.

Example: Suppose, €1 = ₹85

Case-I: € appreciates by 4% (i.e. Premium= 4%)

Increased price of € (i.e. Quantity of price currency ₹) by 4%

Future rate (forward rate) : €1 = ₹85 + (4% of 85) = ₹88.40

Case-II: € depreciates by 4% (i.e. Discount = 4%)

Decrease price of € (i.e. Quantity of price currency ₹) by 4%

Future rate (forward rate) : €1 = ₹85 - (4% of 85) = ₹81.60

Case-III: ₹ appreciates by 4% (i.e. Premium on ₹ = 4%)

As ₹ appreciates, price of ₹ (i.e. quantity of price currency €) increases by 4%

Spot rate ₹ 1 = € $\frac{1}{85}$ or, ₹ 1 = € 0.011765

Forward rate: ₹1 = € 0.011765 + 4% of 0.011765

₹1 = € 0.0122353

As spot rate is quoted for € currency, it is better to give forward rate of € currency.

Here, € 1 = ₹ $\frac{1}{0.0122356}$ **Hence, €1 = ₹ 81.7308**

Shortcut

SR : €1 = ₹85

Appreciation on ₹ = 4 %

€ 1 + (4% of 1) = ₹ 85

€ 1 x (1+0.04) = ₹ 85

€ 1 = $\frac{85}{(1+0.04)}$ = ₹ 81.7308; **Hence, €1 = ₹ 81.7308**

Case-IV: ₹ depreciates by 4% (i.e. Discount on ₹ = 4%)

Price of ₹ (i.e. quantity of €) will decrease by 4%

FR : € 1 x (1-0.04) = ₹ 85

$$€1 = \frac{₹85}{(1-0.04)} = ₹\ 88.54; \quad \textbf{Hence, €1 = ₹ 88.54}$$

Conclusion:

(i) Premium /discount on base currency

- **Multiply by (1+ % premium) or, (1 – % discount) on price currency.**

(ii) Premium/ discount on a price currency

- **Divide by (1+ % premium) or, (1- % discount) on price currency.**

CONCEPT: TIME VALUE OF MONEY

- Suppose, you are given a choice to receive ₹5000 today or ₹5200 after one year then what will you prefer?
- Our decision depends upon prevailing interest rate.

Assume, interest rate is = 8% p.a.

Now, we have following 2 options to take decision.

Option 1: Calculate future value of 5000 and compare with 5200

Now → 1 Year

5000 → 5000 + (5000 x 8%)

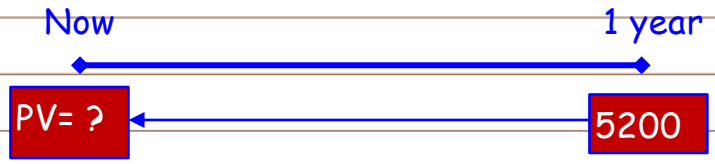
5000 x (1 + .08)

= ₹ 5400

↓

It is higher than 5200. Hence, opt to receive 5000 today.

Option 2: Calculate present value of 5200 and compare with 5000.



Suppose, PV = X

X + (8% of X) = 5200

Never Use: 8% = $\frac{8}{100}$

X × (1 + 0.08) = 5200

Always Use: 8% = 0.08

$\therefore X = \frac{5200}{(1+.08)}$ = ₹ 4814.82

It is lesser than 5000.

Hence, opt to receive 5000 today.

Formula: Future value = PV x $(1 + i)^n$

PV (present value) = $\frac{FV}{(1+i)^n}$

Where, i = periodic interest rate in decimal

n = no. of period (or, No of conversion of Interest into principal)

FV = future value

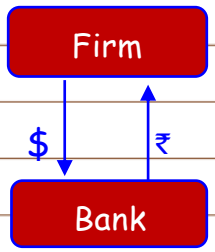
PV = present value

We will study about it in details in Time Value Chapter.

Question – 1A

(i) $ to be sold:

2m FR: $1 = ₹77.00/77.50



₹77.00 = $1

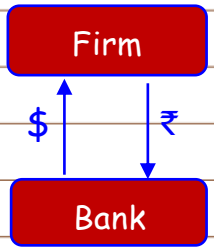
₹25 Lakh = $ $(\frac{1}{77} \times 25)$

= $0.32468 Lakh [i.e., $32,468]

Hence, $ to be sold = $32,468

(ii) Rupee to be paid:

SR : $1 = ₹76.00/76.25



$2,00,000 = ₹(76.25 x 200,000)

= ₹ 1,52,50,0000

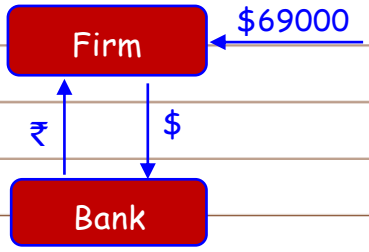
∴ Rupee to be paid = ₹1,52,50,0000

(iii) option – 1: Encash $ today

Withdraw = $69000

Equivalent ₹@ SR

SR : $1 = 76.00/76.25



$69000 = ₹(69000 x 76.000

= ₹5244000

Deposit @10% p.a. for 2m

Value at 2m = ₹ 5244000 x $(1 + 0.10 \times \frac{2}{12})$

= ₹ 53,31,400

Option-2: Encash after 2m :

Withdraw = $69000

2m FR: $1 = ₹77.00/77.50

$69000 = ₹(77 x 69000)

= ₹ 53,13,000

Advise: It is beneficial to Encash $ today as value at 2m time is higher

Question – 1B

Prem/Disc on each currency = $\left[\frac{F-S}{S} \times 100\right]$

Currency	Prem/Discount
(i) pound	$\frac{1.6385 - 1.5398}{1.5398} \times 100 = 6.41\%$
(ii) can $	$\frac{0.6591 - 0.6308}{0.6308} \times 100 = 4.49\%$
(iii) EMU EURO	$\frac{1.0835 - 0.9666}{0.9666} \times 100 = 12.09\%$
(iv) Yen	$\frac{0.008343 - 0.008273}{0.008273} \times 100 = 0.85\%$

CONCEPT: FORWARD MARGIN/ SWAP POINT/ FORWARD POINT OR PREMIUM / DISCOUNT IN POINTS

- Difference between Spot rate and Forward rate is also termed as Swap point. In fact, Swap point is premium/discount value in points term.
- Increasing order swap point indicates premium and decreasing order swap point indicates discount. [For logic see explanation]

Example: (i) Swap point = 10/30 ⇨ It is forward Premium

(ii) Swap point = 50/20 ⇨It is forward Discount

Explanation

- Logic of time value says, Future value should be higher than present value.
- Hence, we can say, spread of forward rate should be higher than spread of spot rate.

(a) Swap point in Premium

(i) SR: CHF1 = $1.2520/ 1.2540 ⇨ *Here, spread is 20 pip*

FR: CHF1 = $ 1.2530/ 1.2560 ⇨ *Here, spread is 30 pip*

Difference between FR & SR:

FR:	CHF1 =	$1.2530	1.2560
SR:	CHF1 =	$1.2520	1.2540
Prem on CHF		$0.0010	0.0020

- It can also be written as follows:

Swap point: 10/20

Or, 0.10/.20 Cent

Or, 0.0010/ 0.0020

(ii) SR: €1 = ₹ 85.50/ 85.70 ⇨ *Spread is 20 pip*

FR: €1 = ₹ 85.60/ 85.90 ⇨ *Spread is 30 pip*

Difference in FR & SR:

FR:	€1 =	₹85.60	85.90
SR:	€1 =	₹85.50	85.70
Prem on €		₹0.10	0.20

- It can also be written as follows:

Swap point: 10/20

Or, 10/20 paisa

Or, 0.10/ 0.20

(b) Swap Point in Discount:

(i) SR: £1 = $ 1.3040/ 1.3060 ⇨ spread 0.0020

FR: £1 = $1.3015/ 1.3045 ⇨spread 0.0030

Difference in FR & SR:

FR: £1 =		$1.3015	$1.3045
SR: £1 =		$1.3040	$1.3060
Disc on £		-$0.0025	-$0.0015

- It can also be written as follows:

Swap point: 25/15

Or, 0.25/0.15 cents

Or, 0.0025/ 0.0015

CONCEPT: CALCULATION OF FORWARD RATE USING FORWARD POINTS/ SWAP POINTS/ FORWARD MARGIN

(i) Add increasing order points in spot rate to calculate forward rate as increasing order points indicate premium.

(ii) Deduct decreasing order points from spot rate to calculate forward rate as decreasing order points indicate discount.

Example (i): ***SR: $1 = £0.7525/ 0.7550***

6m swap point: 20/35

Calculate 6M Forward rate:

Calculation:

SR:	$1 =	£0.7525	0.7550
	Add:	0.0020	0.0035
FR:	$1=	£0.7545	0.7585

Example (ii): ***SR: $1 = £0.7525/ 0.7550***
6m Forward point: 35/ 25
Calculate forward rate.

Calculation:

SR:	$1 =	£0.7525	0.7550
	Less:	- 0.0035	- 0.0025
FR:	$1=	£0.7490	0.7525

Dispute: **Forward Premium: 50/30**
Logically it should be discount because decreasing order points represent negative values.
However, sometimes Institute assume it as premium, which is not correct.

CONCEPT: BROKEN PERIOD FORWARD RATE USING SWAP POINT

- Practically, Bank does not quote forward rate. It quotes spot rate and swap point on monthly basis.
- However, Sometimes customer needs swap points of fractional period (like: 15 days, 70 days, 2.5 months, etc.)
- In this case, we have to use unitary method to calculate desired period swap point/ forward rate.

Example (i): ***2m swap point: 20/40***
3m swap point: 50/70
4m swap point: 70/100

Calculate 100 days and 105 days Swap Points

- **We can calculate 100 days swap point** using 3m swap point (i.e., 90 days) and 4m swap point (i.e., 120 days)
- 100 days swap point= 90 days points + 10 days points derived from 3 months to 4 months points.

	For Bid	For Ask
90 days points	50	70
120 days points	70	100
30 days points after 90 days	20	30
10 days points after 90 days	$\frac{20}{30}$ x 10 = 6.67 (i.e., 7)	$\frac{30}{30}$ x 10 =10
100 days points	50 + 7 =57	70 + 10 =80

We can calculate 105 days points as follows:

	For Bid	For Ask
30 days points after 90 days	20	30
15 days points after 90 days	$\frac{20}{30}$ x 15 = 10	$\frac{30}{30}$ x 15=15
105 days points = 90 days points + 15 days points	50+10 =60	70+15 =85

Second Alternative for 105 days Points,

As 105 days falls in mid of 3m and 4m, we can directly calculate it as follows (i.e., average of 3m & 4m points)

- Bid rate points (105 days): $\frac{50+70}{2}$ = 60
- Ask rate points (105 days): $\frac{70+100}{2}$ = 85

CONCEPT: INTERPRETATION OF EXCHANGE RATES QUOTED IN COMPRESSED FORM

S. N.	Rate	Interpretation
1	$1 = ₹ 75.5025/80	$1 = ₹ 75.5025/75.5080
2.	£1 = ¥ 150.20/90	£1 = ¥ 150.20/150.90
3.	$1 = NPR 120.5295/ 05	$1 = NPR 120.5295/ 120.5205
		That is:
		$1 = NPR 120.5205/ 120.5295

CONCEPT: INTERPRETATION OF EXCHANGE RATE QUOTED IN PAIR (i.e., ₹/$ or, USD/INR)

- Pair of currency can be interpreted in two ways.
  - i. **Second currency is base currency [Theoretical quotation]**
    ₹/$ ⇨ ₹ per $ ⇨ $1 = ₹xxx
  - ii. **First currency is base currency [Official Quotation]**
    USD/INR ⇨ INR per USD ⇨ $1 = ₹xxx

- Keep in mind the strength of currencies at the time of interpreting exchange rates.
- Take same interpretation in all exchange rates of a Question.
  Never take different interpretation in different rate of same question even though exchange rate becomes strength wise illogical.

- It may be possible, few rates become strength wise correct and few wrong in same question when we take an interpretation.
  In this situation. Ignore strength of £, $, € & CHF currencies among each other as strength of these currencies change time to time.
  20 years ago → € stronger & £ weaker but currently £ is Stronger
  3 years ago ⇨ CHF weaker & $ Stronger but currently CHF Stronger

- Never ignore strength of these currencies:-
  - (i) $ with ₹ ⇨ Always $ stronger & ₹ weaker.
  - (ii) $/£/€/CHF/₹ with ¥ ⇨ Always consider ¥ as weaker currency in respect to $/£/€/CHF/₹
  - (iii) £/€/CHF with ₹ ⇨ Always consider ₹ as weaker.

- If there is any confusion then:
  - a) Consider first currency as base currency, if exchange rates are quoted in ISO code.

    Example: [CA June – 2009]

Rate		Interpretation
USD/CHF	1.4650	$ 1 = CHF 1.4650
GBP/USD	1.7645	£ 1 = $ 1.7645

  - b) Consider second currency as base currency if exchange rate are quoted in other than ISO CODE.

    Example:

Rate		Interpretation
$/Euro	0.8385	€1 = $0.8385
$/pound	1.7645	£1 = $1.7645

Question - 1C:

(i) Here, **$** currency is quoted at premium and ₹ currency is quoted at discount.

(ii) As question is silent, calculate premium / discount on mid-rate.

$$\text{SR (mid-rate)} = \frac{75.42 + 75.50}{2} = ₹\ 75.46$$

$$\text{FR (mid-rate)} = \frac{75.62 + 75.80}{2} = ₹\ 75.71$$

$$\text{\% premium on \$} = \left[\frac{F-S}{S} \times 100\right] \times \frac{12}{3}$$

$$= \frac{75.71-75.46}{75.46} \times 100 \times \frac{12}{3} = 1.325\ \%$$

$$\text{\% discount on ₹} = \left[\frac{S-F}{F} \times 100\right] \times \frac{12}{3}$$

$$= \frac{75.46-75.71}{75.71} \times 100 \times \frac{12}{3} = -1.321\%$$

Note: Alternatively, we can calculate premium and discount on bid rate and ask rate separately also.
(i) premium on $ (Bid) = 1.06% premium on $ (Ask) = 1.59%
(ii) Discount on ₹ (Bid) = -1.058% Discount on ₹ (Ask) = -1.583%

Question – 1D:

(i) Swap point for 2m & 15 days:

	For Bid	For Ask
Swap Point	$\left[\frac{70+160}{2}\right]$	$\left[\frac{90+186}{2}\right]$
	= 115	= 138

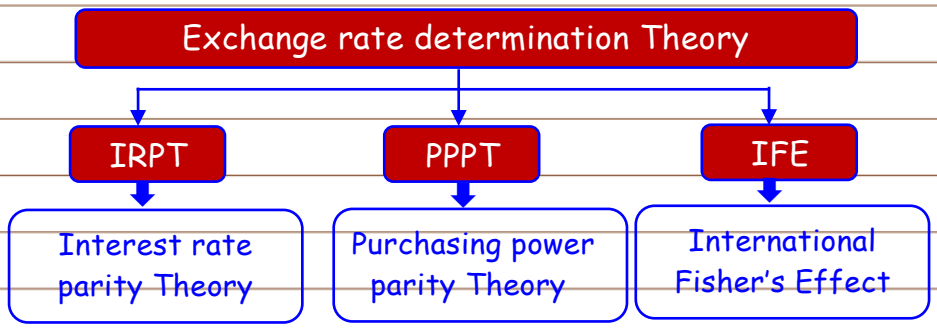
(ii) Forward rate for 20th June

SR: $1	= ₹ 66.2525	67.5945
Add: Swap point	00.0115	00.0138
FR: $1	= ₹66.2640	67.6083

(iii) Premium / discount on $ on average rate:

	Bid Rate	Ask Rate
Average rate $\left[\frac{SR+FR}{2}\right]$	$\frac{66.2525+66.2640}{2}$	$\frac{67.5945+67.6083}{2}$
	= 66.2583	= 67.6014
% premium on $ $\left[\frac{F-S}{Avg.rate} \times 100\right] \times \frac{12}{2.5}$	$\left[\frac{66.2640-66.2525}{66.2583}\right] \times 100 \times \frac{12}{2.5}$	$\left[\frac{67.6083-67.5945}{67.6014}\right] \times 100 \times \frac{12}{2.5}$
	=0.0833%	=0.0980%

CONCEPT: EXCHANGE RATE DETERMINATION THEORY



(A) Interest Rate parity Theory:

- According to IRPT, Exchange rate of two currencies depends upon Interest rate of those currencies.
- Currency with higher interest rate, depreciates in future and currency with lower interest rate appreciates in future.
- Premium/discount of a currency is approximately equal to interest rate difference.
- Fair forward rate can be calculated using the following formulae.

(i) $FR\ (₹/\$) = SR(₹/\$) \times \frac{[1 + PIR\ (₹)]^n}{[1 + PIR\ (\$)]^n}$ Or,

(ii) $FR\ (\$/₹) = SR(\$/₹) \times \frac{[1 + PIR\ (\$)]^n}{[1 + PIR\ (₹)]^n}$

Where,

₹/$	⇨ ₹ per $
$/₹	⇨ $ per ₹
PIR	= Periodic Interest rate (i.e. i)
	[Eg: For 3Months period, PIR ⇨ 3 month Interest rate
n	= NO. of period
SR	= Spot rate
FR	= Forward rate

Normally, we consider T-Bill (Treasury bill) rate to forecast fair forward rate (or, Fair expected rate of future date)

LOGIC BEHIND ABOVE THEORY:

At fair position, there should not be any loss/gain to any party when borrow from one country and deposit in another country.

Suppose, SR = $1 = 82

India		USA	
Annual int	= 7%	Annual int	= 5%
PV	= ₹8200	PV	= $100
6m int	= 3.5%	6m int	= 2.5%
FV at 6M	= ₹8200 × (1+.035)	FV at 6M	= $100 × (1+.025)
	= ₹8,487		= $102.5

According to IRPT, Two countries currency will be at parity when, FV of both currencies are equal.

FV of ₹ = FV of $

₹8,487 = $102.5

$1 = $\frac{₹8487}{\$102.5}$

FR at 6M: $1 = ₹82.80

Parity Formula Derivation

$$\frac{8200 \times (1+.0335)}{100 \times (1+.0265)} = 82 \times \frac{(1+.0335)}{(1+.0265)}$$

It means: $SR \times \frac{(1+i(₹))}{(1+i(\$))}$

Note:

- In real life, we may find actual forward rate different from fair forward rate. In that situation loss/gain may arise which is known as Arbitrage gain (i.e. Risk free profit)

Real life data :

Today is	28-July-2023
T bill rate in India	= 6.7% p.a. (ie. 3.35% for 6M)
T bill rate in USA	= 5.3% p.a. (i.e. 2.65% for 6M)
Spot rate (RBI reference)	= 82.2465 per $ [28-July-23]

(1) 6M Fair forward/future rate = $(82.2465 \times \frac{(1+.0335)}{(1+.0265)}$

= **82.8074**

Jan 24 future price in NSE for $1 On 28-July-2023 = **82.7450** (₹0.0624 lower than Fair forward rate)

(2) 1Y Fair forward/future rate = $(82.2465 \times \frac{(1+.067)}{(1+.053)}$

= **83.34**

July 24 future price in NSE for $1 On 28-July-2023 = **83.5025** (₹0.1525 higher than Fair forward rate)

FOREIGN CURRENCY - INDIAN RUPEE

CURRENCY DERIVATIVES

As on 28-Jul-2023 7:00:00 IST (All price values in ₹)

All Contracts | Option Chain | All Historical Data | GLOSSARY

Currency Futures | USDINR | 29-Jan-2024 ← Expiry date | Strike Price | Filter | Clear

INSTRUMENT TYPE	SYMBOL	EXPIRY DATE	OPTION TYPE	STRIKE	OPEN	HIGH	LOW	CLOSE	PREV. CLOSE	LAST	CHNG	%CHNG	VOLUME (Contracts)	VALUE * (₹ Lakhs)
Currency Futures	USDINR	29-Jan-2024	-	-	82.7525	82.8800	82.7050	-	82.4750	**82.7450**	0.2700	0.3274	15,923	13,184.71

Trade Information | Intraday Chart

→ 6M Future Rate

Order Book

Qty	Bid (₹)	Ask (₹)	Qty
3	82.7400	82.7450	232
12	82.7325	82.7550	100
6	82.7300	82.7650	120
100	82.7250	82.7800	5
120	82.7150	82.8000	4

Buy *(Total Quantity)* - *19,313* Sell *(Total Quantity)* - *20,795*

Trade Information	
USDINR $ 1	₹ 82.2465
No. of Trades	759
Traded Volume (Contracts)	15,923
Traded Value (₹ Lakhs)	13,184.71
VWAP	82.8029
Open Interest	34,080
Change in Open Interest	-
% Change in Open Interest	-

→ RBI Reference Rate

FOREIGN CURRENCY - INDIAN RUPEE

CURRENCY DERIVATIVES

As on 28-Jul-2023 7:00:00 IST (All price values in ₹)

All Contracts | Option Chain | All Historical Data | GLOSSARY

Currency Futures | USDINR | 29-Jul-2024 ← Expiry date | Strike Price | Filter | Clear

INSTRUMENT TYPE	SYMBOL	EXPIRY DATE	OPTION TYPE	STRIKE	OPEN	HIGH	LOW	CLOSE	PREV. CLOSE	LAST	CHNG	%CHNG	VOLUME (Contracts)	VALUE * (₹ Lakhs)
Currency Futures	USDINR	29-Jul-2024	-	-	83.3500	83.6200	83.3500	-	83.2475	**83.5025**	0.2550	0.3063	13,376	11,177.93

Trade Information | Intraday Chart

→ 1Y Future Rate

Order Book

Qty	Bid (₹)	Ask (₹)	Qty
15	83.5025	83.5100	10
36	83.5000	83.5175	100
50	83.4975	83.5200	10
1	83.4900	83.5250	100
1	83.4800	83.5275	100

Buy *(Total Quantity)* - *15,259* Sell *(Total Quantity)* - *16,769*

Trade Information	
USDINR $ 1	₹ 82.2465
No. of Trades	366
Traded Volume (Contracts)	13,376
Traded Value (₹ Lakhs)	11,177.93
VWAP	83.5671
Open Interest	10,592
Change in Open Interest	-
% Change in Open Interest	-

→ RBI Reference Rate

The indicative yield for three-month, six-month, and 364-day T-bills is 6.71 per cent, 6.82 per cent, and 6.87 per cent, respectively. The settlement date is July 6, 2023. 01-Jul-2023

→ T bill Rate in India

Outlook India
https://www.outlookindia.com › Business

RBI Treasury Bill And Bond Auction Update: Long-Term Yield ...

Google | US 182 days t bill rate 2023 june

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About 1,39,00,000 results (0.28 seconds)

YCharts
https://ycharts.com › indicators › 6_month_treasury_b...

→ T bill Rate in USA

6 Month Treasury Bill Rate (I:6MTBRNK)

6 Month Treasury Bill Rate is at 5.29%, compared to 5.28% the previous market day and 2.83% last year. This is higher than the long term average of 4.48%.

You visited this page on 29/7/23.

CONCEPT: PREMIUM/DISCOUNT OF A CURRENCY USING INTEREST RATE OF TWO COUNTRIES:

⇨We can calculate fair premium/discount rate directly using two currencies interest rate as follows:

⇨ Assume involved currencies are $ & ₹

(a) prem/disc on $ (periodic in Decimal) = $\left[\frac{PIR(₹) - PIR(\$)}{1 + PIR(\$)}\right]$

OR, $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right] - 1$

(b) prem/Disc on ₹ (periodic in decimal) = $\left[\frac{PIR(\$) - PIR(₹)}{1 + PIR(₹)}\right]$

OR, $\left[\frac{1 + PIR(\$)}{1 + PIR(₹)}\right] - 1$

Where, PIR = Periodic Interest rate

⇨ Fair premium/Discount calculated using interest rate may differ from actual premium/Discount calculated using quoted FR and SF by Bank.

⇨ In other words, Prem / Discount calculated using $\left[\frac{F-S}{S} \times 100\right]$ and $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right]$ differs when quoted Forward rate is not fair.

⇨ Now confusion arises, which method to be used to calculate prem discount?

(i) If forward rate is given and asks to calculate Prem / discount, then use $\left[\frac{F-S}{S} \times 100\right]$ or $\left[\frac{S-F}{F} \times 100\right]$

(ii) If forward rate is not given but interest rates are given and asks to calculate Prem/discount, then use $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right]$ or $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right]$

CONCEPT: (B) PURCHASING POWER PARITY THEORY (PPPT)

- According to PPPT, Exchange rate of two currencies depend upon price of a product in different countries and inflation rate.
- Currency with high inflation rate, depreciates in future and currency with low inflation rate appreciate in future.
- Premium/discount of a currency is approximately equal to inflation rate difference.
- **Sport Rate:**

  Current Price of a product in one country = Current Price of same product in another country.
- **Fair Future Rate:**

  (i) Using Price of a Product:

  Price of a product in one country at some future date = Price of same product in another country at same date.

  (ii) Using Inflation rate:

$$FR\ (₹/\$) = SR\ (₹/\$) \times \frac{[1 + \text{Periodic Inflation}(₹)]^n}{[1 + \text{Periodic Inflation}\ (\$)]^n}$$

$$FR\ (\$/₹) = SR\ (\$/₹) \times \frac{[1 + \text{Periodic Inflation}\ (\$)]^n}{[1 + \text{Periodic Inflation}\ (₹)]^n}$$

Where, n ⇨ Number of period

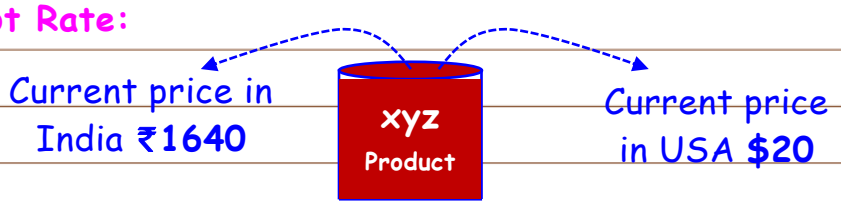
₹/$ ⇨ ₹ per $ [i.e. $ is base currency]

$/₹ ⇨ $ per ₹ [i.e. ₹ is base currency]

LOGIC BEHIND ABOVE THEORY:

According to PPPT, "prices of similar products of two different countries should be equal when measured in a common currency".

(i) Spot Rate:



Here, SR: ₹1640 = $20 ∴ $1 = $\frac{1640}{20}$ = 82

∴ $1 = ₹82 ⇨Rate quoted in India.

Similarly,

₹1640 = $20; ₹100 = $$\frac{20}{1640}$$ × 100

∴ ₹100 = $1.2195 ⇨ Rate quoted in USA.

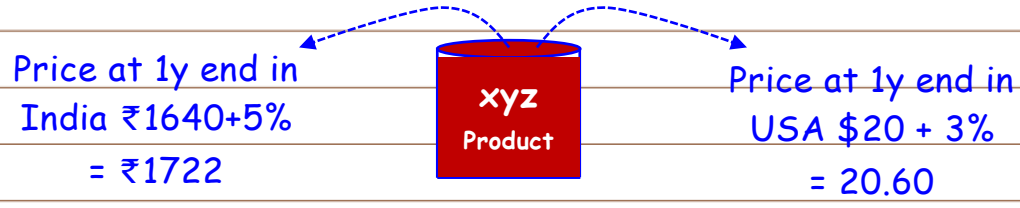
(ii) Fair Expected rate:

We can calculate fair expected exchange rate or, fair forward rate or, fair future rate by using price of similar product of future date and/or, Inflation rate.

(a). Using Future price:

Suppose, Inflation in India = 5% p.a.

Inflation in USA = 3% p.a.



At Parity, Price of a product at 1 Year time should be equal.

$20.60 = ₹1722

$1 = $$\frac{₹1722}{20.60}$$

$1 = ₹83.5922

Parity Formula Derivation

$$\frac{1640 \times (1+.05)}{20 \times (1+.03)} = 82 \times \frac{(1+.05)}{(1+.03)}$$

It means: $$SR \times \frac{(1 + \text{inflation}(₹))}{(1 + \text{inflation}(\$))}$$

(b) Using Inflation rate:

$$1Y\ FR\ (₹/\$) = SR(₹/\$) \times \frac{[1 + \text{Inflation}(₹)]^n}{[1 + \text{Inflation}(\$)]^n}$$

$$= ₹82 \times \frac{(1+0.05)}{(1+0.03)} = ₹83.5922$$

Note:

PPPT is also known as Inflation rate parity theory or, Law of one price.

CONCEPT: PREMIUM/DISCOUNT OF A CURRENCY USING INFLATION RATE OF TWO COUNTRIES:

All Concepts are same as Prem/Disc of Currency using interest rate:

⇨We can calculate fair premium/discount rate directly **using** two currencies **inflation rate** as follows:

⇨ Assume involved currencies are $ & ₹

(a) prem/disc on $ (periodic in Decimal) = $\left[\frac{PIR(₹) - PIR(\$)}{1 + PIR(\$)}\right]$

OR, $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right] - 1$

(b) prem/Disc on ₹ (periodic in decimal) = $\left[\frac{PIR(\$) - PIR(₹)}{1 + PIR(₹)}\right]$

OR, $\left[\frac{1 + PIR(\$)}{1 + PIR(₹)}\right] - 1$

Where, PIR = Periodic Inflation Rate.

⇨ Fair premium/Discount calculated using inflation rate may differ from actual premium/Discount calculated using quoted FR and SF by Bank.

⇨ In other words, Premium / Discount calculated using $\left[\frac{F-S}{S} \times 100\right]$ and $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right]$ differs when quoted Forward rate is not fair.

⇨ Now confusion arises, which method to be used to calculate prem discount?

(i) If forward rate is given and asks to calculate Prem / discount, then use $\left[\frac{F-S}{S} \times 100\right]$ or $\left[\frac{S-F}{F} \times 100\right]$

(ii) If forward rate is not given but inflation rates are given and asks to calculate Prem/discount, then use $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right]$ or $\left[\frac{1 + PIR(₹)}{1 + PIR(\$)}\right]$

CONCEPT:(C) INTERNATIONAL FISHER'S EFFECT(IFE):

- IFE also supports Interest rate parity theory. In addition, it provides relationship between Interest rate and inflation rate.
- Fisher Formula:

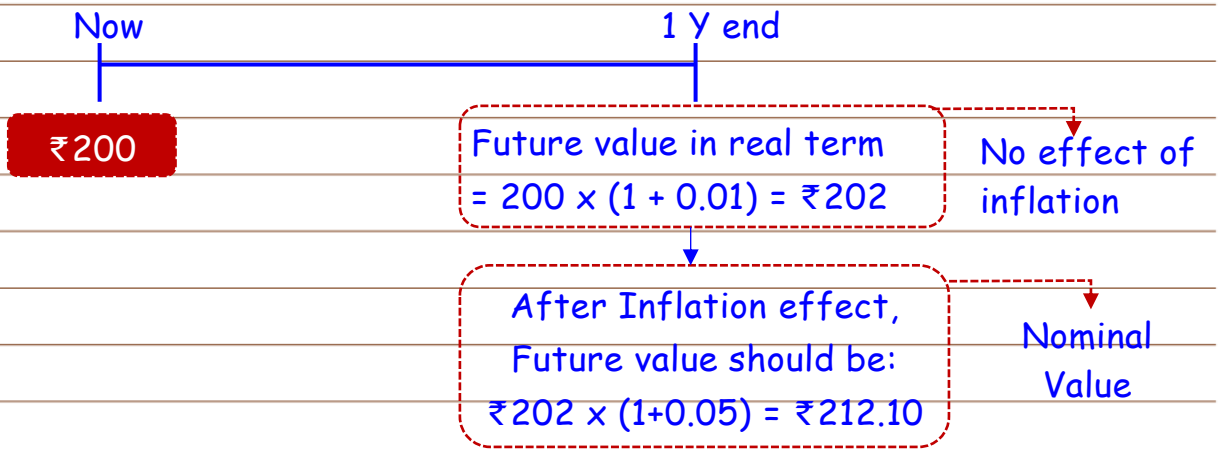
According to Fisher, "Nominal risk - free interest rate contains a real rate of return and anticipated inflation"

(1 + Real rate) x (1 + Inflation rate) = (1+Nominal risk-free rate)

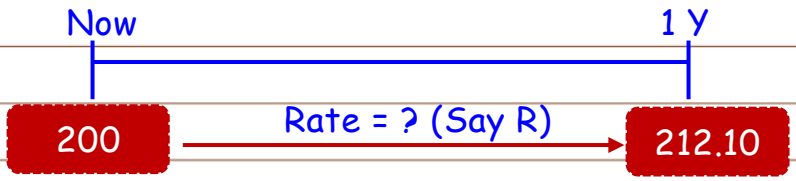
Note: T-Bill rate is nominal risk free interest rate which contains compensation for Inflation also.

