$$F_3 = \frac{[1+S_3]^3}{[1+S_2]^2} - 1 \qquad F_3 = \frac{[1+S_3]^3}{[1+F_1][1+F_2]} - 1$$

$$F_4 = \frac{[1+S_4]^4}{[1+S_3]^3} - 1 \qquad F_4 = \frac{[1+S_4]^4}{[1+F_1][1+F_2][1+F_3]} - 1$$

or

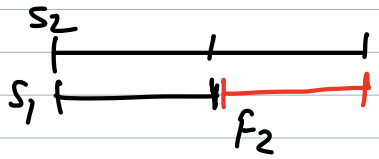
$$f_4 = \frac{[1+S_4]^4}{[1+S_2]^2[1+F_3]} - 1$$

F

Q6

① $F_1 = S_1 = 10\%$

② $F_2 = \frac{(1+S_2)^2}{(1+S_1)} - 1$



$= \frac{(1.11)^2}{(1.10)} - 1$

$= \frac{1.2321}{1.10} - 1$

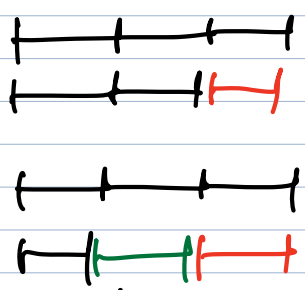
$= 12.01\%$

③ $f_3 = \frac{(1+S_3)^3}{(1+S_2)^2} - 1$

$= \frac{(1.12)^3}{(1.11)^2} - 1$

$= \frac{1.4049}{1.2321} - 1$

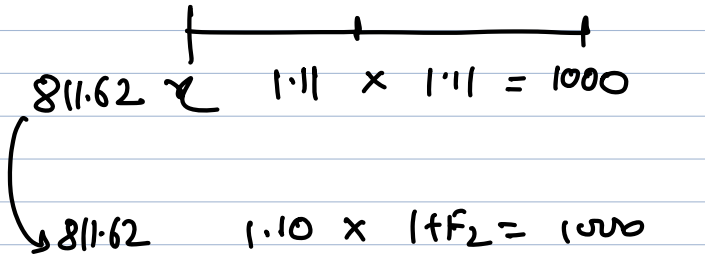
$= 14.02\%$



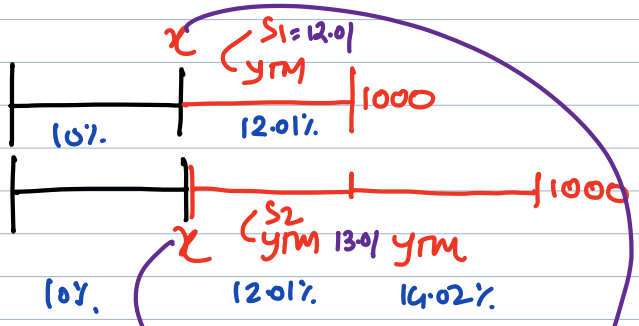
$F_3 = \frac{(1+S_3)^3}{(1+F_1)(1+F_2)} - 1 = \frac{1.123}{1.10 \times 1.1201} - 1$

$= \frac{1.4049}{1.232} - 1$

$= 14.13\%$



ii)



1 year Bond :- $\frac{1000}{1.1201} = 892.78$

2 year Bond = $\frac{1000}{1.1201 \times 1.1402} = 783.00$

YTM

1 year Bond $S_1 = F_1 = 12.01\%$

2 year Bond $F_2 = \frac{(1+S_2)^2}{(1+F_1)} - 1$

$$0.1402 = \frac{(1+S_2)^2}{(1.1201)} - 1$$

$$(1.1201)(1.1402) = (1+S_2)^2$$

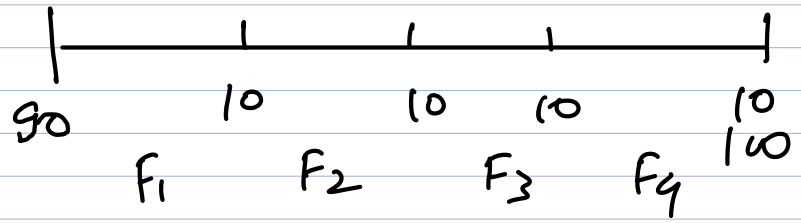
$$1.2771 = (1+S_2)^2$$

$$\sqrt{1.2771} = 1+S_2$$

$$1.1301 = 1+S_2$$

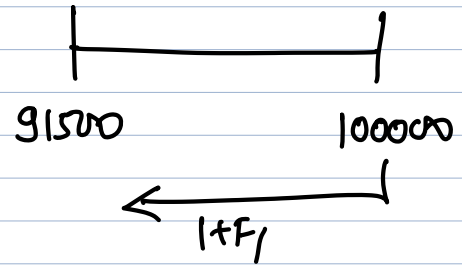
$$S_2 = 13.01\%$$

Q7



$$CMP = \frac{CF_1}{1+F_1} + \frac{CF_2}{(1+F_1)(1+F_2)} + \frac{CF_3}{(1+F_1)(1+F_2)(1+F_3)}$$

F1



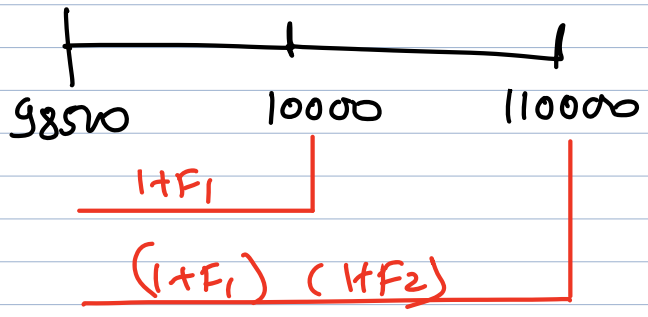
$$CMP = \frac{CF_1}{1+F_1}$$

$$91500 = \frac{100000}{1+F_1}$$

$$1+F_1 = 1.0929$$

$$F_1 = 9.29\%$$

F2



$$98500 = \frac{10000}{(1+F_1)} + \frac{110000}{(1+F_1)(1+F_2)}$$

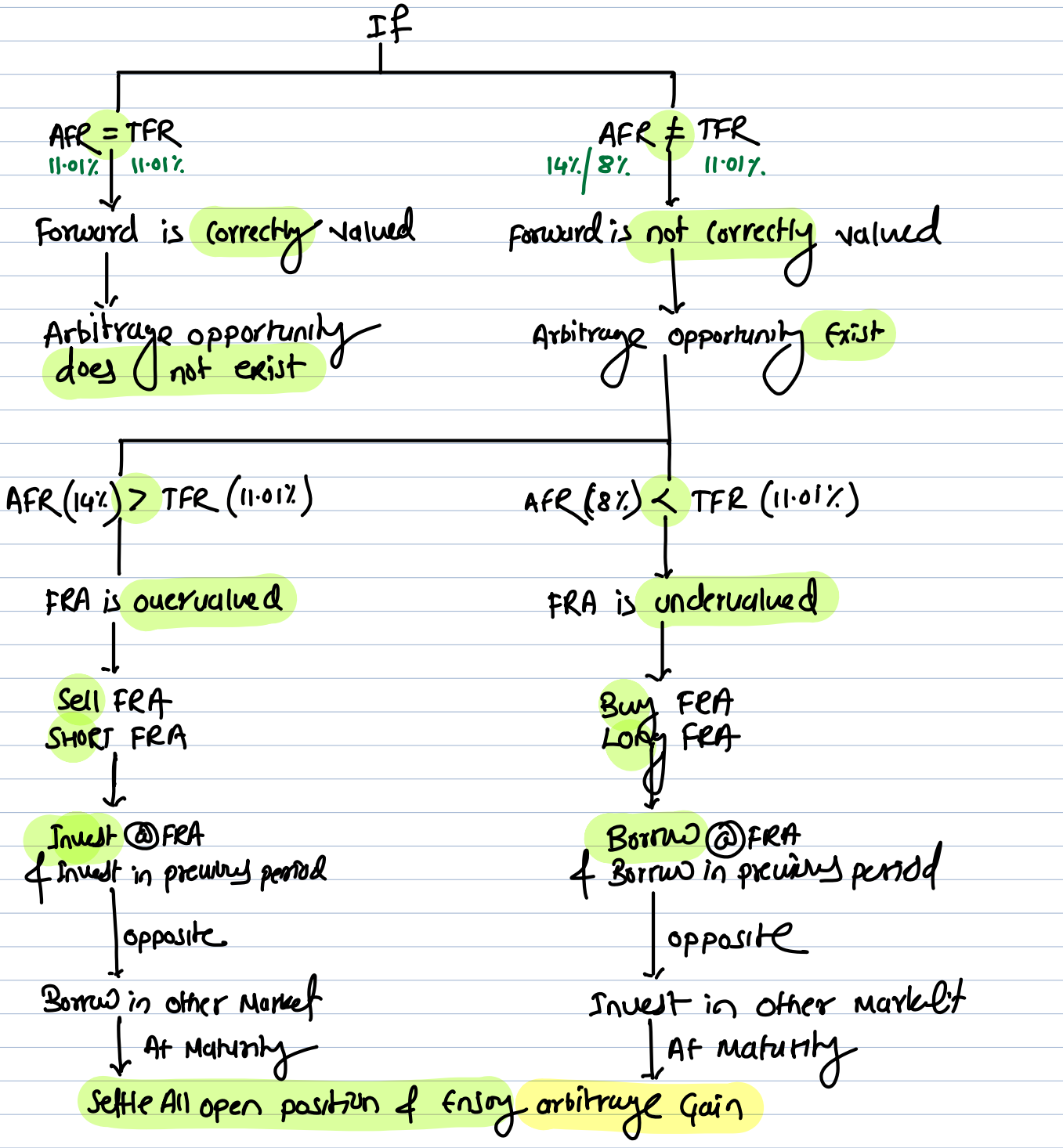
$$98500 = \frac{10000}{1.0929} + \frac{110000}{1.0929\,(1+F_2)}$$

$$9850 = 9149.97 + \frac{10064.65}{1+F_2}$$

$$89350.03 = \frac{10064.65}{1+F_2}$$

$$F_2 = 12.65\%$$

$$F_3: \quad CMP: \frac{CF_1}{1+F_1} + \frac{CF_2}{(HF_1)(HF_2)} + \frac{CF_3}{(HF_1)(HF_2)(HF_3)}$$



10 a)

$$(1+S_{6m}) = (1+S_3)(1+F_3)$$

$$\left[1+\frac{0.05}{2}\right] = \left[1+\frac{0.045}{4}\right]\left[1+\frac{F_3}{4}\right]$$

$$1.025 = 1.01125\left[1+\frac{F_3}{4}\right]$$

$F_3 = 5.44\%$ p.a.

Bank will always
Buy Cheap 4%.
Sell High 14%.

BANK's View

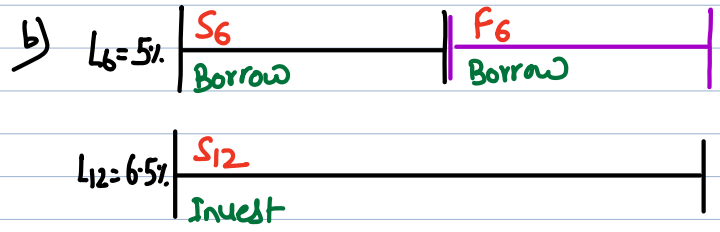
CoF 6.50% - 6.75% CtF

Bid ↓ Ask ↓

Bank's Buying Rate — Bank's Selling Rate

Borrow ↑ Deposit — Lend ↑ Borrow

b)



TFR $[1+S_{12}] = [1+S_6][1+F_6]$

$$1.065 = \left[1+\frac{0.05}{2}\right]\left[1+\frac{F_6}{2}\right]$$

$$1.065 = 1.025\left[1+\frac{F_6}{2}\right]$$

TFR = $f_6 = 7.80\%$

AFR < TFR (7.80%)

↓

FRA is undervalued

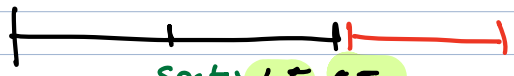
↓

Buy FRA
Long FRA

Arbitrage Transactions

t=0	✓ Borrow @ spot for 6m	+100000
	✓ Invest @ spot for 12m	-100000
	Buy FRA @ 6.75%	-
		0
t=6m	X Repayment $100000 \times \left[1+\frac{0.05}{2}\right]$	-102500
	✓ Borrow under FRA	+102500
t=12m	X Investment Proceeds 100000×1.065	+106500
	X Repayment $102500 \times \left[1+\frac{0.0675}{2}\right]$	-105959
	Arbitrage Gain	541

Q1



FRA = 5.04%.

premium 0.1%.

