

INTERNATIONAL FINANCE

A. Exchange Rate

1. Exchange rate is the rate at which one currency can be exchanged, i.e., bought and sold for another.
2. A direct quote expresses the exchange rate as home currency per unit of foreign currency.
3. An Indirect quote expresses the exchange rate as foreign currency per unit of home currency
4. Indirect quote is the inverse of direct quote and vice versa
5. What is direct quote in one country is indirect quote in another.
6. An exchange rate that is direct quote in America is said to be in American terms. A rate that is indirect quote in American is said to be in European terms
7. International quotes except a few currencies are in European terms

B. Product and Price

8. In a direct quote the home currency is the price and the foreign currency is the product.
9. In an indirect quote the foreign currency is the price and the home currency is the product.
10. In either case, the first currency is the price and the second current is the product
11. Quotes can be expressed as
 - a. Rs per Dollar: Rs is price, Dollar is product
 - b. Rs/Dollar: Normally here too Rs is price, dollar is product. In some cases, dollar is regarded as price and Rs regarded as the product
 - c. Dollar: Rs. Here, dollar is the product and Rs the price.

C. Bid, Ask, Spread and Middle rate

12. The meaning of the terms is as under
 - a. Bid is the rate at which bank buys a currency
 - b. Ask is the rate at which bank sells a currency
 - c. Spread is the difference between bid and Ask
 - d. Middle rate is the simple average of bid and ask
 - e. Middle rate is used for appreciation, depreciation computation
13. Quotes and Bid Ask relationship
 - a. Direct quote is a bid or ask as the case may be on the foreign currency.
 - b. Indirect quote is a bid or ask as the case may be on the home currency.
 - c. A bid on one currency is an Ask on the other and vice versa.
 - d. In a two way quote bid precedes ask.
$$\text{Spread} = \text{Ask} \text{ minus Bid}$$
$$S = A - B$$

D. Cross Rate

14. Cross rate is a rate which does not involve the dollar in it
15. Cross multiplication is a procedure adopted to arrive at an exchange rate when two other exchange rates are given. The three rules of Cross Multiplication are as under.

- $\text{Bid} \left(\frac{A}{B} \right) = 1 / \text{Ask} \left(\frac{B}{A} \right)$
- $\text{Ask} \left(\frac{A}{B} \right) = 1 / \text{Bid} \left(\frac{B}{A} \right)$
- $\text{Bid} \left(\frac{A}{B} \right) \times \text{Bid} \left(\frac{B}{C} \right) = \text{Bid} \left(\frac{A}{C} \right)$
- $\text{Ask} \left(\frac{A}{B} \right) \times \text{Ask} \left(\frac{B}{C} \right) = \text{Ask} \left(\frac{A}{C} \right)$

16. Margins are to be added in the case of purchase by customer and subtracted in the case of sale by customer.

Customer	Rate	Commission	Person
Buys	Ask	Add	Importer
Sells	Bid	Deduct	Exporter

17. Use of DQ and IDQ

- a. Every ER is a DQ for one country and an IDQ for another
- b. The nature of quote is required to be known only to ascertain whether the ER is currency A per unit of currency B or vice versa
- c. Once this is ascertained, we must view the quote as DQ to solve any question

18. Units of a product to be bought = Money Available / Price of the Product

E. Forward Rate

19. Spot rate is the rate at which currencies are exchanged today. In contrast, b. Forward rate is the rate entered into today for delivery and settlement on a specified future date

20. Following table explains the appreciation/depreciation position and formula

- a. If $F > S$, the product is appreciating and the price is depreciating
- b. If $F < S$, the product is depreciating and the price is depreciating

Relationship	HC	FC	HC	FC
$F > S$	Depreciating	Appreciating	Discount	Premium
$F < S$	Appreciating	Depreciating	Premium	Discount

21. Appreciation/ Depreciation formula for product and price are as under

$$\text{Product: } \left(\frac{F-S}{S} \right) \times \left(\frac{12}{M} \right) \times 100$$

$$\text{Price: } \left(\frac{S-F}{F} \right) \times \left(\frac{12}{M} \right) \times 100$$

22. Forward can be expressed either as

- a. Outright forward or as
- b. Swap points

23. From Swap points to outright forward

Points	Action	Outcome
Ascending	Add	Appreciating
Descending	Deduct	Depreciating

F. Parity Theories

24. High interest rate in one country is offset by depreciation in the currency of that country. The interest rate parity theory is expressed with the help of the following formula.

$$\left(\frac{1+R_H}{1+R_F} \right) = \left(\frac{F_1}{E_0} \right)$$

25. High inflation rate in one country is offset by depreciation in the currency of that country. The purchasing power parity theory is expressed with the help of the following formula.

$$\left(\frac{1+I_H}{1+I_F} \right) = \left(\frac{F_1}{E_0} \right)$$

G. Arbitrage**26. Space Arbitrage**

- a. Express exchange rate in same mode
- b. Buy from the bank which offers lower ask rate and sell to the bank which offers higher bid rate
- c. If this leads to gain, there is arbitrage.