- Explanation with example:

Present value = ₹200
Real interest rate = 1% p.a.
Inflation rate = 5% p.a.



It means.



$200 \times (1 + R) = 212.10$

$(1 + R) = \frac{212.10}{200}$

$\therefore R = [1.0605 - 1] = 0.605$ (i.e., 6.05%)

⇨Nominal interest rate (Risk free)

Same rate can be calculated using fisher formulae:

(1+ Real) x (1+ Inflation) = (1+ Nominal RF)

Or, (1 + 0.01) + (1 +0.05) = (1+ x)

Or, (1 + x) = 1.0605

∴ x = (1.0605 – 1) = 0.0605 (i.e., 6.05%)

Approx calculation:

Nominal risk free rate = Real rate + Inflation

= 1% + 5%

= 6% approx.

Note:

⇨ If investors of all countries require the same real return, interest rate differential between countries may be the result of differential in inflation.

⇨ Hence, expected forward/future rate forecasted using interest rate and inflation rate remain same (approx.)

⇨ We can feel it with Real life data of Inflation and Interest rate prevailing in India and USA:

Interest Rate:	Inflation Rate:
India = 7%	India = 5%
USA = 5%	USA = 3%
Interest rate Differential =2%	Inflation rate Differential =2%

QUESTION - 2A:

(i) Premium/discount on $:

- As per IRPT, currency with higher interest rate depreciates in forward market and currency with lower interest rate appreciates in forward market.
- As US interest rate is lower, $ currency will be at premium.

(ii) Expected 3m FR:

$$= SR \times \frac{[1+i(₹)]^n}{[1+i(\$)]^n}$$

$$= 72.50 \times \frac{\left[1+0.06 \times \frac{3}{12}\right]}{\left[1+0.0275 \times \frac{3}{12}\right]}$$

$$= 72.50 \times \frac{1.015}{1.006875}$$

$$= 73.09$$

(iii) Premium/discount on $:

$$= \frac{F-S}{S} \times 100 \times \frac{12}{3} = \frac{73.09-72.50}{72.50} \times 100 \times \frac{12}{3} = 3.255\%$$

Second Alternative:

$$= \text{P/D on \$} = \frac{[1+i(₹)]^1}{[1+i(\$)]^1} - 1 = \frac{1.015}{1.006875} - 1 = 0.00807$$

[i.e. 0.807% for 3m

$$\text{Annual rate} = .807 \times \frac{12}{3} = 3.228\%$$

Premium/ discount on ₹:

$$= \left[\frac{S-F}{F} \times 100\right] \times \frac{12}{3} = \frac{72.50-73.09}{73.09} \times 100 \times \frac{12}{3} = -3.229\%$$

QUESTION - 2B

(i) Spot rate in Mumbai:

As per PPPT,

Price of Bag in NY = Price of Bag in Mumbai

Or, $105 = ₹4250

$\therefore \$1 = \frac{₹4250}{105} = ₹40.4762$

(ii) Price of Bag at Mumbai:

₹ 4250 × (1 + inflation)

= ₹ 4250 × (1 + .07)

= ₹4547.50

Price of Bag at NY:

$ 105 × (1 + .04)

= $ 109.20

Exchange rate at 1Y time:

₹ 4547.50 = $ 109.20

$₹ 1 = \$ \frac{109.20}{4547.50}$

$\therefore ₹100 = \$ \frac{109.20}{4547.50} \times 100$

∴ ₹100 = $ 2.4013

(iii) Premium / Discount on ₹:

$SR: ₹ 1 = \$ \frac{1}{40.4762}$

∴ ₹ 100 = $ 2.4706

$\text{Premium / Discount on ₹} = \left[\frac{F-S}{S}\right] \times 100$

$= \frac{2.4013-2.4706}{2.4706} \times 100$

= - 2.805% (Discount)

QUESTION - 2C

(i) Expected rate after 1Y:

Using PPPT,

$$ER = SR\ (₹/\$) \times \frac{[1+\text{inflation }(₹)]^n}{[1+\text{inflation }(\$)]^n}$$

$$= 46 \times \frac{[1+.08]^1}{[1+.04]^1} = 47.77$$

Expected rate at 4Y:

$$ER = 46 \times \frac{[1+.08]^4}{[1+.04]^4} = 53.50$$

ON	1.08	×	=	=	=	÷	1.04	=	=	=	=	×	46	=

(ii) 3m forward rate:

$1 = £ 0.7570

Using IRPT,

$$3m\ FR = SR\ (£/\$) \times \frac{[1+i\ (£)]}{[1+i(\$)]}$$

Where, i = periodic interest rate

$$= 0.7570 \times \frac{\left[1+.075 \times \frac{3}{12}\right]}{\left[1+.035 \times \frac{3}{12}\right]}$$

$$\therefore \$1 = £ .7645$$

QUESTION - 2D

(i) **Missing entries for 3 months**

(a) 3m forward rate:

Using IRPT,

$$\text{FR } (F/\$) = \text{SR}(F/\$) \times \frac{[1+i\,(F)]}{[1+i\,(\$)]}$$

Where, i = periodic interest rate

$$= 7.05 \times \frac{\left[1+.195 \times \frac{3}{12}\right]}{\left[1+.115 \times \frac{3}{12}\right]}$$

$$= 7.05 \times \frac{1.04875}{1.02875}$$

$$\therefore \$1 = F\ 7.19$$

(b) Forward discount on Franc (Annual)

Alternative-1: Directly calculate Annual Premium / Discount

$$\text{Premium / Discount on Franc (Annual)} = \left[\frac{1+\text{Annual Interest }(\$)}{1+\text{Annual interest }(F)}\right] - 1$$

$$= \left[\frac{1+.115}{1+.195}\right] - 1$$

$$= -0.0699 \text{ [i.e., 6.69\% Discount]}$$

Alternative-2: First calculate 3m premium/discount and then convert into annual rate.

$$\text{Premium / Discount on Franc (3m)} = \left[\frac{1+i\,(\$)}{1+i\,(F)}\right] - 1$$

$$= \left[\frac{1+.115 \times \frac{3}{12}}{1+.195 \times \frac{3}{12}}\right] - 1$$

$$= -0.0191$$

$$\text{Annual Discount} = (-0.0191 \times \frac{12}{3}) = -0.0763$$

i.e., 7.63%

[RTP-N23] **Alternative-3**: Discount on Franc = Interest rate differential

= 19.5% - 111.5% = 8%

Note: In the above two alternatives, answers are different because of compounding effect.

Alternative-1: Annual Compounding

Alternative-2: Quarterly Compounding

NS sir recommendation:
This Question asked in RTP Nov-2023 also. In that suggested ICAI provided solutions with three different alternatives.

(ii) Missing entries for 6 months

(a) Premium / Discount on Franc $= \left[\frac{1+.1225}{1+\text{AR}(F)}\right] - 1$

Or, $-0.063 + 1 = \left[\frac{1+.1225}{1+\text{AR}(F)}\right]$

$\therefore 1 + \text{AR}(F) = \frac{1+.1225}{0.937}$

$\therefore$ Annual rate $(F) = 1.198 - 1 = .198$ i.e., 19.80%

(b) 6m forward rate:

$$= \text{SR}(F/\$) \times \frac{\left(1+.198 \times \frac{6}{12}\right)}{\left(1+.1225 \times \frac{6}{12}\right)}$$

$$= 7.05 \times \frac{1.099}{1.06125}$$

$\therefore \$1 = F\ 7.30$

(iii) Missing entries for 1 Year

(a) 1 Y FR $= \text{SR}(F/\$) \times \frac{(1+.20)}{1+\text{AR}(\$)}$

Or, $7.52 = 7.05 \frac{(1+.20)}{1+\text{AR}(\$)}$

Or, $\frac{7.52}{7.05} = \frac{(1+.20)}{1+\text{AR}(\$)}$

Or, $1 + \text{AR}(\$) = \frac{1.20}{1.0667}$

$\therefore \text{AR}(\$) = 1.125 - 1 = .125$ i.e., 12.50%

(b) Premium / Discount on Franc:

$$= \left[\frac{S-F}{F}\ 100\right] = \frac{7.05-7.52}{7.52} \times 100 = -6.25\%$$

CONCEPT: LOSS/GAIN AND HEDGING WITH THE HELP OF FORWARD CONTRACT

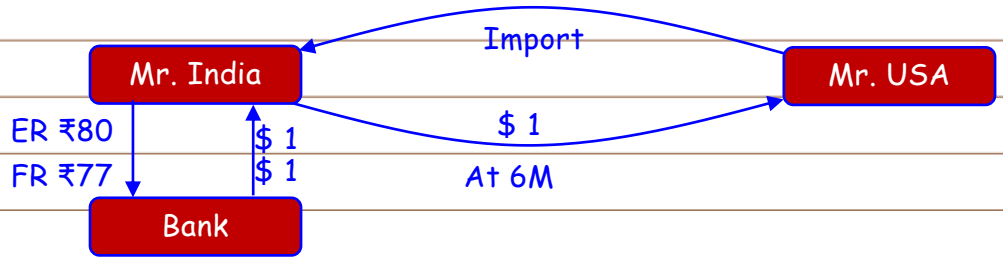
- Let us consider following example to understand entire concept.
- **Example:** Mr. India imported a product at $1 from Mr USA. Amount is payable at 6m. SR: $1 = ₹ 75

Entry as on today, in books of Mr. India

Import a/c Dr. ₹75

To Mr. USA a/c ₹75

[payable recorded @ SR]



FR = forward rate (rate quoted today in bank for 6 months' time)

ER = expected rate

(iii) Expected Loss:

Payable Recorded = ₹ 75

Expected Outflow = ₹ 80

Expected Loss = ₹ 5

(Not to be recorded in the books)

(iv) Hedging with the help of forward contract

- Bank quoted 6m FR : $ 1= ₹ 77 (assume)
- Mr. India can hedge risk by taking forward contract for 6 months at ₹ 77. In this situation it doesn't matter what will be exchange rate on 6-month time, applicable rate should be ₹ 77.

HEDGE AMOUNT:

Method 1:

Expected outflow = ₹ 80

Actual outflow under forward contract = ₹ 77

Hedge Amount = 80 – 77 = ₹ 3

(Not to be recorded in the books)

Method 2:

⇨ Expected loss = ₹ 5

⇨ Actual loss if enter into forward contract

Actual outflow = ₹ 77

Payable recorded = ₹ 75

Actual Loss due to forward contract = ₹ 2

(To be recorded in the books)

⇨ Hedge amount = ₹ 5 -₹2 = **₹3**

[By taking forward contract, expected loss ₹5 reduced to ₹2]

(v) **At 6 months' time exchange rate (i.e. spot rate at 6 m) becomes:**

Case -(i): $1 = ₹81 [Loss/ gain due to forward contract]:

Outflow due to forward contract = ₹77

Outflow if forward contract has not been taken = ₹81

Gain due to forward contract = **₹4**

(Not to be recorded in the books)

Case -(i): $1 = ₹71 [Loss/ gain due to forward contract]:

Outflow due to forward contract = ₹77

Outflow if forward contract has not been taken = ₹71

Loss due to forward contract = **₹6**

(Not to be recorded in the books)

Note:

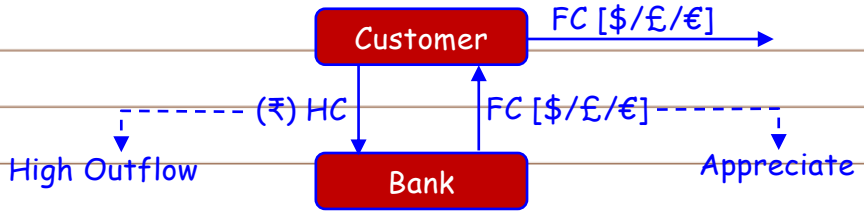
If question provides actual exchange rate prevailing on due date of forward contract (i.e. spot rate prevailing on due date) then compare "FR" with "SR of due date" to calculate loss/ gain.

CONCEPT: SHORTCUT TO FIND LOSS/GAIN QUICKLY IN EXPORT/ IMPORT TRANSACTIONS [For decision making and Interpretation of question]

1. **Payable** in FC and that currency will be **appreciated** on due date:

   ⇨ **Loss [High outflow]**

   Logic:



   Where, FC = Foreign Currency and HC = Home Currency

2. **Payable** in FC and that currency will be **depreciated** on due date:

   ⇨ **Gain [Low outflow]**

3. **Receivable** in FC and that currency will be **appreciated** on due date:

   ⇨ **Gain [High inflow]**

4. **Receivable** in FC and that currency will be **depreciated** on due date:

   ⇨ **Loss [Low inflow]**

CONCEPT: EXPECTED VALUE

- In Statistics, average value calculated using probability as weight is known as Expected Value.
- It means, Expected Value = ∑(value x probability)
- Example:

Rate at 6 months' time for $1	Probabilities
₹ 70	0.10
₹ 75	0.40
₹ 80	0.30
₹ 82	0.20

Expected rate = ∑(Rate x probability)

= (70 x .10) + (75 x .40) + (80 x .30) + (82 x .20)

= 77.40

QUESTION - 3A

(i) Expected rate on 01-Sep-2018

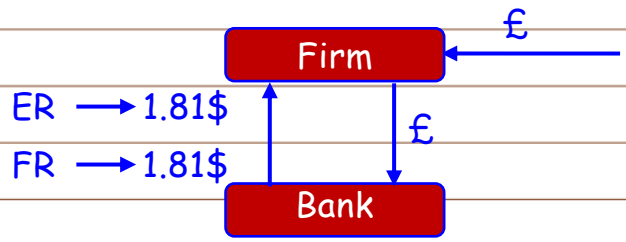
Expected rate = ∑[Difference rate × probability]

= (1.60× .15) + (1.70× .20) + (1.80× .25) + (1.90× .20) + (2.0×.20)

= 1.81

∴ £1 = $1.81

(ii) Decision regarding Forward cover:



As expected, inflow in $ is higher at expected rate, it is not advisable to take forward contract.

QUESTION - 3B

Amount receivable: =$5,00,000

SR: $1 = ₹75.60 → SR quoted by Bank.

Consignment rate: $1 = ₹75.50 → SR quoted by Custom dept.

60d FR: $1 = ₹75.20

(i) Rate of Discount quoted by Bank (on $):

$$= \left[\frac{F-S}{S}\right] \times 100 \times \frac{365}{60}$$

$$= \frac{75.20-75.60}{75.60} \times 100 \times \frac{365}{60} = -3.22\%$$

(ii) Probable loss of operating profit:

Receivable recorded in books	₹3,77,50,000
$1 = ₹75.50	
$5,00,000 = ₹3,77,50,000	
Actual receipt at 60d FR ₹ (75.20 X 5,00,000)	₹3,76,00,000
Loss	₹1,50,000

Second alternative:

Loss on $1: (75.50 - 75.20)	₹ 0.30
Total loss on $ 5,00,000	₹ 1,50,000

Note: (Not for exam)

If possible, use all information given in question. In this question, we can use either SR or consignment rate (custom dept rate) to book receivable.

It is appropriate to use consignment rate to book receivable so that all information can be used.

QUESTION - 3C

Amount receivable: = $1,24,000 [at 90d]

SR: $1 = FRF 5.70

(i) Transation loss/gain:

Note: (Not for exam)

- In recent past Institute started to adjust prem/discount of base currency only.
- We are also trying to adopt same calculation.
- If base currency prem/disc rate is given then there is no problem.
- If price currency prem/disc is given then assume it as base currency disc/Prem and then adjust rate.

  Price currency prem% = Base currency disc % (Approx.)

  Price currency disc% = Base currency prem% (Approx.)
- As ICAI prefers approx. calculation, we are also doing same.

(i) **Alternative-1: (Approx cal.)**

Depreciation on $ = 5% (i.e. Appreciation on FF)

90 days rate: $1 = FF 5.70 X (1-0.05)

= FF 5.415

Receivable recorded at SR	FF 5.70
Receipt at 90 days rate	FF 5.415
Loss per $	FF 0.285
Total loss on $ 1,24,000	0.285 X 1,24,000
	=35,340

Alternative-2: (Accurate Calculation)

Appreciation on FF = 5%

90 days rate: $1 X (1+0.05) = FF 5.70

$1 = $\frac{FF\ 5.70}{(1+0.05)}$ = 5.43

Receivable recorded at SR	FF 5.70
Receipt at 90 days rate	FF 5.43
Loss per $	FF 0.27
Total loss on $ 1,24,000	33,480

(ii) Loss/gain when FF weaken by 5%:

Alternative-1 (Approx.):

Premium on $ = 5%

90 days rate: $1 = FF 5.70 X (1+0.05)

= FF 5.985

Receivable recorded at SR	FF 5.70
Receipt at 90 days rate	FF 5.985
Gain per $	FF 0.285
Total loss on $ 1,24,000	35,340

Alt-2 (Accurate calculation):

Discount on FF = 5%

90 days rate: $1 X (1-0.05)

= FF 5.70

$$\$1 = \frac{FF\ 5.70}{(1-0.05)}$$

= FF 6

Receivable recorded at SR	FF 5.70
Receipt at 90 days rate	FF 6
Gain per $	FF 0.30
Total gain on $ 1,24,000	FF 37,200

QUESTION - 3D

Receivable at 6m = Can $5,00,000

Note: (Not for exam)

- Calculate loss/gain by comparing 6m forward rate with exchange rate prevailing on 6m time as exporter hedges its exposure.
- Do not compare SR with expected rate at 6m.

6m Forward rate using IRPT:

$$= \text{SR (Can \$/£)} \times \left[\frac{1+i(\text{Can\$})}{1+i(£)}\right]$$

$$= 2.5 \times \left[\frac{1+0.15 \times \frac{6}{12}}{1+0.12 \times \frac{6}{12}}\right] = 2.5 \times \frac{1.075}{1.06} = 2.535$$

∴ £1 = Can$ 2.535

(i) Loss/gain if Can$ decline by 2%:

Note: (Not for exam)

As base currency in given exchange rate is £, think about £ appreciation and depreciation in approx term.

It means, Appreciation on £ = 2% (ICAI Interpretation)

Appreciation on £ = 2% (Approx)

Rate at 6m: £1 = Can$ 2.50 X (1+0.02)

£1 = Can$ 2.55

Note: (Not for exam)

Here, we can't compare rate to calculate loss/gain as amount is receivable in Can$ but exchange rate is given for £ currency.

Equivalent receipt at 6m FR (Actual Receipt)	**£1,97,239**
Can$ 2.535 = £1	
Can$ 5,00,000 = £ ($\frac{1}{2.535}$ X 5,00,000)	
Notional receipt at 6m rate if forward contract has not been taken.	**£1,96,078**
[5,00,000 X $\frac{1}{2.55}$]	
Gain (due to forward contract)	**£1,161**

(ii) Loss/gain due to Forward contract when Can$ gains by 4%

SR: £1		= Can$ 2.5
Depreciation on base currency (£)		= 4% (approx.)
6m rate:	£1	= Can$ 2.5 (1-0.04)
		= Can$ 2.40

Actual receipt under Forward Contract	£1,97,239
Notional receipt at 6m rate if forward contract has not been taken.	£2,08,333
[5,00,000 X $\frac{1}{2.40}$]	
Loss (due to forward contract)	£ 11,094

(iii) Loss/gain when Can$ remain unchanged:

6m rate: £1	= Can$ 2.50
Actual receipt under Forward Contract	£1,97,239
Notional receipt at 6m rate	£2,00,000
[5,00,000 X $\frac{1}{2.50}$]	
Loss (due to forward contract)	£ 2,761

QUESTION - 3E

Amount payable = JPY 216 lakhs [For Indian Co.]

SR: ¥ 216 lakhs = ₹ 50 lakh

$₹1 = ¥\frac{216}{50} = ¥4.32$

3m FR: ₹1 = ¥4.12

Interpretation: (Not for exam)

- Given, exchange rate decline by 8%
- We have to find which currency decline by 8% (¥ or ₹)
- Importer makes loss when foreign currency (¥) appreciates. It means, ₹ currency depreciates by 8%

Expected rate at 3m: ₹1 = ¥4.32 X (1-0.08)

= ¥3.9744

(i) Expected loss:

Payable recorded at SR	₹ 50lakh
Expected outflow at 3m	₹ 54.35lakh
₹1 = ¥3.9744	
¥ 216lakh = ₹($\frac{1}{3.9744}$ X 216)	
Expected loss	₹ 4.35lakh

(ii) Hedging with the help of forward contract:

Outflow under forward contract ($216 X \frac{1}{4.12}$)	₹ 52.43 lakh
Expected outflow	₹ 54.35 lakh
Hedging amount if forward contract taken	₹ 1.92 lakh

Second alternative:

Expected loss	= ₹ 4.35 lakh
Loss due to forward contract	= (52.43-50) = ₹ 2.43 lakh

By taking forward contract expected loss of ₹ 4.35 lakh can be reduced to ₹2.43 lakh

Hence, Hedge amount (4.35- 2.43) = ₹ 1.92 lakh

QUESTION - 3F

Amount payable at 6m = $60,000 (For Indian)

Note: (Not for exam)

Upfront premium = Commission payable at the time of entering into contract (i.e. Now)

Outflow under Forward Contract:

(a) 6m FR: $1 = ₹ 64

$60,000 = ₹ (64X60,000) = ₹ 38,40,000

(b) Upfront prem = ₹ 38,40,000 X 2% = ₹ 76,800

Borrow ₹76,800 @ 12% p.a. for 6m

Outflow at 6m = ₹ 76,800 X $\left(1 + 0.12 \text{ X } \frac{6}{12}\right)$ = ₹ 81,408

(c) Total outflow under forward contract

= ₹ 38,40,000 + ₹ 81,408 = ₹ 39,21,408

Requirement:

(i) Loss/gain when rate is ₹68:

Notional outflow at 6m rate (60,000 X 68)	₹ 40,80,000
Actual outflow under FC	₹ 39,21,408
Gain due to FC	₹ 1,58,592

(ii) Loss/gain when rate is ₹62:

Notional outflow at 6m rate (60,000 X 62)	₹ 37,20,000
Actual outflow under FC	₹ 39,21,408
Loss due to FC	₹ 2,01,408

CONCEPT: MONEY MARKET/ CAPITAL MARKET

(i) MONEY MARKET:

- Market where short-term debt instruments (i.e. Life less than one year) are traded is known as money market.
- Following are some MM instrument:

  ⇨Treasury bill (T. bill) ⇨ Commercial paper (C.P.)

  ⇨ Call Money/ notice money etc.

(ii) CAPITAL MARKET:

- Market where long term financial instruments (i.e. Life greater than one year) are traded is known as capital market.
- Following are some capital market instruments:

  ⇨ Equity Share ⇨ Preference Share ⇨ Debenture/ Bond etc

CONCEPT: FLOATING INTEREST RATE / VARIABLE INTEREST RATE

- Interest rate that vary periodically on the basis of market condition is known as variable rate (or floating rate)
- Variable rates may be linked with anyone of following benchmark:

MIBOR	⇨	Mumbai interbank offer rate [Rate derived from Mumbai money market]
LIBOR	⇨	London interbank offer rate [Rate derived from London money market]
EURIBOR	⇨	Euro interbank offer rate [Rate derived from European money market]
T. Bill	⇨	Treasury bill rate
BR	⇨	Base rate [Rate decided by bank on the basis of central bank interest rate (repo rate)]

Note:

- In money market, interest rates are quoted in annual term only.
- Period attached with money market benchmark represents the life of instrument from which interest rate derived.

Example:

(i) 6Months MIBOR = 5%

[It is annual rate (i.e. 5% p.a. derived from 6 months' life instruments traded on Mumbai money market]

(ii) 3Months LIBOR = 3%

[It is annual rate (i.e. 3% p.a. derived from 3 months' life instruments traded on London money market]

QUESTION – 3G

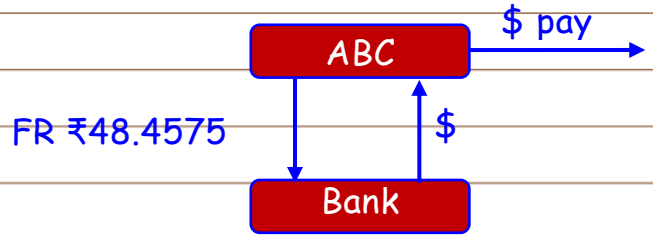
Loan = $2 mill [i.e. 20 lakh]

Borrowing rate = LIBOR + 1% = 2% + 1% = 3% p.a.

(i) Commitment in Rupee:

Amount payable at 6m: $[20 \times (1+0.03 \times \frac{6}{12})]$	$20.30 lakh
6m FR: $1 = ₹48.4575	
Equivalent ₹ @ 6m FR: (20.30 X 48.4575)	₹ 983.68725 lakh

(ii) Forward Contract advise:



- If expected exchange rate at 6m time is higher than forward rate [i.e. $ appreciate] then it is advisable to enter forward contract otherwise not enter into forward contract.

- In long run, $ appreciates against rupee in forex market, hence it is advisable to take forward contract.

QUESTION - 3H

Loan = $20 lakh [i.e. 2 mill]

Borrowing rate = LIBOR + 1% = 2% + 1% = 3% p.a.

(i) Rupee requirement:

Repayment of loan at 6m: [20 X (1+0.03 X $\frac{6}{12}$)]	$20.30 lakh
Equivalent ₹ @ 6m FR: (20.30 X 68.4575)	₹ 1389.68725

(ii) Advise on forward contract:

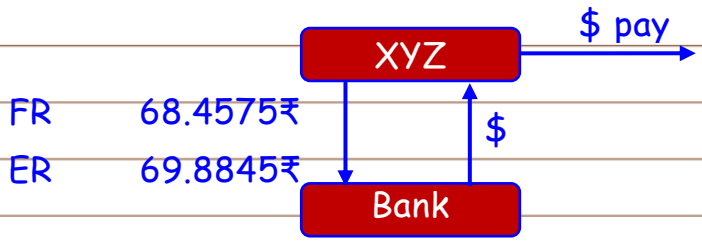
Note: (Not for exam)

As interest rate of both currencies are available, use IRPT to calculate fair expected forward rate and compare with quoted forward rate to take decision.

6m Expected forward rate (₹/$)

$$= SR\ (₹/\$) \times \frac{[1+i(₹)]}{[1+i(\$)]}$$

$$\therefore \$1 = 68.5275 \times \frac{[1+0.03]}{[1+0.01]} = ₹69.8845$$



As quoted forward rate is lower than expected forward rate it is advisable to take forward contract.

Decision when SR: ₹68.4275

Revised expected forward rate

$$= 68.4275 \times \frac{[1+0.03]}{[1+0.01]} = ₹69.7825$$

As the quoted forward rate is lower than revised expected forward rate, it is still advisable to take forward contract.

QUESTION - 3I [Must revise]

Total cost (Fund req.) = ₹90 Cr
Loan = £10 mill
Average Life = 3.4 year
Processing fee = 1.2%
Borrowing rate = 1.05% +2.5% = 3.55% p.a.

Interpretation:
5 yr life with some % interest = 3.4 yr life with 0% interest

(i) Overall cost in %

Interest Cost (annual)	3.55%
Processing fee (annual) $\left[\frac{1.2\%}{3.4}\right]$	0.35%
Hedging cost (annual)	4%
Annual % cost	7.90%

Overall cost in rupee term:

Loan amount = £10 mill
Equivalent ₹ amount = 10 X 90 = 900 mill
Cost in ₹ = 900 X 7.90% = 71.10 mill

(ii) Cost of hedging in rupee term:

Annual cost of hedging: [900 mill X 4%] ₹36 mill
Total cost of hedging: [36×3.4] ₹122.4 mill

(iii) Loss/gain to K ltd.:

(a) INR appreciates by 10% [i.e. £ currency depreciates by 10% (approx.)]
Rate after 5yr: £1 = ₹90 X (1-0.10)
£1 = ₹81

K ltd has to buy £ at 5yr end, Hence, there will be gain

Gain per £:	₹9
Total gain on £10 mill:	₹90 mill
Saving in cost of hedging: [Total in 5yr]	₹122.4 mill
Total gain	₹212.40 mill

Disclaimer:

ICAI used annual saving in cost of hedging [i.e. 36 mill] which is not appropriate as currency fluctuation gain is calculated for the period of 5yr.

ICAI Solution:

Gain on 10 mill pound	₹90 mill
Saving in cost of hedging	₹36 mill
Total gain	₹126 mill

(b) INR depreciates by 10% [i.e.£ currency appreciates by 10%]

Rate after 5yr: £1 = ₹90 X (1+0.10)

£1 = ₹99

K ltd has to buy £ at 5yr time. Hence there will be loss.

Loss per £ (99-90):	₹9
Total loss on £10 mill:	₹90 mill
Less: Saving in cost of hedging: [Total in 5yr]	₹122.4 mill
Total gain	₹32.40 mill

ICAI Solution:

Loss on 10 mill pound	₹90 mill
Less: Saving in cost of hedging	₹36 mill
Net loss	₹54 mill

CONCEPT: CONTRIBUTION TO SALES RATIO [OR P/V RATIO: PROFIT VOLUME RATIO]

- Contribution = Sale -Variable Cost
- Contribution to Sale ratio = $\left[\frac{\text{Contribution}}{\text{Sale}} \times 100\right]$
- High contribution to sale ratio (or P/V ratio) indicates better position.
- Average contribution to sale ratio when there are more than one product with different PV ratios.
- Example:

	Product A	Product B
Sales	50,000	100,000
Variable Cost	30,000	75,000
Contribution	20,000	25,000
Contribution to Sales ratio	$= \frac{20,000}{50,000} \times 100$ = 40%	$= \frac{25,000}{100,000} \times 100$ = 25%

Average contribution to sale ratio

Total Contribution = 20,000 + 25,000 = 45,000

Total Sales = 50,000 + 100,000 = 150,000

Average contribution to sale ratio = $\left[\frac{45,000}{150,000} \times 100\right]$ = **30%**

Alternatively,

we can calculate it using weighted average method also.

$W_A = \frac{50,000}{150,000} = \frac{5}{15}$; $W_B = \frac{100,000}{150,000} = \frac{10}{15}$

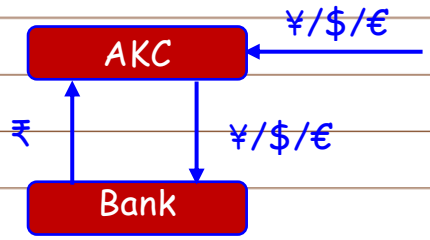
Average contribution to sale ratio = $(40 \times \frac{5}{15}) + (25 \times \frac{10}{15})$ = **30%**

Note: If we use simple average then it should be $\left[\frac{40\%+25\%}{2}\right]$ = 32.5% which is logically wrong. Hence, it is advisable not to use simple average method.

QUESTION - 3J

Interpretation of question

	Japan	USA	Europe
Sales Qty. $\left[\frac{\text{Sales Value}}{\text{Price}}\right]$	12,000 Unit	10,000 Unit	8,000 Unit



₹1 = ¥/$/€ xxx/xxx

As AKC has to buy Base currency (₹), ask rate is applicable for conversion.

Solution:

(i) Average contribution to sale ratio when it hedge risk.

