

FX: L19 - Part 1

IRP Equation :-

1) style 1 :
$$\frac{F}{S} = \frac{\text{Interest rate factor of Price Currency}}{\text{Interest rate factor of Base Currency}}$$

2) style 2 : For Base Currency $\rightarrow \frac{F-S}{S} \times 100 \times \frac{12}{n}$

For Price Currency $\rightarrow \frac{S-F}{F} \times 100 \times \frac{12}{n}$

Difference of Interest Rate
Periodic Interest rate factor

Always prefer style 1 unless both F & \$ not given they asked you to calculate annualized forward premium or discount on a currency, based on IRP.

$$\begin{array}{l}
 \frac{F}{S} \rightarrow \begin{cases} \text{SAR} : \frac{1 + r_A t}{1 + r_B t} \\ \text{EAR} : \left[\frac{1 + r_A}{1 + r_B} \right]^t \\ \text{CAR} : \frac{e^{r_A t}}{e^{r_B t}} \rightarrow e^{(r_A - r_B) \cdot t} \end{cases}
 \end{array}$$

All interest rates in SFM paper are p.a. if sum is silent.
 Imp. is whether whether it is SAR or EAR or CAR.
 Nature of compounding not given $\rightarrow$ assume SAR.
 Daily compounding given $\rightarrow$ CAR (icai pagal h...)

Eg: Spot rate \$ 1.2350/£

6m F rate \$ 1.2610/£

6m interest rate p.a. compounded annually.

\$ $\rightarrow$? , £ = 4%.

$$\text{Sol}^n: \frac{1.2610}{1.2350} = \left[\frac{1 + r_{\$}}{1 + r_{£}} \right]^{6/12} \Rightarrow 1.0413 = (1 + r_{\$})^{1/2}$$

$$\therefore r_{\$} = 8.43\%$$

£ has appreciated which means interest rate of £ shall be less than \$

Eg: Spot ₹ 62.30/CHF

Forward discount on CHF based on 3m F rate is 5% (annualized)

1) Calculate 3m F rate

2) If 3m ₹ interest rate is 10%, what is CHF int rate p.a.

Solⁿ: 1) CHF is a base currency

Discount on CHF i.e. Base currency is 5%.

$$\therefore \frac{F - S}{S} \times 100 \times \frac{12}{n} = -5$$

$$\therefore \frac{F - 62.30}{62.30} \times 100 \times \frac{12}{3} = -5 \Rightarrow F = ₹ 61.5212 / \text{CHF}$$

(shortcut method to chk answer - not to do in exam...
 5% is p.a. i.e. 1.25% for 3 months is discount rate....
 $F = 62.30 - 1.25\% \text{ of } 62.30 = \text{£ } 61.52125 / (\text{CHF})$

$$2) \frac{F}{\$} = \frac{1 + r_{\text{£}}t}{1 + r_{\text{CHF}}t} \Rightarrow \frac{61.5212}{62.30} = \frac{1.025}{1 + r_{\text{CHF}} \times 3/12}$$

$$\therefore r_{\text{CHF}} = 15.20\%$$

Q.45	pg
QW.19	

 $S = \text{£ } 55.5 / \$$

$r_{\text{£}} = 10\%$

$r_{\$} = 4\%$

(i) US \$ should be at a forward premium bcoz US \$ rate of interest is less than £ interest rate (as per IRP).

$$(ii) \frac{F}{\$} = \frac{1 + r_{\text{£}}t}{1 + r_{\$}t} \Rightarrow F = 55.50 \times \frac{1.05}{1.02}$$

$$\therefore F = \text{£ } 57.13 / \$$$

(iii) Annualized Forward premium
 \$ is base currency

$$\frac{F - S}{\$} \times 100 \times \frac{12}{n} = \frac{57.13 - 55.50}{55.50} \times 100 \times \frac{12}{6} = 5.87\%$$

Self Note : wo wale formula se bhi kr skte h but exam me mt krna....

$$\frac{\text{Difference of interest rate}}{\text{Periodic interest factor}} = \frac{10 - 4}{1.02} = 5.88\%$$

(of the currency for which we are calculating prem/disc.)

Self practice : HW. Q. 29, 30] pg. 13

Part-2

Q.46	pg
QW.19	

$$\frac{F}{\$} = \frac{1 + r_{\text{£}}t}{1 + r_{\$}t} \Rightarrow F = 0.7570 \frac{(1 + 0.075 \times 3/12)}{(1 + 0.035 \times 3/12)}$$

$$\therefore F = \text{£ } 0.7645 / \$$$

Self practice : HW. Q. 31, 32] pg. 14

Q.47 Pg
W. 19

DM receivable after 90 days

$\therefore$ DM $\downarrow$ aur \$ $\uparrow$ ka darr

$$\text{S} = 1.71 \text{ DM} / \$ \quad \& \quad F = 1.70 \text{ DM} / \$$$

(i) Shoe Co. is a US company. It has DM 50000 revbl. in 3m & is afraid of \$ rising.