27. Triangular arbitrage

- a. Keep one bank (C) as the pivot and operate through other two banks (AB) to arrive at an equivalent exchange rate
- b. Buy from the bank which offers lower ask rate and sell to the bank which offers higher bid rate
- c. If this leads to gain, there is arbitrage.

28. **Effecting the Arbitrage** If the IRPT equation doesn't equate, arbitrage opportunity will open up. Following steps show how arbitrage are operationalised

Step 1: Compute the theoretical home rate

Step 2: If Actual home rate is less than the Theoretical rate, money will flow from home to foreign; else it will flow from foreign to home

Step3: Confirmation

- a. Borrow
- b. Convert at spot
- c. Invest in other currency
- d. Take forward cover
- e. Realize investment including interest
- f. Reconvert
- g. Repay with interest
- h. Arbitrage gain

H. Risk Management**29. Currency invoicing:**

- a. Invoice in that currency which would lead to highest home currency inflow.
- b. Accept invoicing in that currency which would lead to the lowest home currency outflow

30. Lead and Lag

Foreign Currency	Export		Import
Depreciates	Lead		Lag
Appreciates	Investment	Borrowing	Surplus Cash
Appreciation % < Alternative %	Lead	Lag	Lag
Appreciation % > Alternative %	Lag	Lead	Lead

31. Netting

- Netting involves adjusting receivables against payable
- Multilateral netting involves netting of more than one currency. Multi-lateral is possible logically only if the companies belong to the same group.
- Netting would require that the receivables and payables take place on the same date. If they are on different dates time value of money adjustments need to be done.

32. Forward

- Forward cover is to be taken if taking a forward contract will involve
 - receiving more home currency in the case of exports
 - paying less home currency in the case of exports
- A forward contract does not make for a better outcome, it makes an outcome more certain.

33. Money market hedge

MMH leads to the same outcome as forward cover. Choice of MMH or forward would depend on which gives greater Re inflow in the case of exports and which leads to lower Re outflow in the case of imports.

Exporter

- Identify dollar asset exists
- Borrow dollars which along with interest will equal the dollar asset
- Convert to Rs at Spot rate
- Invest converted Rs
- Realise Rs investment
- Repay dollar loan along with interest thereon

Compare value in Step 5 with forward cash flow to decide the better option

Importer

- Identify dollar liability exists [Sequence 1]
- Borrow Rs [Sequence 6 = Step 3 adjusted for TVM]
- Convert to dollars [Sequence 5 = Step 4]
- Invest converted dollars [Sequence 4 = Step 5]
- Realise dollar investment [Sequence 3: = Step6]
- Settle Step 1 with Step 5 [Sequence 2: = Step1]
- Repay Borrowed Rs of Step 2

34. Honour, Cancellation, Rollover

These can happen either on due date or early

Cancellation

Step 1: Identify original position

[Forward bid in case of Exporter, Fwd Ask for Importer]

- Step 2: Take opposite position
[Forward if you come early, spot if you come on due date]
- Step 3: Difference between 1 and 2 is the gain or loss as the case may be

Honour

- Step 1: Identify original position
[Forward bid in case of Exporter, Fwd Ask for Importer]
- Step 2: Take opposite position
[Forward]
- Step 3: Take new position
[Forward]
If you do due date honour, no steps need be performed

Roll Over

- Step 1: Identify original position
[Forward bid in case of Exporter, Fwd Ask for Importer]
- Step 2: Take opposite position
[Forward if you come early, spot if you come on due date]
- Step 3: Take new position
[Forward]
- Step 4: Gain or loss is (2) versus (3). In that case (1) is carried forward. If we settle (1) vs. (2), three is carried forward

