

FOREX CLASS - 6

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~~100,000,000~~ ~~060~~ ~~060~~

Triangular Arbitrage

↓
Riskless π
involving 3 currencies

Ex:

Bank A : \$/£ 1.6320 / 1.6380

Bank B : £/\$ 1.4910 / 1.4970

Bank C : \$/€ 1.0520 / 1.0550

If you have 100,000 \$, carryout Arbitrage?

Sol: - Step 1: Sell \$100,000 to Bank C we get $\frac{100,000}{1.0550} = € 94,786.73$

Step 2: Sell € to Bank B, we get $\frac{94,786.73}{1.4970} = £ 63,317.79$

Step 3: Sell £ 63,317.79 to Bank A, we get $63,317.79 \times 1.6320 = \$ 103,346.63$

Arbitrage $\pi = \$ 3334.64$

CHF/CAD

Ex: Bank A : 1 CAD = CHF 11.60 / 11.90
 CHF/AUD 1 AUD = CHF 16.10 / 16.40
 CAD/AUD 1 AUD = CAD 1.6050 / 1.6090

Show the process of Arbitrage if you have AUD 500,000?

Step 1: Sell AUD 500,000 to Bank C, we get $500,000 \times 1.6050$
 = CAD 802,500

Step 2: Sell CAD 802,500 to Bank A, we get $802,500 \times 11.6$
 = CHF 93,09,000

Step 3: Sell CHF 93,09,000 to Bank A, we get $93,09,000 \div 16.4$
 = AUD 567,621.95

∴ Arbitrage Profit = AUD 67,621.95

① £/\$ 68.3

£/¥ 95.8

¥/\$ 1.3231

→ USD 10,00,000, Arbitrage Profit

∴ USD 60,113.26 $\left(\frac{10,00,000}{1.3231} - 75,5860.77 \times 95.8 = 72405713.85 \right)$
 68.3

②

(2)

2 \$	48.3
2 £	77.52
\$ £	1.626231

USD 100 | £, Arbitrage Profit :-

Ans: USD 112968.26 $\left(\frac{100 \times 48.3}{77.52} = 6230650.15 \times 1.6231 \right)$

(3)

CNY/HKD	0.8422	$\left. \begin{array}{l} \text{No use} \\ \text{ZAR} \\ \text{SEK} \end{array} \right\} \text{ZAR/SEK} = \frac{1.0218}{0.9149}$
CNY/ZAR	0.9149	
CNY/SEK	1.0218	
ZAR/SEK	1.1210 over	

$\leftarrow \rightarrow = 1.1168$
undervalued

100,000 ZAR SEK

$(1.1210 - 1.1168) \times 1 \text{ million} = \text{ZAR } 4200 \text{ per million}$

(2) SEK traded.

Direct quote v/s Indirect quote

1FC = How many units of HC i.e. $HC/FC \rightarrow$ Direct quote

1HC = How many units of FC i.e. $FC/HC \rightarrow$ Indirect quote

Ex: \$/£ = 1.2050 $\Rightarrow$ is it direct quote or indirect quote for US $\Rightarrow$ DQ for US.

Two currencies

Exams me
One hour

Two Currency Arbitrage

Bank A ₹/\$ 84.20 / 84.90 (Mumbai)

Bank B \$/₹ 0.011680 / 0.011720 (NY)
85.32 / 85.62

Q1. Are these quotes identical?

Ans: NO, because Bank A → Direct Quote for India
Bank B → Indirect quote for India

Q2. Is there a scope for arbitrage?

Bank A	₹/\$	84.20 / 84.90
Bank B	Implied \$/₹	$\frac{1}{0.011720} = 85.32$ $\frac{1}{0.011680} = 85.62$

Yes, there is an arbitrage opportunity as ^{bid rate of} Bank B is higher than ask rate of Bank A.

Q3. If there is arbitrage, how will you make a profit if I have \$ 50,000 or ₹ 500,000, show both.