	Japan	USA	Europe	Total
Sales (in ₹) $\left[\frac{\text{Sales Value}}{\text{3m FR (Ask)}}\right]$	$\left[\frac{78,00,000}{2.427}\right]$	$\left[\frac{1,02,300}{0.0216}\right]$	$\left[\frac{95,920}{0.0178}\right]$	
	= 32,13,844	= 47,36,111	= 53,88,764	= 1,33,38,719
Variable Cost (Qty X cost p.u.)	27,00,000	39,50,000	40,80,000	1,07,30,000
Total Contribution	-	-	-	26,08,719

Average contribution to sale ratio $= \left[\frac{26,08,719}{1,33,38,719} X100\right] = 19.56\%$

(ii) Contribution to sale ratio when it does not hedge.

	Japan	USA	Europe	Total
Sales (in ₹) $\left[\frac{\text{Sales in FC}}{\text{3m SR (Ask)}}\right]$	$\left[\frac{78,00,000}{2.459}\right]$	$\left[\frac{1,02,300}{0.02156}\right]$	$\left[\frac{95,920}{0.0179}\right]$	
	= 31,72,021	= 47,44,898	= 53,58,659	= 1,32,75,578
Variable Cost	-	-	-	1,07,30,000
Total Contribution	-	-	-	25,45,578

Average contribution to sale ratio $= \left[\frac{25,45,578}{1,32,75,578} X100\right]$ = 19.17%

Advice:

Contribution to sale ratio is higher in case of hedging. Hence, it is advisable to hedge currency risk by using forward contract.

QUESTION - 4A

Import Value = $ (5000 × 20) = $ 100,000

0m ——————— 3m

Pay to supplier
$100,000.

Pay to Supplier:
$100,000 × (1 + .10 × $\frac{3}{12}$) = $ 102,500

Requirement:

(i) Pay to 3-m time:

3m FR:	$ 1 =	₹ 60.25	60.55
		-00.35	-00.25
	∴ $ 1 =	₹ 59.90	60.30

Equivalent outflow at 3-m = ₹(60.30 × 102,500)
= ₹ 61,80,750

(ii) Settle now:

SR: $ 1 = ₹ 60.25 / 60.55

Equivalent ₹ @ SR = (60.55 × 100,000)
= 60,55,000 (outflow as on today)

Use OD by 60,55,000 at 14% p.a. for 3-m.

Repayment = (60,55,000 × (1 + .14 × $\frac{3}{12}$)
= 62,66,925 (outflow at 3m)

Advice: It is beneficial to pay at 3m time as outflow is lower.

QUESTION - 4B

2/10 net 90 = Avail 2% Discount by making payment within 10 days otherwise credit period is 90 days.

Amount Payable = 100,000 Mark [At 90 days]
Amount Payable = 98,000 Mark [within 10 days]

(a) $ cost of paying amount within 10 days

Payment = [100,000 – 2%] = 98000 Mark
SR: Mark 1 = $ 0.55
98,000 Mark = $ (0.55 × 98,000) = $53,900

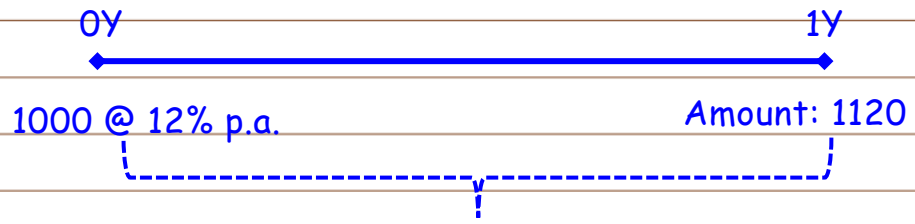
Note: Not for exam
As exchange rate after 10 days is not given, we paid at 0 period (i.e., now)

(b) $ cost of paying amount at 90 days

Amount payable = Mark 100,000
90 days FR: Mark 1 = $ 0.56
Mark 100,000 = $ (0.56 × 100,000) = $ 56,000

(c) Magnitude of Time Value & Currency Fluctuation:

General Concept (Not related to this Question Value)



- Time value = 120
- Value as on 1Y end

This value should be converted using Rate prevailing on 1Y time.

In our question,

0 days (Now)	90 days
98,000 Mark	100,000 Mark

(i) Time value = 2000 Mark [Value as on 90 days]

90 days FR: Mark 1 = $ 0.56

∴ 2000 Mark = $ (0.56 × 2000) = $ 1120

(ii) Currency Fluctuation Values

Method -1 (Balancing Figure) [**As per ICAI**]

Difference in (a) & (b) [56,000 - 53,900]	$ 2,100
Less: Time value	$ 1,120
Currency Fluctuation (Balancing figure)	$ 980

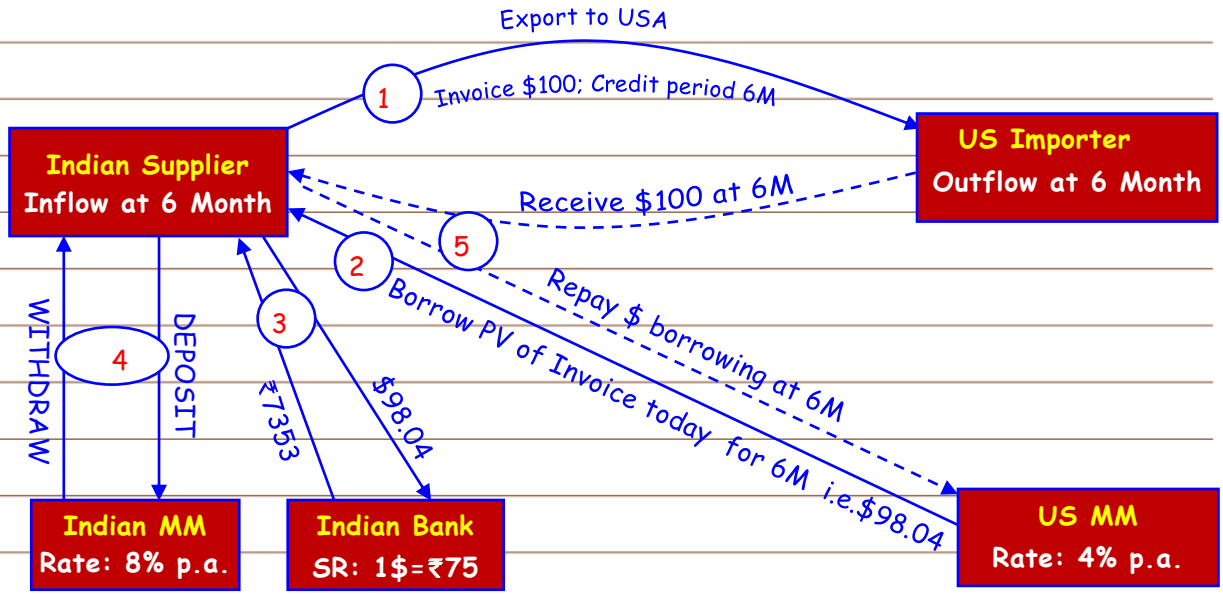
Method -2

Rate fluctuation per Mark [$ (0.56 - 0.55)]	$ 0.001
Rate fluctuation on 98,000 Mark [$ (0.01 × 98,000)]	$ 980

CONCEPT: MONEY (CASH) MARKET HEDGE (MMH)

- It is a technique to hedge foreign currency fluctuation risk by using money market securities (i.e. Short term debt securities ⇨ life less than one year).
  In fact we use money market to raise fund and invest for less than one year.
- We will study MMH in 2 parts:
  (A) MMH for Receivables [FC Receivable]
  (B) MMH for Payable [FC Payable]

(A) MMH for Receivables [FC Receivable]



1 Export value $100. Credit period = 6m

2 Borrow PV of invoice amount from US money market at 4% p.a. for 6 months.

Logic behind borrowing of PV: So that repayment of borrowing at 6 months time should be equal to invoice amount and Mr India can repay borrowing out of proceeds from US customer without any conversion.

$$\text{Borrowing amount} = \frac{\$100}{(1+0.04 \times \frac{6}{12})} = \$\ 98.04$$

3 Convert at spot rate:

Assume SR: $1 = ₹75

$98.04 = ₹(75 X 98.04)

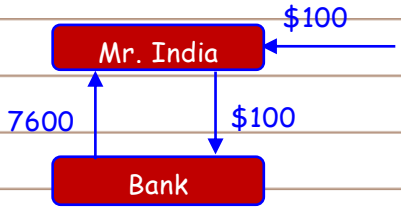
= ₹7353

⇨ Inflow as on today

⇨ It is not comparable with other hedging technique inflow (like forward contract)

For example:

Inflow under forward contract assuming $1 = ₹76



It means

⇨ These two amounts are not comparable.

⇨ Hence, deposit ₹7353 in India for 6 months and compare withdrawal amount with ₹7600 to take decision.

4 Deposit ₹ 7353 in Indian money market for 6 month at 8% p.a. (Assume) withdrawal at 6 months

$= ₹7353 \times (1 + 0.08 \times \frac{6}{12})$ = ₹7647.12

Compare this with forward contract receipt to take decision.

5 Repay $ borrowing at 6m time out of proceed from foreign customer.

Borrowing = $ 98.04 @ 4% p.a. for 6m

Repayment = $ $98.04 \times (1 + 0.04 \times \frac{6}{12}) = \$100$

QUESTION - 5A

Amount receivable = $ 350,000 (at 3-m)

(a) Money market hedge:

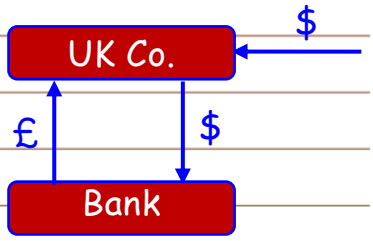
(i) Borrow PV of invoice amount @9% for 3m

$$\text{Borrowing} = \frac{\$\ 350{,}000}{\left(1 + .09 \times \frac{3}{12}\right)} = \$\ 3{,}42{,}298.29$$

ON	.09	×	3	÷	12	+	1	÷	=	×	350,000	=

(ii) Convert @ SR:

£1 = 1.5865 / 1.5905



$ 1.5905 = £ 1

$ 342298.29 = £ $\left(\frac{1}{1.5905} \times 342298.29\right)$

= £ 215214.27

(iii) Deposit £ 215214.27 @ 5% for 3m.

Withdrawal = £ 215214.27 × $\left(1 + .05 \times \frac{3}{12}\right)$ = £ 217904.45

(iv) Repay $ borrowing out of proceeds from customer.

Amount = $ 350,000

Hence, Inflow under MMH = £ 217904.45

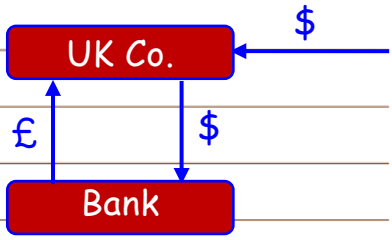
(b) Forward Hedge:

Amount receivable = $ 350,000

3m FR: £ 1 = $ 1.6100 / 1.6140

Equivalent £ = $\frac{350{,}000}{1.6140}$

= £ 216852.54



Advice: Inflow under MMH is higher than forward hedge. Hence, it is beneficial to use MMH.

QUESTION – 5B

Amount receivable = £ 500,000

As interest of both countries are given. Indian firm can use money market hedge to cover risk.

(i) Borrow PV of invoice amount @ 5% p.a. for 3m.

$$\text{Borrowing} = \frac{£\ 500{,}000}{(1 + 0.05 \times \frac{3}{12})} = £\ 493827.16$$

(ii) convert £ into ₹ @ spot rate

SR: £1 = ₹56.00

£ 493827.16 = ₹(56 x 493827.16)

= ₹ 2,76,54,321

(iii) Deposit ₹ 2,76,54,321 @12% p.a. for 3m.

$$\text{Withdrawal} = ₹\ 2{,}76{,}54{,}321 \times (1 + 0.12 \times \frac{3}{12})$$

= ₹ 2,84,83,951

(iv) Repay £ borrowing out of proceeds from foreign customer

Amount =£ 500,000

Hence, Inflow to Indian firm at 3m should be ₹ 2,84,83,951 irrespective of currency fluctuation.

Note: Not for Exam

We can calculate fair forward rate using given interest rate and compare with above inflow.

$$\text{Fair FR (₹/£)} = \text{SR (₹/£)} \times \frac{[1 + i(₹)]}{[1 + i(£)]}$$

$$= 56 \times \frac{(1 + 0.12 \times \frac{3}{12})}{(1 + 0.05 \times \frac{3}{12})} = 56 \times \frac{1.03}{1.0125} = 56.9679$$

Equivalent ₹ @ Forward rate

= (500,000 x 56.9679)

= ₹ 2,84,83,950

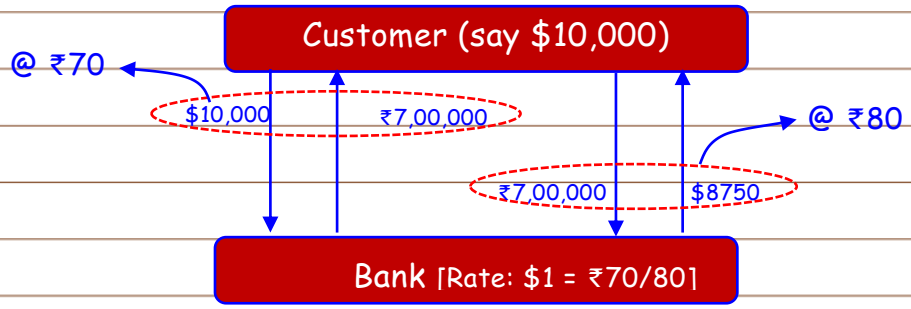
- Exactly same as Money market hedge
- Reason: In MMH, we used same interest rate which we used in forward rate calculation.

In addition, we can provide loss/gain value also in solution:

Receivable recorded at SR	= [56 x 500,000]
	= ₹280,000
Receipt under MMH	= ₹ 2,84,83,951
Gain under MMH	= 483,951

CONCEPT: IMPACT OF CURRENCY CONVERSION FOR SAME CURRENCY AT SAME TIME BOTH SIDE (i.e., BUY AND SALE BOTH)

Never convert same currency at same time both side(i.e. Buy and sale). In this case, customer makes loss as customer buys a currency at higher rate (ASK) and sells at Lower rate (Bid).



Loss to customer in above two transactions = 10,000 – 8750

= $ 1250 (Gain to Bank)

Question – 5C

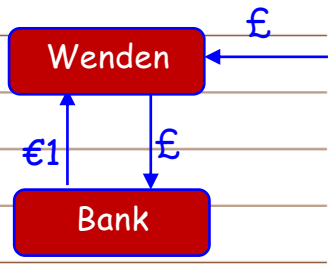
One month net receipt:

Receipt	£ 240,000
Payment	£ 140,000
Net Receipt	£ 100,000

SR: €1	=	£ 1.7820	1.7820
		- 0.0002	+ 0.0002
		£ 1.7818	£ 1.7822

(a) Expected € receipt at 1m

1m FR: €1	=	£ 1.7829	1.7829
		- 0.0003	+ 0.0003
∴ €1	=	£ 1.7826	£ 1.7832



£ 1.7832 = €1

£ 100,000 = € $\left(\frac{1}{1.7832} \times 100{,}000\right)$ = € 56078.96

3m FR: €1 = £ 1.7846 1.7846

- 0.0004 + 0.0004

∴ €1 = £ 1.7842 £ 1.7850

£ 1.7850 = €1

£ 300,000 = € ($\frac{1}{1.7850}$ × 300,000)

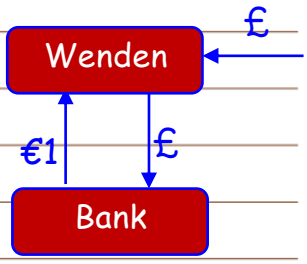
= € 168067.23

(b) Money market hedge for 3m receipt:

(i) Borrow PV of Invoice Amount.

Borrowing Amt = $\frac{£\ 300{,}000}{(1 + 0.054 \times \frac{3}{12})}$ = £ 296003.95

(ii) convert @ SR:



∴ €1 = £ 1.7818 / £ 1.7822

£ 296003.95 = € ($\frac{1}{1.7822}$ × 0 296003.95)

= € 166089.08

(iii) Deposit € at 4.6%

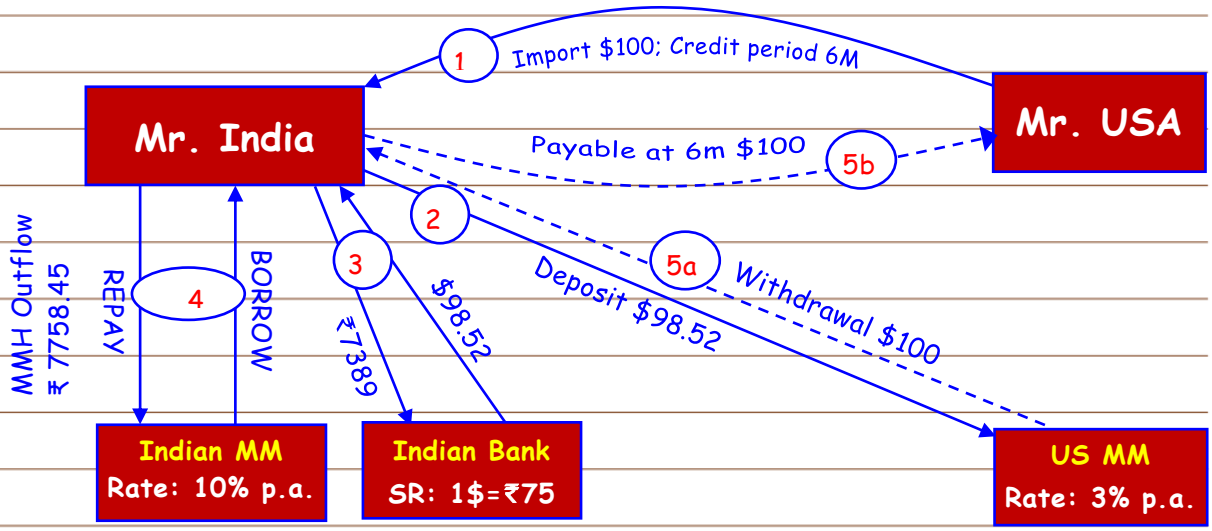
Withdrawal = 166089.08 x (1+ 0.046 x $\frac{3}{12}$)

= € 167999.10

(iv) Repay of borrowing out of receipt from customer.

Advice: Forward hedge is more beneficial.

(B) MONEY MARKET HEDGE FOR PAYABLE:



Explanation:

Above steps are marked for calculation purpose only. For execution of transaction we have to follow different sequence.

1 → 4 → 3 → 2 → 5a → 5b

(1) Imported at $100 for 6 months.

(2) Deposit/Interest PV of Invoice amount in US money market for 6m @3% p.a.

$$\text{Deposit amount} = \frac{\$100}{1 + 0.03 \times \frac{6}{12}} = \$98.52$$

Logic behind deposit of **PV** amount:

So that withdrawal amount should be equal to invoice amount and Mr. India can pay to Mr. USA out of Proceeds from withdrawal.

(3) Convert @ SR:

Assumed SR: $1 = ₹75

$98.52 = ₹(75×98.52) = ₹7389

⇨ Outflow as on today.

⇨ This is not comparable with outflow of other hedging option (like forward contract).

⇨ Here, Borrow ₹7389 from Indian Money Market for 6 Month. Repayment will be made at 6m end which will be compared with other hedging outflow to take decision.

(4) Borrow ₹7389 @10% p.a. for 6m,

Repayment = ₹7389 × $(1 + 0.10 \times \frac{6}{12})$ = ₹ 7758.45

⇨ Outflow under MMH

⇨ This outflow is compared with other hedging option outflow to take decision.

(5) Pay to foreign supplier out of withdrawal of $ deposit.

Deposit = $98.52

Withdrawal = $98.52 × $(1 + 0.03 \times \frac{6}{12})$ = $ 100

⇨ Pay to US Supplier

⇨ Hence, outflow under MMH = ₹ 7758.45

CONCEPT: TAX TREATMENT ON EXCHANGE LOSS/GAIN

(A) TAX IS PAYABLE IF THERE IS EXCHANGE GAIN

Example:

Exchange Gain	= ₹ 1000
Tax rate	= ₹ 30
Tax payable	= (1000 x 30%) = ₹300
Net Gain	= 1000 – 3000 = **₹700**
Or, Net Gain	= ₹1000 x 70% = **₹ 700**
	Or, 1000 x (1-0.30) = **₹700**

(B) TAX WILL BE SAVED IF THERE IS EXCHCHANGE LOSS

Exchange loss is allowable expenditure in Income Tax Act. Hence, we can save tax on exchange loss which is inflow for decision making.

Example:

Exchange loss	= ₹ 5000
Tax rate	= 30%
Tax saving (5000 x 30%)	= ₹1500
Net Exchange loss (5000 – 1500)	= **₹3500**
Or, Net loss (5000 x 70%)	= 3500
Or, 5000 x (1 – T) = 5000 (1- 0.30)	= 3500

Explanation:-

	Case - I	Case - II
	No Ex. Loss	There is Ex. Loss
Profit before Exchange loss	100000	100000
Less: - Exchange Loss	-	(5000)
Profit before tax	10000	95000
Less: - Tax @ (30%)	30000	28500
Profit after tax	70000	66500

It is lesser by ₹3500. But Exchange loss is 5000.

It is due to tax saving of 1500.

Note: - Above tax treatment is applicable for all income/expenses which are allowable under Income Tax Act. (i.e., Applicable on Interest cost also)

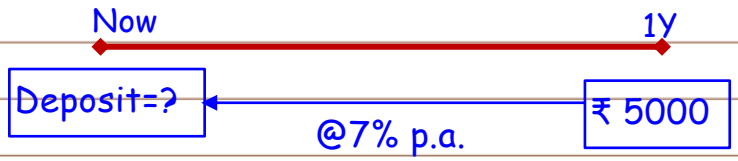
CONCEPT: IMPACT OF TAXATION ON CALCULATION OF PV (PRESENT VALUE) / (FUTURE VALUE)

Example: -

Calculate Deposit amount as on today if we need ₹5000 at 1 Year end.

Interest rate = 10% p.a.

Tax rate = 30%



Interest income	= 10 %
Tax	= 30 %
Net Interest Income	= 10% x (1-t)
	= 10% x 0.70 = 7%
Deposit Amount (PV)	$= \frac{5000}{(1+0.07)}$ = ₹4672.90

Verification:

Deposit	₹ 4672.90
Add: Interest @10%	₹ 467.29
Less: Tax @30% on Interest	(₹140.19)
Net Amount available at 1 year end	**5000**

QUESTION – 5D

Amount Payable at 3m = $ 51 Lakh

(a) Forward hedge:

3m FR: $1 = ₹ 42 / 45

$51 Lakh = (45 x 51)

= 2295 Lakh [i.e., 22.95 cr.]

(b) Money Market hedge:

(i) Deposit PV of invoice amt @8% for 3m

$$\text{Amount} = \frac{\$\ 51\ \text{Lakh}}{(1 + 0.08 \times \frac{3}{12})} = \$\ 50\text{Lakh}$$

(ii) Equivalent ₹ @SR

$1 = ₹ 40 / 42

50 Lakh = ₹(42 x 50) = ₹2100 Lakh

(iii) Borrow ₹2100 Lakh @16% p.a. for 3 Month.

$$\text{Repayment} = ₹\ 2100 \times (1 + 0.16 \times \frac{3}{12})$$

= ₹ 2184 Lakh [i.e., 21.84 cr.]

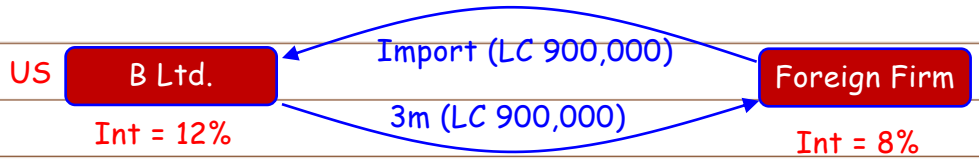
(iv) Pay to foreign suppliers out of proceeds of withdrawal amount.

Amt = $ 51Lakh

Advise: P Ltd. can achieve the objective of cost no more than 22 cr. by using money market hedge.

QUESTION – 5E

Interpretation of question:



SR: $1 = LC 10

SR: $1 = LC 8

90d FR: $1 = LC 9

Not for exam:

LC ⇨ Local currency

But it is local currency for foreign firm and foreign currency for B Ltd.

(a) Forward hedge:

- 90d FR: $1 = LC 9

  LC 9 = $1

  LC 900,000 = $ $(\frac{1}{9} \times 900{,}000) = \$\ 100{,}000$

- Payable record at SR:

  LC 10 = $1

  LC 900,000 = $(\frac{1}{10} \times 900{,}000) = \$90{,}000$

- Exchange Loss = $100,000 - $90,000
  = $10,000

- Tax saving on Ex. Loss = $10,000 x 40% = $4000

- Net outflow under forward hedge = [100,000 - 4000]
  = $ 96000

(b) Money market hedge:

(i) Deposit PV of invoice amount

Interest rate = 8%

Tax rate = 40%

Net Interest = 8% x (1 – 0.40) = 4.8%

Deposit Amount = $\frac{\text{LC } 900{,}000}{(1 + 0.048 \times \frac{90}{360})}$ = LC 8,89,328.06

(ii) Equivalent $at spot rate

SR: LC 10 = $1

LC 8,89,328.06 = $ ($\frac{1}{10}$ x8,89,328.06)

= $ 88932.806

(iii) Borrow $ @ 12% p.a. for 90 days.

Interest rate = 12%

Tax rate = 40%

Net Interest = 12% x (1 – 0.40) = 7.2%

Net Outflow = $88932.806 x $(1 + 0.72 \times \frac{90}{360})$

= $90533.60

(iv) Pay to foreign suppliers out of proceeds from deposit.

Amount = LC 900,000

Verification (Not for exam):

Deposit	88,932.806
Add: Interest @ 8% for 90 days	17786.56
Less: Tax @ 40%	7114.62
Net Withdrawal Amount	900,000

Hence: Outflow under MMH = $ 90533.60

(c) No hedging:

- SR at 90 days:

LC 8 = $1

LC 900,000 = $ ($\frac{1}{8}$ x 900,000) = $ 112,500

- Payable recorded @ SR: = $ 900,000

- Exchange Loss = $112,500 - $90,000
  = $22,500

- Tax saving on Ex. Loss = $22,500 x 40%
  = $9000

- Net outflow = [112,500 - 9000]
  = $103,500

Advise: Outflow under MMH is lowest. Hence MMH is preferable.

QUESTION – 5F

Amount payable at 3m = $20,000

(i) Money market hedge:

- As money market interest rates are given MMH is possible.
- Calculation:

(a) Deposit PV of invoice in US money market

$$\text{Deposit Amount} = \frac{\$\ 20{,}000}{(1 + 0.06 \times \frac{3}{12})} = \$\ 19704.43$$

(b) Equivalent ₹ @ SR

SR: $1 = ₹74.60 / ₹74.90

$ 19704.43 = ₹ (74.90 x 19704.43)
= ₹ 1475861.81

(c) Borrow ₹ @ 11% p.a. for 3m

Repayment = ₹ 1475861.81 x $(1+ 0.11 \times \frac{3}{12})$

= ₹ 15,16,448

(d) Pay to foreign supplier out of withdrawal of $.

Amount = $20,000

Hence, outflow under MMH = ₹ 15,16,448

(ii) Cost of forward hedge:

Payable record @ SR	= ₹ (20,000 x 74.90)
	= ₹ 14,98,000
Outflow under forward contract	= ₹ (20,000 x 75.90)
	= ₹ 15,18,000
Cost of forward hedge (3m % cost)	$= [\frac{15,18,000 - 14,98,000}{14,98,000} \times 100$
	= 1.335%
Annual cost	$= (1.335 \times \frac{12}{3})$ = 5.34%

Second Alternative:

% Annual cost of Forward hedge $= [\frac{75.90 - 74.90}{74.90} \times 100] \times \frac{12}{3}$

= 5.34%

(iii) Advice

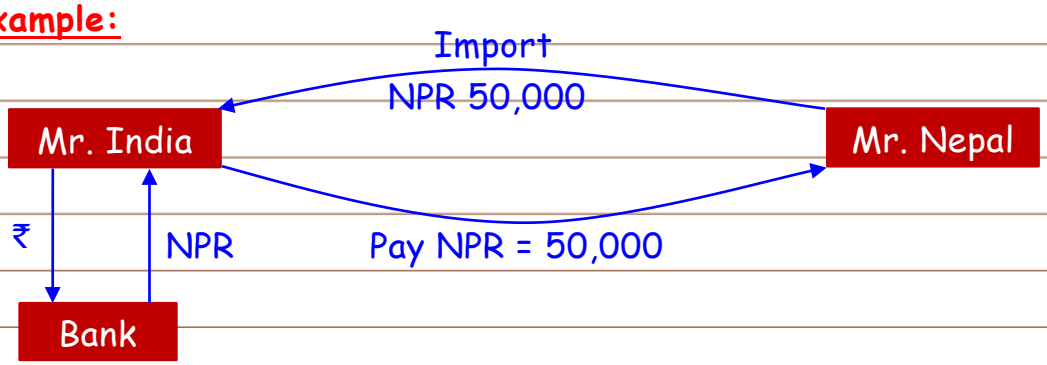
Outflow under (i)	= 15,16,448
Outflow under (ii)	= 15,18,000

Advice: As outflow under MMH is lesser than forward hedge, it is beneficial to opt MMH.

CONCEPT: CROSS RATE

- An exchange rate calculated using two or more other exchange rates is known as cross rate. [Do not mix up International quotation (i.e. cross currency quotation) with this concept]
- Sometimes bank/forex dealer does not quote exchange rate of desired currencies. In this situation, we have to use cross rate.
- Cross rate is mathematical calculation to calculate equivalent amount in home currency. We can't find cross rate in market (i.e., Derived cross rate is not quoted by Bank/Dealer).

Example:



⇨ Exchange rate of NPR with ₹ is not available.

⇨ However, following two rates are available:

Bank – 1: $1 = ₹75

Bank – 2: $1 = NPR 120

⇨ Now we can calculate exchange rate of NPR & ₹ currency. That derived rate is Known as cross rate.

Calculation of cross rate:

Bank-1: $1 = ₹75

Bank-2: $1 = NPR 120

Cross rate can be calculated in any one of following two formats.

(A) ₹ per NPR = ? [i.e., NPR 1 = ₹xxx]

(B) NPR per ₹ = ? [i.e., ₹1 = NPRxxx]

(A) ₹ Per NPR

NPR 120 = ₹75 = $1

Or, NPR 120 = ₹75

NPR 1 = ₹$\frac{75}{120}$

∴ NPR 1 = ₹ 0.625

(B) NPR per ₹

₹ 75 = NPR 120

₹1 = NPR $\frac{120}{75}$

∴ ₹1 = NPR 1.60

CONCEPT: CALCULATION OF CROSS RATE BY FORMING LHS & RHS RELATIONSHIP AMONG DIFFERENT CURRENCIES

Given rates:

Bank-A: £1 = $1.30

Bank-B: €1 = $1.10

Bank-C: €1 = ₹85

Calculate cross rate of ₹ and £ using above three rates.

Solution:

Again, we can calculate cross rate in any one of the following two ways:

(A) ₹ per £ = ? [i.e., ₹/£ = ?]

(B) £ per ₹ = ? [i.e., £/₹ = ?]

(A) ₹ per £=?

$$\left[\frac{₹}{£}\right] = \left[\frac{₹}{€} \times \frac{€}{\$} \times \frac{\$}{£}\right]$$

[₹ per £] [₹ per €] [€ per $] [$ per £]

$$\frac{₹}{£} = [85 \times \frac{1}{1.10} \times 1.30] \longrightarrow \text{Using given rates}$$

£1 = ₹100.45

(B) £ per ₹ =?