I. International Capital budgeting

34. Home country vs Host country: Home is the investor country. Host is the investee country
35. The principles of capital budgeting need to be applied
36. Home currency cash flows should be discounted at home currency discount rate to arrive at home currency NPV
37. Host currency cash flows should be discounted at host currency discount rate to arrive at host currency NPV
38. Home currency and host currency NPV will be same if adjusted at spot rate.
39. Forward rates are computed using IRPT and risk free interest rates
40. Forward rates are computed for other years using chain rule
41. If cash flows are in one currency and discount rate in another currency we must either convert the cash flows in terms in which discount rates are in or we can convert the discount rate in which the cash flow is in.
42. When cash flows in one currency is to be converted to another currency the appropriate rate is the forward rate
43. Discount rate is arrived at using IRPT and risky rate
44. Where there are repatriation restrictions, it would mean that the intervening cash flows are not available for reinvestment at the discount rate. Consequently the Modified NPV should be computed

J. FOREX DERIVATIVES

45. Forward Rate Agreement

Case 1:

A forward rate agreement (FRA) is an agreement entered between a banker and a customer under which the customer agrees to borrow or invest as the case may be for a specified period of time beginning from a specified future date.

Thus a 3x9 FRA would mean that the customer A will invest or deposit as the case may be for a period of 6 months (9-3) three months from today. The bank decides the FRA bid and FRA ask rates keeping in mind the inter bank borrowing and deposit rates.

If the customer wishes to do a 3x9 FRA that would involve borrowing from the bank during the forward period.

- Bank will borrow for 9 months, invest for three months and lend for 6 month

If the customer wishes to do a 3x9 FRA that would involve depositing with the bank during the forward period

- Bank will borrow for 3 months, invest for nine months and accept deposit for 6 months.

Case 2:

A FRA can also be taken on a notional amount. This would involve an IRS. Under an IRS two parties are involved. One, party exchanges its fixed rate obligation for a floating rate. The assumption is that the quoted rate is against LIBOR. The value of the FRA is the present value of the differential cash flow discounted at LIBOR rate.

46. Interest Rate Swap:

IRS between two parties.

This involves a Strong company and a Weak Company. Strong is the one which commands better interest rates.

Following are the conditions for an IRS to be possible.

- The difference in fixed rates available to the two companies is greater than the difference in Floating rates available to the two companies
- The Strong and Weak companies must have opposite views of the direction in which interest rates are headed; i.e., if Strong wants fixed rate, Weak should desire floating rate. And if Strong wants Floating rate weak should desire fixed rate.
- If Strong wants floating rate, then difference in fixed rate should be greater than difference in floating rate
- If Strong wants fixed rate, then difference in floating rate floating rate should be greater than difference in fixed rate.

47. Interest rate swap is a series of FRA involving exchange of interest rates

Principle 1: FRA buyer pays (gives) “Fixed Rate”
FRA seller receives “Fixed Rate”

Principle 2: LIBOR plus premium is same across all currencies

Principle 3: FRA rate involves exchange of quoted fixed rate for “L”

48. How to conduct an IRS when the bank offers such an instrument

Step 1: Find IRS rate of current currency

Step 2: Find other rate of same currency

Step 3: Find other rate of desired currency

49. IRS cash flows

RK = FRA rate

RF = Forward Libor for the period between T1 AND T2 calculated today

RM = Actual LIBOR observed at T1 for the period between T1 and T2

L = Principal

For Lender cash flow $L*(RK-RM)*(T2-T1)$

For Borrower $L*(RM-RK)*(T2-T1)$

Usually FRA is settled at T1 rather than at T2. Hence this should be discounted at RM

50. Valuing an IRS

The IRR of IRS and that of a series of FRAs should be the same

Value of Receive fixed, pay Floating SWAP = Bfixed minus Bfloating

Value of Receive Floating, pay Fixed SWAP = Bfloating minus Bfixed

Method 1 of Valuation:

Value of Fixed rate bond

- Establish the cash flow structure
- Discount at LIBOR to arrive at present value

Value of Floating rate bond

- Discount the dirty price
- Appropriate rate is the LIBOR/Swap Zero rate

Method 2 of Valuation:

A FRA is valued on the assumption that the forward rates are realized. An IRS is a series of FRA.

- Use LIBOR rate/swap zero curve to calculate forward rates for each of the LIBOR rates that will determine swap cash flows
- Calculate swap cash flows assuming that LIBOR rates will equal forward rates
- Discount these swap cash flows (using LIBOR/Swap zero curve) to get swap value.