Spot ⇒ 4.5 5.50

5.04 5.04

FRA ⇒ 0.54 (0.46)

5.04 5.04

Spot	4.5	5.50
FRA	NEO	E (0.46)
	4.5	5.04
	0.10	0.10
	4.60%.	5.14%.

INTEREST RATE FUTURES

1. Interest Rate Futures is Exchange Traded Derivative Contract
2. IRF is based on prices of Bonds & Not interest Rate

IRF → Underlying Asset → Bonds price ✓

→ ~~Interest Rate~~ ✗

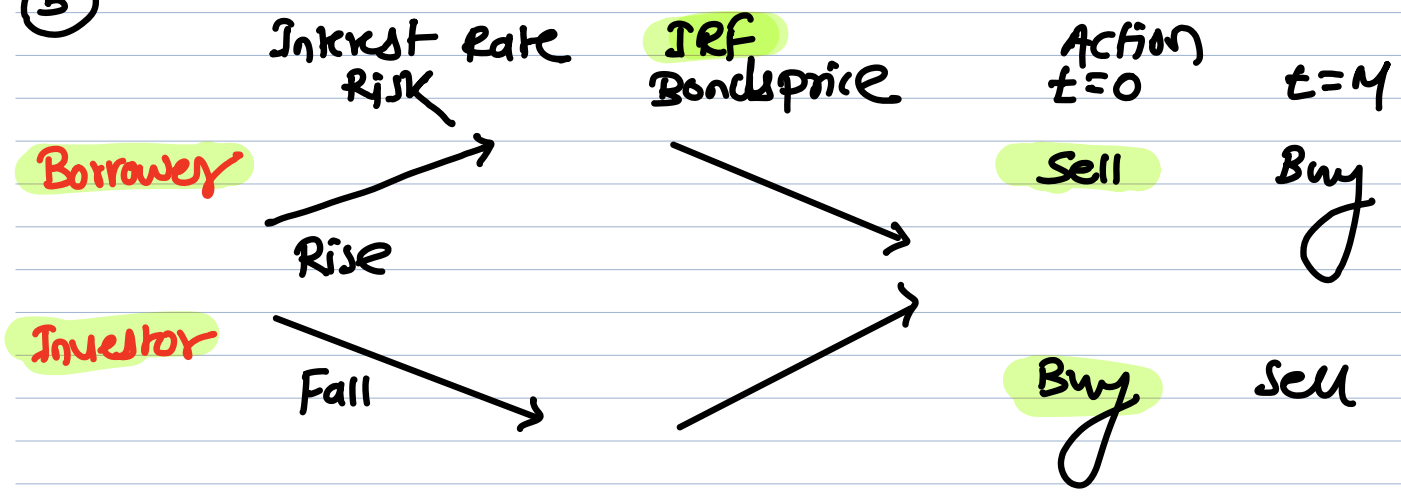
③ Interest Rates $\propto \frac{1}{\text{Bonds price}}$, $\text{YTM} \propto \frac{1}{MP}$

Interest rate futures ↓ Interest Rate ↓ Bond price

④ Theoretical price of IRF = 100 − IR

= 100 − 5% = 95 | 100 − 4% = 96

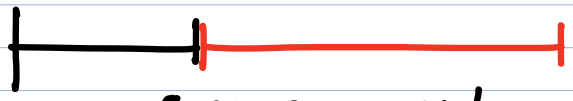
⑤



	FRA	IRF
Borrower	Buy	Sell
Investor	Sell	Buy

⑥ Standard lot size = 2000

5 ↓ 7% | 95 Sell ↓ 93 Buy



Spot $50000000 \times 2\frac{1}{2} = (500000)$

IRF SHORT $100000000 \times 2\% \times \frac{1}{3} = 500000$

4.5

$5.85 - 100 - 4.5$

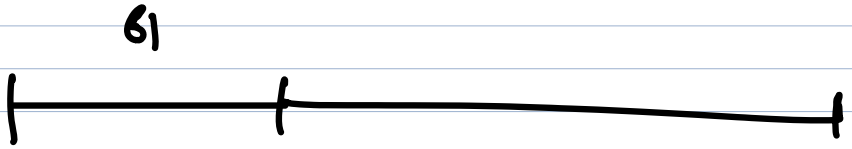
FU 94.15 SHORT 95.50 LONG $= 1.35\% \times 100000000 \times \frac{3}{12} = (337500)$ Loss

Spot $= 4.5\% \times 50000000 \times \frac{6}{12} = (1125000)$

$$= \frac{1462500}{50000000} \times \frac{12}{6} \times 100$$

5.85%

$$\frac{5000000}{100 \times 2000} = 25 \text{ lot SHORT}$$

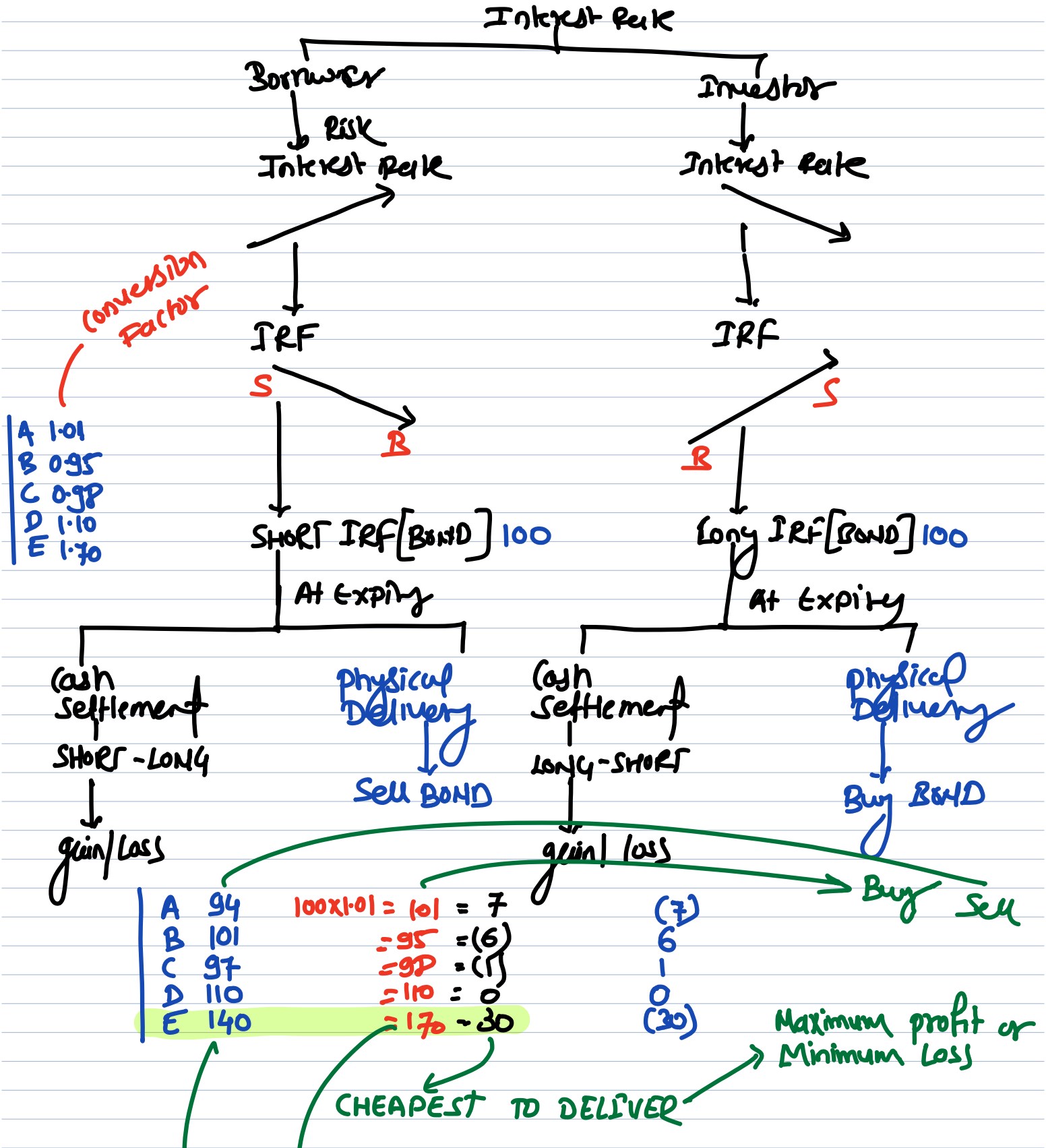


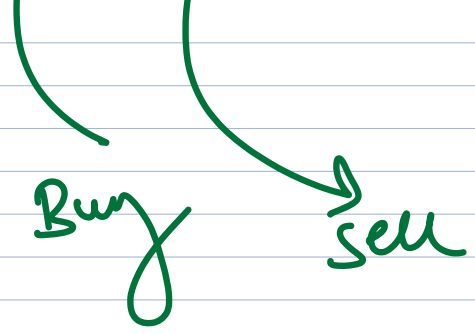
$500000 \times 2.5\% = 125000$

t= Borrow 8/125000
Initial Mar. −125000
SHORT 0

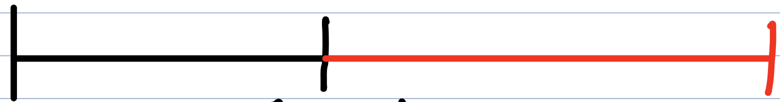
t=61 Loss due to increase in ENF (313080)
$120[60662 - 58054]$
profit in IRF 339500
$[100 - 93.21] \times 2000 \times 25$

Interest on Margin (167)
1250000 × 8% × 61/365





Interest Rate Options Cap & Floor



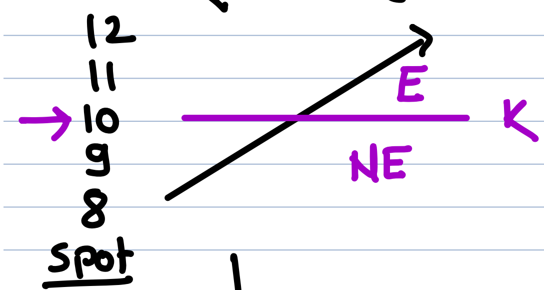
Spot	8%	7%	12%
FRA	9%	-7	-12
Obligation		-2	+3
		- 9%	-9%

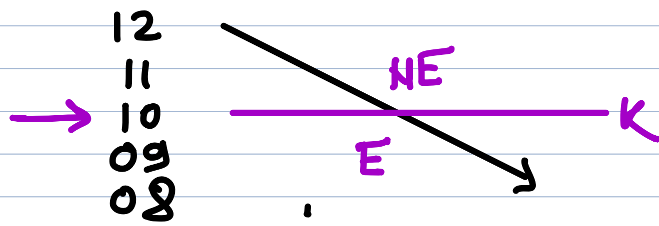
IRO
↳ CAP K = 9%
Right ↓
premium = 0.10%

-7%	-12%
NE	+3%
-7%	-9%

IRO

Borrower	Investor
↓	↓
Risk	Risk
↓	↓
IR to Rise	IR to fall





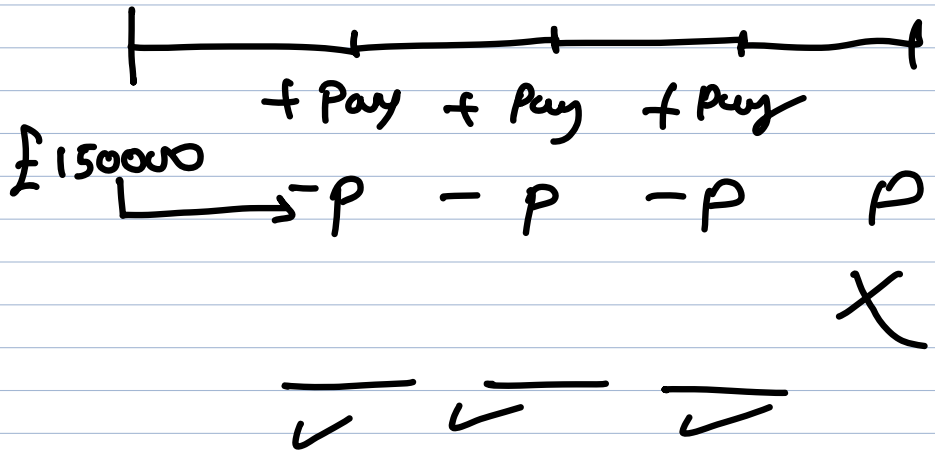
Borrower	Investor
↓	↓
Buy CAP option	Buy Floor option
↓	↓
Fix upper limit	Fix Lower Limit
↓	↓
payoff Max [S-K, 0]	payoff Max [K-S, 0]

Premium
↳ option Seller

2]

Date	spot S	strike K	Action	Payoff
31.03.13	10.2	8.50	E	1.7% x 4000000 = 68000
14	11.5	8.50	E	3% x 4000000 = 120000
15	9.25	8.50	E	0.75 x 4000000 = 300000
16	8.25	8.50	NE	= 0