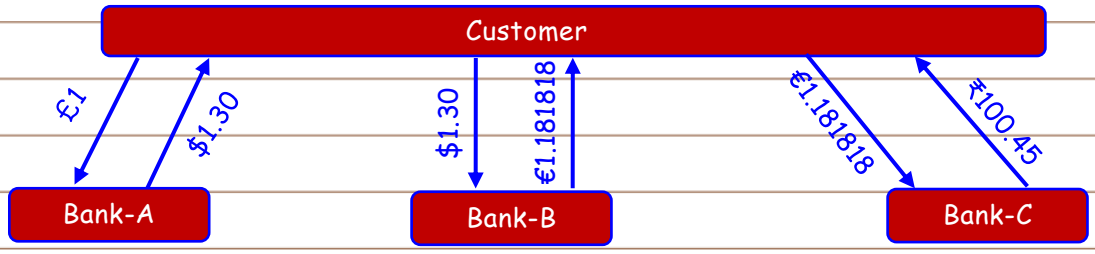
$$\frac{£}{₹} = \frac{£}{\$} \times \frac{\$}{€} \times \frac{€}{₹}$$

$$= \frac{1}{1.30} \times 1.10 \times \frac{1}{85} \longrightarrow \text{Using given rates}$$

₹ 1 = £ 0.009955 ⟶ It should be reciprocal of 100.45

Second alternative [logical]

We are going to calculate ₹ per £ rate.



£1=$1.30

€1 =$1.10

Or, $1 = €$\frac{1}{1.10}$

∴$1.30 = €($\frac{1}{1.10}$ x1.30)

= €1.1818188

€1 = ₹85

€1.181818 = ₹ (85x1.181818)

=₹100.45

From above diagram, net Position is: £1= ₹100.45

Summary:

Always prefer LHS & RHS relationship of currencies to calculate cross rate.

LHS = Left hand side [Keep desired currency]

RHS = Right hand side [keep given rates currencies]

CONCEPT: CALCULATION OF CROSS RATE IN TWO WAY QUOTE:

Given rates are:

Bank-A: £1 = $1.30/1.32

Bank-B: $1 = ¥120/122

Bank-C: ₹1 = ¥1.5/1.6

Calculate cross rate of £ and ₹.

Solution:

Again, we have two choices:

(A) ₹ per £ = ? [₹/£ = ?]

(B) £ per ₹ = ? [£/₹ = ?]

We may need indirect quote of above at the time of calculation of cross rate. Hence, first calculate indirect quote of above.

Bank-A: $1 = £$\frac{1}{1.32}$ / $\frac{1}{1.30}$

Bank- B: ¥1 = $$\frac{1}{122}$ / $\frac{1}{120}$

Bank- C: ¥1 = ₹$\frac{1}{1.6}$ / $\frac{1}{1.5}$

(A) ₹ per £

$$\left[\frac{₹}{£}\right] = \left[\frac{₹}{¥} \times \frac{¥}{\$} \times \frac{\$}{£}\right]_{Bid} / \left[\frac{₹}{¥} \times \frac{¥}{\$} \times \frac{\$}{£}\right]_{Ask}$$

Rate of £1 | Bid rate of ¥1 | Bid rate of $1 | Bid rate of £1 | Ask rate of ¥1 | Ask rate of $1 | Ask rate of £1

$$£1 = \left(\frac{1}{1.6} \times 120 \times 1.30\right) / \left(\frac{1}{1.5} \times 122 \times 1.32\right)$$

£1 = 97.50 / 107.36

(B) £ per ₹:

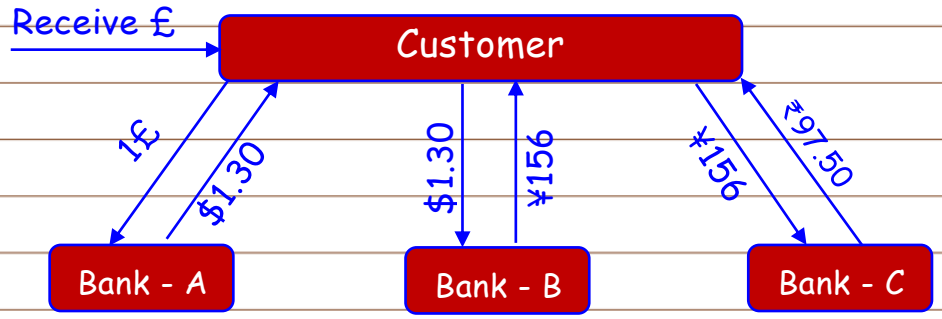
$$\left[\frac{£}{₹}\right] = \left[\frac{£}{\$} \times \frac{\$}{¥} \times \frac{¥}{₹}\right]_{Bid} / \left[\frac{£}{\$} \times \frac{\$}{¥} \times \frac{¥}{₹}\right]_{Ask}$$

$$= \left[\frac{1}{1.32} \times \frac{1}{122} \times 1.5\right] / \left[\frac{1}{1.30} \times \frac{1}{120} \times 1.6\right]$$

₹ 1 = 0.00931 / 0.01026

SECOND ALTERNATIVE (LOGICALLY) ⇨ FOR CONCEPTUAL CLARITY

Case-(i) Customer has to sell £ (i.e., Bid rate of £)



£1 = $1.30/1.32

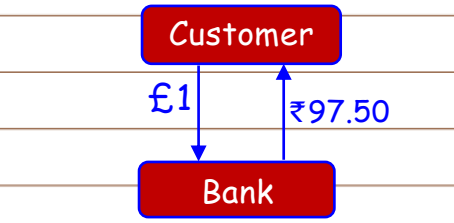
$1 = ¥120/122

$1.30 = ¥120×1.30
= ¥ 156

₹1 = ¥1.5/1.6

¥ 156 = ₹$\frac{1}{1.6}$ × 156
= ₹ 97.50

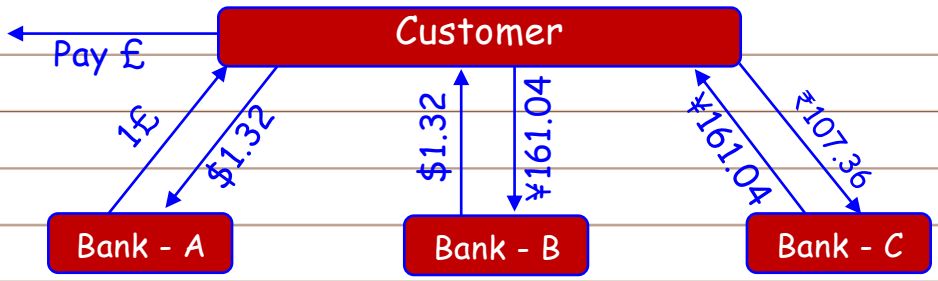
Net Position:



£1 = 97.50 → Bid rate of £

Case – (ii) Customer has to pay £ (i.e., Buy £ at ask rate)

We are going to calculate ask rate of £.



£1 = $1.30/1.32

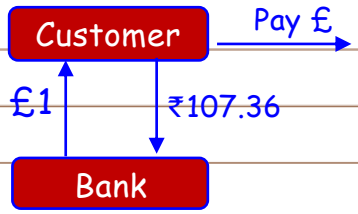
$1 = ¥120/122

$1.32 = ¥122 x 1.32
= ¥ 161.04

₹1 = ¥1.5/1.6

¥161.04 = ₹$\frac{1}{1.5}$ × 161.04
= ₹107.36

Net Position:



£1 = 107.36 → Ask rate of £ as Bank sells £

From case – (i) & (ii) we can say : £1 = ₹97.5/107.36

CONCEPT: IDENTIFICATION OF CROSS RATE CURRENCY:

- Currency quoted two times (in two rates) will be eliminated and currency quoted once will be paired in cross rate.
- **Example:**

Bank – 1: £1 = $xxx
Bank – 2: ¥1 = $xxx
Bank – 3: €1 = ¥xxx
Bank – 4: €1 =NPRxxx

(A) By using rates of Bank – 1 & Bank – 2, we can calculate cross rate of £ & ¥

(B) By Using Bank – 1, Bank – 2 & Bank – 3: cross rate of £ and €

(C) By Using all Banks, cross rate of £ and NPR.

(D) By Using Bank – 1 and Bank – 3 cross rate can't be calculated.

QUESTION – 6A

SR 1:	€1	=	$ 0.8385	0.8391
			+ 0.0020	+ 0.0030
∴ FR 1:	€1	=	$ 0.8405	0.8421

SR 2:	£1	=	$ 1.4548	1.4554
			- 0.0035	- 0.0025
∴ FR 2:	£1	=	$ 1.4513	1.4529

Forward rate (€ per £) = ?

$$\left[\frac{€}{£}\right] = \left[\frac{€}{\$} \times \frac{\$}{£}\right]_{Bid} \quad \Big| \quad \left[\frac{€}{\$} \times \frac{\$}{£}\right]_{Ask}$$

$$= \left[\frac{1}{0.8421} \times 1.4513\right] \quad \Big| \quad \left[\frac{1}{0.8405} \times 1.4529\right]$$

$$\therefore £1 = € 1.7234 \quad \Big| \quad 1.7286$$

QUESTION – 6B

(i) Cross rate for £ in ¥ terms:

$$\left[\frac{¥}{£}\right] = \left[\frac{¥}{\$} \times \frac{\$}{£}\right]$$

$$= [107.31 \times 1.26]$$

$$\therefore £1 = ¥ 135.21$$

(ii) Cross rate for AD in ¥ terms:

$$\left[\frac{¥}{AD}\right] = \left[\frac{¥}{\$} \times \frac{\$}{AD}\right]$$

$$= [107.31 \times 0.70]$$

$$\therefore AD1 = ¥ 75.12$$

(ii) Cross rate for £ in AD terms:

$$\left[\frac{AD}{£}\right] = \left[\frac{AD}{\$} \times \frac{\$}{£}\right]$$

$$= \left[\frac{1}{0.70} \times 1.26\right]$$

$$\therefore £1 = AD 1.80$$

QUESTION – 6C

£1	= ₹ 75.31	75.33
$1	= £ 1.563	1.565
¥1	= $ 1.048	1.052

As question is silent think for customers as purchase/sale is requirement of customers.

Here Customer buys currency at Ask rate (i.e., ₹/¥ 100= Ask ?)

$$\left[\frac{₹}{¥100}\right] = \left[\frac{₹}{£} \times \frac{£}{\$} \times \frac{\$}{¥100}\right]_{Ask}$$

$$= [75.33 \times 1.565 \times 1.052] = 124.022$$

$$\therefore ¥100 = 124.022$$

Alternatively, calculate bid rate assuming bank buys ¥ currency.

QUESTION – 6D

$1	= HK$ 7.7506	7.7546
$1	= ₹ 74.70	74.85

(i) Cover rate (₹ per HK $):

$$\left[\frac{₹}{HK\$}\right] = \left[\frac{₹}{\$} \times \frac{\$}{HK\$}\right]_{ASK}$$

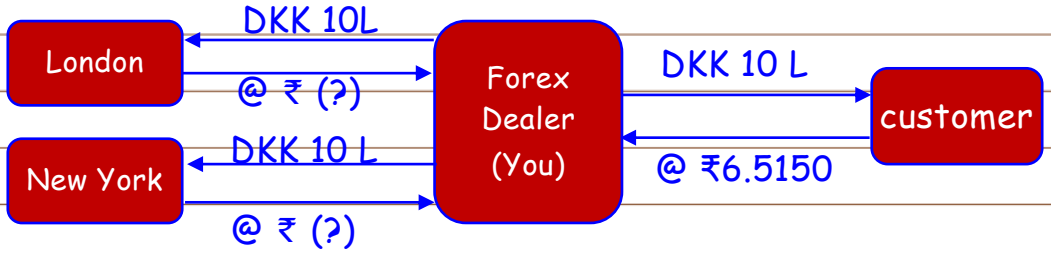
$$= \left[74.85 \times \frac{1}{7.7506}\right]$$

$$\therefore HK\$\ 1 = ₹\ 9.6573$$

(ii) Loss/gain:

Sale rate of HK$	₹ 9.70
Buy rate of HK$	₹ 9.6573
Gain per HK$	₹ 0.0427
Total gain on HK$ 10 cr. ((0.0427x 10 cr.))	₹ 0.427 cr.

QUESTION – 6E



(i)	£1	=	₹ 74.3000	74.3200	
(ii)	$1	=	₹ 49.2500	49.2625	London
(iii)	£1	=	DKK 11.4200	11.4350	New York
(iv)	$1	=	DKK 7.5670	7.5840	

(A) Cover in London (₹/DKK) = ?

$$\left[\frac{₹}{DKK}\right] = \left[\frac{₹}{£} \times \frac{£}{DKK}\right]_{ASK}$$

$$= \left[\frac{1}{11.4200} \times 74.3200\right]$$

∴ DKK 1 = **₹ 6.5079**

Cover in New York (₹/DKK) = ?

$$\left[\frac{₹}{DKK}\right] = \left[\frac{₹}{\$} \times \frac{\$}{DKK}\right]_{ASK}$$

$$= \left[\frac{1}{7.5670} \times 49.2625\right]$$

∴ DKK 1 = **₹ 6.5102**

Advice: it is beneficial to cover the transaction (i.e., buy DKK) in London market as DKK can be bought at cheaper rate in London.

(B) Loss/gain to forex dealer:

Sale rate of DKK	₹ 6.5150
Purchase rate of DKK	₹ 6.5079
Gain per DKK	₹ 0.0071
Total gain for 10Lakh DKK (0.0071 x 10,00,000)	**₹ 7100**

CONCEPT: EXCHANGE MARGIN

(A) Inter Bank Rate:

Exchange rate applicable for transaction between two banks/forex dealer is known as Inter Bank rate. (Or, Wholesale rate)

(B) Merchant Rate:

Exchange rate applicable for transaction between bank and retail customer is known as merchant rate. (Or, Retail rate)

(C) Exchange Margin:

Difference between Inter Bank rate and merchant rate is known as Exchange margin.

Adjustment of Exchange margin to calculate merchant rate from Inter Bank rate:

(i) Deduct Exchange margin from bid rate of Inter Bank rate to calculate Bid rate of merchant rate.

(ii) Add exchange margin in Ask rate of Inter Bank rate to calculate ask rate of merchant rate.

Example:

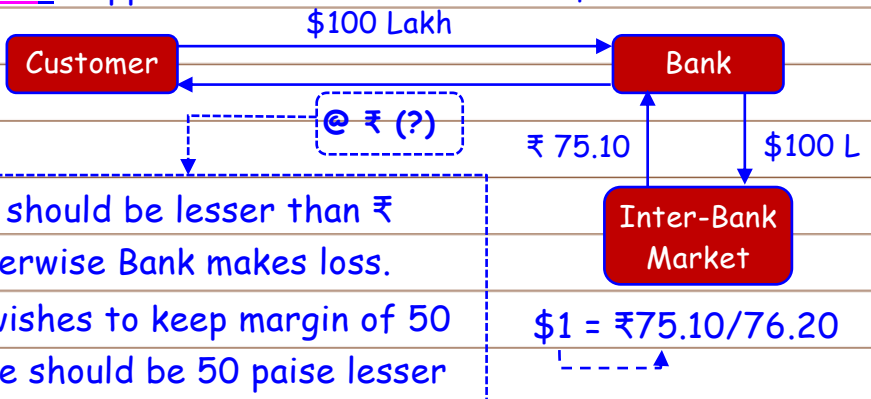
Inter Bank rate : $1 = ₹75.10/76.20

Exchange margin : 50 paise

Merchant rate:			
	$1=	₹75.10	₹76.20
		-0.50	+0.50
	∴$1=	₹74.60	₹76.70

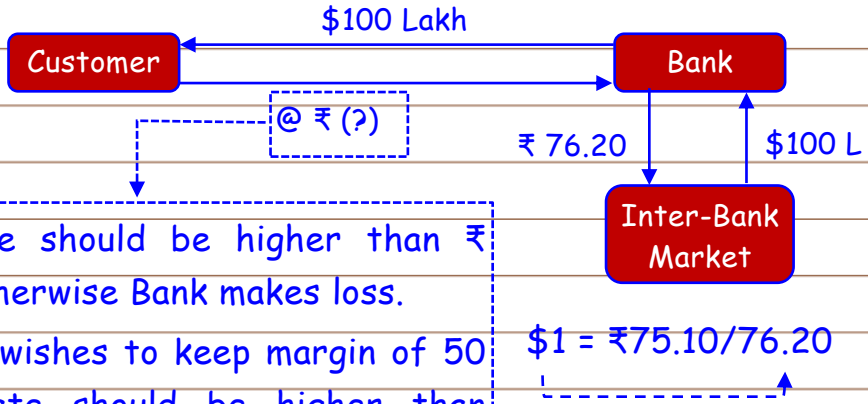
Logic behind above adjustment:

(1) Situation-1: Suppose Customer has to Sell $100 Lakh



- This rate should be lesser than ₹ 75.10 otherwise Bank makes loss.
- As Bank wishes to keep margin of 50 paise, rate should be 50 paise lesser than 75.10
- Hence, merchant Bid rate quoted by Bank to customer should be (75.10-0.50) =74.60

(2) Situation-2: Suppose, Customer has to buy $100 Lakh

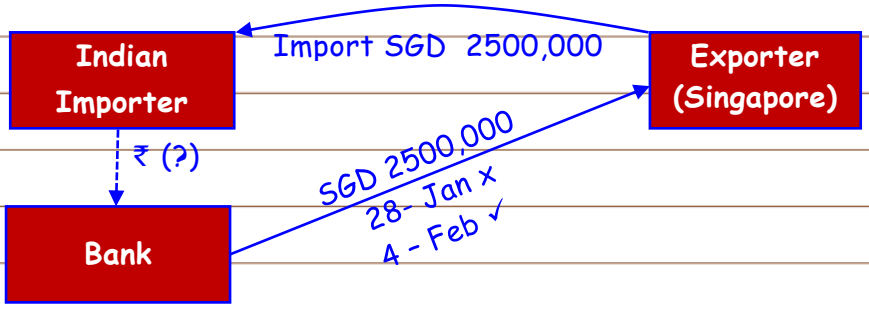


⇨ This rate should be higher than ₹ 76.20 otherwise Bank makes loss.

⇨ As Bank wishes to keep margin of 50 paise, rate should be higher than 76.20 by 50 paise.

⇨ Hence, merchant Ask rate to be quoted by Bank to customer should be (76.20+0.50) =76.70

QUESTION – 6F



Interpretation (Not for Exam):

If possible, use all informations given in question. By using all 3 exchange rates we can calculate cross rate of SGD with ₹ which indirectly hints that importer is from India.

(i) Notional outflow on 28 – Jan:

$$\left[\frac{₹}{SGD}\right] = \left[\frac{₹}{\$} \times \frac{\$}{£} \times \frac{£}{SGD}\right]_{ASK}$$

$$= \left[\frac{1}{3.1575} \times 45.90 \times 1.7850\right]$$

∴ SGD 1 = ₹ 25.9482 [Inter Bank rate]

+ 0.125% [Margin]

₹25.9806 [Merchant rate]

Notional outflow = (25.9806 x 25,00,000)

= **₹ 649,51,500**

(ii) Actual outflow on 4 – Feb:

$$\left[\frac{₹}{SGD}\right] = \left[\frac{₹}{\$} \times \frac{\$}{£} \times \frac{£}{SGD}\right]_{ASK}$$

$$= \left[\frac{1}{3.1380} \times 45.97 \times 1.7775\right]$$

∴ SGD 1 = ₹ 26.0394 [Inter Bank rate]

+ 0.125%

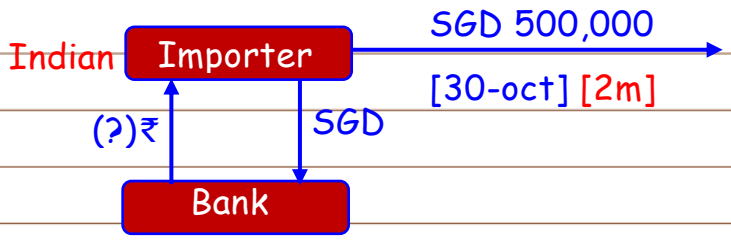
₹26.0719 [Merchant rate]

Actual outflow = ₹ (26.0719 x 25,00,000)

= **₹ 651,79,750**

(iii) Loss due to delay = ₹ (651,79,750 – 649,51,500) = **₹ 228,250**

QUESTION – 6G



2m FR: $1 =	₹ 49.3700	49.3800
	+ .1100	+ .1300
$1 =	₹ 49.4800	49.5100

2m FR: $1 =	SGD 1.7058	1.7068
	+ .0096	+ .0097
$ 1 =	SGD 1.7154	1.7165

Cross rate (₹ per SGD):

$$\left[\frac{₹}{SGD}\right] = \left[\frac{₹}{\$} \times \frac{\$}{SGD}\right]_{ASK}$$

$$= (49.5100 \times \frac{1}{1.7154})$$

∴SGD 1 = ₹ 28.8621 [Inter bank rate]

Merchant rate:

SGD 1 =	₹ 28.8621
	+ .0500
$ 1 =	₹ 28.9121

100 paisa = ₹ 1

5 paisa = ₹ $\frac{1}{100} \times 5$ = ₹ 0.05

Hence, Rate to be quoted to importer = **₹ 28.9121**

Disclaimer [not for exam]

- ICAI adjusted exchange margin before calculating cross rate which is not appropriate as Importer approaches his bank to quote forward rate and his bank approached to Inter bank Market and hence margin should not be applied on individual rate.

2m FR: $1 =	₹ 49.3700	49.3800
	+ .1100	+ .1300
	49.4800	49.5100
	-.0500	+ .0500
	49.4300	49.5600

ICAI used this rate to calculate cross rate.

QUESTION – 6H Good Question (Must Revise)

Not for exam:

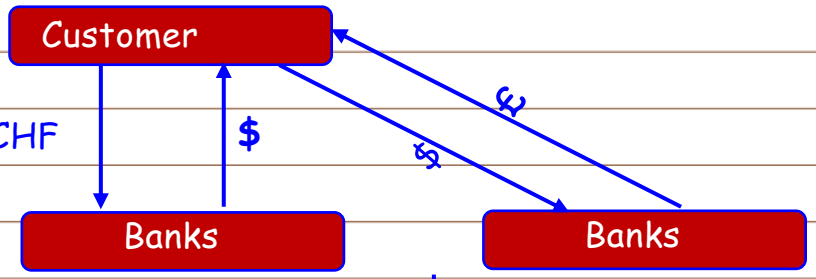
CHF 1 = $ 1.4650 / ~~1.4655~~ ⇨ Current strength **OK**

$1 = £ 1.7645 / ~~1.7660~~ ⇨ Current strength **Wrong**

As there is confusion, take first currency as base currency because rate quoted are in ISO Code. ⇨Give priority to £ currency strength.

Bank A	Bank B
SR: $1 = CHF 1.4650 / 1.4655	$1 = CHF 1.4653 / 1.4660
SR: £1 = $ 1.7645 / 1.7660	£1 = $ 1.7640 / 1.7650

(i) Minimum CHF to be paid:



A: $1 = CHF 1.4650 / **1.4655**	A: £1 = $ 1.7645 / **1.7660**
B: $1 = CHF 1.4653 / **1.4660**	B: £1 = $ 1.7640 / **1.7650**
Beneficial to buy $ from bank-A	Beneficial to buy £ from bank-B

Customer has to pay minimum CHF if he buys $ from Bank A and buy £ from Bank B.

$$\left[\frac{CHF}{£}\right] = \left[\frac{CHF}{\$} \times \frac{\$}{£}\right]_{ASK}$$

$$= 1.4655 \times 1.7650$$

$$\therefore £1 = CHF\ 2.5866$$

$$\therefore £1\ million = CHF\ 2.5866\ million$$

(ii) 3m swap point for £1 in CHF term:

(a) SR of £1 in CHF (Bank -A):

$$\left[\frac{CHF}{£}\right] = \left[\frac{CHF}{\$} \times \frac{\$}{£}\right]_{Bid} \Big/ \left[\frac{CHF}{\$} \times \frac{\$}{£}\right]_{Ask}$$

$$= (1.4650 \times 1.7645) \; / \; (1.4655 \times 1.7660)$$

$$\therefore £1 = CHF\ 2.5850 \; / \; 2.5881$$

(b) 3m FR of £1 in CHF:

(1) $1 =	CHF 1.4650	1.4655	(2) £1 =	$ 1.7645	1.7660
	+ .0005	+ .0010		- .0025	- .0020
$1 =	CHF 1.4655	1.4665	£1 =	$ 1.7620	1.7640

$$\left[\frac{CHF}{£}\right] = \left[\frac{CHF}{\$} \times \frac{\$}{£}\right]_{Bid} \Big/ \left[\frac{CHF}{\$} \times \frac{\$}{£}\right]_{Ask}$$

$$= (1.4655 \times 1.7620) \; / \; (1.4665 \times 1.7640)$$

$$\therefore £1 = CHF\ 2.5822 \; / \; 2.5869$$

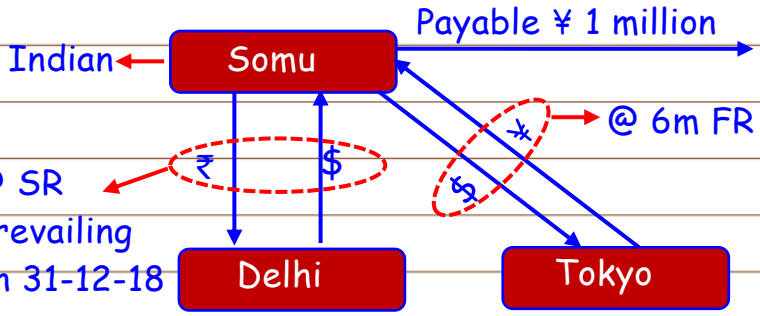
(c) Swap points

FR: £1 =	CHF 2.5822	2.5869
SR: £1 =	(CHF 2.5850)	(2.5881)
	CHF - 0.0028	- 0.0012

Hence, swap point = 28/12

QUESTION – 6I [GOOD QUESTION]

(i) Actual outflow in strategy adopted by Mr. X:



Interpretation (Not for exam)

- If Somu Enterprises purchases $ at today's spot rate and convert $ into ¥ using 6m rate, then there is holding period of 6 month for $ currency which is not allowed by government.
- Hence, correct interpretation is: Somu Ent bought $ at 6m using SR prevailing on 31-12-18 and converted $ into ¥ using 6m forward rate.
- This strategy is partial hedging strategy:

  Delhi ⇨ Risk open ; Tokyo ⇨ Hedged

6m SR: $1 = ₹46.24 / 46.26 [Delhi]

6m FR: $1 = ¥ 110 / 110.60 [Tokyo]

Cross rate (₹ per ¥) =?

$$\frac{₹}{¥} = \left[\frac{₹}{\$} \times \frac{\$}{¥}\right]_{Ask} = \left(46.26 \times \frac{1}{110}\right)$$

∴ ¥1 = ₹0.4205

Hence, ¥1 Mill = ₹0.4205 Mill [0.4205×10,00,000 or **4,20,500**]

(ii) Notional outflow under forward contract:

6m FR (Delhi): $1 = ₹ 46.00 / 46.03

6m FR (Tokyo): $1 = ₹110.00 / 110.60

Cross rate: (₹ per ¥) = ?

$$\frac{₹}{¥} = \left[\frac{₹}{\$} \times \frac{\$}{¥}\right]_{Ask} = \left(46.03 \times \frac{1}{110}\right)$$

∴ ¥1 = ₹0.4185

Hence, ¥1 Mill = ₹0.4185 Mill [0.4185×10,00,000 or **4,18,500**]

(iii) Loss in strategy adopted by Mr. X = (420500 – 418500) = **₹2000**.

CONCEPT:

(1) Post Shipment Credit:

It is a low interest loan or, Advances provided by a bank to an exporter for the period from date of extending credit after shipment of goods to the realisation of export proceeds.

(2) Transit Period:

- Transit period is the average period calculated from the date of negotiation /purchase /discount till the date of bill proceeds.
- It is not confused with the time taken for the arrival of goods at destination. (ICAI opinion in post qualification course book)
- Interpretation in Question⇨Time taken to reach goods at destination.

(3) Applicable forward rate (Rounding off of period)

- As transit period is average period actual realisation date of foreign currency may differ (i.e. may be earlier or later)
- In this situation, no need to calculate rate of exact date as exact date of foreign currency realisation is unknown.
- Hence, consider rounded period as mentioned below:

According to FEDAI:

(i) If foreign currency is quoted at premium then period will be rounded to lower month.

(ii) If foreign currency is quoted at discount then period will be rounded to higher month.

Example:

On 25th January, ABC Exporter submitted a 60 days bill for $100,00 under irrevocable LC for negotiation. Transit period is 25 days.

In this case, Notional due date is (60+25= 85 days from 25th Jan)

= 20th April (i.e. 6+28+31+20)

⇨ If foreign currency ($) is quoted at premium then period will be rounded to lower month (i.e. March end or, April beginning in our eg).

⇨ If foreign currency ($) is quoted at discount then period will be rounded to higher month (i.e. April end or May beginning in our eg).

Logic behind above rounding off:

Above rounding off rule is provided in FEDAI Rule. FEDAI formed rule in such a way that it is beneficial to Bank.

1. Suppose, SR: $1= ₹75
   Mar FR $1= ₹77 (Premium)
   Apr FR $1= ₹78 (Premium)

As forward rates are quoted at premium, Period should be rounded to lower month (i.e. March end) as Notional due date is 20th April.

That is, Bank buy $ and Exporter sells $ @77 (Beneficial to Bank)

2. Suppose, SR: $1= ₹75
   Mar FR $1= ₹72 (Discount)
   Apr FR $1= ₹71 (Discount)

As forward rates are quoted at discount, Period should be rounded to higher month (i.e. April end) as Notional due date is 20th April.

It means, Bank buy $ and Exporter sells $ @71 (Beneficial to Bank)

QUESTION – 7A

(i) Exchange rate to be quoted:

- Notional due date = 60 days + 20 days = 80 days.
- As swap points are quoted in premium. (i.e., Increasing order). Period should be rounded to lower month (i.e., 2month)

$1	= ₹ 67.8000	67.8100	
	+ 0.2100	+ 0.2200	
	= 68.0100	68.0300	

We know, 100 paise = ₹1

21 paise = $\frac{1}{100} \times 21 = ₹0.21$

€1	= $ 1.0775	1.8000	
	+ 0.0040	+ 0.0045	
€1	= 1.0815	1.8045	

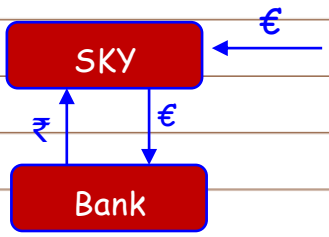
We know, 100 cent = $1

.40cent = $\frac{1}{100} \times .40 = \$0.0040$

$$\left[\frac{₹}{€}\right] = \left[\frac{₹}{\$} \times \frac{\$}{€}\right]_{Bid}$$

= (68.0100 x 1.0815)

€1 = ₹ 73.5528 [inter Bank rate]



Rate to be quoted to customer:

Inter Bank Bid rate	₹ 73.5528
Less: margin @ 0.1%	0.0736
	73.4792

(ii) Cash inflow to the company:

Amount to be converted = 50% of €500,000

= € 250,000

Equivalent Amount = (250,000 x 73.4792)

= **₹ 183,69,800**

(iii) Interest amount:

$$= \left[183,69,800 \times 8\% \times \frac{80}{365}\right]$$

= **₹3,22,100**

CONCEPT: RETURN FROM FOREIGN SECURITIES AND RELATIONSHIP BETWEEN HOME CURRENCY RETURN (HCR) AND FOREIGN CURRENCY RETURN (FCR)

(1) Return:

- Percentage earning is also termed as return.
- **Return** $= \left[\frac{\text{Inflow at end} - \text{Outflow at beginning}}{\text{Outflow at beginning}}\right] \times 100$
- Hence:

Return from a securities (Equity/Bond) $= \frac{[D_1 \text{ or } I_1 + P_1] - P_0}{P_0} \times 100$

Where,

D_1 = Dividend at end

I_1 = Interest at end

P_1 = Price at end

P_0 = Price at beginning

$(D_1 + P_1)$ or $(I_1 + P_1)$ ⇨Inflow at end

- If cashflows are in Foreign Currency then return should be FCR.
- If cashflows are in Home Currency then return should be HCR.