Solve using \$ 50,000

Step 1: Sell \$ 50,000 to Bank B = $50,000 \times 85.32$
= 4,266,000

Step 2: Sell ₹ 4,266,000 to Bank A = $\frac{4,266,000}{84.90} = 50,247.35$

Step 3: Arbitrage $\pi = 247.35$

Using ₹ 500,000

Step 1: Sell ₹ 500,000 to Bank A = $\frac{500,000}{84.9} = \$ 589.28$

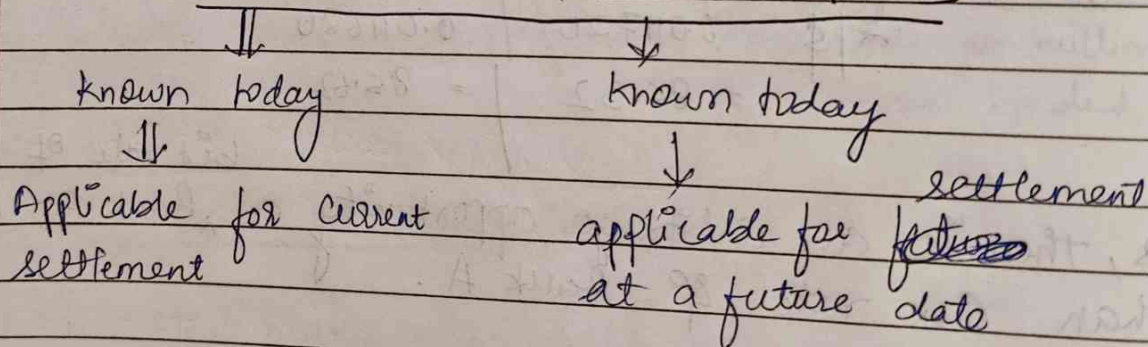
Step 2: Sell \$ 589.28 to Bank B = $589.28 \times 85.32 = 502473.50$

Step 3: Arbitrage Profit = 2473.50

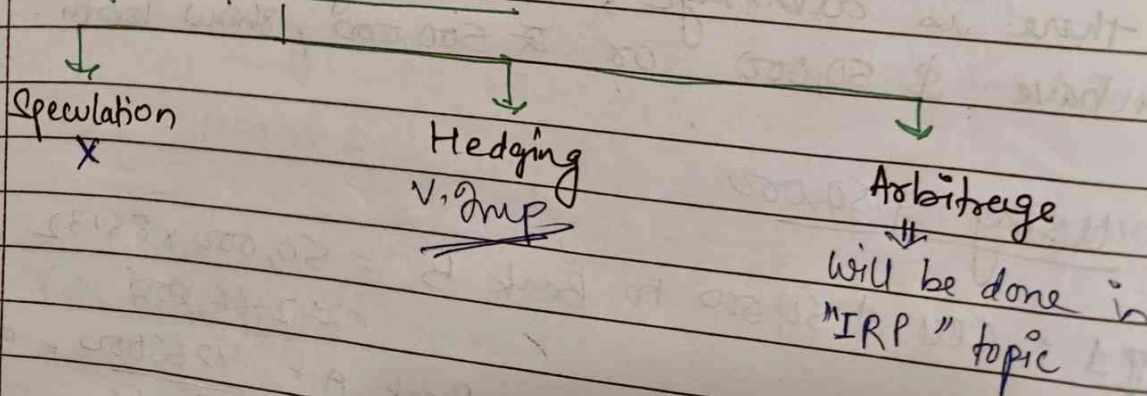
③
H/W

JPY / USD	105.00	106.50
USD / JPY	0.0090	0.0093
	107.53	111.11

~~Forward~~ SPOT RATES & FORWARD RATES



Note: Usage of Forward Rate



- Some mechanical topics related to Forward Rates

(i) Annualised Forward Premium/Discount on a Currency

Eg: Spot £/\$ 85.30
6 month forward £/\$ 86.90

Q1. Which currency is at a Forward Premium and is at a Forward Discount?

Sol: \$ $\rightarrow$ Forward Premium
£ $\rightarrow$ Forward Discount

Q2. Calculate Annualised Forward Premium on \$?

Sol:
$$\left[\frac{F - S}{S} \times 100 \times \frac{12}{n} \right]$$

$$= \frac{86.9 - 85.3}{85.3} \times 100 \times \frac{12}{6} = 3.7515\%$$

Q3. Calculate the Annualised Forward Discount on £?

Can't we directly do this? of course: -

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

$$\frac{86.90 - 85.30}{85.30} \times 100 \times \frac{12}{6}$$

$$= \frac{85.30 - 86.90}{86.90} \times 100 \times \frac{12}{6}$$

$$= -3.6824\%$$

Discount

$$\frac{F-S}{S}$$

Base currency ka
Premium or Discount

$$\frac{S-F}{F}$$

Price currency ka Premium
or Discount

Ex: Spot \$/£ 1.4020
3M F \$/£ 1.3910

Q1. which currency is at a forward Premium & which currency is at a forward Discount

Ans: \$ → Forward Premium
£ → Forward Discount

Q2. Calculate Annualised forward Discount on £?

$$= \frac{1.3910 - 1.4020}{1.4020} \times 100 \times \frac{12}{3}$$

$$= -3.1384\%$$

i.e. 3.1384% Discount

Q3. Calculate Annualised forward premium on \$?

$$= \frac{S-F}{F} \times 100 \times \frac{12}{3}$$

$$= \frac{1.4020 - 1.3910}{1.3910} \times 100 \times 4$$

$$= 3.1632\%$$