Q24



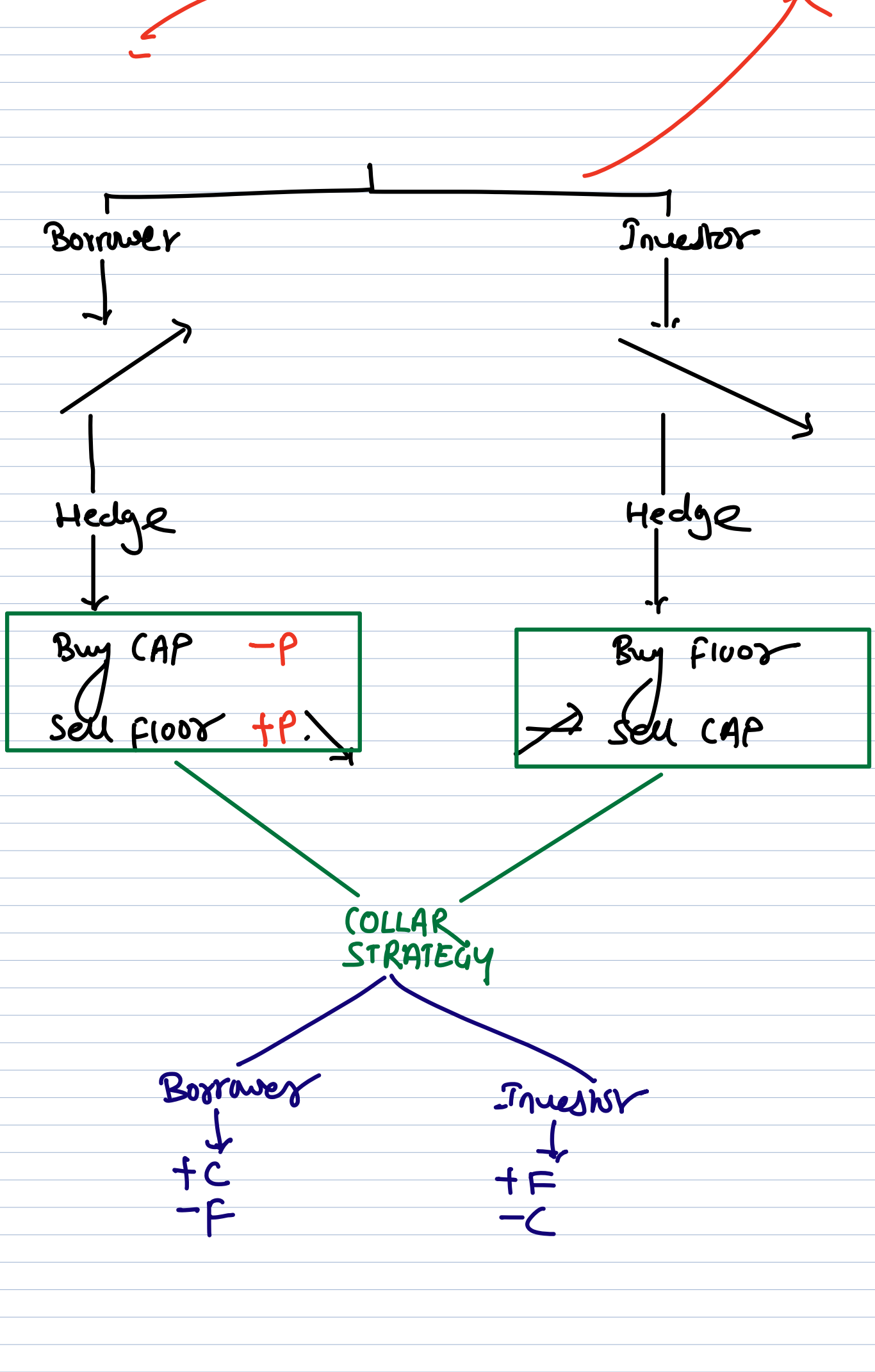
$$\text{PV of Annuity} = A \times PVAF_{3.5\%,\,4}$$

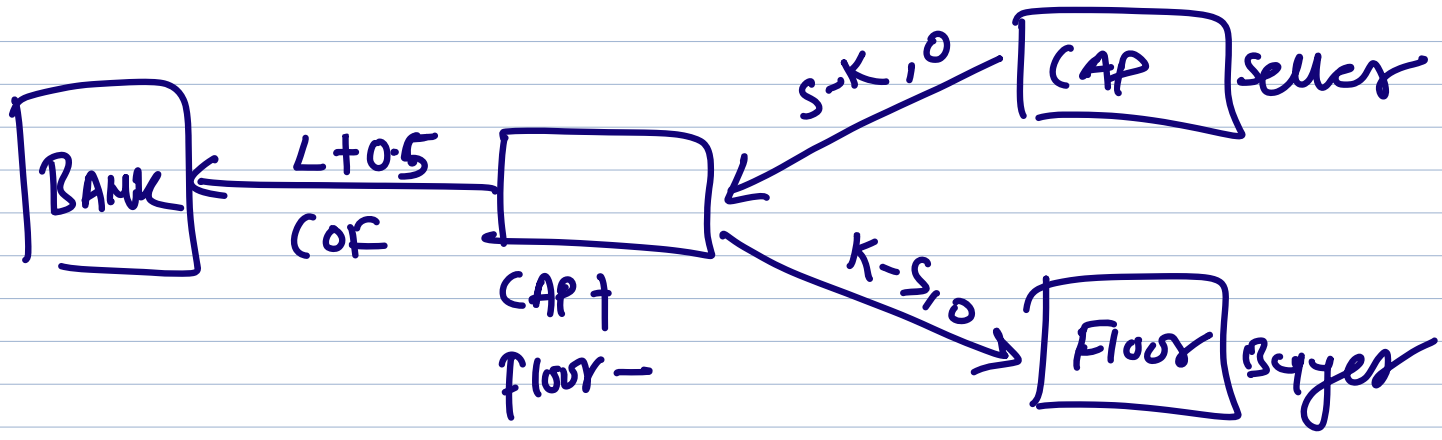
$$1500000 \times 1\% = A \times 3.6731$$

$$\frac{150000}{3.6731} = A$$

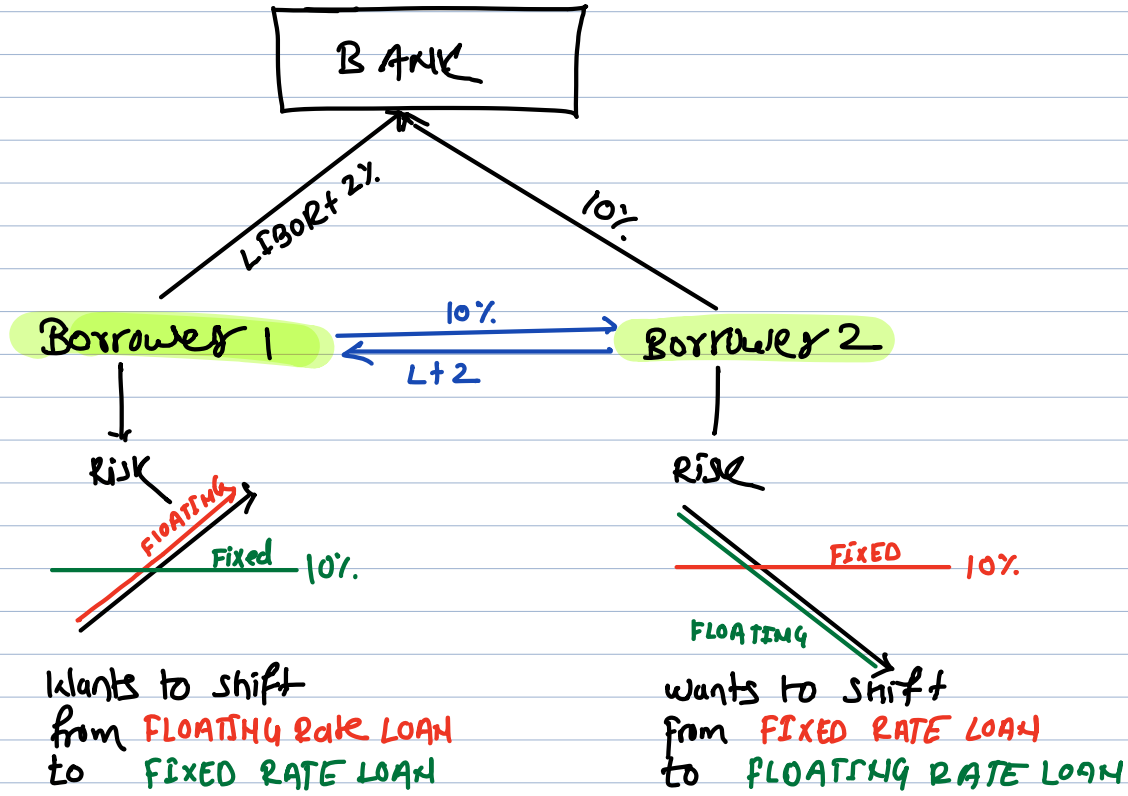
Premium = £40837

	L	K	Additional Inf.	Receipt under CAP	prem ium	Net Receipt
19%.18	1	9.00	8.00	75000 $1500000 \times 1\% \times 6/12$	75000	40837	34163
19.50	2	9.50	8.00	112500 $1500000 \times 1.5\% \times 6/12$	112500	40837	71663
20.00	3	10.00	8.00	150000 $1500000 \times 2\% \times 6/12$	150000	40837	109163
				337500	337500	122511	214989


Borrower
Investor
Hedge
Hedge
Buy CAP -P
Sell Floor +P
Buy Floor
Sell CAP
COLLAR STRATEGY
Borrower
+C
-F
Investor
+F
-C



INTEREST RATE SWAPS



1. opposite view
2.

Q31

Quality Spread [possible gain] = Difference in Fixed Rate − Difference in Floating Rate

= 2 − 0.25

= 1.75%

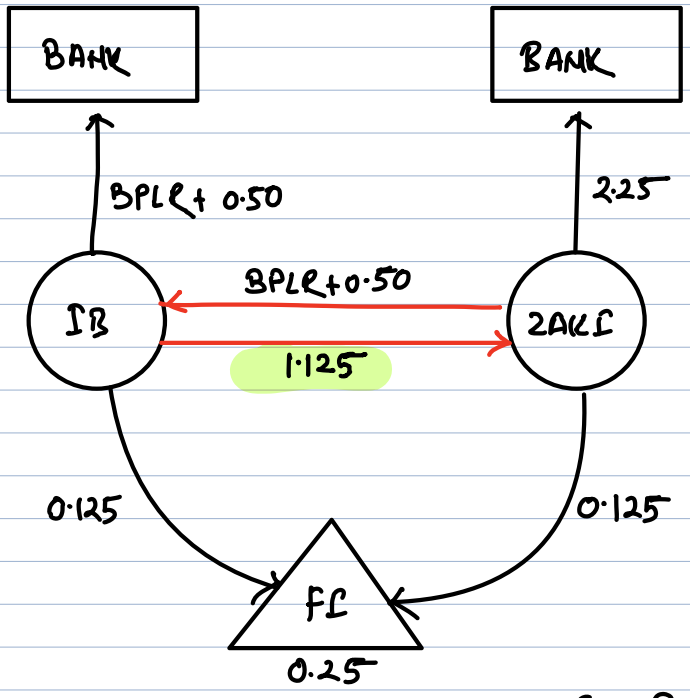
(−) Financial Institution 0.25%

= 1.50%

2%	IB share	= 0.75	= 1.25%
BPLR+2.50	ZAKL share	= 0.75	= BPLR+1.75
Direct			Swap

1. Absolute Advantage is with IB in Fixed & Floating Rate
2. IB has comparative Advantage in Floating Rate Loan

Swapping is possible only when A party with comparative advantage in one type of Loan wishes to borrow other type of Loan



	Swap	Direct	Gain
IB = (BPLR+0.50) − (BPLR+0.50) + 0.125 + 1.125	= 1.25%	2%	0.75%
ZAKL = 2.25 + 0.125 + BPLR+0.50 − 1.125	= BPLR+1.75%	BPLR+2.50%	0.75%