(2) Relationship between FCR and HCR:

(i) $(1 + HCR) = (1 + FCR) \times (1 + \text{Premium on FC})$

Or, $(1 + HCR) = (1 + FCR) \times (1 - \text{Discount on FC})$

(ii) $(1 + FCR) = (1 + HCR) \times (1 + \text{Premium on HC})$

Or, $(1 + FCR) = (1 + HCR) \times (1 - \text{Discount on HC})$

From above, $(1 + FCR) = \frac{(1+HCR)}{(1+\text{Premium on FC}) \text{ or } (1-\text{Discount on FC})}$

Where,

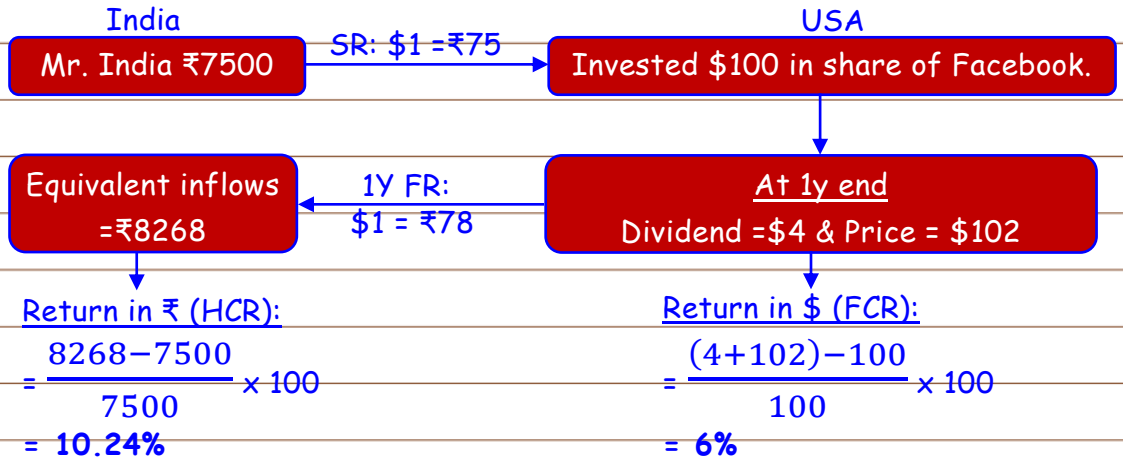
HCR = Home Currency return

FCR = Foreign Currency return

HC = Home Currency

FC = Foreign Currency

Logic behind above formula:



Alternatively, we can calculate return of one currency by using return of another currency and premium/discount of a currency.

In our example:

SR : $1 = ₹75

1Y FR: $1 = ₹78

Premium/discount on $ $= \frac{78-75}{75} \times 100 = 4\%$

Premium/discount on ₹ $= \frac{S-F}{F} \times 100$

$= \frac{75-78}{78} \times 100 = -3.846154\%$

Calculation of:

(i) ₹ return using $ return:

$ return = 6%

₹ return =?

(a) (1 + ₹ return) = (1 + $ return) x (1 + premium on $)

= (1 + 0.06) x (1 + 0.04) = 1.1024

∴ ₹ return = 0.1024

i.e.10.24% (Same As calculated above)

(b) (1 + ₹ return) $= \frac{(1+\$ \text{ return})}{(1-\text{Discount on } ₹)}$

$= \frac{(1+0.06)}{(1-0.03846154)} = 1.1024$

∴ ₹ return = (1.1024 – 1) = .0124 **i.e., 10.24%**

(ii) Similarly, we can calculate $ return using ₹ return also.

₹ Return = 10.24%

$ Return = ?

(a) (1 + $ Return) = (1 + .1024) x (1 - .03846154) = 1.06

∴ $ Return = .06 **i.e., 6% (Same As calculated above)**

(b) (1 + $ Return) $= \frac{(1+0.1024) \text{ ---→ ₹ return}}{(1+0.04) \text{ ---→ Premium on \$}}$

= 1.06

∴ $ Return = 0.06 **i.e. 6% (Same As calculated above)**

Note:

Sometimes ICAI uses approx. calculation of return as follows:

(i) ₹ return = ($ return + $ premium)

= (0.06 + 0.04) = 0.10 i.e., 10%

[But it is approx. calculation not correct calculation. Hence, avoid it or ignore it]

QUESTION - 8A

Bond price at beginning (B_0) = $ 5000
Value at end (B_1) = $ 5250
Interest = $ 350
Prem on $ = 2%

Note: If possible, use all information given in question. Question is silent regarding currency for which return to be calculated. But, prem on $ is given in question. It indirectly hints to convert $ return into home currency return.

$$\text{Return in \$} = \frac{(Int + B_1) - B_0}{B_0} \times 100$$

$$= \frac{(350 + 5250) - 5000}{5000} \times 100 = 12\%$$

(1 + HCR) = (1 + $ return) x (1 + Prem on $)
= (1 + 0.12) x (1 + 0.02)
∴ HCR = (1.1424 - 1)
= 0.1424 **[i.e., 14.24%]**

QUESTION -8B

Standard & poor Index ⇨ In short, S & P 500:

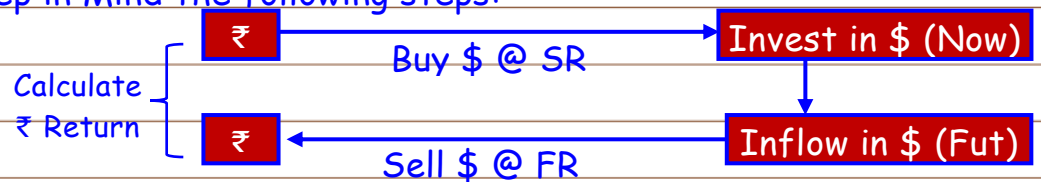
- Group of 500 stocks listed on New York stock (NYSE) .
- Investment in S&P500 ⇨ Investment in 500 shares listed on NYSE

(i) Return for a US investors:

- Calculate return of S & P Index
- Return $= \frac{Value\ at\ end - value\ at\ beg}{value\ at\ beg}$

$$= \frac{1919 - 2028}{2028} \times 100 = \mathbf{-\ 5.37\ \%}\ \text{(i.e., Loss of 5.37\%)}$$

Keep in Mind the following steps:



(ii) Holding period return of Mr. X (in ₹):

(a) **Initial investment** = ₹ 1.58 cr.

(b) **Inflow at end (in ₹)**

Investment in $ $= \frac{158,00,000}{62.25}$ = $253815.26

Price of S&P = 2028

Quantity Bought $= \frac{253815.26}{2028}$ = 125.155 units

Sale value = 125.155 units @ 1919

= $ 2,40,172.445

Equivalent ₹ at 1Y FR = ₹ 240172.445 x 67.25

[Inflow at 1y end] = ₹ 161,51,596.92

(C) Return in ₹ currency $= \frac{Inflow\ at\ end - Investment}{Investment} \times 100$

$= \frac{161,51,596.92 - 158,00,000}{158,00,000} \times 100$

= **2.23%**

(iii) Indian market Index value on 1.1.2012

- At indifference Point, return in Indian market should also be 2.23% (i.e., equal to return from investment in S&P)
- Index value = 7395 + (2.23% of 7395) = **7560**

CONCEPT: WITH HOLDING TAX

- It is a Tax Deducted at Source (TDS) on payment made to foreign party (i.e., Income of foreign party)

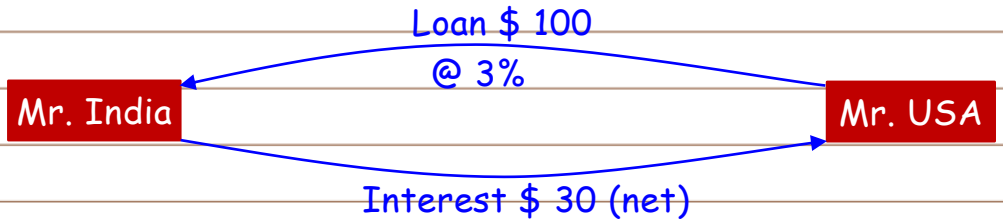
- **Example:**

Mr. India borrowed $100 from Mr. USA at 3% p.a. (net of any taxation).

It means with holding tax burden should be borne by Mr. India

Assume with holding tax = 10%

Calculate cost of borrowing to Mr. India.



Assume, cost to Mr. India = X

Cost = Net payment to Mr. USA + With holding tax

$X = \$ 30 + (X \times .10)$

$X - (X \times 0.10) = 30$

$$X = \frac{30}{(1-0.10)} \text{ Or, } \left[\frac{\text{Net Payment}}{(1-\text{with holding tax})}\right]$$

$= 33.3333$

Hence,

Cost to Mr. India	= 33.3333
Less: with holding tax @10%	= 3.3333
Net payment to Mr. USA	= 30

Summary:

Cost to Mr. India $= \left[\frac{\text{Interest Cost}}{(1-\text{With holding tax})}\right]$

Question -8C

Requirement = € 100,000 for 12 Months

(i) Loan from German Bank:

Not for Exam:

From German, company can take loan in € currency which is the requirement of company. Hence no need to convert one currency into another. Hence borrowing cost itself is cost to company.

Cost of company = Loan cost + processing fee

= 5% + 0.25% = 5.25%

(ii) Loan from US Bank:

$ cost of borrowing = 4% p.a.

€ cost of borrowing = ?

Prem/Disc on $ $= \frac{(1 + € \text{ rate})}{(1 + \$ \, rate)} - 1$

$= \frac{(1 + 0.05)}{(1 + 0.04)} - 1$ = 0.0096 or, 0.96%

Calculation of € cost: (ICAI)

Effective cost including withholding tax (in $) $\left(\frac{4\%}{(1-0.08)}\right)$	4.35%
Add: Premium on $	0.96%
Total cost in €	**5.31 %**

Disclaimer (Not for Examination):

Above adjustment of premium is approx. adjustment not exact adjustment.

Approx Calculation: € cost = $ cost + Premium on $

Exact Calculation: (1 + € cost) = (1 + $ cost) x (1 + $ prem)

NS solution:

(i) € Cost excluding Withholding tax:

(1 + € cost)	= (1 + 0.04) x (1 + 0.0096)	
(1 + € cost)	= 1.05	
€ cost	= 1.05 – 1 = 0.05	5%

(ii) Withholding tax:

Gross value (including withholding tax)

$$= \left[\frac{4\%}{(1 - 0.08)}\right] = 4.348\%$$

Withholding tax cost	= [4.348 x 8%] = 0.348%	0.348%
(iii) Total cost		**5.348%**

(iii) Loan from Swiss Bank:

CHF cost of borrowing = 3%

€ cost of borrowing = ?

Prem/Disc on CHF $= \frac{(1 + € \text{ rate})}{(1 + CHF\ rate)} - 1$

$= \frac{(1 + 0.05)}{(1 + 0.03)} - 1 = 0.0194$ or, 1.94%

€ cost of borrowing: (ICAI)

Effective cost gross of withholding tax (CHF cost) $\left(\frac{3\%}{(1 - 0.08)}\right)$	3.26%
Add: Premium on CHF	1.94%
Total cost in €	**5.20 %**

Alternatively:

We can do exact adjustment of premium/discount as shown above in point (ii). Calculation ⇨ Home Work. **Ans: 5.26%**

Summary:

(i) Loan from German = 5.25% cost

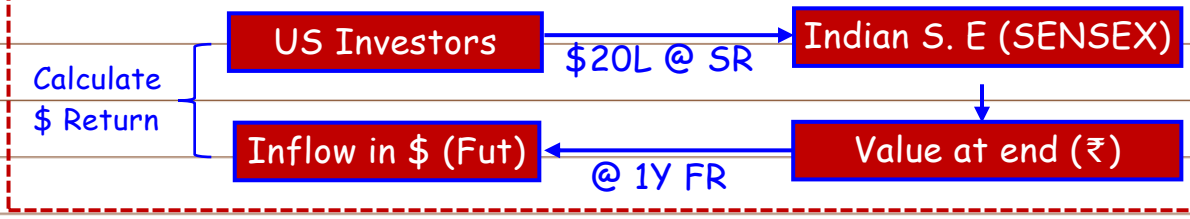
(ii) Loan from US = 5.31% cost

(iii) Loan from Swiss = 5.20% cost

Advise: Take Loan form Swiss Bank as cost is lower.

QUESTION - 8D

Not For Examination

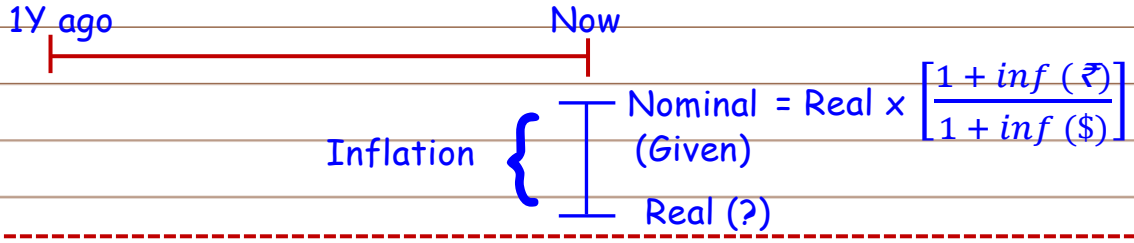


(i) Nominal rate of return to US investor:

Investment in ₹ @SR (20,00,000 x 42.50)	850,00,000
Value of Investment at end $(850,00,000 \times \frac{3765}{3256})$	982,87,776
Equivalent $ at end $\left[\frac{98287776}{43.90}\right]$	22,38,901.5
Return to US Investor = $\frac{22,38,901.50 - 20,00,000}{20,00,000}$	= **11.945%**

(ii) Real appreciation/Depreciation of ₹:

Not For Examination



Current Real rate:

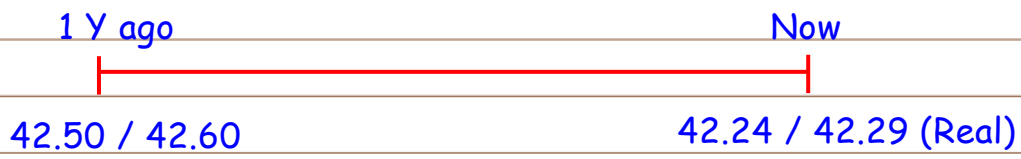
(a) For Bid rate:

Real SR (₹/$) $\times \frac{1+\text{inflation (₹)}}{1+\text{inflation (\$)}}$	= Nominal SR (₹/$)
or, Real SR $\times \frac{1+.09}{1+.05}$	= 43.85
∴ Real SR (Bid)	= $43.85 \times \frac{(1+.05)}{(1+.09)}$ = 42.24

(b) For Ask rate:

Real SR (Ask) = $43.90 \times \frac{(1+.05)}{(1+.09)}$ = 42.29

∴ Real SR (Ask) = 42.24 / 42.29



Real Appreciation /Depreciation:

(a) on Bid rate $= \frac{42.24-42.50}{42.50} \times 100 = -0.61\%$ on $

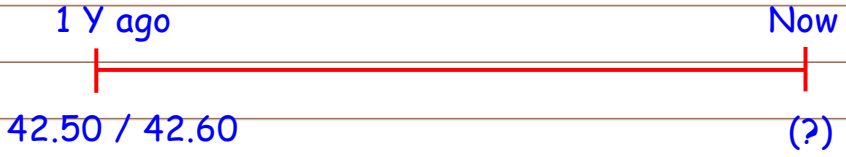
ICAI: Premium on ₹ = 0.61%

(b) on Ask rate $= \frac{42.29-42.60}{42.60} \times 100 = -0.73\%$

NS Opinion: (a) Prem/disc on ₹ $= \frac{SR-FR}{FR} = \frac{42.50-42.24}{42.24} \times 100 = 0.616\%$ (on Bid)

(b) Prem/disc on ₹ $= \frac{SR-FR}{FR} = \frac{42.60-42.29}{42.29} \times 100 = 0.733\%$ (on Ask)

(iii) Exchange rate if PPPT holds good:



(a) Bid rate: $\left[42.50 \times \frac{1+.09}{1+.05}\right] = 44.12$

(b) Ask rate: $\left[42.60 \times \frac{1+.09}{1+.05}\right] = 44.23$

∴ Exchange rate: 44.12 / 44.23

(iv) Real return to Indian investor:

(1 + real return (₹)) × (1 + inflation) = (1 + nominal return (₹))

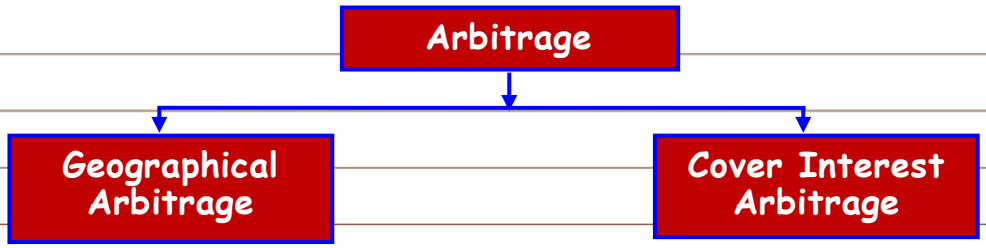
or, (1 + real return) × (1 + .09) = (1 + .1563)*

* Sensex return (nominal) $= \frac{3765-3256}{3256} \times 100 = 15.63\%$

∴ Real return $= \frac{(1+.1563)}{(1+.09)} - 1 = 1.0608 - 1 = .0608$ (i.e., 6.08%)

CONCEPT: ARBITRAGE

- Act to earn risk free profit is known as arbitrage.
- Arbitrage profit arises when there is mismatch in exchange rate of same currency in two different market and when interest rate and exchange rates are not based on parity.



(A) GEOGRAPHICAL ARBITRAGE:

- It arises when there is mismatch in spot rate of same currencies in different market.
- **Action:**

  (i) Buy a currency at low rate in one market and

  (ii) Sale same currency at high rate in another market.
- We may face difficulty to find low rate and high rate of a currency when more than two markets rate are given.

  In this situation, we use cross rate to find mismatch.

Example:

Mumbai : $1 = ₹75

London : £1 = ₹100

New York : £1 = $ 1.30

To check mismatch in exchange rate we need two exchange rates of same currencies. For this we have following three alternatives.

(i) Calculate cross rate of ⇨ $ & ₹ ⇨ Using London & New York rate and compare with Mumbai rate ($ & ₹).

(ii) Calculate Cross rate of ⇨ $ & £ ⇨ Using Mumbai and London rate and compare with New York rate (£ & $)

(iii) Calculate Cross rate of ⇨ £ & ₹ ⇨ Using Mumbai & New York rate and Compare with London rate (£ & ₹)

⇨When two rates of same currency is different, we can say there is mismatch and we can earn arbitrage by purchasing at low rate and selling at high rate.

In our example:

Cross rate (London & New York)

$ 1.30 = ₹ 100 = £1

$1 = ₹ $\frac{100}{1.30}$ = ₹ 76.9231

- Higher than ₹75 of Mumbai rate.
- Hence, we can say there is mismatch.
- Action:

  Buy $ in Mumbai & sale $ in London & NY

  OR,

  Sale ₹ in Mumbai & Buy ₹ in London & NY

⇨ Alternatively, we can check mismatch using other currencies too but result remains same.

⇨ In exam, we can check mismatch for any currencies.

⇨ **Calculation of Arbitrage:**

- As there is mismatch any one of following three parties can earn arbitrage using given rates:

  A). Mr. India (who has ₹ xxx)

  B). Mr. USA (who has $ xxx)

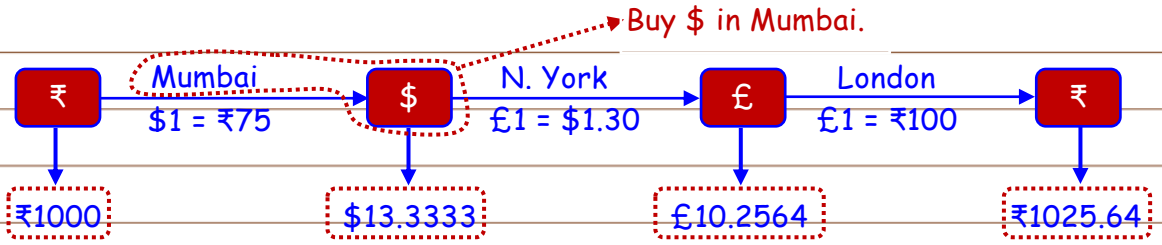
  C). Mr. UK (who has £xxx)

- For all three parties there are two routes but only one route is profitable for each. (i.e., Buy $ in Mumbai as decided above)
- Profit from one route ≠ Loss of another route.

(A) Arbitrage for Mr. India:

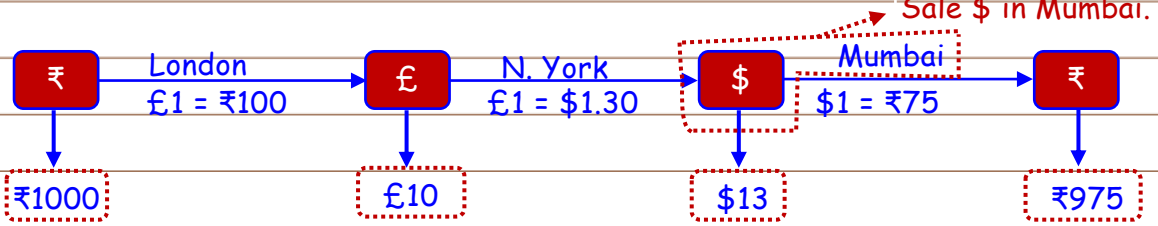
Assume Mr. India has ₹1000.

Route-1:(Profitable route: Buy $ in Mumbai)



Arbitrage gain = ₹1025.64 - 1000 = **₹25.64**

Route-2: Non profitable route: Sale $in Mumbai



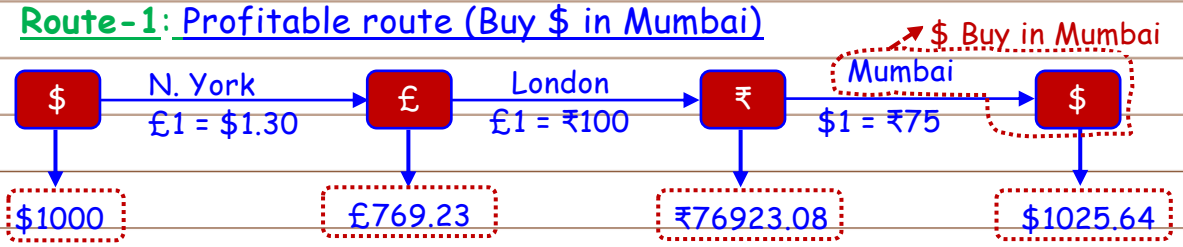
Loss =₹ (1000 - 975) = **₹25**

Here, Gain of Route 1 is not exactly equal to route -2

(B) Arbitrage for Mr. USA:

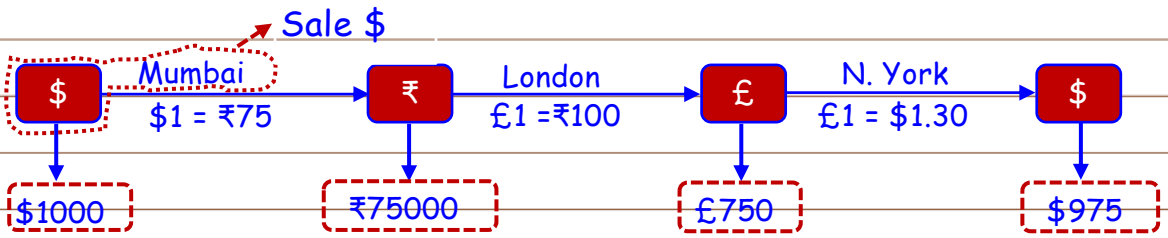
Assume Mr. USA has $1000.

Route-1: Profitable route (Buy $ in Mumbai)



Arbitrage gain = ($1025.64 -1000) =**$25.64**

Route-2: Non profitable route (Sale $ in Mumbai)

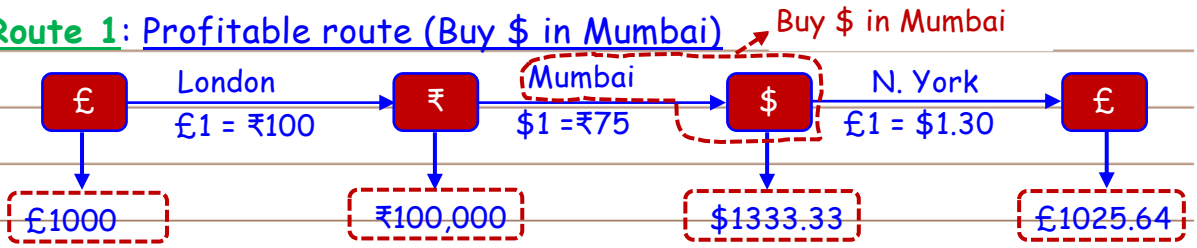


Arbitrage gain =$(1000 - 975) =**$25**

(C) Arbitrage for Mr. UK:

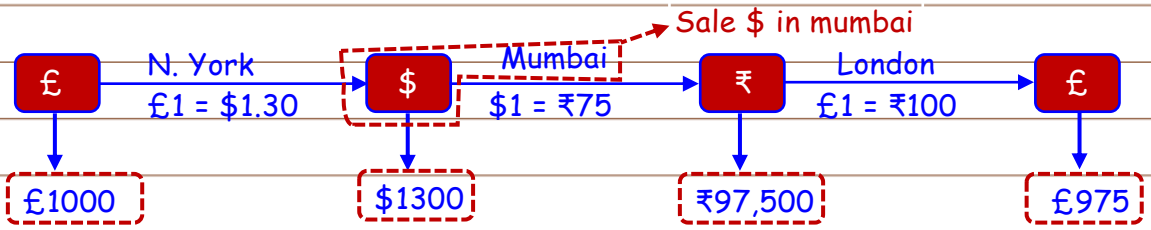
Assume Mr. UK has £1000.

Route 1: Profitable route (Buy $ in Mumbai)



Arbitrage gain =£ 1025.64 - £1000 =£25.64

Route 2: Non Profitable route (Sale $ in Mumbai)



Loss in this route =£ (1000 - 975) =£25

Conclusion:

- Arbitrage gain remains same for all parties if we use same exchange rates.
- In examination, we don't have to show non profitable route calculation.
- If anyone of you feel difficulty to find profitable route then proceed randomly from any route. If first route provides gain then no need to check arbitrage from another route, otherwise check arbitrage from another route too.

CONCEPT: FINDING PROFITABLE ROUTE IN TWO WAY QUOTE

In two way quote, customer buys base currency at Ask Rate and sells base currency at Bid Rate.

Example-1:

Mumbai : $1 = ₹75.00 / 76.00
New York : $1 = ₹76.25 / 76.90

Route-1: Profitable

Buy $ in Mumbai @76 and sell $ in New York @76.25

Route-2: Non Profitable

Buy $ in New York @76.90 and sell $ in Mumbai @75

Example 2:

Mumbai : $1 = ₹ 75.00 / 75.50
London : £1 = ₹ 100.00 / 100.50
N. York : £1 = $ 1.30 / 1.32

Now, we have to check for mismatch in exchange rate by calculating cross rate to find profitable route.

We have three choices as explained earlier.

Cross Rate: [₹ per $ =?]⇨Using London and N. York rate

$$\left[\frac{₹}{\$}\right] = \left[\frac{₹}{£} \times \frac{£}{\$}\right]_{Bid} \quad / \quad = \left[\frac{₹}{£} \times \frac{£}{\$}\right]_{Ask}$$

$$= \left[100 \times \frac{1}{1.32}\right] \quad / \quad \left[100.50 \times \frac{1}{1.30}\right]$$

∴$1 = ₹ 75.76 / 77.31 — $ sale

Compare with Mumbai rate:

$1 = ₹ 75 / 75.50 — $ Buy

Profitable route:

Buy $ in Mumbai and Sale $ in London & New York.

Note:

- In two-way quote, it may be possible that there is loss in both route due to higher spread.

Example:

Mumbai : $1 = ₹ 75.00 / 76.00

New York : $1 = ₹ 75.50 / 77.00

Here, no gain in any route.

Route-1:

- Buy $ in Mumbai @76 and sale $ in New York @75.50.
- Buy at High rate and sale at Low rate (i.e. Loss)

Route-2:

- Buy $ in New York @ 77 and sale $ in Mumbai @ 75
- Buy at High rate and sale at Low rate (i.e. Loss)

QUESTION -9A

- Finding profitable route

(i) Mumbai: $1 = ₹48.30

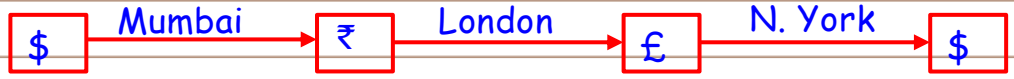
(ii) Cross rate:

$$\left[\frac{₹}{\$}\right] = \left[\frac{₹}{£} \times \frac{£}{\$}\right]$$

$$\therefore \$1 = 77.52 \times \frac{1}{1.6231} = ₹47.76$$

As above two rates are different, there is mismatch in exchange rate. Hence, arbitrage is possible by selling $ in Mumbai.

Calculation:



(i) Sale $ and buy ₹ in Mumbai:

$1 = ₹48.30

$100 lakh = ₹ (48.30 × 100) = ₹ 4830 lakhs

(ii) Sale ₹ and buy £ in London:

£ 1 = ₹ 77.52

₹ 4830 lakhs = £ $\left(\frac{1}{77.52} \times 4830\right)$ = £62.30650 lakh

(iii) Sale £ and buy $ in New York:

£1 = $1.6231

£63.30650 = $ (1.6231 × 62.30650 = $ 101.12968 lakh

Arbitrage gain = $(101.12968 - 100) = $ 1.12968 lakhs

QUESTION -9B

Interpretation:(Not for exam)

If possible, use all information's given in question. We can use exchange margin, when we assume given exchange rates are Inter Bank rate.

Hence, Assume rates are Inter Bank.

Mumbai:	$1	=	59.25	59.35
			- 0.125%	+ 0.125%
		=	59.18	59.42
London:	£1	=	₹ 102.50	103.00
			- 0.125%	+ 0.125%
		=	₹ 102.37	103.13
New York:	£1	=	$ 1.70	1.72
			- 0.125%	+ 0.125%
		=	$ 1.698	1.722

Finding profitable Route:

Cross rate of $ & ₹ using London & New York

$$\left[\frac{₹}{\$}\right] = \left[\frac{₹}{£} \times \frac{£}{\$}\right]$$

$$= \left(102.37 \times \frac{1}{1.722}\right) / \left(103.13 \times \frac{1}{1.698}\right)$$

$1 = 59.45 / 60.74

Compare with

Mumbai: $1 = 59.18 / 59.42

Finding: Buy $ in Mumbai and sell in New York for gain.