To hedge the same it should enter into a forward contract to sell DM @ 1.70.

$$\text{Inflow of \$ after 3m} = \frac{50000}{1.70} = \$ 29411.76$$

Today spot rate is DM 1.71 / \$

$$\text{Inflow based on spot rate} = \frac{50000}{1.71} = \$ 29239.77$$

Gain due forward contract = 172 dollars

(ii) \$ is @ forward discount

DM is @ forward premium

Imp

(iii) As per IRP, annualized forward premium / discount approximately equals interest rate difference.

Annualised forward discount on \$

$$= \frac{F - \text{S}}{\text{S}} \times 100 \times \frac{365}{90}$$

$$= \frac{1.70 - 1.71}{1.71} \times 100 \times \frac{365}{90}$$

$$= -2.37\%$$

$$\therefore r_{\$} - r_{\text{DM}} \approx 2.37\%$$

self practice : Extra Q.1), pg. HW soln. 65

Part-3

Q.49 Pg
W. 20

$$r_{\$} = 7\%$$

$$r_{¥} = 5.5\%$$

} (compounding frequency not given $\therefore$ SAR)

$$\text{S} = \$ 0.009 / ¥$$

$$\text{If IRP holds good} \rightarrow \frac{F}{\text{S}} = \frac{1 + r_{\$}t}{1 + r_{¥}t}$$

$$\frac{F}{0.0090} = \frac{1.035}{1.0275} \Rightarrow F = \$0.0091/\text{¥}$$

Self practice: Extra Q.2] HW soln pg 66

Q.48	pg	$S = 7.05 \text{ Fr.F}/\$$ (annual compounding)
QW.19		

① 3 months :

Wrong (ICAI)

$$\frac{F}{S} = \frac{1 + r_{\text{Fr.F}} \times t}{1 + r_{\$} \times t}$$

$$\frac{F}{7.05} = \frac{1 + 0.195 \times 3/12}{1 + 0.115 \times 3/12}$$

$$\therefore F = \text{Fr.F } 7.1871/\$$$

Correct solution

$$\frac{F}{S} = \left[\frac{1 + r_{\text{Fr.F}}}{1 + r_{\$}} \right]^t$$

$$\frac{F}{7.05} = \left[\frac{1 + 0.195}{1 + 0.115} \right]^{3/12}$$

$$\therefore F = \text{Fr.F } 7.1732/\$$$

Forward discount on Fr.F (price currency)

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

$$= \frac{7.05 - 7.1871}{7.1871} \times 100 \times \frac{12}{3}$$

$$= -7.63\%$$

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

$$= \frac{7.05 - 7.1732}{7.1732} \times 100 \times \frac{12}{3}$$

$$= -6.87\%$$

② 6 months :

Wrong (ICAI)

$$\frac{S - F}{F} \times 100 \times \frac{12}{n} = -6.3\%$$

$$\frac{7.05 - F}{F} \times 100 \times \frac{12}{6} = -6.3\%$$

$$\therefore F = \text{Fr.F } 7.2793/\$$$

Correct solution

← same

$$\frac{F}{S} = \frac{1 + r_{\text{Fr.F}} \times t}{1 + r_{\$} \times t}$$

$$\frac{7.2793}{7.05} = \frac{1 + r_{\text{Fr.F}} \times 6/12}{1 + 0.1225 \times 6/12}$$

$$\therefore r_{\text{Fr.F}} = 19.15\%$$

$$\frac{F}{S} = \left[\frac{1 + r_{\text{Fr.F}}}{1 + r_{\$}} \right]^t$$

$$\frac{7.2793}{7.05} = \left[\frac{1 + r_{\text{Fr.F}}}{1 + 0.1225} \right]^{6/12}$$

$$\therefore r_{\text{Fr.F}} = 19.67\%$$

③ 1 year

$$\frac{F}{S} = \frac{1 + r_t}{1 + r_{\$}t} \Rightarrow \frac{7.52}{7.05} = \frac{1 + 0.20}{1 + r_{\$}} \Rightarrow r_{\$} = 12.5\%$$

Annualized discount on Fr.F

$$= \frac{S - F}{F} \times 100 \times \frac{1}{t}$$

$$= \frac{7.05 - 7.52}{7.52} \times 100$$

$$= -6.25\%$$

Self practice: HW soln. Extra Q.3] pg. 67