1) Quality spread = Diff. in Floating − Diff in Fixed

Possible gain

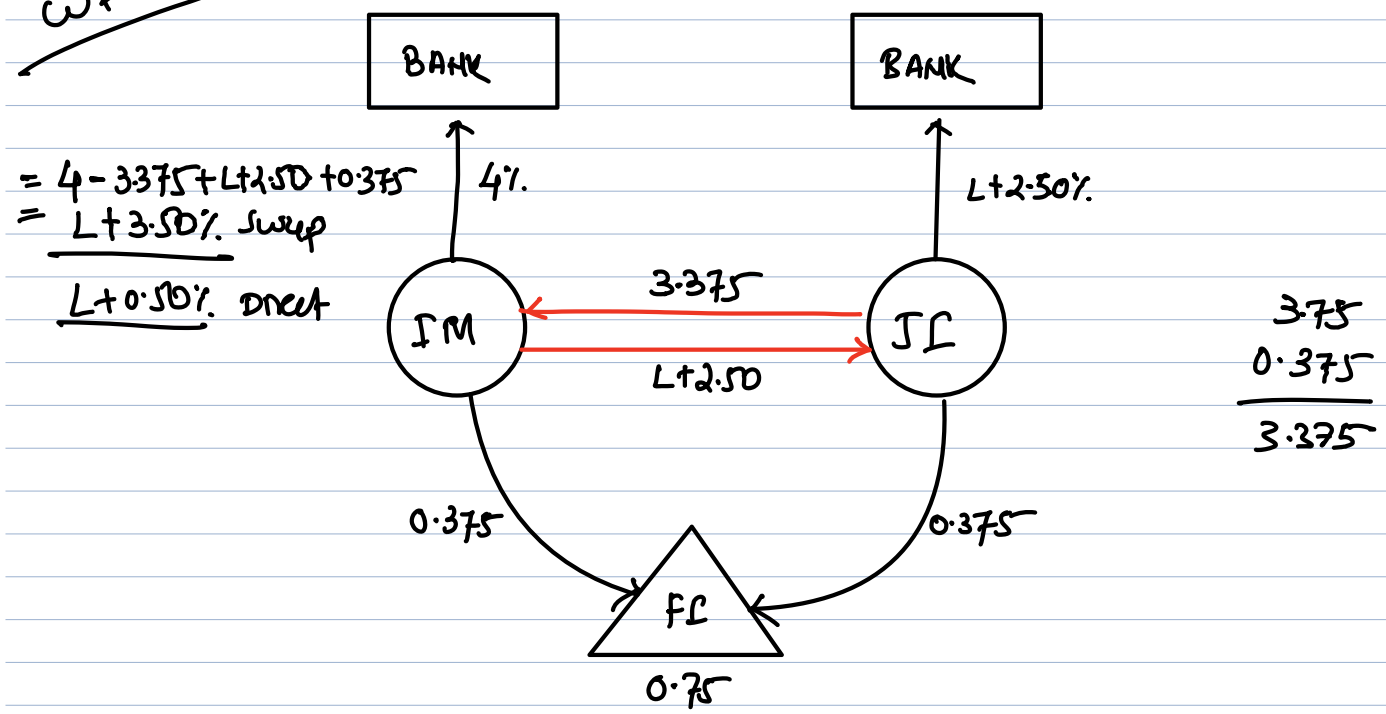
2] Ask parties to take opposite type of Loan from Bank

3] Pay to Dealer in the agreed gain sharing ratio

4] Floating Payer will receive Floating paid to Bank from other party

5] Floating Payer will pay fixed to other party to extent it justifies the gain

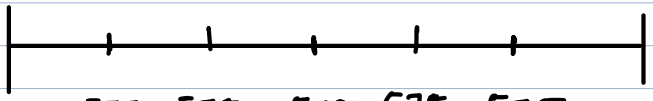
Q30 WRONG



= 4 − 3.375 + L+2.50 + 0.375
= L+3.50% swap

L+0.50% Direct

3.375
0.375
3.375

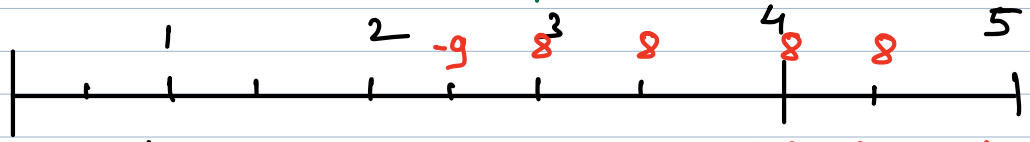


MIBOR	5.25	5.75	5.75	5.75	5.75	5.75
Swap		.75	.75	.75	.75	.75	.75
DR (M+0.45)	5.70	6.20	6.20	6.20	6.20	6.20	p.a. 1/2

A ltd wanted to Borrow at Floating Rate

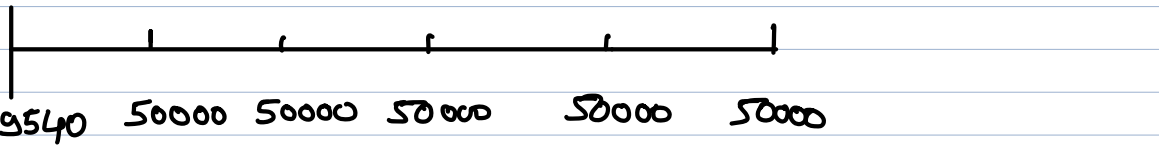
Direct Rate =	MIBOR + 0.75
(-) Swap gain 0.50 X 60%	0.30
Swap Rate	MIBOR + 0.45

Q33

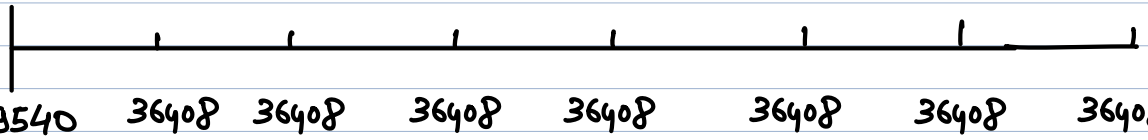


	1	2	-9	3	8	4	8	8	5
+Fixed	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10
-Floating	-L	-L	-L	-L	-L	-9	-8	-8	-8	-8
						+1	+2	+2	+2	+2
						50000	100000	100000	100000	100000

[7]



189540	50000	50000	50000	50000	50000	



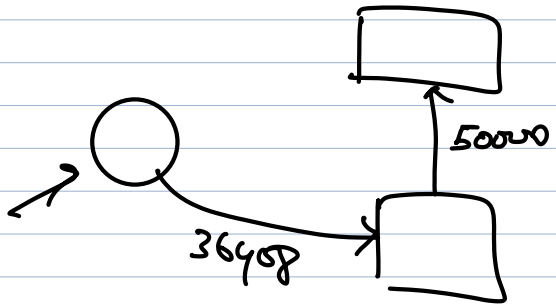
189540	36408	36408	36408	36408	36408	36408	36408

Present Interest Rate: PV of Annuity = $A \times PVAF_{\gamma,5}$

$189540 = 50000 \times PVAF$

$PVAF_{\gamma,5} = 3.791$ i.e. $\gamma = 10\%$

New Interest Rate: $PVAF_{\gamma,7} = 189540/36408 = 5.206$ i.e. $\gamma = 8\%$



189540
- 5686 @3%
- 12000
171854

100 → 10
90 → 10
10

Effective IR = $\frac{171854}{36408} = 4.720$

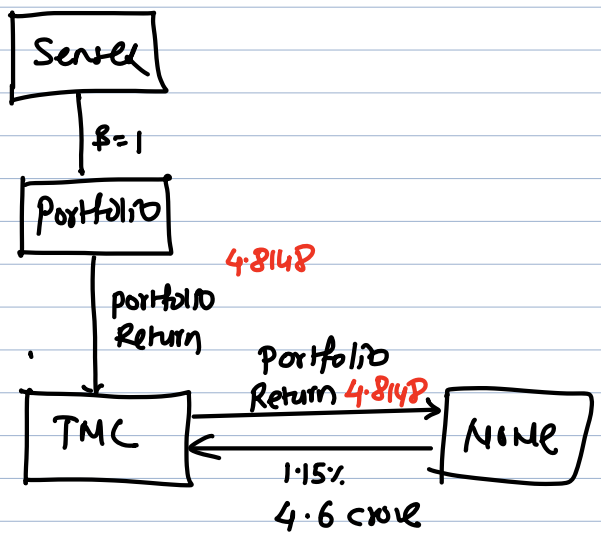
$\gamma = 10\%, 7 = 4.868$
$\gamma = 11\%, 7 = 4.712$ → 4.720

1	0.156	0.148

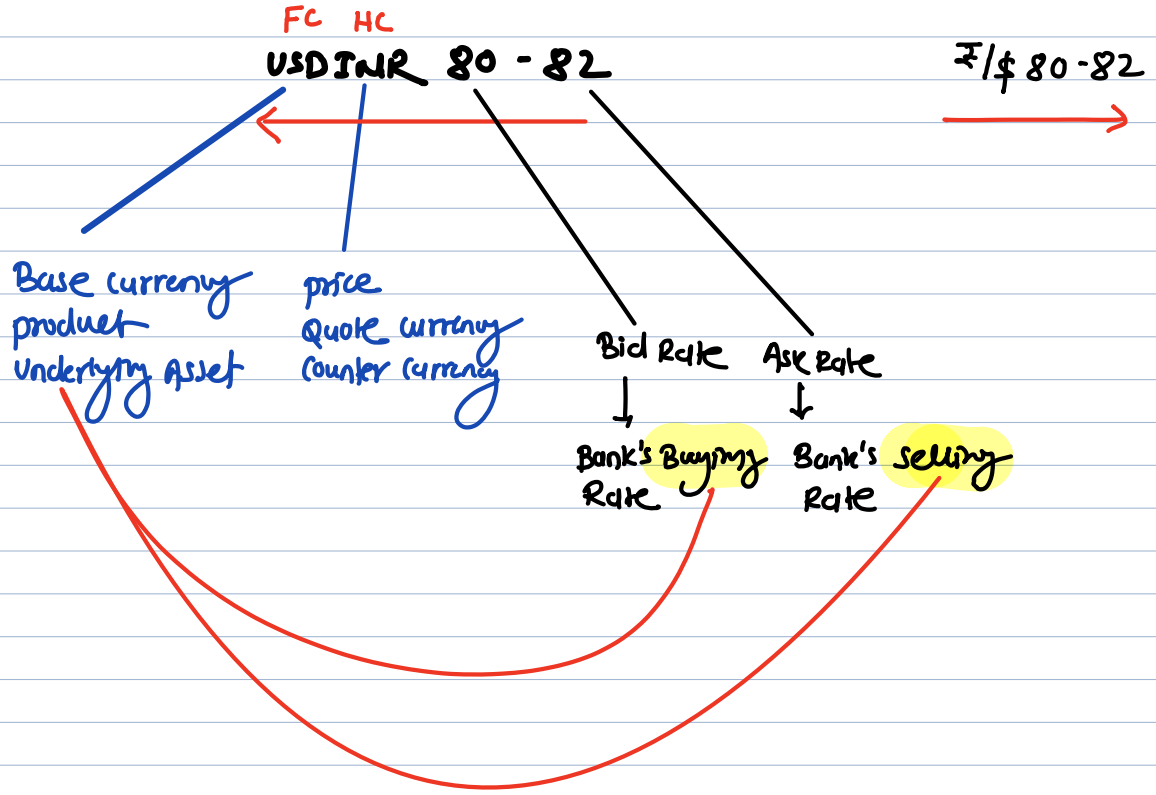
$= 10 + \frac{1}{0.156} \times 0.148$

$= 10.95\%$

Q67



FOREX



Points worth Noting to avoid 90% Mistakes in FOREX

1. Always say "for underlying asset/Base currency" after Bank's Buying Rate or Bank's Selling Rate
2. Always put requirement in terms of Base currency to the bank

---

Bank will always Buy cheap
Sell High

Direct Quote = Home currency per unit of Foreign Currency
Indirect Quote = Foreign currency per unit of Home currency

DQ ₹/$ 50

IDQ ₹/£ 0.02

$\frac{1}{50}$

$DQ = \frac{1}{IDQ}$

$50 : \frac{1}{0.02}$

$100000 SELL +$100000

spot ₹/$ 80 ₹/$ 70

8000000 7000000

Forward ₹/$ 76

Spot	₹/$	80	82	2	= spread
Forward	₹/$	82	85	3	
		2	3		

Difference between Bid & Ask

Swap points

Difference between spot & Forward

Pattern

Ascending

Spot + Swap / Forward

Descending

Spot − Swap / Forward

Bid + Spread = Ask

Ask − Spread = Bid

Spot	80	82
- Swap	5/75	2/80

CROSS RATES

① $\frac{A}{C} = \frac{A}{B} \times \frac{B}{C}$ $\quad ₹/\$ = 80 \quad \$/£ = 1.20$

Cross Rates $\quad \frac{₹}{£} = \frac{₹}{\$} \times \frac{\$}{£}$

$= 80 \times 1.20$

$₹/£ = 96$

₹96000 → £1000

$1200 ← $1200

② $\frac{₹}{\$}$ 80 $\quad \frac{£}{\$}$ 0.8333

$\frac{₹}{£} = \frac{₹}{\$} \times \frac{\$}{£}$ $\quad$ DQ → IDQ

$= 80 \times \frac{1}{\frac{£}{\$}}$

$= 80 \times \frac{1}{0.8333}$

$₹/£ = 96$

③ $\frac{₹}{\$}$ 80 82 $\quad \frac{\$}{£}$ 1.20 1.30

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

$Bid\left[\frac{₹}{£}\right] = Bid\left[\frac{₹}{\$}\right] \times Bid\left[\frac{\$}{£}\right]$ $\quad$ Bid & Ask