Calculation of Arbitrage: Gain:

(i) sale $ and buy £ in New York

£1 = $ 1.698 / 1.722

$ 1.722 = £1

$ 100,00,000 = £ $\left(\frac{1}{1.722} \times 100,00,000\right)$

= £ 5807200.93

(ii) sale £ and buy ₹ in London

£1 = ₹102.37 / 103.13

= ₹ (102.37 x 5807200.93)

= ₹ 59,44,83,159.20

(iii) sale ₹ and buy $ in Mumbai

$1 = 59.18 / 59.42

₹ 594483159.20 = $ $\left(\frac{1}{59.42} \times 594483159.20\right)$

= $ 100,04,765.38

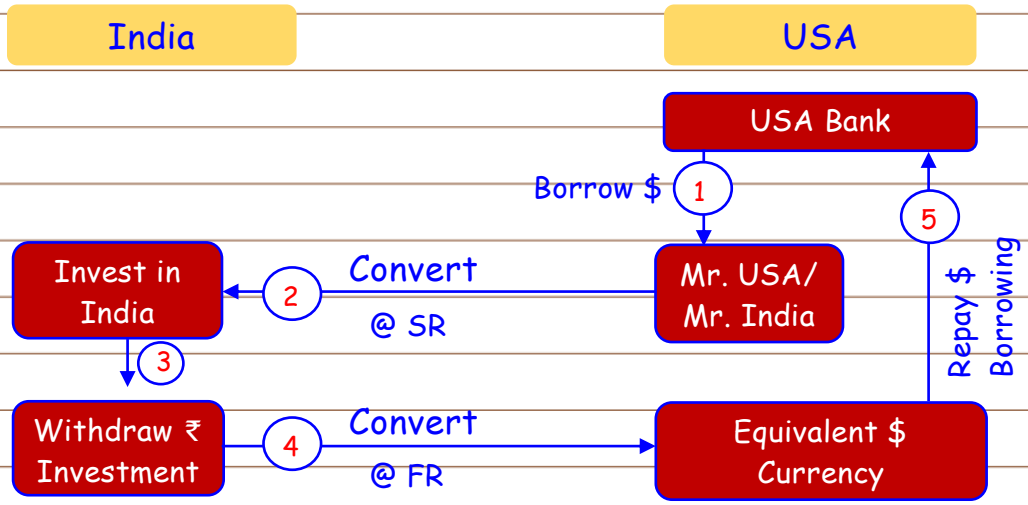
(iv) Gain = 100,04,765.38 - 100,00,000 = 4765.38

(B) COVER INTEREST ARBITRAGE

- This arbitrage arises when there is mismatch in exchange rate and interest rate of 2 currencies (i.e., Not based on parity ⇨IRPT).
- Suppose involved countries are India and USA

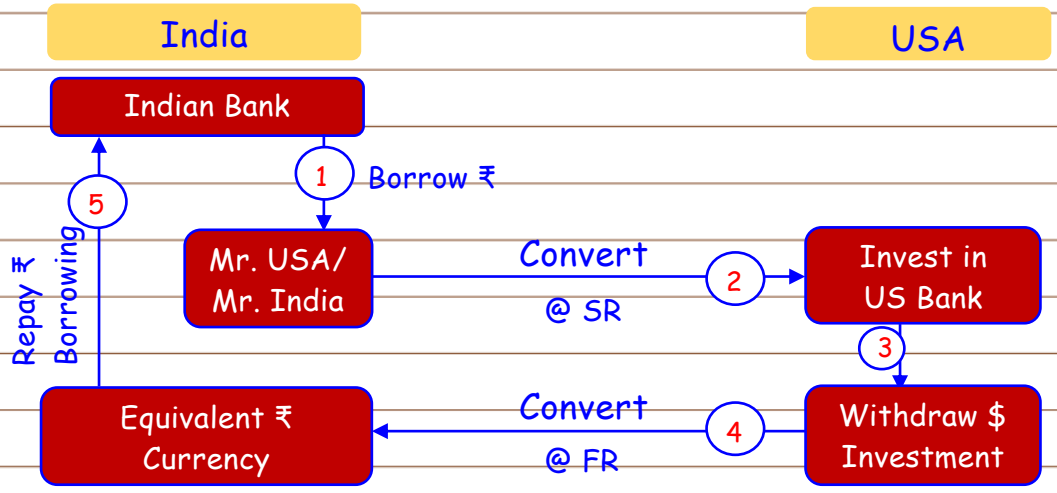
  In this case we have following 2 routes to check arbitrage

Route -1: (Borrow in USA and Deposit in India)



Surplus (if any) of 5th step is arbitrage.

Route-2: (Borrow in India and Deposit in USA)



Surplus (if any) of 5th step is arbitrage.

Note:

(i) Arbitrage is possible when interest and exchange rates are not based on parity (i.e., IRPT) but gain is possible in any one route only.

(ii) We can find profitable route by checking parity when exchange rates are one way quote and single interest rate is given for both borrowing and deposit of a currency. (Refer next concept)

(iii) We can't check profitable route directly, if exchange rates are 2-way quote and/ or, borrowing/ deposit rates are different.

In this case, we have to proceed randomly from any one route. If first route provide loss, then check arbitrage from another route also. However, if first route provide gain then no need to check arbitrage from another because gain from both route is not possible.

(iv) In two-way quote or, different borrowing/ deposit rate there is possibility of loss in both routes because customer:

- Buys a currency at higher rate (Ask)
- Sells a currency at lower rate (Bid)
- Borrows money at high interest rate.
- Deposit money at low interest rate.

CONCEPT: FINDING PROFITABLE ROUTE:

(When exchange rates are one way quote and single interest rate is applicable for both borrowing and deposit)

- To find profitable route first we have to check for parity.

If FR, SR and 2 countries interest rate are not based on IRPT then arbitrage is possible.

- **Example:**

SR:	$1 = ₹75	Interest (₹)	= 8% p.a.
1y FR:	$1 = ₹78	USA ($)	= 5% p.a.

According to IRPT:

$$FR\ (₹/\$) = SR\ (₹/\$) \times \frac{[1 + PIR(₹)]}{[1 + PIR(\$)]}$$

$$\text{or, } FR\ (₹/\$) \times [1+ PIR\ (\$)] = SR\ (₹/\$) \times [1+PIR\ (₹)]$$

$$\text{or, } [1+PIR\ (₹)] \times SR\ (₹/\$) = FR\ (₹/\$) \times [1+ PIR\ (\$)]$$

$$\text{or, } [1+PIR\ (₹)] = [1+ PIR\ (\$)] \times \frac{FR\ (₹/\$)}{SR\ (₹/\$)}$$

Remember this step of parity.

(1+ ₹ rate) (1+ $ rate) (1+ prem/disc on $)

Here, $\left[\frac{FR}{SR}\right]$ → Indicates (1+ premium) or (1-discount)

Explanation:

Now — 1Y End

SR: 75 per $ FR: 78 per $

$$\frac{FR}{SR} = \frac{78}{75} = 1.04 \text{ (i.e., 1+0.04)}$$

Here, $ is at 4% premium.

Conclusion:

Parity check to find profitable route:

$$[1+PIR\ (₹)] = [1+ PIR\ (\$)] \times \frac{FR\ (₹/\$)}{SR\ (₹/\$)}$$

LHS RHS

(i) If LHS = RHS → FR, SR and 2 countries interest rate are based on IRPT → No arbitrage

(ii) If LHS > RHS → Invest in ₹ and borrow in $ for Arbitrage

(iii) If LHS < RHS → Invest in $ and borrow in ₹ for Arbitrage

Note:

If someone of you still face difficulty to find profitable route, then forget above discussion and proceed randomly from any one route. If first route provide gain, then no need to check arbitrage from another route as gain from both route is not possible. However, if first route provide loss, then must check arbitrage from another route also.

QUESTION -10A

(i) Parity Check

According to IRPT,

$$[1 + PIR\ (CAD)] = [1 + PIR\ (DEM)] \times \frac{FR}{SR}$$

$$\text{Or, } (1 + 0.09 \times \frac{3}{12}) = (1 + 0.07 \times \frac{3}{12}) \times \frac{0.78}{0.775}$$

Or, 1.0225 ≠ 1.024

As, LHS ≠ RHS, we can say Interest rate parity does not hold.

(ii) Arbitrage:

As LHS < RHS, arbitrage is possible by borrowing in CAD and deposit in DEM

(a) Borrow CAD 1 mill

(b) Convert @ SR

1 DEM = CAD 0.775

CAD 1 mill = DEM $(\frac{1}{.775} \times 1)$

= DEM 1.290323 [i.e., DEM 12,90,323]

(C) Deposit DEM 1290323 @ 7% for 3m

Withdrawal = DEM 12,90,323 $(1+0.07\times \frac{3}{12})$

= DEM 13,12,904

(d) Convert @ 3m FR:

DEM 1 = CAD 0.780

DEM 1312904 = CAD (0.780 x 1312904)

= CAD 1024065

(e) Repay CAD borrowing

= 10,00,000 $(1+0.09\times \frac{3}{12})$ = CAD 10,22,500

(f) Arbitrage Gain = CAD 1024065 - 10,22,500 = CAD 1565

QUESTION -10B

$$[1 + PIR (€)] = [1 + PIR ($)] \times \frac{FR(€/\$)}{SR(€/\$)}$$

$$Or, (1 + 0.05 \times \frac{3}{12}) = (1 + 0.08 \times \frac{3}{12}) \times \frac{1.0101}{1.0114}$$

$$Or, 1.0125 \neq 1.0187$$

As, LHS ≠ RHS, Arbitrage is possible for this borrow in (€) and deposit in $

Calculation:

(i) Borrow equivalent € of $1 mill

SR: $1 = € 1.0114

$10,00,000 = € (1.0114 x 10,00,000) = € 10,11,400

(ii) Convert @ SR

$1 = € 1.0114

€ 1011400 = $\$\frac{1}{1.0114} \times 1011400 = \$ 10,00,0000$

(iii) Deposit $ @ 8% p.a.

Withdrawal = $10,00,000 (1+0.08\times\frac{3}{12}) = \$ 10,20,000$

(iv) Convert @FR

$1 = € 1.0101

$1020.000 = € (1.0101 × 10,20,000) = € 10,30,302

(v) Repay € borrowing

$= € 10,11,400 \times \left(1 + .05 \times \frac{3}{12}\right) = € 10,24,042.5$

(vi) Arbitrage = € (10,30,302 – 10,24,042.5) = € 6259.5

Or,

3m FR: $1 = € 1.0101

€ 1.0101 = $1

$€ 6259.50 = \$ \left(\frac{1}{1.0101} \times 6259.50\right) = \$ 6196.91$

QUESTION - 10C

True Blue Cosmetics (TBC) = From India

Order received = FFr. 80,00,000

Current policy = Invoice in ₹

(i) Arbitrage:

Parity Check (₹/FFr.)

$$[1 + PIR\ (₹)] = \frac{FR}{SR} \times [1 + PIR(FFr.)]$$

$$\text{or, } (1 + .09 \times \frac{3}{12}) = \frac{6.50}{6.60} \times [\,1 + .12 \times \frac{3}{12}\,]$$

$$\text{or, } 1.0225 = 1.0144$$

As LHS ≠ RHS, these are not based on Parity and hence arbitrage is possible. For this borrow in FFR and deposit in ₹.

Calculation: Do Yourself

(ii) Decision on action taken by Mr. E:

First calculate fair forward rate using IRPT and then compare with action forward rate for decision.

$$FR(₹/FFr) = SR\ (₹/FFr) \times \frac{1+PIR\ (₹)}{1+PIR(FFr)}$$

$$= 6.60 \times \frac{\left(1+ .09 \times \frac{3}{12}\right)}{\left(1+ .12 \times \frac{3}{12}\right)} = 6.55$$

Fair FR: 1 FFr = ₹ 6.55

Actual FR quoted by Bank: 1 FFr. =₹ 6.50

Decision: Action of Mr.E is not correct as he entered into forward to sell FFr at low rate (6.50).

Negotiation: If bank agrees for negotiation then FR should be 6.55.

QUESTIONS - 10D

Case-I: Borrow in USA and deposit in Canada.

(i) Suppose borrowing amount = $1000

Borrow @4% for 90 days

(ii) Equivalent Can$ at SR

$1 = Can$ **1.235** / 1.240

$1000 = Can$ (1.235 × 1000) = Can$1235

(iii) Invest Can$ 1235 at 3.5% for 90 days

Withdrawal = Can$ $1235 \times \left(1 + .035 \times \frac{90}{360}\right)$

= Can$ 1245.81

(iv) Equivalent $ at 3m FR

$1 = Can$ 1.255 / **1.260**

Can$ 1.260 = $1

Can$ 1245.81 = $ $\left(\frac{1}{1.260} \times 1245.81\right)$ = $ 988.738

(v) Repay $ borrowing

Repayment amount = $ 1000 × $\left(1 + .04 \times \frac{90}{360}\right)$ =$ 1010

(vi) Loss in this route = 1010 - 988.738 = $ 21.262

Case-II: Borrow in Canada and Deposit in USA

(i) Borrow equivalent amount of $1000 in Can$

SR: $1 = Can$ 1.235 / **1.240**

$ 1000 = Can$ (1.240 × 1000) = Can$ 1240

[Buy $ @ask rate deposit $ in USA]

Note: Alternatively, we may assume Can$ 1000 borrowing also. Our decision remains same.

(ii) Equivalent $ @ SR = $ 1000

(iii) Invest $1000 in USA @2.5% for 90 days.

$$\text{Withdrawal} = \$\ 1000 \times \left(1 + .025 \times \frac{90}{360}\right)$$

$$= \$\ 1006.25$$

(iv) Equivalent $ @ FR

$1 = Can$ **1.255** / 1.260

$ 1006.25 = Can$ (1.255 × 1006.25) = Can$ 1262.84

(v) Repay Can$ Borrowing

$$\text{Repayment amount} = \text{Can\$ } 1240 \times \left(1 + .045 \times \frac{90}{360}\right)$$

$$= \text{Can\$ } 1253.95$$

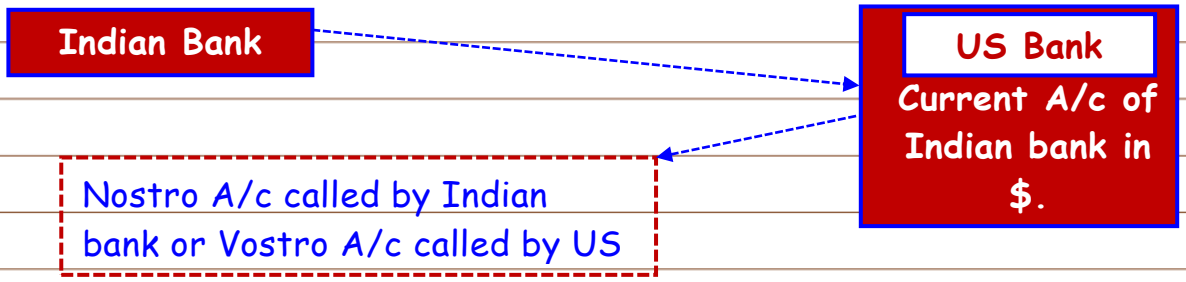
(vi) Gain in this route = 1262.84 - 1253.95 = Can$ 8.89

Conclusion: Borrow in Canda and Deposit in USA to earn arbitrage profit.

CONCEPT: NOSTRO, VOSTRO AND LORO ACCOUNT

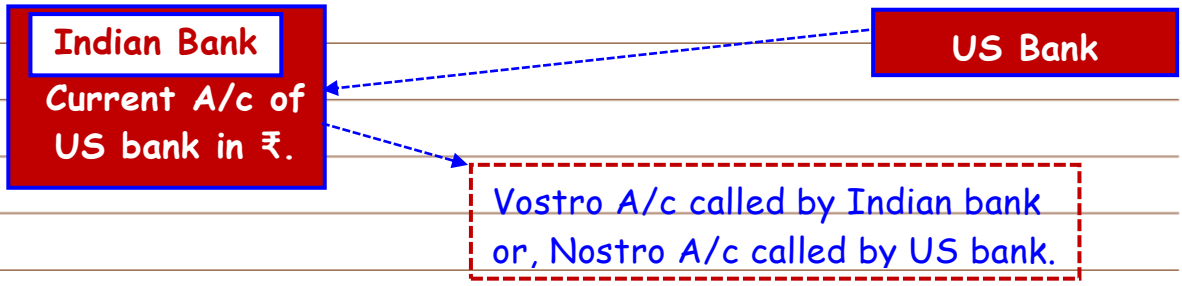
(A) Nostro Account [Our account with you]

Current account of domestic bank maintained with overseas bank in foreign currency is known as Nostro Account.



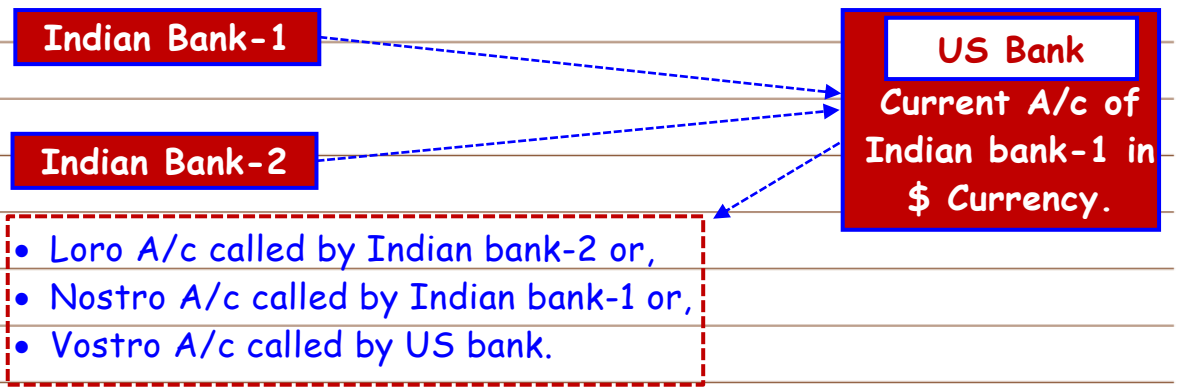
(B) Vostro account [Your account with us]

Current account of overseas bank maintained with domestic bank in domestic currency is known as Vostro account.



(C) Loro Account [Our account for their money with you]

Current account of one domestic bank maintained with overseas bank in foreign currency referred by another domestic bank for its own transaction is known as loro account.



Use of Nostro, Vostro and Loro Account

These accounts are useful in TT transaction [telegraphic transfer] of foreign currency.

Settlement [Electronic transfer]:

Indian bank: Pay ₹7500 lakh to U.S. bank [i.e., ₹ A/c of U.S. bank which may be Nostro A/c or Vostro or Loro A/c]

U.S. bank: Pay $100 lakh to Indian bank [i.e., $ A/c of Indian bank which may be Nostro A/c or Vostro A/c or Loro A/c]

.

CONCEPT: EXCHANGE POSITION AND NOSTRO ACCOUNT BALANCE

(A) Exchange Position

- Foreign currency detail maintained by domestic bank is known as exchange position.
- Overbought position ⇨ Excess of purchase over sale.

Example:

Buy	⇨	$1000
Sale	⇨	$700
Overbought position	⇨	$300

- Oversold position ⇨ Excess of sale over purchase

Example:

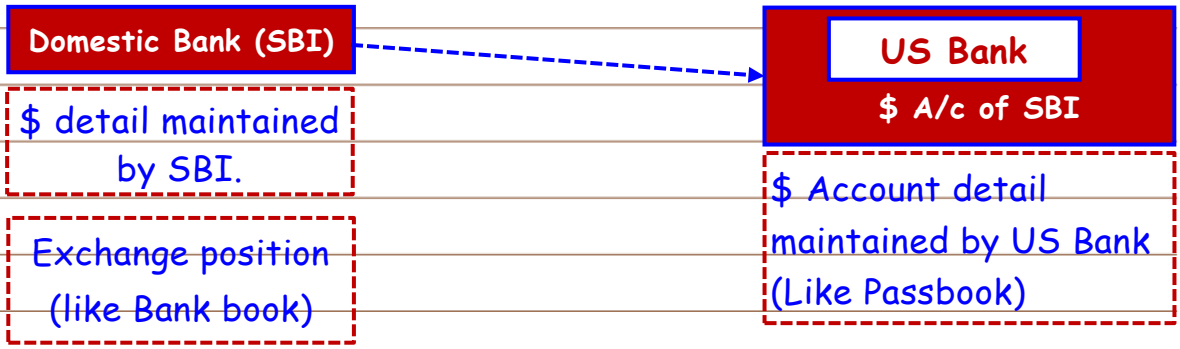
Purchase	⇨	$800
Sale	⇨	$1000
Oversold position	⇨	$200

- Practically, oversold position is possible when bank has to give delivery of currency later on (i.e., in future).

(B) Nostro Account balance (Cash Position)

- Nostro account details are maintained by foreign bank (i.e., Think like passbook maintained by foreign bank)
- Credit balance of Nostro account indicates deposit (i.e., Positive balance)
- Debit balance of Nostro account indicates overdraft (i.e., Negative balance)

Summary



Note: Exchange position may differ from Nostro account balance due to timing difference of recording of transactions.

CONCEPT: EFFECT OF DIFFERENT TYPES OF TRANSACTIONS ON NOSTRO ACCOUNT BALANCE AND EXCHANGE POSITION

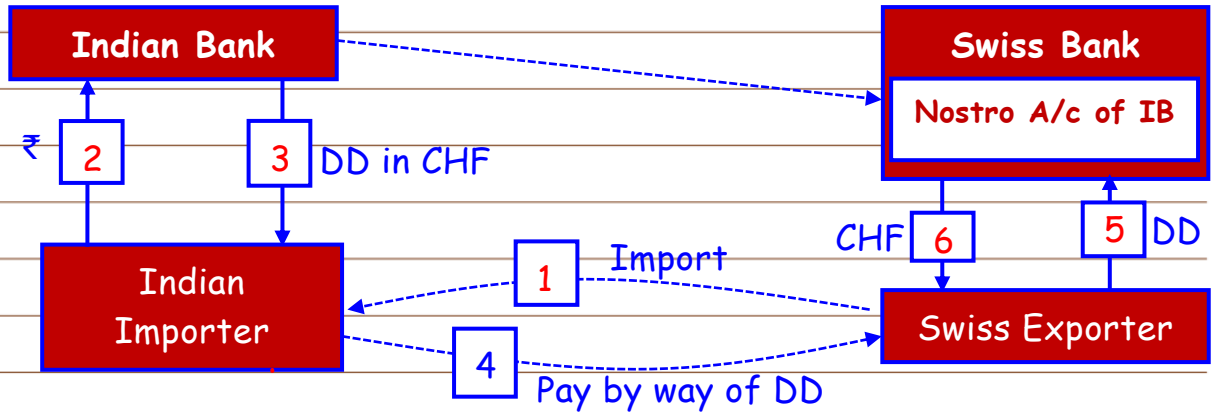
S.N.	Transactions (TT)	Effect on exchange position (Like Bank book)	Effect on Nostro A/c balance (Like Passbook)
1.	Spot purchase of foreign currency	Increase today	Increase today
2.	Spot sale of foreign currency	Decrease today	Decrease today
3.	Forward purchase of foreign currency	Increase today	Increase on due date
4.	Forward sale of foreign currency	Decrease today	Decrease on due date
5.	Forward purchase contract cancelled	Decrease today	No Effect
6.	Forward sale contract cancelled	Increase today	No Effect
7.	DD in foreign currency issued (#)	Decrease today	Decrease when DD presents in foreign Bank
8.	DD cancelled (#)	Increase today	No Effect
9.	DD Purchased	Increase today	No Effect today
10.	Bills in foreign currency purchased (##)	Increase today	Increase on maturity date
11.	Bills dishonour (##)	Decrease today	No Effect
12.	Remitted foreign currency by TT (Remittance from Nostro to customer)	Decrease today	Decrease today

(#) See Explanation – 1 below

(##) See Explanation – 2 below

Explanation-1: Demand Draft (DD) Transaction:

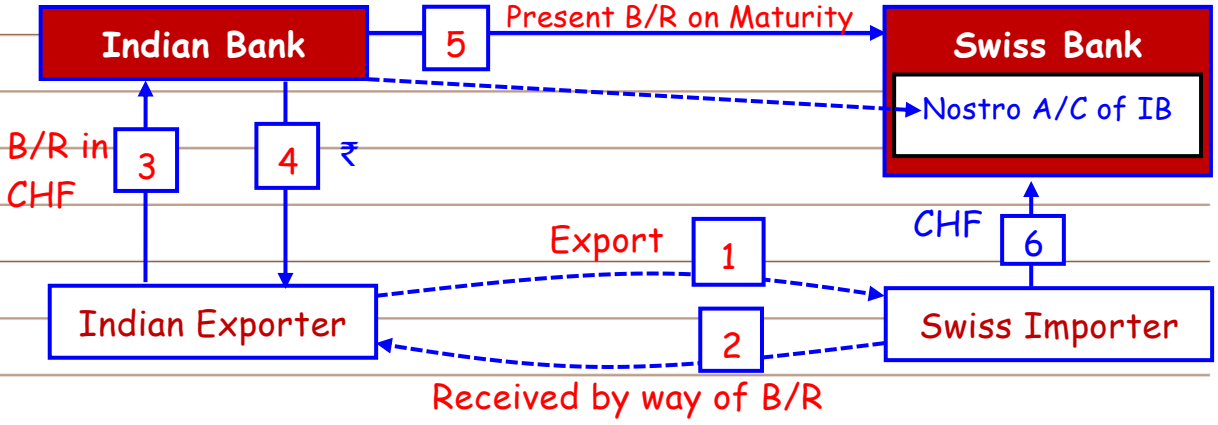
Indian Bank Issues DD in CHF to Importer.



- ⇨ After step-3 Indian bank reduces exchange position.
- ⇨ After step-6 Nostro Account of Indian bank decreases.
- ⇨ If DD cancels due to some reason then step 6 & 5 does not apply and Importer gets money back and hence Indian bank increases Exchange position but No effect on Nostro A/C.

Explanation-2: Bills Receivable (B/R) Transaction:

Indian Bank buys bills receivable from Indian Exporter.

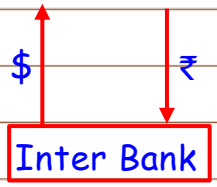


- ⇨ At Step-3 Indian bank increases exchange position.
- ⇨ At Step-5 & 6, Nostro A/C of Indian bank increases.
- ⇨ If B/R dishonor, Indian bank decreases exchange position and in this case there is no effect on Nostro Account.

QUESTION -11A

Inter bank needs $500,000 (i.e., Buy)

Rate: $1 = ₹47.20 / 47.50



Equivalent ₹:

$1 = ₹47.20 / **47.50**

$500,000 = ₹(47.50× 500,000) = ₹237,50,000

Hence, amount to be credited ₹ 237,50,000.

Question -11B

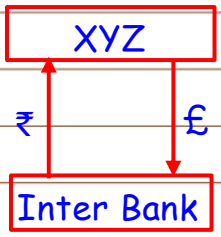
XYZ bank needs ₹25 million

Equivalent amount in £ (?)

Given:

(i) $1 = ₹ 61.3625 / 61.3700

(ii) £ = $ 1.5260 / 1.5270



£ per ₹ cross rate:

$$\frac{£}{₹} = \left[\frac{£}{\$} \times \frac{\$}{₹}\right]_{ASK}$$

$$₹1 = \left[\frac{1}{1.5260} \times \frac{1}{61.6325}\right] = £\ 0.0107$$

₹25 million = £ (0.0107 × 25) million = £ 0.2675 million

Hence, Loro A/c to be credited = £ 0.2675 million.

Question -11C

(i) Exchange Position: "Amount in CHF"

Particulars	Purchase	Sale
Over bought position	50,000	
Bill Purchased	80,000	
Forward TT sold		68,000
Forward Purchase cancelled		30,000
Remitted by TT		75,000
DD Cancelled	30,000	
DD Purchased	8000	
Total	**168,000**	**173,000**

Closing balance (Oversold) = 173,000 – 168,000 = 5,000

(ii) Nastro A/C Balance: "Amount in CHF"

	Credit	Debit
Balance	100,000	
Remittance by TT		75,000
Total	**100,000**	**75,000**

Closing balance (Credit) = 1,00,000 – 75,000 = CHF 25,000

(iii) Action:

(a) Purchase of spot TT for CHF 5000

New Balance: Nostro A/C = 25000 + 5000

= 30,000 (objective achieved)

New Balance: Exchange position = -5000 + 5000 = NIL

(b) Purchase Forward TT for CHF 10,000

New balance (Existing position) = (0 + 10,000)

= 10,000 (Objective achieved)

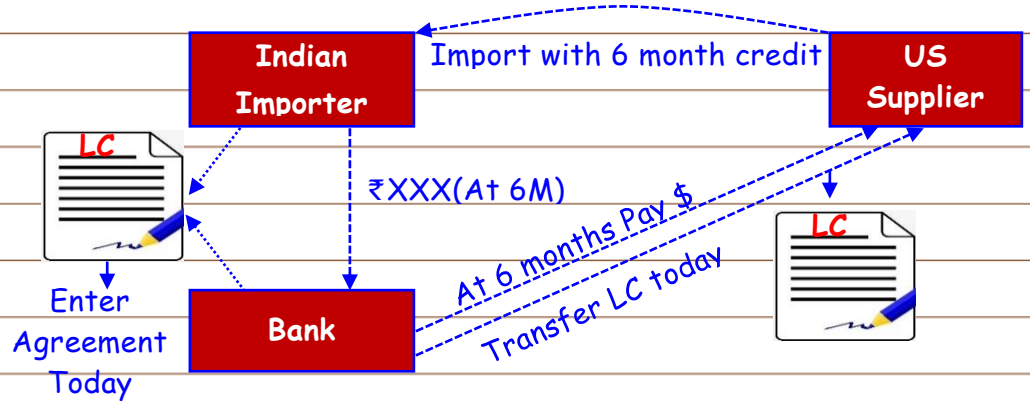
Summary:

(a) purchase spot TT for CHF 5000 &

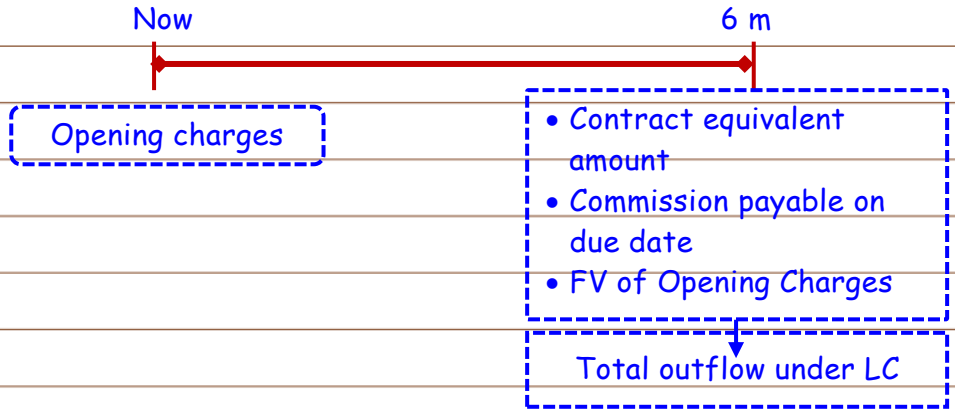
(b) Purchase Forward TT for CHF 10,000

CONCEPT: LC ARRANGEMENT (LETTER OF CREDIT)

- It is a document issued by domestic Bank to foreign exporter on behalf of domestic importer which gives assurance to supplier that he will receive full payment on time.

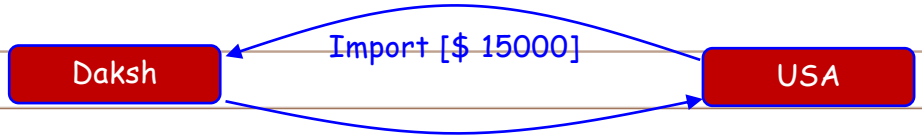


- There are two types of charges involved in this transaction:
  (a) Opening charges payable on equivalent amount calculated on spot rate.
  (b) Periodic commission payable on due date on equivalent amount calculated at forward rate.
- **Total outflow and LC arrangement:**



- **Types of LC:**
  (i) Revocable LC: LC in which term and conditions can be changed without permission of foreign supplier.
  Practically, Revocable LC is not in use.
  (ii) Irrevocable LC: LC in which term and conditions can't be changed without permission of foreign supplier.

Question -12A



(i) pay today by taking Loan
Or, (ii) 180 days credit under LC

(i) Decision on offer from foreign branch:

(a) pay today by taking Loan:

Equivalent ₹ @ SR = (15,000 x 75) = ₹ 11,25,000

Borrow ₹ 11,25,000 @ 19% p.a. for 180 days

Payment $= 11,25,000 \times (1 + 0.19 \times \frac{90}{360})^2$

Hence, Outflow = ₹ 12,34,413

(b) Pay at 180 days under LC:

- Opening Charges $= [11,25,000 \times 2\%] \times \frac{180}{360}$

  = ₹ 11,250 (payable Today)

- Borrow ₹ 11250 @ 19% p.a. for 180 days.

  Repayment $= 11,250 \times (1 + 0.19 \times \frac{90}{360})^2$

  = ₹ 12,344

Equivalent ₹ @ 180 days FR.