$= 80 \times 1.20$

$= 96$

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

$$= 82 \times 1.30$$

$$= 106.60$$

(4) $\frac{¥}{\$}$ 80 82 $\frac{£}{\$}$ 0.769 0.833

$\frac{\$}{£}$ 1.20 1.30

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

$$= 80 \times \frac{1}{Ask\left[\frac{£}{\$}\right]}$$

$$= 80 \times \frac{1}{0.833}$$

$$= 96$$

$$Bid(DQ) = \frac{1}{Ask[1/DQ]}$$

$$Ask[DQ] = \frac{1}{Bid[1/DQ]}$$

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

$$= 82 \times \frac{1}{Bid\left[\frac{£}{\$}\right]}$$

$$= 82 \times \frac{1}{0.769}$$

$$= 106.63$$

Q11 LONDON

(4) Ask [DKK INR] = Ask [DKK GBP] × Ask [GBP INR] × $\frac{1}{\text{Bid [GBP DKK]}}$

Q12

(3) Ask [GBP CHF] = Ask [GBP USD] × Ask [USD CHF]

= 1·7650 × 1·4655

= CHF 2·5866 / GBP

= GBP 1000000

= CHF 2586600

spot (GBP CHF)	2·5850	2·5881
3m forward (GBP CHF)	2·5822	2·5869
3m swap points	28	12

spot (GBP CHF)

Bid (GBP CHF) = Bid (GBP USD) × Bid (USD CHF)

= 1·7645 × 1·4650

= 2·5850

Ask (GBP CHF) = 1·7660 × 1·4655

= 2·5881

Forward (GBP USD) =

spot	1·7645	1·7660
less 3m swap	·0025	·0020
	1·7620	1·7640

Forward (USD CHF)

spot	1·4650	1·4655
Add 3m swap	·0005	·0010
	1·4655	1·4665

Forward (GBP CHF) 2·5822 2·5869

Q13

Sell	$1000000	€1.4400	€ 1440000
Buy	$1003484	€1.4350	€ 1440000

gain $3484

Sell $3484

61.4300

gain (₹) 214022

Sell	$1000000	€1.4400	€ 1440000
Buy	$1000000	€1.4350	€ 1435000
		gain	€ 5000

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

$$= \text{Bid}\left[\frac{₹}{\$}\right] \times \frac{1}{\text{Ask}\left[\frac{€}{\$}\right]}$$

$$= 61.4300 \times \frac{1}{1.4350}$$

$$= 42.8084$$

€ 5000

gain = ₹ 214042

Sell	$1000000	€1.44	€ 1440000
Buy	$996540	€1.4450	€ 1440000

Loss $3460

× 31.45

Loss 108817

(15) $\text{Ask}\left[\frac{¥}{S\$}\right] = \text{Ask}\left[\frac{¥}{US\$}\right] \times \text{Ask}\left[\frac{US\$}{£}\right] \times \text{Ask}\left[\frac{£}{S\$}\right]$

$= \text{Ask}\left[\frac{¥}{US\$}\right] \times \text{Ask}\left[\frac{US\$}{£}\right] \times \frac{1}{\text{Bid}\left[\frac{S\$}{£}\right]}$

premium = Appreciation = strong
Discount = Depreciation = weak

¥/$

S = 50 F = ¥55 = $ premium ¥ Discount

F = ¥48 = $ Discount ¥ premium

$ premium $= \frac{5}{50} = 10\%$

$= \frac{F-S}{S} \times 100 = 10\%$

$= \frac{F-S}{S} \times \frac{12}{N} \times 100 =$ p.a.

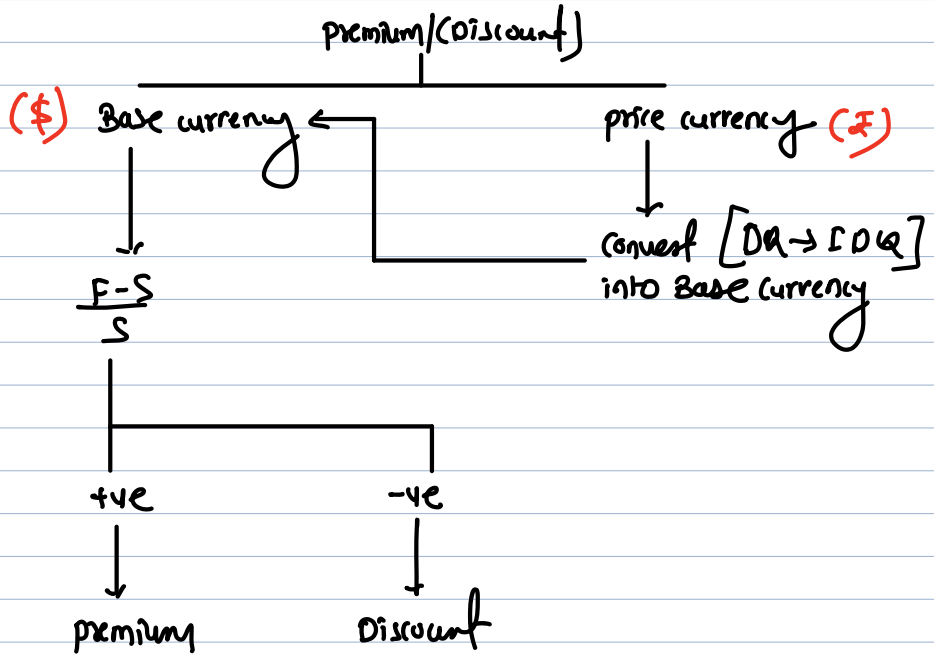
¥ Discount $= \frac{S-F}{F}$

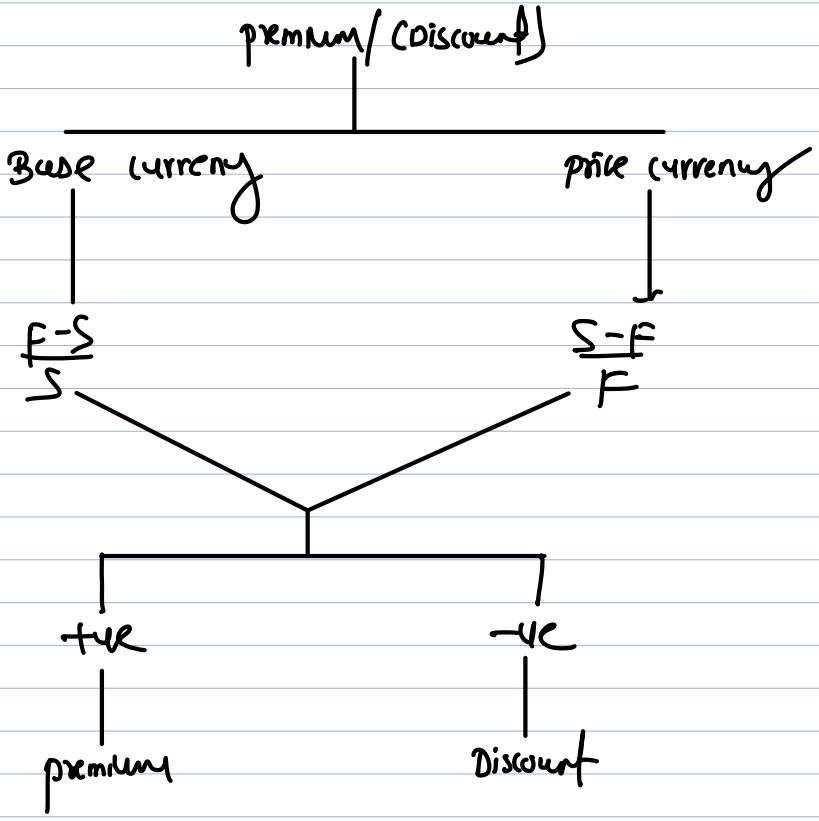
$= \frac{50-55}{55}$

$= -9.09\%$

¥ Discount $\frac{\$}{¥}$ spot $\frac{1}{50} = 0.02$, Forward $\frac{1}{55} = 0.01818$

$= \frac{F-S}{S} = \frac{0.01818 - 0.02}{0.02} = -9.09\%$





INTEREST RATE PARITY THEORY

US	spot	Forward	IND
	₹1 = $ 50	₹1 = $ 50	
		₹1 = $ 54	

IND = 12%, US = 8%

t = 0	
Borrow	+$100
Convert at spot	-$100
	+₹5000
Invest	-₹5000
Forward Buy	—
	0

t = 0	
Borrow	+₹5000
Convert at spot	-₹5000
	+$ 100
Invest	-$ 100
Forward sell	—
	0

t = 1 year

Invest. proceeds + ₹5600

Buy $-forward − ₹5600

5600 ÷ 50 × +$112 = 108

Repayment of Borrowings

100 × 1.08 −$108

gain $4

Result

Rise in Demand of $

↓

$ will start Appreciating

t = 1 year

Invest. proceeds 100 × 1.08 = +$108

Sell $ − Forward = −$108

108 × 54 +₹5832

Repayment of Borrowings 5000 × 1.12 −₹5600

gain ₹232

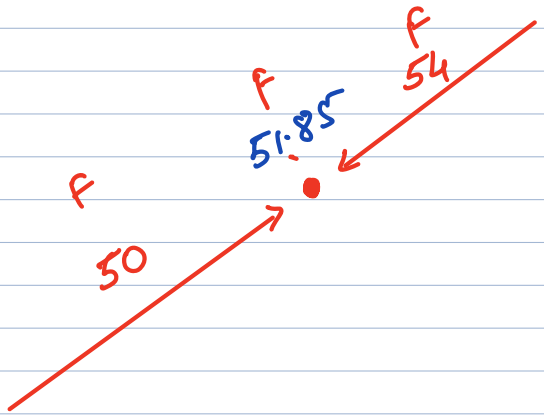
Result

Rise in Demand of ₹

Fall in Demand of $

↓

$ will start depreciating.



$\frac{5600}{x} = 108$ $\quad 108x = 5600$

$x = \frac{5600}{108} = 51.85$

HC / FC

₹/$

IRPT Formula

$\frac{1+r_d}{1+r_f} = \frac{F}{S}$

$r_d = 12\%$

$r_f = 8\%$

$\frac{1.12}{1.08} = \frac{F}{50}$

$1.037 = \frac{F}{50}$

$F = 51.85$

$S = 50$ $\quad F = 51.85$ =

$r_d = 12\%$

$r_f = 8\%$

4%

$\frac{F-S}{S} = \frac{51.85-50}{50} = 3.70\%$

Interest Rate Differential ≒ forward premium / (discount)

4% ≒ 3.70

DQ

$$\frac{1+r_d}{1+r_f} = \frac{F}{S}$$

IRQ

$$\frac{1+r_f}{1+r_d} = \frac{F}{S}$$

or

$$\frac{1+r_d}{1+r_f} = \frac{S}{F}$$

According to IRPT

1. High Interest Rate in one country will result in depreciation in currency of that country
   & Low Interest Rate in one country will result in Appreciation in currency of that country
2. Interest Rate Differential ≅ forward premium/(discount) in currency

1. Can$ declines by 2%

$$\frac{S-F}{F} \times 100 = -2$$

$$\frac{2.50-F}{F} \times 100 = -2$$

$$2.50 - F = -0.02F$$

$$2.50 = 0.98F$$

$$F = 2.551$$

98% 100% 2%

£2300 / 0.98 = £2346.9 (100%)

23000 × 1.02 = 23460 (102%)

IRPT

Dq — $\frac{1+r_d}{1+r_f} = \frac{F}{S}$

IDq — $\frac{1+r_f}{1+r_d} = \frac{F}{S}$

PPP

Dq — $\frac{1+i_d}{1+i_f} = \frac{F}{S}$

IDq — $\frac{1+i_f}{1+i_d} = \frac{F}{S}$

Q28 **3months**

a. using IRPT $\frac{1+r_d}{1+r_f} = \frac{F}{S}$

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

$F = 7.19$

b. premium/(discount) in price currency $\frac{S-F}{F} \times \frac{12}{M} \times 100$

$= \frac{7.05-7.19}{7.19} \times \frac{12}{3} \times 100$

$= -7.79\%$

6months

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

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

$\frac{7.05-F}{F} = -0.0315$

$7.05 = 0.9685F$

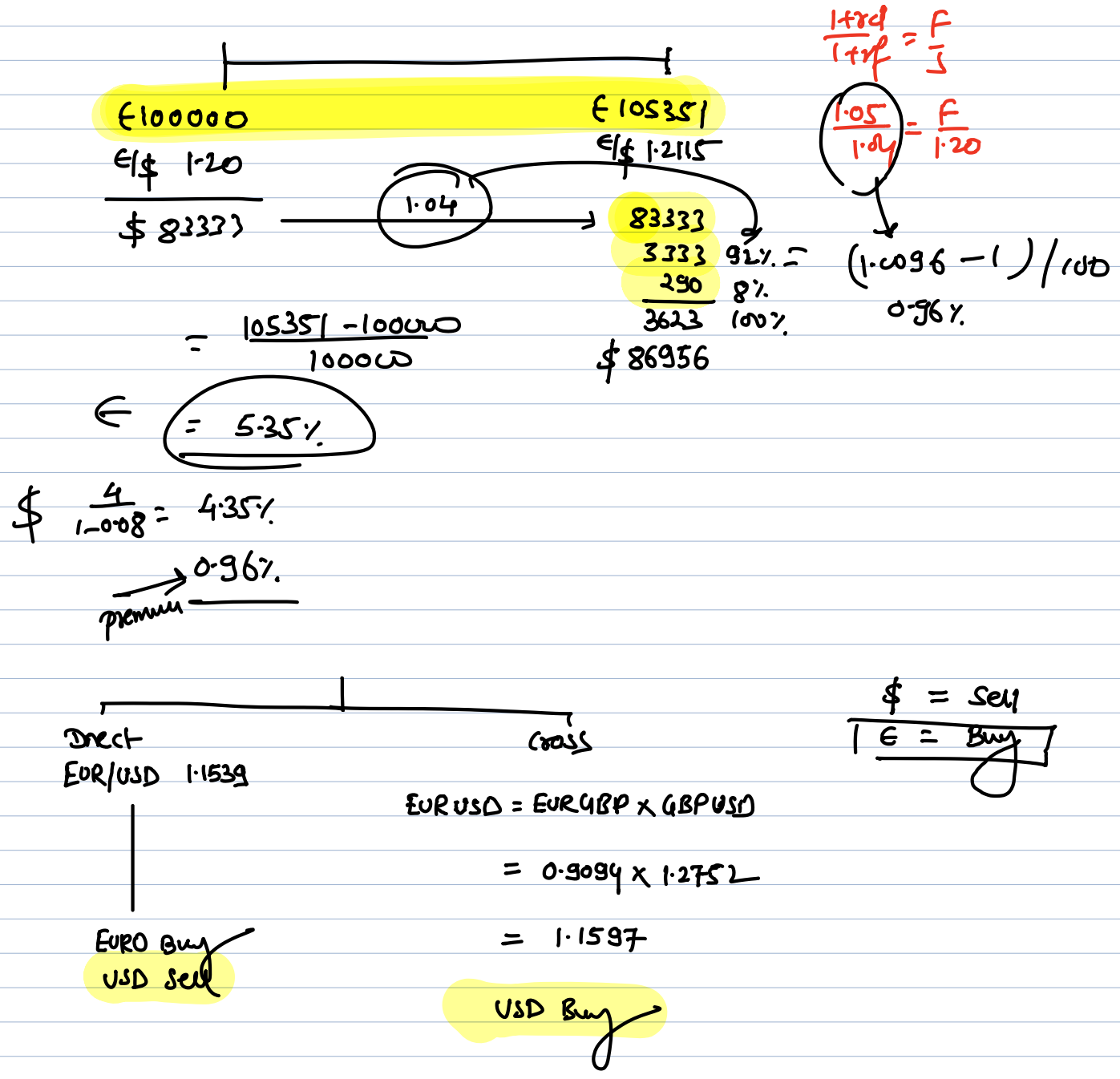
$F = 7.28$

$\frac{1+r_d}{1+r_f} = \frac{F}{S}$

$\frac{1+r_d}{1.06125} = \frac{7.28}{7.05}$

$r_d = 9.59\%$ 6months

$\rightarrow$ 9.17% 12months



$\frac{1+r_d}{1+r_f} = \frac{F}{S}$

$\frac{1.05}{1.04} = \frac{F}{1.20}$

Arbitrage transaction

Sell	USD 10000	@ EUR/USD 1·1539	$\frac{10000}{1.1539}$	€8666
Sell	EUR 8666	@ EUR/GBP 0·9094		£7881
Sell	GBP 7881	@ GBP/USD 1·2752		$10050
Arbitrage gain [10050 − 10000]				$50

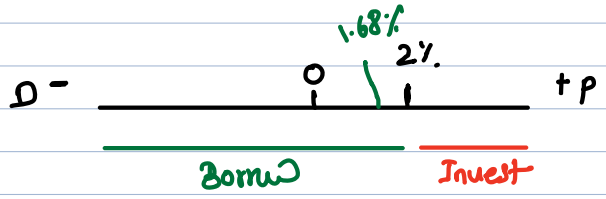
Forward premium/(discount) ≅ Interest Rate Differential

≅ → No arbitrage exist

≅ → Arbitrage is possible

Low Interest rate — High Interest rate

First Impression: Borrow — Invest



Borrow in Low Interest Rate currency until premium in that currency equals IRD

If premium exceeds IRD then Invest in Low interest rate currency

Low Interest Rate

Discount → Borrow

premium < IRD → Borrow

premium = IRD → No arbitrage

premium > IRD → Invest

Q35 premium (Low Interest Rate currency) < IRD

↓

Borrow $

Arbitrage

t=0

Borrow $	+$83312
Sell @ spot 48.0123	-$83312
	+£4000000
Invest £	-£4000000
forward Buy	
	0

t=6

Investment proceeds	+£4240000
Forward settle	-£4229873 4227624
86644 X 48.8190	+$86644
Repayment 48.7930	
[83312 X 1.04]	-$86644
gain	£10127

Covered — Zero Risk

Uncovered — Risky

12379

Q39 Spot £0.75/$

Forward £0.85/$

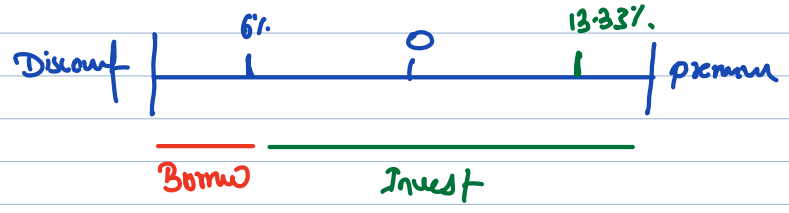
premium/Discount = $\frac{F-S}{S} = \frac{0.85-0.75}{0.75}$

£ rd = 10% = 6%

$ rf = 16%

premium $ = 13.33%. 6%.

Discount $ = 6%



Borrow £

Invest $

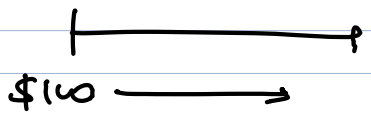
Arbitrage transaction.

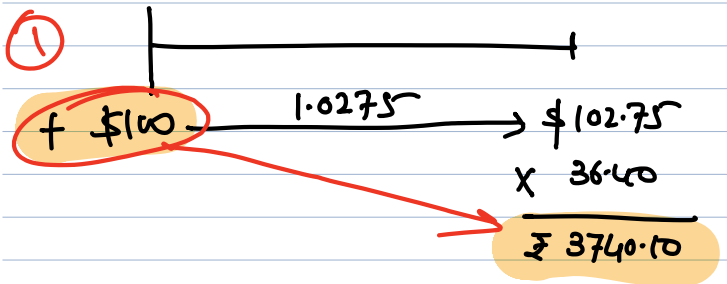
t=0

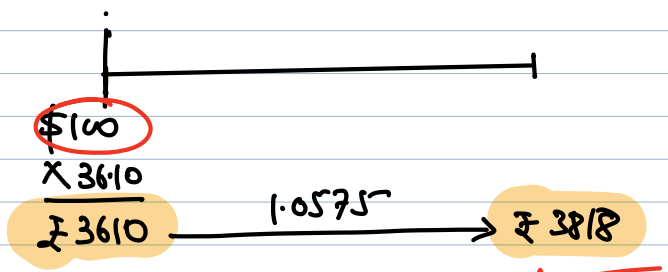
Borrow	+£1000
sell £	£1000
Buy $ $\frac{1000}{0.75}$	+$1333
Invest $	−$1333
Forward sell	0

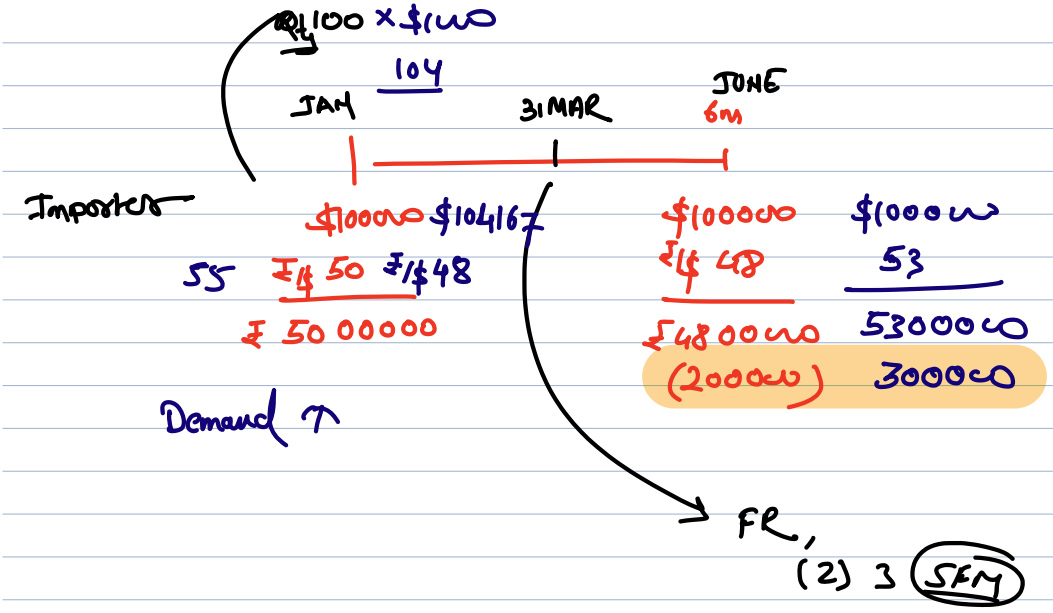
t: 2 years

Dollar $1333 × 1.1735	$1564.28
sell $1564.28 ÷ 0.85	£1330
Repayment £1000 × 1.1049	£1104.90
	£225.10









43

profit At current exchange Rate

= Qty [Sales − [Purchases + Fixed cost + variable cost]]

= 2400 [(€500 × 51.50) − [S$800 × 27.25 + 1000 + 1500]]

= 2400 [25750 − 24300]

= 3480000

profit At 6months exchange Rate

= Qty [Sales − [Purchases + Fixed cost + variable cost]]

= 2400 [(€500 × 52.00) − [S$800 × 27.75 + 1000 + 1500]]

= 2400 [26000 − 24700]

= 3120000

Loss due to transaction Exposure: 3480000 − 3120000 = 360000

profit At New current exchange Rate

= Qty [Sales - [Purchases + Fixed cost + variable cost]]

= 2400 [25000 - [S$800 × 27.15 + 1000 + 1500]]

= 2400 [25000 - 24220]

= 1872000

profit At 6 month exchange Rate

= Qty [Sales - [Purchases + Fixed cost + variable cost]]

= 2400 [25000 - [S$800 × 27.75 + 1000 + 1500]]

= 2400 [25000 - 24700]

= ₹720000

Loss due to transaction Exposure: 1872000 − ₹720000 = 1152000

Cost of Buying ₹25000

At old spot rates $\frac{₹25000}{51.50}$ = €485.44

At New spot rates $\frac{₹25000}{51.75}$ = €483.09

Decrease in price (€) ↓ €2.35

Decrease in price (%) $\frac{2.35}{485.44}$ = 0.48% ↓

price elasticity of demand 1.5

∴ Increase in demand 0.72% ↑

Existing demand 2400

Additional Demand 17 units

Total 2417 units

profit At Now current exchange Rate

$= Qty [Sales - [Purchases + Fixed cost + variable cost]]$

$= 2400 [25000 - [S\$800 \times 27.15 + 1000 + 1500]]$

$= 2400 [25000 - 24220]$

$= 1872000$

profit At 6 month exchange Rate

$= Qty [Sales - [Purchases + variable cost] - 2400000 [Fixed cost]]$

$= 2417 [25000 - [S\$800 \times 27.75 + 1500] - 2400000$

$= 2417 [2500 - 23700] - 2400000$

$= ₹ 42100$

Loss due to operating Exposure = $1872000 - 742100 = 1129900$

Transaction
+
Loss 1152000

profit due to increase in demand
17 [25000 - 23700]
profit = 22100

$69000
× 46
₹ 3174000

$69000
× 47
₹ 3243000

$[1 + 0.10 \times \frac{2}{12}]$

₹ 3226900

Q1. a. Acting Independently [in Millions]