= (15,000 x 77) = 11,55,000

- Commission payable at 180 days

  $= (11,55,000 \times 2\% \times \frac{180}{360})$ = ₹ 11,550

- Total outflow under Lc

  = 12,344 + 11,55,000 + 11,550

  = 11,78,894

Advise: AS outflow under LC agreement is lower, it is beneficial to accept foreign branch offer.

(ii) Advice of hedging:

Interprtation (Not for Exam)

- This point is not linked with first point because there is no risk in both options used in point – (i)
- Hedging cost = 30,000 , it means ₹75 rate will be applicable for conversion of currency and in addition pay ₹ 30,000 as hedging cost.
- Another alternative is to do forward cover at ₹77

- Hedging cost in forward contract = (77 – 75) x 15000 = ₹30,000
- As in proposed option, additional expense is ₹ 30,000 which is same as forward contract, we can do so.

FATE OF FORWARD CONTRACT

Whenever any forward contract is entered, normally it meets any of the following three fates.

(A) Delivery under the Contract

(B) Cancellation of the Contract

(C) Extension of the Contract

Further above of fates of forward contract can further classified into following sub-categories.

(A) Delivery under the Contract

(i) Delivery on Due Date; (ii) Early Delivery (iii) Late Delivery

(B) Cancellation of the Contract

(i) Cancellation on Due Date; (ii) Early Cancellation

(iii) Late Cancellation

(C) Extension of the Contract

(i) Extension on Due Date; (ii) Early Extension; (iii) Late Extension

Let us discuss each of above situations one by one.

CONCEPT: CANCELLATION OF FORWARD CONTRACT

- Sometimes forward contract can't be executed due to various reasons. In this situation, customer has to cancel forward contract by taking opposite position of same currency for same amount.
- In fact, cancellation is netting off of foreign currency.
- **Cancellation Action:**

Original Contract	Cancellation Contract
1. Bought $100 @ ₹ X (6m forward rate)	1. Sale $100 @ ₹ Y
2. Sold $200 @ ₹ X (6m forward rate)	2. Purchase $200 @ ₹ Y

- Cancellation loss/gain (X-Y) or, (Y-X)
- Cancellation is also termed as square off or, square up or, netting off of forward contract.

CONCEPT: DIFFERENT DATES FOR CANCELLATION

Forward contract can be cancelled on any of following dates/period.

(i) Cancellation before due date

(ii) Cancellation on due date

(iii) Cancellation after due date:

- Up to (due date + 3 days) --► India
- Up to (due date + 15 days) --► Nepal, India old provision

Note:

If customer didn't approach for cancellation up to 3 days or, 15 days (Nepal) after due date then Bank calculates loss/gain on its own by using opposite transaction exchange rate. This cancellation is also known as Automatic Cancellation.

Example:

Due date of forward contract	= 10th Jan
Automatic cancellation date	= 10+3 = 13th Jan
In Nepal, Automatic Cancellation date	= 10+15 days = 25th Jan

CONCEPT: APPLICABLE RATES TO CANCEL FORWARD CONTRACT ON DIFFERENT DATES

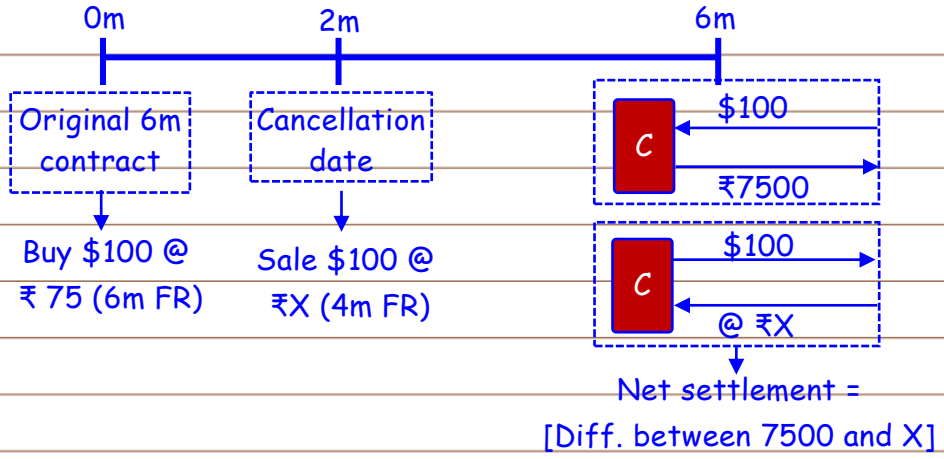
(1) Cancellation before due date:

- To cancel forward contract before due date, enter opposite contract at forward rate of remaining period to due date.
- Example:

  Original forward contract period ⇨ 6 months

  Customer approaches for cancellation after 2 months ⇨ Applicable rate is 4m forward rate prevailing at 2m time

- **Logic**



Note:

This net settlement is loss/gain to customer/bank.

In fact, this loss/gain due on expiry date of contract but there is common practice to settle on cancellation date itself (i.e., 2m time ignoring time value).

(2) Cancellation on due date:

To cancel forward contract on due date, enter opposite transaction at spot rate prevailing on due date.

(3) Cancellation after due date:

To cancel forward contract after due date, enter opposite transaction at spot rate of approach date/automatic cancellation date (i.e., due date + 3 or 15 days).

CONCEPT: SETTLEMENT OF LOSS/GAIN

- As cancellation transaction take place between same parties (i.e., customer and Bank), gain of one party is equal to loss of another party or, vice versa.

Therefore, Gain to customer = Loss to Bank

Or Loss to customer = Gain to Bank

(A) Settlement of cancellation on/before due date:

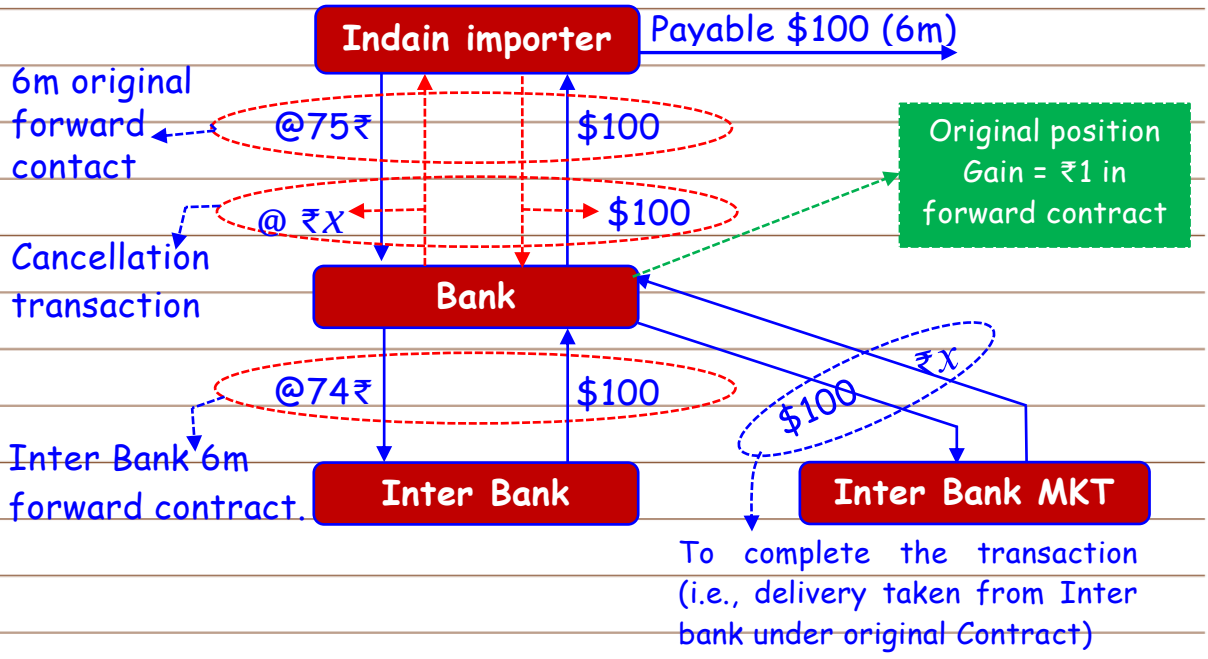
Both parties are entitled to receive gain from the counter party or, pay loss to counter party.

(B) Settlement for cancellation after due date/Automatic cancellation:

- If customer makes loss in cancellation, then he has to pay to Bank,
- If customer makes gain, then he is not entitled to receive it from Bank. [we will study more in this regard later on.]

CONCEPT: POSITION OF BANK AFTER CANCELLATION OF FORWARD CONTRACT (For Conceptual clarity only)

- Bank's existing position (i.e., position of original forward contracts) does not change due to cancellation. In other words, Bank's existing loss/gain remains same even after cancellation of contract.
- **Verification:**



(i) Loss/gain in cancellation:

L/G of Bank = ₹(75-x) per $

L/G of Customer = ₹(x-75) per $

+ve = Gain (Receive from counter party)

-ve = Loss (Pay to counter party)

(ii) Overall Bank's position after cancellation:

L/G to Bank in cancellation	(75-x)
L/G from inter Bank transactions. ($100 Buy and $100 sell)	(x-74)
	(75-x) + (x-74)

Net Position=75-74= ₹ 1

Equal to original position before cancellation

QUESTION -13A

Original contract (3m):

Bank bought AUD 100,000 @ ₹47.2500.

or, Customer sold AUD 100,000 @ ₹47.2500

Cancellation date:

2M from original contract date (i.e., 1m before due date)

Cancellation:

Enter opposite contract at 1m forward rate to cancel forward contract: Customer has to buy AUD @ ₹47.5200

Loss/gain to customer:

Sale price of AUD ₹ 47.2500

Purchase price of AUD ₹ 47.5200

Loss per AUD ₹ 0.27

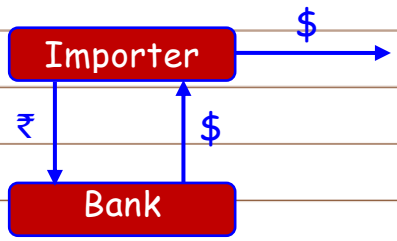
Total loss = ₹ (.27 × 100,000) = **₹ 27,000**

QUESTION -13B

Original 2m forward contract:

Bank sold $ @ ₹ 65.3450

or, Customer bought $ @ ₹ 65.3450



Cancellation:

- Enter opposite transaction @SR
- Applicable rate:

$1 = ₹ 65.2900	/ 65.2975
- .10%	+ .10%
65.2247	65.3628

Customer has to sell $ @ ₹ 65.2247

Loss/gain to customer:

Sale price of $ ₹ 65.2247

Purchase price of $ ₹ 65.3450

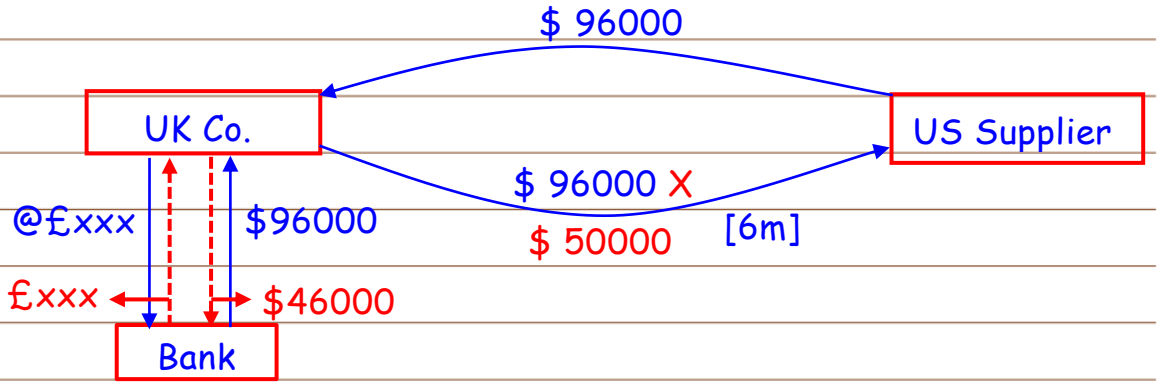
Loss per $ ₹ 0.1203

Total loss for $ 250,000 excluding cancellation charges

= (.1203 × 250,000) = ₹ 30,075

Total Loss including charges = (30,075 + 100) = ₹ 30,175.

QUESTION - 13C



6m FR:	$ 1.5145	/ 1.5155
	- 0.0095	- 0.0085
£1	= $1.5050	1.5070

Original contract amount:

$ 1.5050 = £ 1

$ 96000 = £ $\left(\frac{1}{1.5050} \times 96000\right)$ = £ 63,787.38

To complete transaction, UK Co. has to buy $96000 @ contracted rate & sell $ 46000 to bank @ spot rate prevailing on 1- July.

SR: £1 = $ 1.5100 / **1.5110**

$ 46000 = £ $\left(\frac{1}{1.5110} \times 46000\right)$ = £ 30443.42

Net outflow = 63787.38 – 30443.42 = **£ 33,343.96**

CONCEPT: EXTENSION OF FORWARD CONTRACT OR, ROLL OVER OF FORWARD CONTRACT

Extension of forward contract is not possible. However, extension objective can be achieved by taking following actions:

(i) Cancel original forward contract [Either before due date or, on due date or, after due date]

⇨ Same concepts are applicable.

(ii) Enter new forward contract for desired period at forward rate prevailing on approach date (i.e., when approached for extension)

⇨ Extension cost/charges = loss/gain of cancellation

QUESTION - 14A

Original forward contract (Due date = 5th June)

Bank bought $ @ ₹ 59.6000 (i.e., customer sale)

To extend forward contract:

(i) Cancel original contract @ 1m forward rate (i.e., for 5th June).

(ii) Enter new forward contract for 2m (i.e., for 5th July)

(i) Extension charges:

For cancellation bank has to sell $ @ ₹ 59.2425 (ask rate) [i.e., customer buy]

Applicable merchant rate = 59.2425 × (1 + .0010) = 59.3017

(Rounded off to ₹ 59.3025)

Loss/gain to customer

Sale price of $ = ₹ 59.6000

Buy price of $ = ₹ 59.3025

Gain per $= ₹ 00.2975

Total gain = ₹ (0.2975 × 50,000) = ₹ 14875

Gain receivable under extension = ₹ 14875.

(ii) New rate to be quoted for new forward contract:

2m FR: $1 = ₹ 59.6300 / 59.6425

Merchant rate:

$ 1 = ₹ 59.6300 - 0.10% = ₹ 59.5704 (rounded off to ₹ 59.5700)

Hence, Bank enters buy contract or Customer enters sell contract @ ₹ 59.5700.

QUESTION - 14B

- Original forward contract (2 months)

  Bank bought $ @ ₹ 62.5200

  Exporter sold $ @ ₹ 62.5200

- Exporter approached for extension on due date for 1 month.
- To complete extension, Exporter has to cancel forward contract at spot rate and enter new forward contract for 1 month.

(i) Cancellation:

SR: $1 = ₹ 62.7200 / 62.6800

Ask rate Bid rate

Note: ICAI wrongly quoted ask rate first.

Merchant rate:

$1 =	₹ 62.6800	62.7200
	- .10%	+ .10%
$1 =	₹ 62.6173	62.7827

Rounded off to: $1 = ₹ 62.6175 / 62.7825

For cancellation:

Exporter has to buy $ @ ₹ 62.7825

Loss to Exporter = (62.7825 - 62.5200) × 100,000 = ₹ 26,250

Hence, Extension charges payable by Exporter = ₹ 26,250.

(ii) New forward contract rate:

1m FR: $1 =	₹ 62.6400	62.7400
	- .10%	+ .10%
$1 =	₹ 62.5774	62.8027

Rounded off to: $1 = **₹ 62.5775** / 62.8025

New forward contract rate should be **₹ 62.5775**

QUESTION - 14C

Original contract of importer : Buy $ @ ₹ 61.00 [Due date: 31-oct-015]

(i) Cost in respect of extension:

Merchant SR: $1 =	₹ 60.3200	60.6300
	- .086%	+ .15%
$1 =	₹ 60.2681	60.7209

Importer has to sell $ @ ₹ 60.2681 to cancel existing forward contract.

Loss/gain

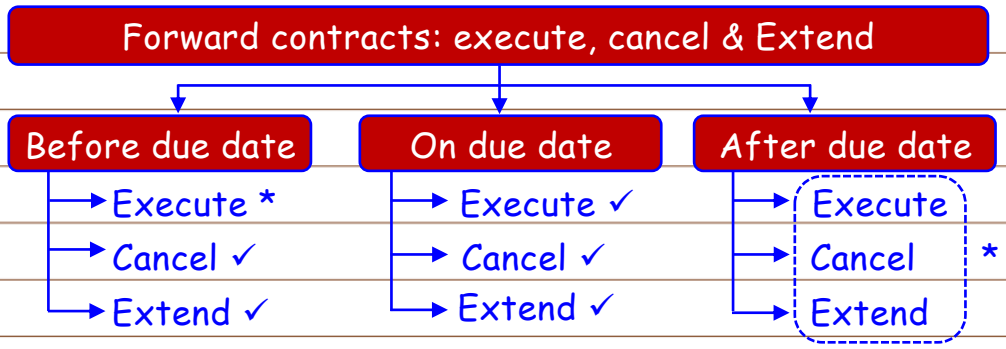
Sale rate of $ =	₹ 60.2681
Purchase rate of $ =	₹ 61.0000
Gain per $=	₹ 00.7319
Total loss on $ 25000	₹ 18297.50

(ii) New forward contract rate:

6m FR on 31-10-15:	$1 =	₹ 60.3200	60.6300
		+ .86%	+ .98%
	$1 =	₹ 60.8388	61.2242
		-.086%	+ .15%
	$1 =	₹ 60.7865	61.3160

Importer has to buy $ at ₹ 61.3160 to extend forward contract.

CONCEPT: EXECUTION, CANCELLATION AND EXTENSION OF FORWARD CONTRACT AT DIFFERENT DATES

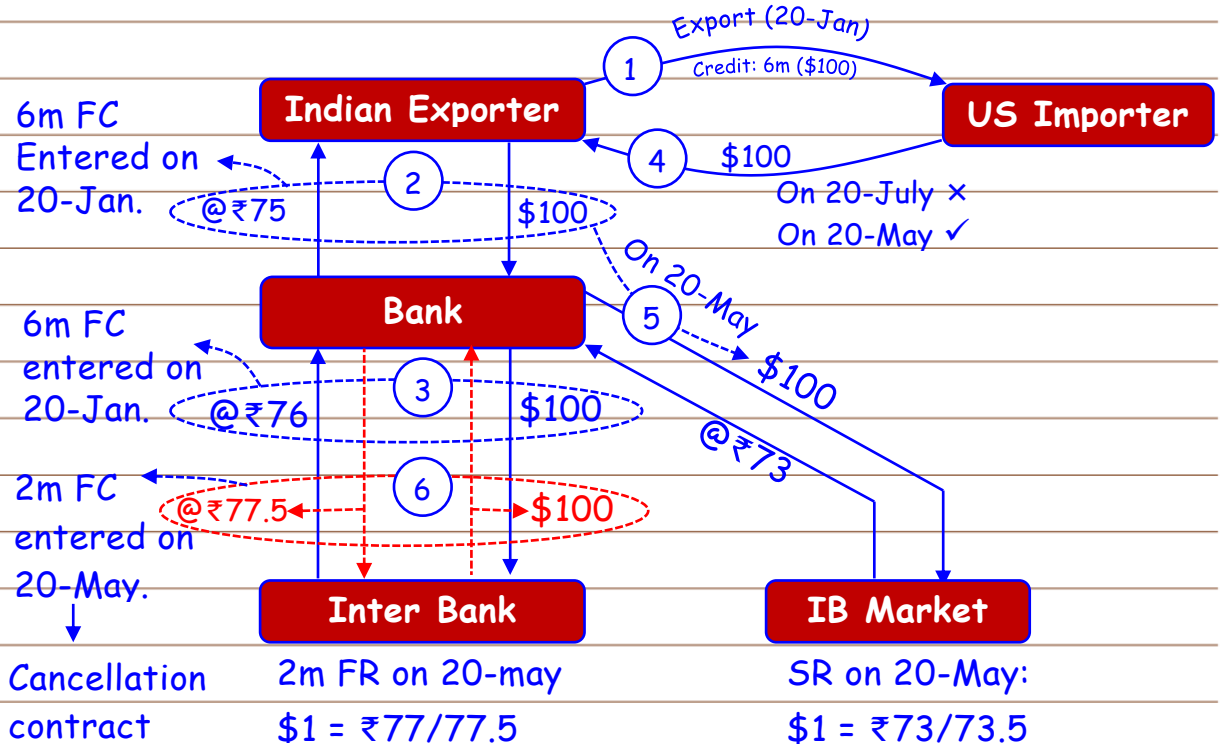


✓ Already studied.

* There are some special treatment in FEDAI rule.
(Refer Next concept for that Rule)

CONCEPT: EXECUTION OF FORWARD CONTRACT BEFORE DUE DATE [OR EARLY DELIVERY OF CURRENCY UNDER FORWARD CONTRACT] [ICAN students ⇨ Ignore this Concept]

- According to FEDAI rule, Bank has to execute forward contract at agreed rate even if customer approach for it before due date of forward contract.
- In addition, Bank charges interest on outlay of fund and swap loss from customer.
- Let us see an example to understand the entire concept:



Transactions:

(i) Bank has to buy $100 @ ₹75 (i.e. agreed rate under forward contract) on 20th May (i.e. 61 days before due date)

(ii) Interest on outlay of fund:

Bank buys $ (on 20th May) from exporter @	₹ 75
Bank sells $ (on 20th May) in inter-Bank market @ [SR prevailing on 20th May]	₹ 73
Outlay of fund (for Bank) per $	₹ 2
Total outflow on $100	₹ 200

If it is inflow, then Bank earns interest.

In this case Bank has choice to pay to customer

Calculate interest on this ₹200 for 61 days and recover it from customer.

Logic: Bank took loan of ₹200 to buy $100 from customer because there is shortfall of ₹200 on 20th May.

Counting of Period: Include start date, exclude due date (For logic - Refer time value of money)

= (20th May to 20th July)

= 12 (May) +30(June) + 19(July) = 61 days.

Note: Normally Bank calculates interest on daily basis using 365 days in a year. Hence, consider 365 days in a year unless otherwise stated.

(iii) Swap loss recoverable from customer

Rate at which $ sold in interbank on 20-may	₹73	(Inflow)
Rate at which interbank original forward contract cancelled on 20-may	₹77.50	(outflow)
Swap loss of bank to be recovered from cust.	₹4.50	

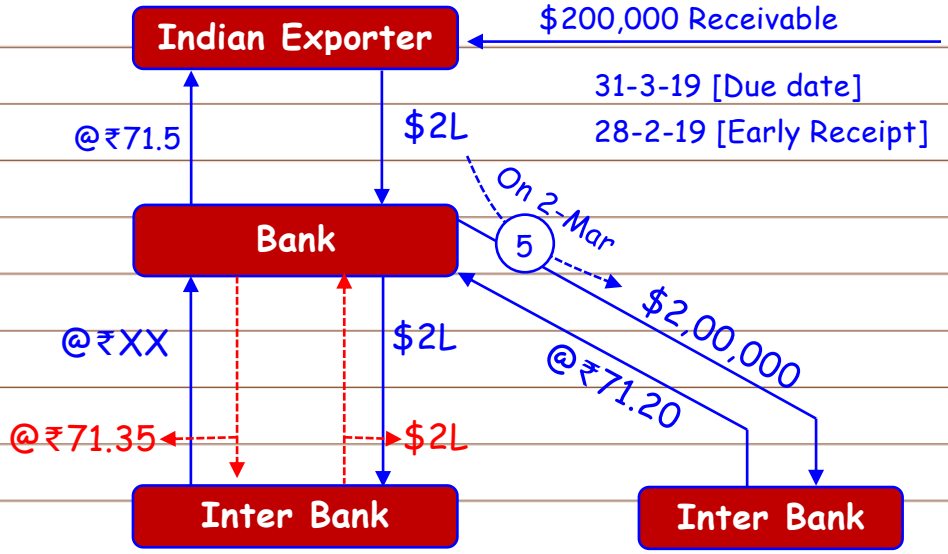
Not For Exam:

Interpretation of swap loss (No effect on Bank's Existing Position):

Loss to Bank at the time of delivery of currency on 20th May	₹ 2.00
Loss to bank on cancellation of interbank Forward C (77.5 - 76)	₹ 1.50
Bank missed ₹1 gain which was booked originally (76 -75)	₹ 1.00
Total loss to bank to be recovered from customer as Swap L.	₹ 4.50

QUESTION -15A

Interpretation of question:



1M FR on 28-Feb:

$1 = ₹ 71.20 / 71.25

-0.05 + 0.10

$1 = ₹71.25 ₹71.35

SR on 28-Feb:

$1 = ₹71.20/71.25

Solution:

(i) Inflow to Exporter from sell of $ 200,000 under original contract.

= ₹ (71.50 x 200,000) = 143,00,000

(ii) Interest on outlay of fund

Bank sell $ @	71.20
Bank buys $ @	71.50
Outflow to Bank per $	₹ 0.30
Total outflow on $ 200,000 (0.30 x 200,000)	₹ 60,000

Period = 2nd march to 31st March = 29 days

Interest = $[60{,}000 \times 15\% \times \frac{29}{365}]$ = 715.07

Bank recovers this interest from customer.

Hence, outflow to customer = ₹ 715.07

Disclaimar: In this question (may – 2019) ICAI counted period from 28th feb to 31st of March (1+30 =31 days) which is not appropriate as actual remittance take place on 2nd March.

Interest as per May – 2019 suggested.

$$= 60,000 \times 15\% \times \frac{31}{365} = 764.38$$

Same questions are available in study material, MTP – 2021, SSM – 2016 (with different figure).

- But counting is from remittance date (i.e., from 2nd Mar)

NS Recommendation:

Provide both alternative solution as it takes max 1 min.

(iii) Swap loss of Bank to be recovered from Exporter:

Bank sell $ @	₹ 71.20
Bank buys $ @	₹ 71.35
Loss per $	₹ 0.15
Total Loss on $ 200,000	₹ 30,000

It should be recovered from exporter.

Hence, outflow to exporter = ₹ 30,000

(iv) Net Inflow to Exporter = 143,00,000 – 715.07 – 30,000

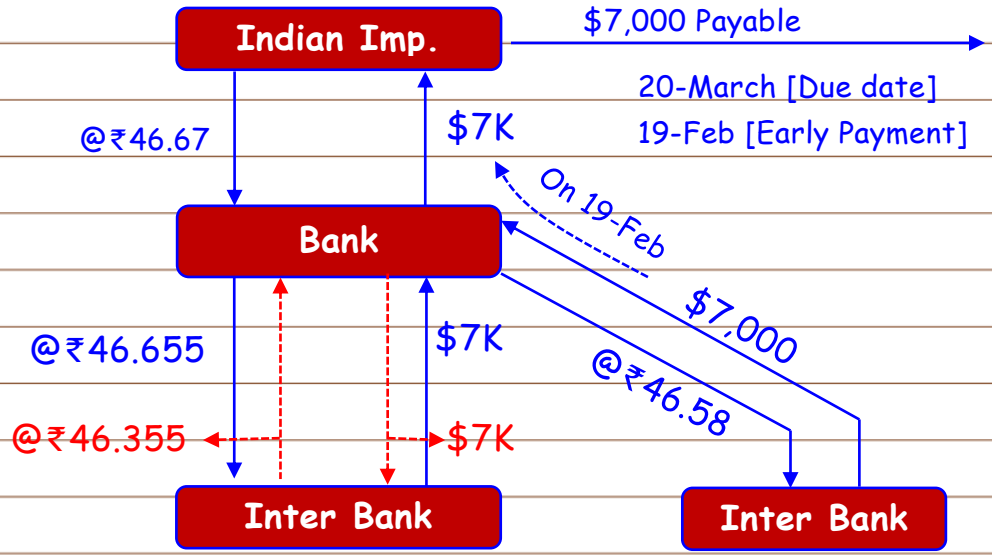
= ₹ 14269284.93

Second Alternative: = 14300,000 – 764.38 – 30,000

= 14269235.62

QUESTION - 15B

Interpretation of question:



1M FR on 19-Feb: $1 = ₹ 46.3550 / 46.3650

SR on 19-Feb: $1 = ₹46.5725/46.5800

Solution:

(i) Bank has to pay $7000 on 19th Feb at contracted rate (i.e., 46.67)

Equivalent ₹ receivable = (46.67 × 7000) = 3,26,690

(ii) Cash flows on 19th Feb: (₹46.67-46.58)× 7000 = ₹ 630

Interest payable to customer for 1m =630×12%×(1/12) = ₹ 6.30

(iii) Swap difference:

Difference between cancellation rate and spot rate of inter bank.

= [46.58 (outflow) - 46.355 (inflow)] × 7000

= ₹ 1575 [loss recoverable from customer]

(iv) Net amount recoverable from customer

= 326690 - 6.30 + 1575 + 100 = 3,28,358.70

CONCEPT: EXECUTION, CANCELLATION AND EXTENSION OF FORWARD CONTRACT AFTER DUE DATE

- In all three transactions (i.e., Execution, Cancellation and Extension), original forward contract should be cancelled at spot rate prevailing on approach date or (due date + 3 days) whichever is earlier.
- To cancel forward contract both parties have to enter the opposite transaction.
- In this cancellation, following three charges are involved:
  - (i) Loss/ gain under cancellation
    [i.e., Loss/gain arises under opposite transaction]
  - (ii) Interest on outlay of fund
  - (iii) Swap difference / Swap loss

These are common in all three transactions (i.e., (A) Execute Forward Contract, (B) Cancel Forward Contract and (C) Extend Forward Contract).

In addition to above common charges, following actions are to be taken to complete the transactions:

(A) Execution of Forward Contract after due date:

- Pay common charges (as explained above).
- Take delivery of currency at spot rate prevailing on approach date [i.e., (DD + 1 day) or (DD + 2 days) or (DD + 3 days) or (DD + any days)]

Note: Even if customer approaches for execution after 3 days from due date, cancellation takes place on (DD + 3 days) and common charges are calculated for (DD + 3 days) only.

(ii) Cancellation of Forward Contract after due date:

- Pay common charges to Bank (as explained above).
- If customer did not approach for cancellation, then automatic cancellation takes place on (DD+3 days)

(iii) Extension of Forward Contract after due date:

- Pay common charges (as explained above).
- Enter the fresh forward contract for desired period at the forward rate prevailing on approach date [i.e., (DD +1 days) or (DD+2days) or (DD+3days) or (DD+ any days)]

Note: Even if customer approaches for extension after 3days, cancellation takes place on (DD + 3 days).

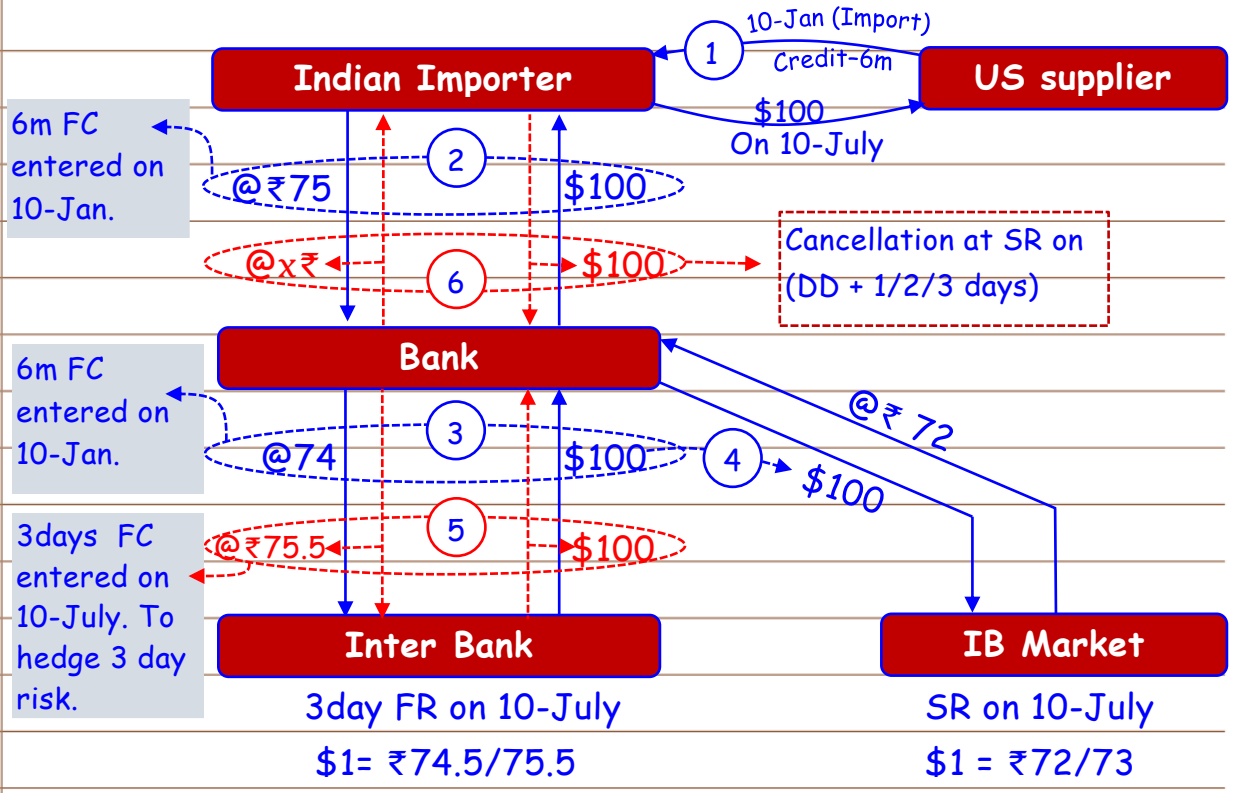
Explanation:

Calculation of common charges with the help of example.