Currency	Surplus (Deficit)	Interest Rate	Interest Amt	Total (Fc)	Exchange Rate	Total (₹)
$	12.5	1.5%	0.0156	12.5156	0.0217	576.7558
£	6	3.7%	0.0185	6.0185	0.0150	401.2333
₹	(500)	6.4%	(2.6667)	(502.6667)	1	(502.6667)
						475.3224

b. Immediately pooled [in Millions]

Currency	Surplus	Spot Rate	Surplus (₹)
$	12.5	0.0215	581.40
£	6.0	0.0149	402.68
			984.08
(-) Indian deficit			500.00
			484.08

Q49

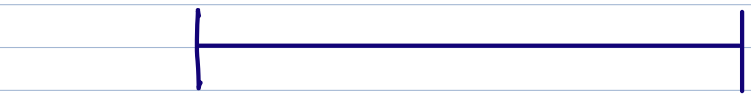
Sydney

— USD 700000
USD 0.7300
+ AUD 958904
−AUD 958904 [1+0.075×2/12] → AUD 970890
− AUD 992281
Loss AUD 21391

New York

−USD 700000 [1+0.08×2/12] → $ 709333
$ 707000
Gain USD 2333
USD 0.7330
AUD 3183

Tokyo

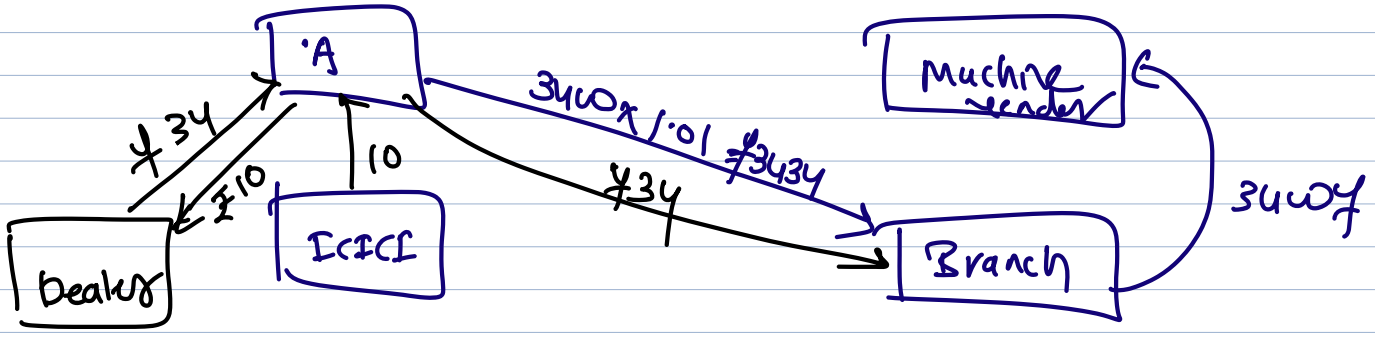


- USD 700000
0·7300
+AUD 958904
-AUD 958904
JPY 79·0900
+JPY 7583971 7
-JPY 7583971 7 [1+0·04×2/12] → +JPY 76345315
-JPY 76345315
JPY 79·1950
+AUD 964017
-AUD 992281
Loss AUD 28264

Q53

- GBP 200
JPY 148·0002
JPY 29600·04 → -2% → JPY 29008·04
Dividend JPY 1182
LBS JPY 10
JPY 30200·04
JPY 150
GBP 201·334

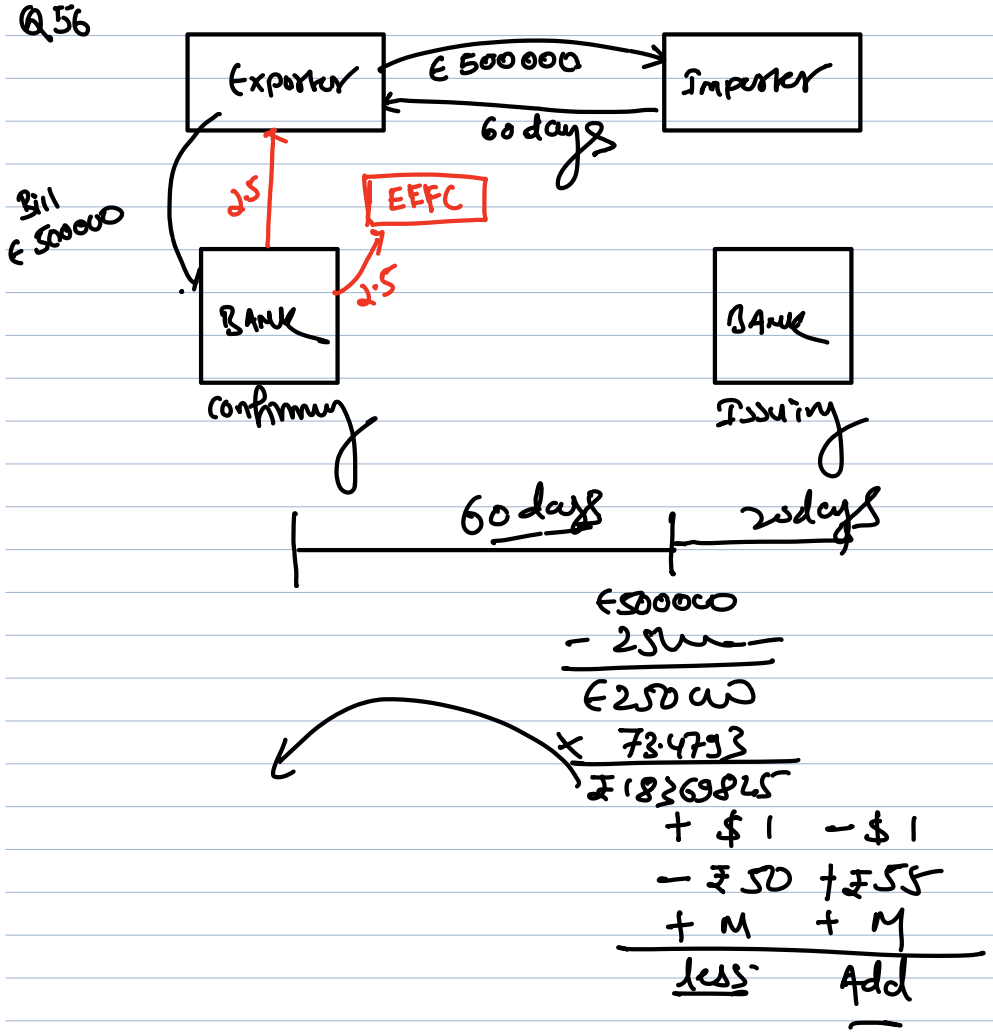
Q55



10 → 1·045 | 1·045 → £10·92

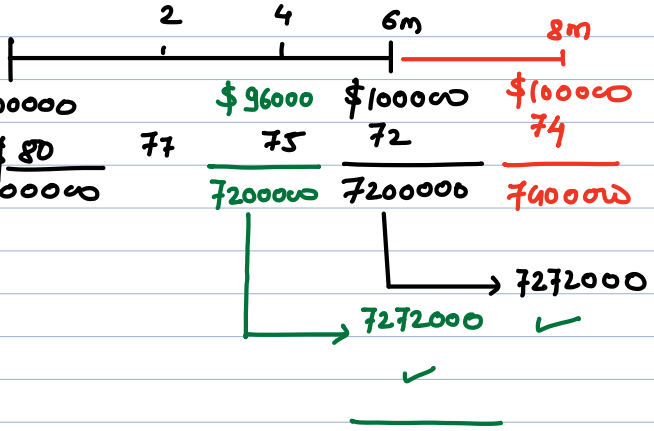
3400 x 1·01 ¥3434 £995·36
345
1006·28

Q.56



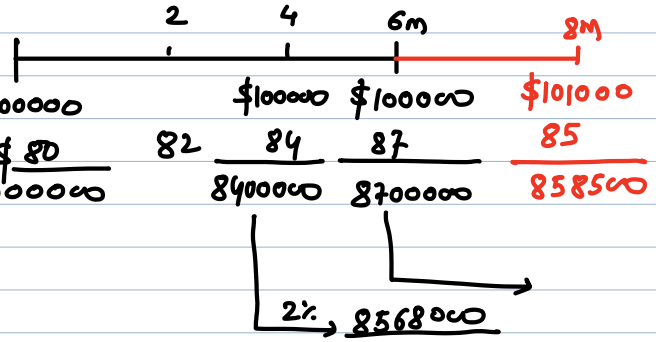
LEADING & LAGGING

Exporter



6%.
1%.

Importer

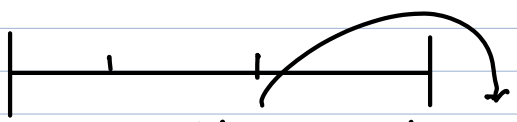


12%.
2%.

Leading – Early settlement

Lagging – Delayed settlement

Q57



f-$450000 -$700000

+48.90 F-sell 48.90 49.15

+ 22005000 - 34405000

-49.00 F-Buy

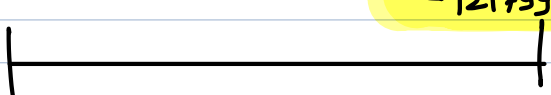
0.10

x4500

(450)

1%. + 222250

- 12179950



Lagging

- $700000

+$450000 X

- $250000

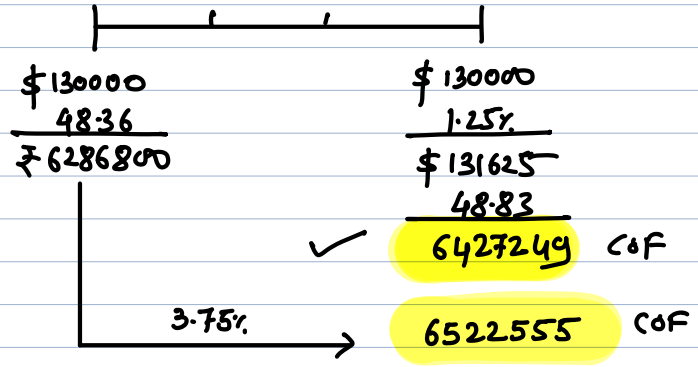
49.15

- 12287500

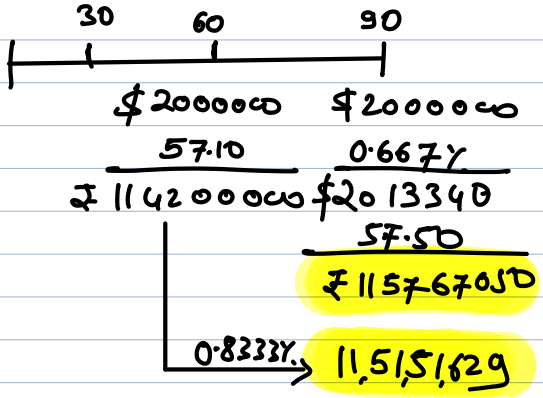
Cancellation - 4500

- 12332500

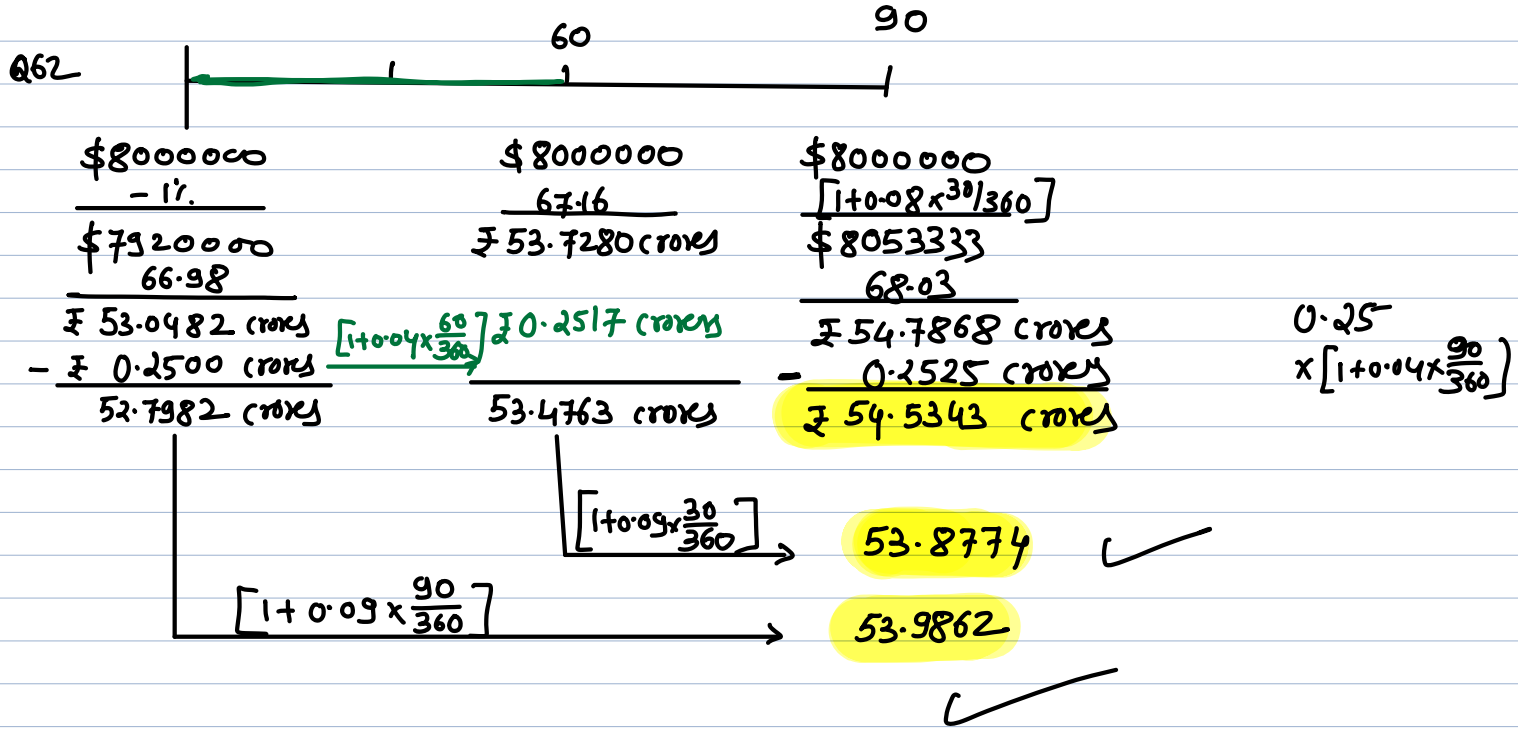
Q58


$130000
48.36
₹6286800
$130000
1.25%
$131625
48.83
6427249
CoF
3.75%
6522555
CoF

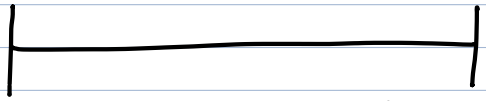
Q60


30
60
90
$2000000
57.10
₹114200000
$2000000
0.6667%
$2013340
57.50
₹1157670500
0.8333%
11,51,51,829

Q62


60
90
$8000000
-1%
$7920000
66.98
₹53.0482 crores
-₹0.2500 crores
52.7982 crores
[1+0.04×60/360]
$8000000
67.16
₹53.7280 crores
₹0.2517 crores
53.4763 crores
$8000000
[1+0.08×30/360]
$8053333
68.03
₹54.7868 crores
-0.2525 crores
₹54.5343 crores
0.25
×[1+0.04×90/360]
[1+0.09×30/360]
53.8774
[1+0.09×90/360]
53.9862

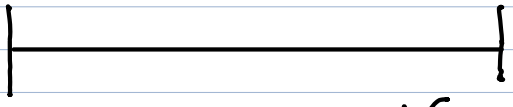
Q69



Spot	£/$	62.22	0.6080	Estimated Spot	65	0.5242
	¥/$	102.34			124	
Forward		66.50	0.6026	Actual Spot	66.25	0.5977
		110.35			110.85	

		Loss
Estimated loss	[0.6080 − 0.5242] × 10000000 =	838000
Forward Loss	[0.6080 − 0.6026] × 10000000 =	54000
		784000
Actual Loss	[0.6080 − 0.5977] × 10000000 =	103000

Q73



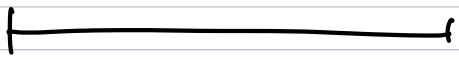
+€
Sell €
Buy £ – Asset

Buy Futures €1.1943/£
Sell Future €1.1873/£
Loss €0.007/£
Contract value £458250 [70500 × 65]
Loss in future €32077.50

No. of lots. = €5500000 / €1.1943 / £70500

= £4605208 / £70500

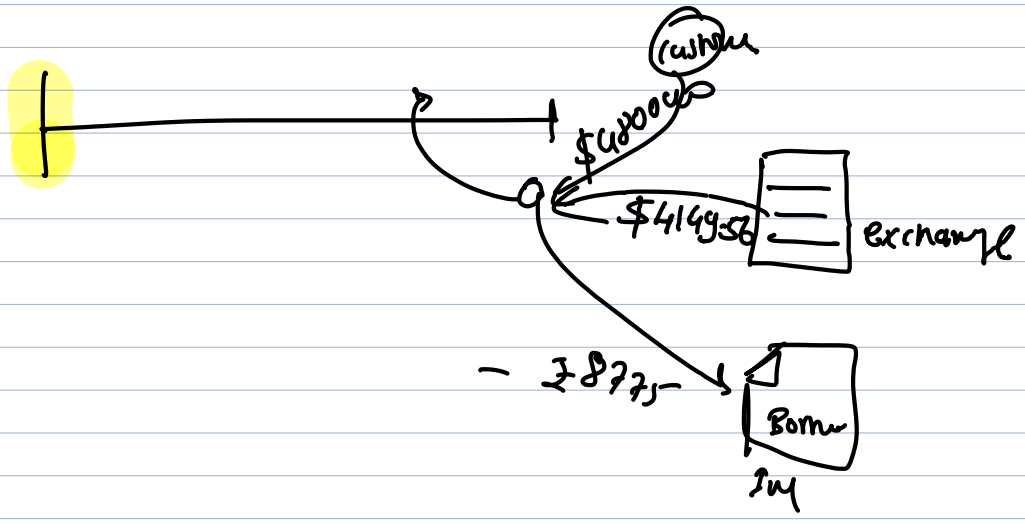
= 65.32 lots.
i.e. 65 lots.
× Initial Margin
↓
Borrow
↓
Exchange
↓
Buy Future
Sell Future
given

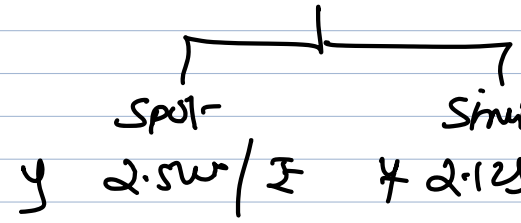


Spot		+€5500000
Future		−€32077.50
		€5467922.50
Spot	1.1873	
		£4605342

Currency Futures

1. Find out underlying **Asset** in futures — GBP
2. Decide what we want to do with that Asset at expiry
   Buy **Sell**
3. Take the same Action in futures Today
   i.e. if Buy Asset ; **Buy Futures**
   Sell Asset ; **Sell Futures**
4. Calculate **no. of contracts.** = $\frac{\text{Total value}}{\text{Contract value}}$
5. Borrow & Pay **Initial Margin** = Initial Margin per contract × No. of contracts
6. At expiry, **settle Futures** by opposite transaction
   Also **Repay Borrowings**.
   & exports or imports proceeds will be settled in **Spot Market**



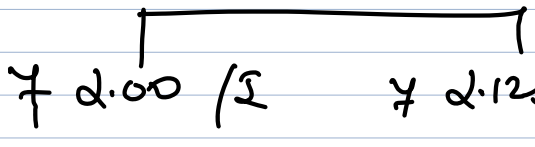


¥ 2.50 /₹ ¥ 2.125 /₹ NE

$\frac{500000}{2.50}$

Cof ₹ 200000

prem ₹ 11815

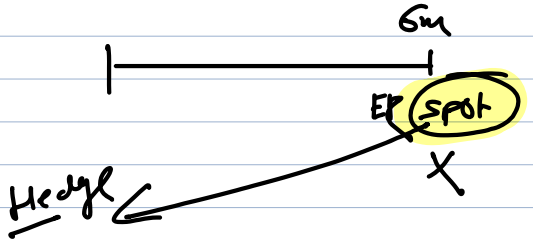


CIF option gain ¥[2.125 − 2.00] × 235294 = ¥$\frac{29412}{2}$ = ₹14706

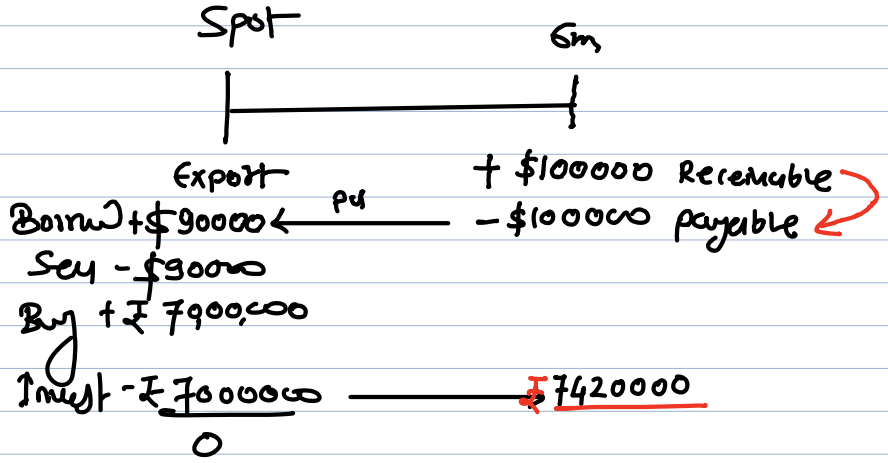
Cof Spot Buy ¥$\frac{500000}{2}$ = ₹250000

235294

Cof premium 11815



Money Market Hedging



t:0

We have	FC	Receivable	payable
credit	FC	payable	Receivable

Borrow pv of FC payable @ B_{FC} — Deposit-

Sell FC at spot — Buy FC

Buy HC at spot — Sell HC

Invest HC @ D_{HC} — Borrow HC @ B_{HC}

t=due date

Receive investment proceeds HC

Settle FC payable with FC Receivable

⇒ t=0

+ We have — FC Receivable £500000
− Create — FC Payable £500000

+ Borrow PV of $\frac{500000}{1.0125}$ +£493827
− Sell FC @ spot −£493827
+ Buy HC @ 56 +₹27654312
− Invest ₹ −₹27654312

t=3m ↓

+ Investment proceeds 27654312 × 1.03 +₹28483941

Settle FC payable with FC receivable

We have — FC payables $500000
Redeem $500000

Invest PV of $\frac{500000}{1.025}$ −$487805

Buy $ at spot +$487805
Sell ₹ at 71 −₹34634155

Borrow ₹ +34634155

↓

t=90

Repayment 34634155 × 1.06 36712204

$500000 @ spot 73.25 366250 CF

Repayment premium −53000 CF
option settlement +62500 CF

366550

Q82

$\frac{\$364897}{\$1.70}$ − £214645

No. of contracts $\frac{£214645}{£12500} = 17.17$

i.e. Hedge 17 contracts under option $17 \times 12500 = £212500 \times 1.70 = \$361250$

Cover the unhedged portion under Forward [364897 − 361250] $3647

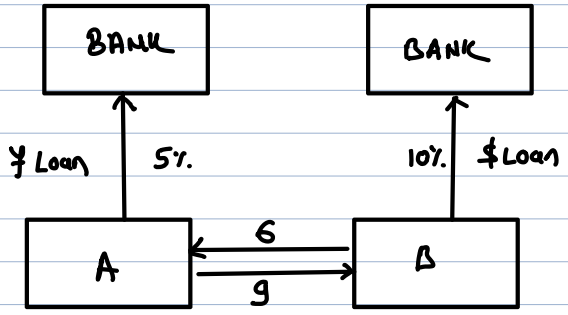
1.5455

£2360

Exchange premium £212500 × 0.096 = £2040

Dealer Buy $ @ spot f $2040
Sell £ @ 1.5617 −£13063

BANK Borrow £13063 × 1.035 = £13520



	A	B
	−5	−10
	+6	−6
	−9	+9
	18000	
	8	7
Swap	9	8
Direct	1%	1%
gain	200	£240,00,00
	$2000	2400

A

	¥	$
pay to BANK 24000000 × 5%	1200000	−$100000
Receive from B 240,00,000 × 6%	1440000	+$12000
pay to 13 $2000000 × 9%		−$18000
		−$16000
Swap interest cost		
Direct interest cost 2000000 × 9%		−$18000
gain		$2000

Scenario

	A	B
	+$ 3.64	+$2.90
	−10.80	−$10.80
+$10	+$4.44 = +14.44	+$13.70
−$ 10	50	54
F50	−500	−240
+F500		740
−F500	F740	

loan

By

SKW Buy
USD Sell

	SKW	USD
Sell NDF	+1190	−1
	1190	
Buy NDF	−1190	+1.0042
	1185	
gain		$0.0042 Millions

SKW spot −F

gain USD spot +F

	Spot 0.0634 SKW X 11900	Spot 0.0638 X 11900	
①	₹ 754.46	₹ 759.22	= 4.76 Loss
②	₹754.46 gain due to HOF	₹759.22 (3.171) [$0.042 lakhs × 75.50	
		756.049	= 1.589 Loss