That is: (1) Loss/ gain under opposite transaction

(2) Interest on outlay of fund

(3) Swap Loss



Transactions:

(1) Interest on outlay of fund

- It is calculated on cash flow arises on original due date of forward contract when Bank takes delivery under forward contract from inter Bank and settles it in market @SR.
- Cash flows (of Bank)

Purchase rate of $ [Under original F.C.]	₹74 (out)
Sale price of $ [@SR on 10-july]	₹72 (inf)
Outlay of fund per $	₹2
Total outlay for $100	₹200

If this cash flow becomes inflow, then Bank earns interest on it.

Bank has choice to pass on it to customer or not.

Calculate interest on this outflow for max 3 days (as the case may be) and recover it from .

(2) Swap Loss/Swap Difference:

- It should be calculated using **3 days forward rate** prevailing on original due date and **SR prevailing on original due date**.

Purchase rate of $ [3 days FR at which Bank hedges risk of 3 days]	₹75.50(out)
Sale price of $ [SR at which delivery settled in interbank]	₹72 (in)
Swap loss of Bank for $1 (recover from Customer)	₹3.50
Total swap loss to be recovered from customer	(3.50 x 100) =₹350

Logic behind this recovery: See After point (3)

(3) Loss/gain under cancellation (opposite transaction with customer):

- Suppose customer approached on 13th July or did not approach (i.e., Automatic cancellation on 13th July).
-

Sale price of $ for Bank (original forward contract)	₹ 75
Purchase price of $ for Bank (opposite transaction at SR prevailing on 13th July)	₹ x
Loss/ gain under cancellation	75-x

+ve ⇨ Gain to Bank (receive from customer)
-ve ⇨ Loss to Bank (Bank has choice to pay to customer or not.

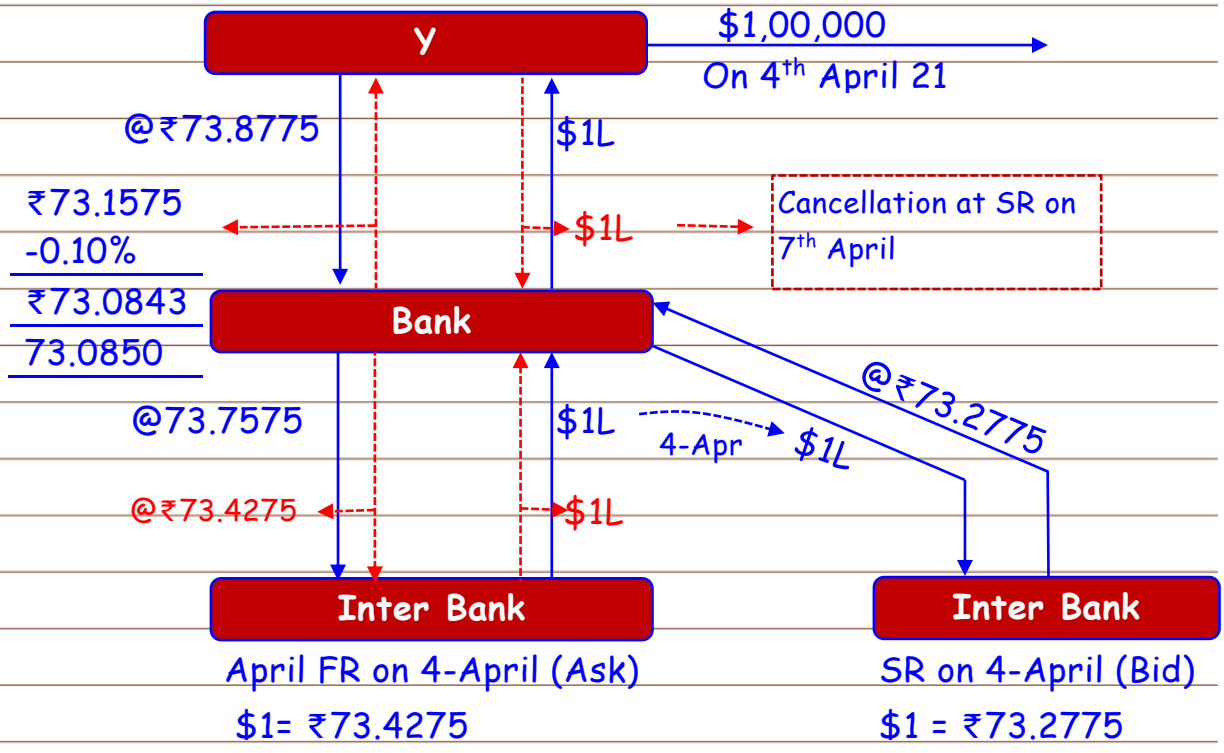
Interpretation of swap loss (No effect on Bank's Existing Position) :

Swap loss to be recovered from customer = ₹ 3.50

₹1 Loss	₹2 Loss	₹0.50 Loss
₹1 Original Gain missed due to Customer's default.	₹2 Loss incurred on due date to settle interbank forward contract due to Customer's Default.	3 days forward contract entered at 50 paise higher than original forward contract.

QUESTION - 16A

Interpretation of Question:



Solution:

(i) Cancellation rate:

- Spot rate (Bid) prevailing on 7th April is applicable for cancellation as Mr. Y approached on 14th April but FEDAI allows maximum 3 days.

$1 = ₹ 73.1575 - .10% = ₹ 73.0843 (rounded off to ₹ 73.0850)

(ii) Amount payable on $100,000 (Amount payable on cancellation):

• Sale price of Bank	₹ 73.8775
• Purchase price of Bank	₹ 73.0850
• Gain of Bank per $	₹ 0.7925
• Total gain receivable from customer / payable by customer	₹ 79250

(iii) Swap Loss:

• Purchase price of $	₹ 73.4275
• Sale price of $	₹ 73.2775
• Swap loss per $	₹ 0.15
• Total swap loss to be recovered from customer	₹ 15000

(iv) Interest on outlay of fund:

• Purchase price of $	₹ 73.7575
• Sale price of $	₹ 73.2775
• Outlay per $	₹ 0.48
• Total outlay for $100,000	₹ 48000

Interest for 30 days = 48000 × 12% × (3/365) = ₹ 47.34

(v) New Contract rate:

Requirement (on 14-April): Forward contract with due date 14-june-2021

June forward rate prevailing on 14-April (Ask):

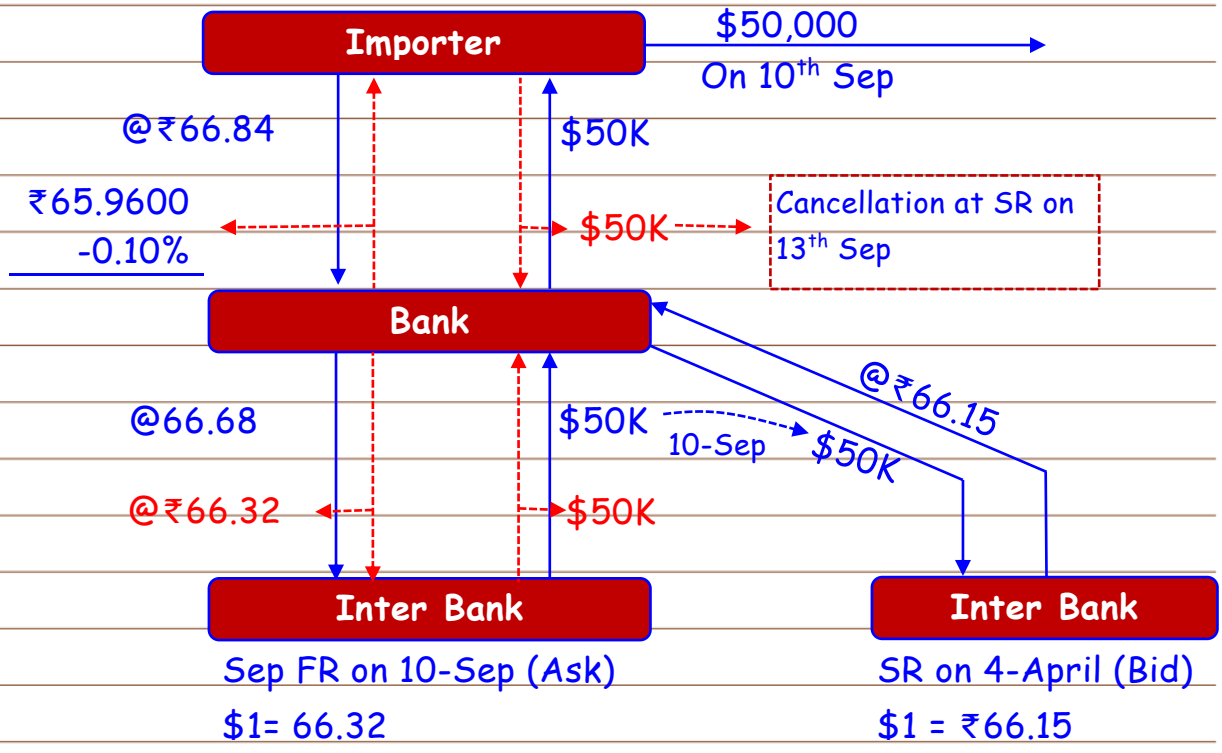
$1 = ₹ 73.7075 + .10% = ₹ 73.7812 (rounded off to ₹ 73.7800)

(vi) Total cost of Y:

Cancellation loss	79,250
Swap loss	15,000
Interest	47.34
Total cost of Y	**94,297.34**

QUESTION - 16B

Interpretation of Question:



Solution

Calculation of common charges:

(a) Interest on outlay of fund:

• Purchase rate of $	₹ 66.68
• Sale rate of $	₹ 66.15
• Outlay per $	₹ 0.53
• Total outlay	₹ 26500

Interest for 3 days = 26500 × 12% × (3/365) = ₹ 26.14

(b) Swap Loss:

• Sale price of $	₹ 66.15
• Purchase price of $	₹ 66.32
• Swap loss per $	₹ 0.17
• Total swap loss to be recovered from customer	₹ 8500

(c) Cancellation loss/gain:

• Purchase price of $ for customer	₹ 66.84
• Sale price of $ for customer [65.9600-.10%=65.8940] rounded to:65.8950	₹ 65.8950
• Loss to customer per$ (payable to Bank)	₹ 0.945
• Total loss	₹ 47250

Requirement:

(i) Cancel the contract:

Total charges payable by customer = 26.14 + 8500 + 47250
= 55776.14

(ii) Execute the contract:

- Pay 55,776.14 as total charges.
- Purchase $ 50,000 at SR prevailing on 13-Sept [Ask rate + exchange margin]

$1 = ₹ 65.9900 + .10% = ₹ 66.0560
(Rounded off to ₹ 66.0550)

Equivalent amount = (50,000 × 66.0550 = ₹ 33,02,750

(iii) Extend the Contract:

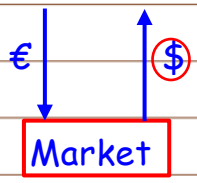
- Pay ₹55,776.14 as total charges.
- Enter new forward contract for due date 10-Nov. at rate prevailing on 13th Sept.

$ 1 ₹66.4900
+0.10%
₹66.5565
Rounded to: **₹66.5575**

QUESTION - 17A

Cross currency deal ⇨ Deal in both foreign currency.
It means, $ & € are foreign currencies and ₹ is home currency.

Deal: Sold $ @ € 1.4400.
Square off: Dealer has to buy $ @ € 1.4450.



Loss/gain to dealer:

Sale price of $	€ 1.4400
Buy price of $	€ 1.4450
Loss per $	€ 0.0050

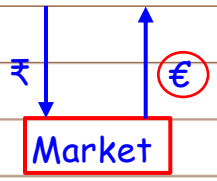
Total loss for $10,00,000 = € (0.0050 × 10,00,000) = € 5000

It is foreign currency for dealer.
He has to buy € 5000 to settle loss.

Now, we need rate of € with ₹ .
Cross rate (₹ per €) = ?

$$\frac{₹}{€} = \left[\frac{₹}{\$} \times \frac{\$}{€}\right]_{ASK}$$

$$= \left[31.4500 \times \frac{1}{1.4400}\right]$$



∴ €1 = ₹ 21.8403

Hence, Loss in Home currency:
= ₹ (21.8403 × 5000) = **₹ 1,09,201.50**

CONCEPT: LEADING AND LAGGING

(A) Leading or, lead payment:

- Payment before due date is also termed as lead payment.
- For early payment there is no discount provided by supplier.
- Lead payment is beneficial when:

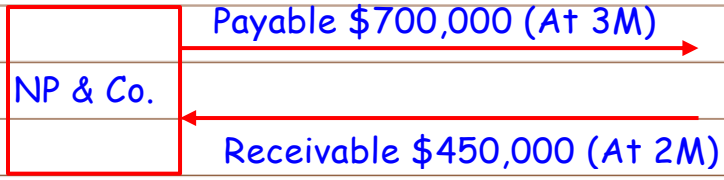
Time value benefit missed in credit period.	<	Exchange loss saved during credit period.

(B) Lagging or, Lag payment:

- Delaying the payment beyond due date is also termed as lag payment.
- Supplier charges interest for late payment.
- Lag payment is beneficial when:

Interest charged by supplier during delayed period.	<	Exchange gain and time value benefit during delayed period.

QUESTION - 18A Good Question (Must Revise)



(i) Cover payable in Forward market & receivable separately

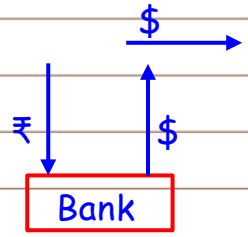
(a) Equivalent receipt at 2m:

$1 = ₹ 48.90

$ 450,000 = ₹ (48.90 × 450,000) = ₹ 220,05,000

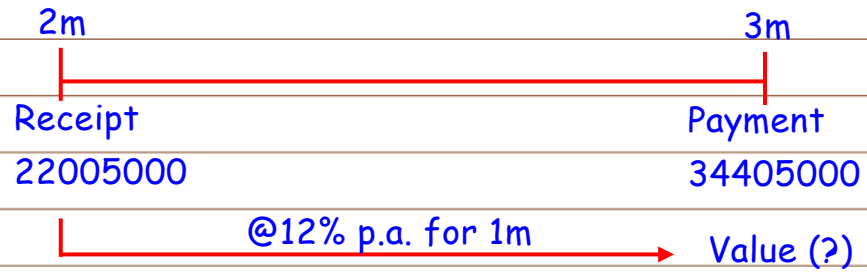
(b) Equivalent payment at 3m:

3m FR: $1 =	₹ 48.50	48.70
	+ .40	+ .45
$1 =	₹ 48.90	**49.15**



$ 700,000 = ₹ (49.15 × 700,000) =₹ 344,05,000

(c)



Receipt as on 3m = 22005000 × (1 + .12 × (1/12))

= 222,25,050

Net payment / outflow at 3m (34405000 - 22225050

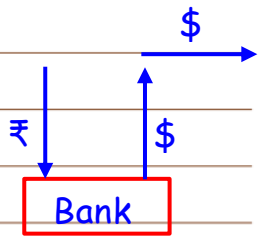
= ₹ 121,79,950

(ii) Lag the receivable:

Receipt at 3m = $ 450,000

Payment at 3m = $ 700,000

Net payment = $ 250,000



Enter forward contract for net amount only.

3m FR: $1 = ₹ 48.90 / **49.15**

Equivalent payment

$250,000 = (49.15 × 250,000) = ₹ 122,87,500

As receivable is delayed by 1 months., NP & o. has to cancel forward contract @ 2m FR as contract has already been entered.

Original contract:

Bank bought $ @ ₹ 48.90

Customer sold $ @ ₹ 48.90

Cancellation:

2m FR: $1 =	₹ 48.50	48.70
	+ .25	+ .30
$1 =	₹ 48.75	**49.00**

Customer has to buy $ @ 49.00.

Loss/gain to customer:

Sale price	₹ 48.90
Buy price	₹ 49.00
Loss Per $	₹ .10

Total loss = ₹ (.10 × 450,000) = ₹ 45000 (payable today).

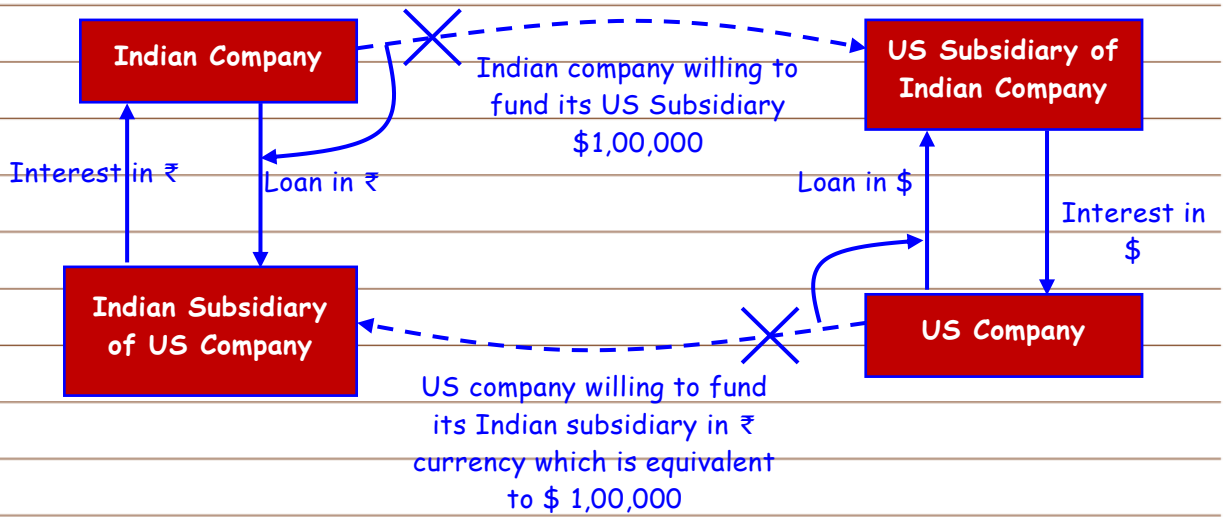
Ignoring time value for loss payment,

Total outflow = 12287500 + 45000 = **₹ 123,32,500**

Advice: First option is more beneficial.

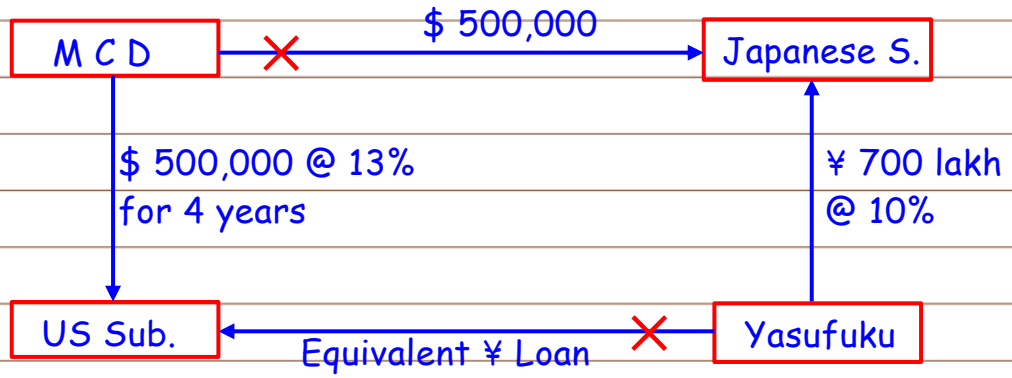
CONCEPT: PARALLEL LOAN OR BACK-TO-BACK LOAN

Following arrangement is parallel loan:



Note: This arrangement is not currency swap. We will study currency swap in IRRM (Interest Rate Risk Management) chapter.

QUESTION - 19A



SR: $1 = ¥ 140

4 Y rate: $1 = ¥ [140 - (5 × 4)] = ¥ 120

(i) Receipt of Yasufuku:

= ¥ 700 lakhs × $(1 + .10)^4$ = ¥ 1024.87 Lakhs

4Y rate: ¥ 120 = $1

¥ 1024.87 = $ $\left(\frac{1}{120} \times 1024.87\right)$ = $ 8.54058 lakhs

(ii) Receipt of MCD:

= $500,000 × $(1 + .13)^4$ = $ 815236.81 i.e., $8.1523681 lakhs

(iii) Yasufuku is in better deal as $ equivalent receipt is high.

Second part:

$1 = ¥ 140

¥ 140 = $1

¥ 1024.87 = $ $\left(\frac{1}{140} \times 1024.87\right)$ = **$ 7.3205 lakhs**

In this case, MCD is in better deal.

QUESTION - 20A

Repayment transaction:

(i) Indian Sub. ← ₹ 14438100 — Malaysian Sub.

(ii) Indian Sub. → $ 106007 — US Sub.

(iii) Malaysia Sub. ← MYR 1443800 — US Sub.

(iv) Malaysia Sub. → $ 80,000 — US Sub.

Equivalent amount:

(i) ₹ 14438100 = £ $\left[\frac{14438100}{68.10}\right]$ = £ 212013.22

(ii) $ 106007 = £ $\left[\frac{106007}{1.415}\right]$ = £ 74916.61

(iii) MYR 1443800 = £ $\left[\frac{1443800}{10.215}\right]$ = £ 141341.16

(iv) $ 80,000 = £ $\left[\frac{80,000}{1.415}\right]$ = £ 56537.10

Net off of transactions/ balances : **Amt in "£"**

Indian S.	Malaysian S.	US S.
(+) 212013.22	(-) 212013.22	
(-) 74916.61		(+) 74916.61
	(+) 141341.16	(-) 141341.16
	(-) 56537.10	(+) 56537.10
(+) 137096.61	(-) 127209.16	(-) 9887.45

Instruction:

Malaysian Sub. has to pay £ 127209.16 to Indian Sub. & US Sub. has to pay £ 9887.45 to Indian Sub.

QUESTION - 20B

(i) Net exposure of each currency (i.e. Net fluctuation in currency)

	Currency	Net Exposure= (Net cash flows x change in rate)
(i)	$	(400 – 200) x (48.82 – 48.01) = ₹ 162 lakhs (Gain)
(ii)	FRF	(200 – 80) x (8.12 – 7.45) = ₹ 80.40 lakhs (Gain)
(iii)	£	(300 – 200) x (75.98 – 75.57) = ₹ 41 lakhs (Gain)
(iv)	¥	(150 – 250) x (2.40 – 3.20) = ₹ 80 lakhs (Gain)

(ii) Net exposure in all currencies are offset by better forward rate (i.e. gain)

QUESTION - 21A

(i) Cash requirement under decentralised cash management

(Not for exam)
Under decentralised cash management surplus of one subsidiary can't be utilised for deficit of other subsidiaries.

(a) Deficit of Canadian Sub

$1 = Can$ 1.58

Can$ 2,50,00,000 = $($\frac{1}{1.58}$ x 2,50,00,000) =$1,58,22,784.81

(b) Deficit of UK Sub

£1 = $1.5

£30,00,000 = $(1.5 x 30,00,000) = $ 45,00,000

(c) Total cash requirement

= $(15822784.81 + 45,00,000) = $2,03,22,784.81

(ii) Cash requirement under Centralised cash management

Under this system, surplus of one subsidiary can be utilized for deficit of other subsidiaries.

(a) Deficit of Canadian Sub

$1 = SF 1.48

SF 1.48 = $1

SF 1,50,00,000 = $($\frac{1}{1.48}$ x 1,50,00,000) = $1,01,35,135.14

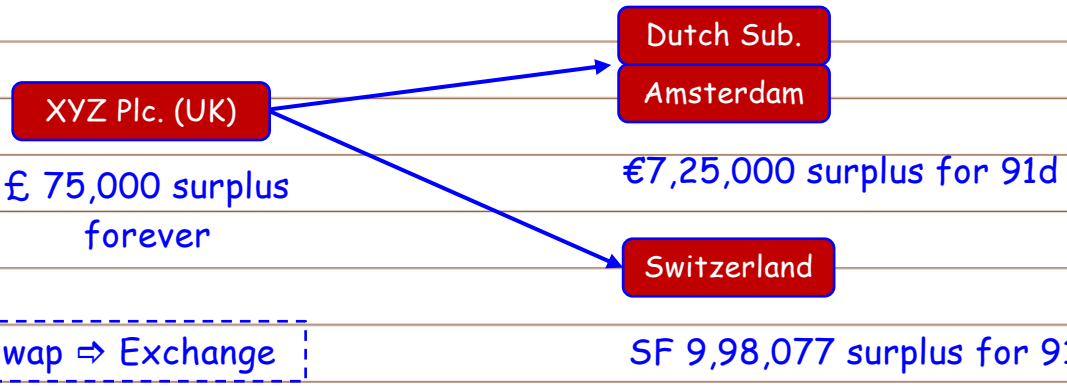
(b) Total deficit

= $2,03,22,784.8

(c) Net cash requirement

= $(2,03,22,784.8 - 1,01,35,135.14) = $ 1,01,87,649.66

QUESTION - 21B



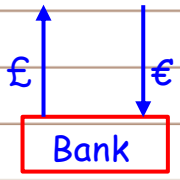
(i) Amount at 91d if € and SF are invested in UK by swapping into £

(a) Equivalent £ for € 7,25,000 @ SR

€1 = £ 0.6858/0.6869

€ 7,25,000 = £(0.6858 x 7,25,000)

= £ 4,97,205



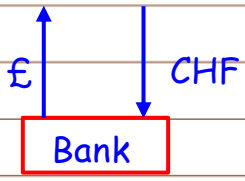
(b) Equivalent £ for SF 9,98,077 @ SR

£1 = CHF 2.3295/2.3326

CHF 2.3326 = £ 1

CHF 9,98,077 = £($\frac{1}{2.3326}$ x 9,98,077)

= £ 4,27,881.76



(c) Total Amount = 4,97,205 + 4,27,881.76 + 75,000

= £10,00,086.76

(d) Deposit £ @ 5.375% for 91 days.

Withdrawal = 10,00,086.76 x (1 + 0.05375 x $\frac{91}{365}$)

= £ 10,13,488.61 (Amount at 91 days)

(ii) Amount at 91 days if invested individually in own country

(a) Invest £ 75,000 in UK for 91 days at 1%

Withdrawal = £ 75,000x $(1 + 0.01 \times \frac{91}{365})$

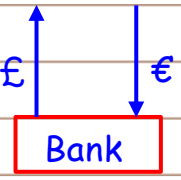
= £ 75,186.99 (i.e. 75,187)

(b) Invest € 7,25,000 @ 2% for 91 days

Withdrawal = € 7,25,000 x $(1 + 0.02 \times \frac{91}{365})$ = € 7,28,615.07

Equivalent £ at 91d FR

€1	=	£0.6858/	0.6869
		+ 0.0037	+0.0040
€1	=	£ 0.6895	0.6909



€ 7,28,615.07 = £(0.6895 x 7,28,615.07)

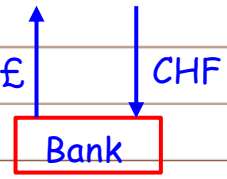
= £ 5,02,380

(c) Invest CHF 9.98,077 @ 0.5% for 91 days

Withdrawal = CHF 9.98077 x $(1 + 0.005 \times \frac{91}{365})$ = CHF 9,99,321.18

Equivalent £ at 91d FR:

£1	=	CHF 2.3295/	2.3326
		- 0.0242	- 0.0228
£ 1	=	2.3053	2.3098



CHF 9,99,321.18 = £$(\frac{1}{2.3098}$ 9,99,321.18) =£ 4,32,644.03

(d) Total £ at 91d = (75,187 + 5,02,380 + 4,32,644) = 10,10,211

Advantage in swapping € & CHF into £

= 10,13,488.61 – 10,10,211 = **3,277.61**

CONCEPT: EXPOSURE MANAGEMENT STRATEGIES MTRIX

There are four types of strategies to manage risk.

(1) No Hedging

Risk ⇨ High

Reward ⇨ Low

(2) Selective Hedging

Risk ⇨ Low

Reward ⇨ High

(3) Full Hedging

Risk ⇨ Low

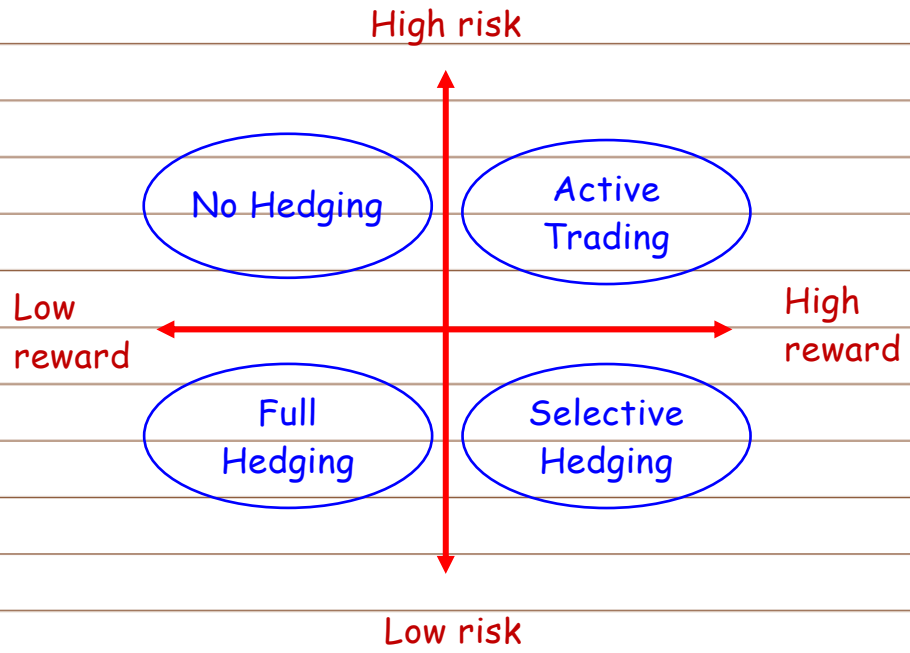
Reward ⇨ Low

(4) Active Trading

Risk ⇨ High

Reward ⇨ high

We can present it in following matrix:



QUESTION – 22A

(1) Strategy – 1: Kuljeet ⇨ (No Hedging)

Risk ⇨ High

Reward ⇨ Low

(2) Strategy – 2: Moni ⇨ (Selective Hedging)

Risk ⇨ Low

Reward ⇨ High

(3) Strategy – 3: TSC ⇨ (Active Trading)

Risk ⇨ High

Reward ⇨ High

(4) Strategy – 4: DNB ⇨ (Full Hedging)

Risk ⇨ Low

Reward ⇨ Low

We can be presented it in following matrix: