

# Finance

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# Corporate Finance

- PV
- Valuation of bonds

# Bonds

- ☛ Coupon rate, yield
- ☛ Two type of yield : Current yield and Yield to Maturity
- ☛ You pay \$800 to buy a bond at a face value is \$1,000 and a coupon rate is 5%. The maturity years is 3 years. Therefore, you receive interest each year for \$50

# Bonds

$$\text{Real interest rate} = \frac{\text{coupon rate}}{\text{price}} \times 100 \%$$

$$\text{Real interest rate} = \frac{5\%}{80\%} \times 100\% = 6.25\%$$

$$PV = \frac{C}{1+R} + \frac{C}{1+R^2} + \dots + \frac{C + 1000}{1+R^n}$$

Where C = coupon interest , R=YTM , n = years

$$800 = \frac{50}{1+R} + \frac{50}{1+R^2} + \frac{1000+50}{1+R^3} = 13.55\%$$

# Shares

$$V_0 = \frac{Div}{K_e}$$

$$V_0 = \frac{Div_0(1+g)}{K_e - g} \text{ where } r_e > g$$

$g = ROE \times (1 + \text{dividend payout ratio}) \Rightarrow ROE \times P$

$P = \text{retention ratio and plowback rate}$

# Shares

PVGO = Present value of Growth Opportunities

$$V_0 = \frac{D_0}{r_e - r_g} - \frac{E_1}{r_e}$$

# Shares

$$\text{P/E : } P_0 = \frac{E_1}{r_e}$$

$$\frac{P_0}{E_1} = \frac{1}{r_e}$$

$$P_0 = \frac{D_0(1+g)}{r_e - g} = \frac{E_0(1-P)(1+g)}{r_e - g}$$

$$\frac{P_0}{E_1} = \frac{1-P}{r_e - (P \times \text{ROE})}$$

# Valuation

- $P/R = \text{Market value/turnover}$  , Share price/turnover per share
- $PER = \text{share price} / \text{EPS}$
- $PEG = PER / \text{the increasing rate of earning}$
- EBITDA
- IRR
- PAYBACK PERIOD

# Financial Analysis

- ✓ Gross Margin
- ✓ Operating Margin
- ✓ Operating profits exclude bad debts, disposal of fixed assets, exchange difference, but include dividend from listed securities and interest income
- ✓  $ROE = \text{net profits} / \text{shareholder's fund}$
- ✓  $\text{Return on Assets} = \text{net profit} / \text{total asset}$
- ✓  $ROTA = \text{net profits before taxation and interest} / \text{total assets}$

# Financial Analysis

- ☛  $ROCE = \frac{EBIT}{\text{Shareholder' fund} + \text{long-term debts}}$  ,  $\frac{EBIT}{\text{fixed assets} + \text{current assets} - \text{current liabilities}}$
- ☛  $\text{Return on net operating assets} = \frac{\text{Operating profits}}{\text{net operating assets}}$
- ☛  $\text{Operating assets} = \text{fixed assets} + \text{working capital}$  , exclude investment

# Financial Analysis

- ☛ Gearing = Debts with interest / Shareholder's fund
- ☛ Interest Cover = net profits before tax and interest / Interest expenses
- ☛ Dividend payout = Dividend / net profit after taxation
- ☛ Current ratio = current assets / current liabilities
- ☛ Acid test ratio = current assets – inventory / current liabilities

# Financial Analysis

- Inventory turnover rate =  $\frac{\text{cost of goods sold}}{\text{Average inventory}}$
- Accounts Receivable ratio =  $(\text{Average accounts receivable} / \text{turnover}) \times 365$
- Value of the firm =  $\text{EV} / \text{EBITDA}$
- EV = share price x no. of shares issued + market value of debts with interest – cash on hand
- EBITDA = net profits before interest, tax, depreciation

# Financial Analysis

- NORM – Net Operating Profits Margin
- $\text{NORM} = \text{Net Operating Profits} / \text{turnover}$
- NOPAT – Net Operating Profits after taxes
- $\text{NOPAT} = \text{Net operating Profits} \times (1 - \text{taxes rates})$

# Cash flow

- Free Cash Flow to Equity – FCFE
- Net profits after tax + depreciation – cash flow from operation
- FFCE = cash flow from operation – Preference share's dividend – movement in operation capital – repay the debts in principal + issue new debts(cash inflows) – capital expenditure

# Cash flow

- Free Cash Flow to Firms – FCFF
- FFCE = NOP(net operation profit) – taxation + depreciation – capital expenditure - movement in operation capital
- Operation Capital = (Accounts Receivable + inventory – Accounts payable)

# Cash flow

- FCFF defined as CIIA
- Free cash flow from operation = EBIT – taxation + non-cash items (depreciation) – non-cash expenditure (exchange difference)
- Free cash flow = Free cash flow from operation - capital expenditure +/- movement in operation capital + sells of fixed asset
- FCFF = EBITDA – change in working capital - capital expenditure – taxation: EBIT X tax rate
- EBITDA = net profits before interest, taxation, depreciation, etc.

# WACC

$$WACC = \frac{K_e \times V_e}{V_e \times V_d} + \frac{K_d \times V_d}{V_e \times V_d}$$

- $V_d$  = market value of bonds
- $V_e$  = Value of equity
- $K_e$  = cost of equity ( $R_e$ )
- $K_d$  = cost of debt -  $R_d \times (1 - \text{tax rate})$
- $R_e$  and  $R_d$  – required return

# CAPM

- ☛ Capital Asset Pricing Model
- ☛  $K_e = R_f + \beta (R_m - R_f)$
- ☛  $R_f$  = no risk return
- ☛  $\beta$  = risk
- ☛  $R_m$  = market return

# Cost of the Capital

- $\beta = 1.2$  , tax rate = 16% , no risk return = 6% ,  
return on debt = 11% , market return = 10%
- Equity = \$4,000,000 , Debts = \$4,160,000
- $K_e = 6\% + 1.2(10\% - 6\%) = 10.8\%$
- $K_d = 11\% \times (1 - 16\%) = 9.24\%$
- Equity =  $10.8\% \times 4/8.16 = 5.29\%$
- Debts =  $9.24\% \times 4.16/8.16 = 4.71\%$
- Total = 10%

# DCF

- Leveraged buyout – LBO
- Management buyout - MBO

# International Finance

- International market

# Exposure

- ☛ Economic exposure
- ☛ Transaction exposure
- ☛ Translation exposure ( accounting or consolidation purpose)

# Economic Exposure

- ☛ The extent to which the value of the firm would be affected by unanticipated changes in exchange rate
- ☛ Firm value affect by the below two elements:
- ☛ Exchange rate change affect home currency value of assets and liabilities ( assets exposure)
- ☛ Exchange rate changes affect future operation cash flows operation exposure)

# Transaction exposure

- ☛ The firm is subject to transaction exposure when it faces contractual cash flow that are fixed in foreign currency
- ☛ Hedging via financial contract and operational techniques

# Financial contracts

- Forward market hedge
- Money market hedge
- Option market hedge
- Swap market hedge

# Operational techniques

- ☛ Choice of invoice currency
- ☛ Lead / lag strategy – pay or collect early (lead) , pay or collect late (lag)
- ☛ Exposure netting – same amount of foreign currency of accounts receivable and accounts payable

# Futures

- ☞ Objectives : reduce/eliminate the potential loss
- ☞ Future contract is a commitment to purchase/delivery specific quantity of goods
- ☞ Long position – buy
- ☞ Short position - sell

# Money market hedge

- ☛ hedge by leading and borrowing in the domestic and foreign money market.
- ☛ Borrow in foreign currency to hedge foreign currency receivable
- ☛ Lead in foreign currency to hedge foreign currency payable
- ☛ Matching assets and liabilities in the same currency

# Forward

- Forward contract was defined as a vehicle for buying or selling stated amount of foreign exchange at a stated price per unit at a specific time in the future

# Netting

- Bilateral netting – each pair of affiliates determine the net amount due between them and only net amount is transferred
- Multilateral netting – each affiliates net all its interaffiliate receipt against all its disbursement
- Centralized Cash Depository

# Comparisons of future and forward contract

	Future	Forward
Trading location	Organised exchange	Bank dealer
Size	Standardised	Tailor-made
Settlement	Daily settlement, market-to-market Through margin account	Buys or sell the contract amount of the underlying assets from the bank at maturity at contractual price

# Comparisons of future and forward contract

	Future	Forward
Expiration Date	Standard delivery date	Tailor-made delivery date
Delivery	Seldom	Common
Cost	Bid-ask spread plus broker's commission	Bid-ask spread plus indirect bank charges

# Future Exchanges

## 1. Market-to-Market

Contract Face Value	C\$100,000
Initial Margin	1,080
Maintained Margin	800
Day 1: Trader buys 1 contract @0.8677/C\$	86,770
Close price : @0.8677/C\$	86,770
Day 2 : Close price : @0.8577/C\$	85,770
Loss	1,000
Margin account (1080-1000)	80
Margin call	720
Maintenance Margin	800

Day 3 : close price : @0.8677/C\$	86,770
Gain	1,000
Margin account (1000+800)	1,800

Day 4 : Close price : @0.8477/C\$	84,770
Loss	2,000
Margin account	-200
Margin call (1000+(-200))=800	1,000

## Selling hedge

Cash market

Buy SFR 500,000

@0.2560/SFR

=128,000

Dec 1

Future

Sell 4 SFR contract for June

Delivery (@0.2550/SFR)

(4 X SFR125,000-standard

contract size = SFR500,000

= 127,000

Sell SFR 500,000

@0.2610/SFR

=130,500

June 1

Buy SFR 500,000 @0.26090

=130,450

Gain = 2500

Loss = 2950

Net Loss = 450

1/3 of the entire loss

Buying Hedge is same is a selling hedge

Mr. A borrow \$1.5 million at 8%. He will convert dollar into 1 million by buying GBP for \$1.5 each. Therefore, he buy British Security (mature 1 year) and interest 10%

Sell 44 contract (GBP25,000/contract at 1.518/GBP in the future mkt

After 1 year : Market price of GBP decrease => \$1.35/GBP

Convert 1.1 million (P+I) => convert to dollar

Receive 1,485,000 (cannot repay the loan of \$1.5 million)

Market price = \$1.35/GBP

Future price= 1.3550/GBP

Gain = 0.163 (1.518-1.3550)

1,485,000 (Value of \$ received by convert 1.1million)

179,300 (Gain in future)

-1,500,000 (repayment of loan)

-120,000 (interest)

NET GAIN

= 44,300

# Interest Rate Future

- ☛ Borrow 12 million (Dec 15)
- ☛ Now : Sept 1
- ☛ Today's 6-mth rates, borrow at 6.75%
- ☛ December 3th future contract 93.38
- ☛ Each 3th interest rate contract cover 0.5 million of lending and borrowing for 3ths.

# Interest Rate Future

- Dec 15, interest increase by 3%, future price decrease 2.8%
- Need to borrow 12 million for 6 mths, need  $12/0.5 \times 6/3 = 48$  contracts
- Sept 1 : sells 48 December future contract
- Dec 15: buys 48 future contract

# Hang Seng Index Future

- Buy shares of ABC at \$55 for 4000 shares
- Sell a future at 11100 (HS index)
- After one month, share price of ABC decrease to \$54, HS index to 10000
- Loss from shares :  $4000 \times (55-54) = \$4000$
- Profits from future :  $(11100-10000) \times 50 = 5000$

# Hang Seng Index Future

- Investor borrow money to buy shares
- Share value = index = 10100
- Time = contract expiry date = 91 days
- Interest rate = borrowing rate = 7%
- Cost of holding shares =  $10100 \times 7\% \times 91/365 = 176.27$  (index)

# Hang Seng Index Future

- ☛ Index = 10100
- ☛ Dividend ratio = 3% p.a.
- ☛ Time = 91 days
- ☛ Dividend effect =  $10100 \times 3\% \times 91/365$   
= 75.54 (index)
- ☛ Theory value of HS index future
- ☛  $10100 + 176.27(\text{borrow cost}) - 75.54 = 10201$

# Hedging Hang Seng Index Future

- Buy a basket of shares and sell a future contract
- Index = 10,100 , interest rate = 6%, time = 3 mth, dividend = 80(index)
- Transaction cost of buying shares –  
commission = 0.5%, stamp duty = 0.4%,  
transaction levy = 0.03%, spread price = 0.75.  
Total = 1.68% -169.68(index)
- Transaction cost of selling contract-  
commission = \$200, transaction levy = \$20,  
other = \$3, total = \$223 (index = 4.46)

# Hedging Hang Seng Index Future

- ✦ Borrow cost =  $10100 \times 6\% \times 3\text{mth} = 151.5$  (index)
- ✦ Hedging basis = cost – benefit
- ✦ Cost = borrowing cost + transaction cost
- ✦ Benefit = dividend
- ✦ Hedging basis =  $151.5 + 169.68 + 4.46 - 80 = 245.64$

# Future in Bullish

- ✦ Expect share price does not fall
- ✦ Strategy : Buy DEC Future at 12800(index)
- ✦ Maturity
- ✦ Balance = 12800
- ✦ Profit = unlimited if index  $>$  12800
- ✦ Loss = unlimited if index  $<$  12800

# Option

- ☛ An option is a contract giving the owner the rights, not the obligation, to buy or sell a given quantity of an asset at a specified price at some time in the future
- ☛ Buyer pays a premium
- ☛ Flexible optional hedge against exchange exposure
- ☛ Buyer of option – long
- ☛ Seller of option – writer

# Option-Price

- Value of American Call = Value of European at expiration =  $\text{MAX}(\text{the expiration date of spot price: } ST - \text{the exercise price of foreign currency: } E)$
- $ST > E$  (in the money – call option)
- $ST = E$  (At the money)
- $ST < E$  (out of the money – call option)

# American option-price

- ☛ American option price – exercise at any date before expiry dates
- ☛ Call (CA)  $\geq \text{MAX} (ST - E)$
- ☛ Put (PA )  $\geq \text{MAX} (E - ST)$
- ☛ CA and PA is the option has a current premium

# European option-price

- European option price – exercise at expiry dates

# Value of the Option

- Value of Option : Intrinsic value and time value
- Shares of ABC = \$6 (current market price)
- Strike price of option = \$5
- Intrinsic value = \$1

# Option in bullish

- ☞ Long call
- ☞ Expect share price increase
- ☞ Strategy : Buy call option - DEC HS INDEX 12800 (premium : -360)
- ☞ Maturity date
- ☞ Balance : 13160 (12800+360)
- ☞ Loss : 360 (premium)
- ☞ Profits : unlimited if HS index increase over 13160

# Option in bullish

- Short Put
- Expect share price increase
- Strategy : sell put option - DEC HS INDEX 12800 (premium : +279)
- Maturity date
- Balance : 12521 (12800-279)
- Loss : unlimited if HS index decrease over 12521
- Profits : receive premium rights

# Bull spread in Bullish

- ☛ Buy a option and sell a option with a high strike price
- ☛ Expect price rises
- ☛ Strategy : Buy DEC index 12800 (-360) and sell DEC index 13000(+234)- Total : -94
- ☛ Balance = 12894 (12800 +94 )
- ☛ Loss = 94 (12894-12800)
- ☛ Profit = 106 if index upto 13000 (13000-12800-94)

# Call Option – Foreign Currency

- ☛ In May, Local co need DM312,500 for investment. After 4 months, the co know the result of investment
- ☛ Option contract =  $DM312,500 / 62,500 = 5$   
Sept contracts
- ☛ If co are successful to have an investment, need to buy DM
- ☛ Assume spot rate \$0.55/DM in September
- ☛ Option price = \$0.5/DM and the cost = \$0.018/DM

# Call Option – Foreign Currency

- ✓ Eliminate the risk of exchange
- ✓ Speculative

# Call Option – Foreign Currency

- 1.  $DM62,500 \times 5 \times \$0.55/DM = \$171,875$  (Spot rate)
- 2. Exercise a call :  $DM62,500 \times 5 \times \$0.5/DM = \$156,250$
- 3. Cost of a call :  $DM62,500 \times 5 \times \$0.018/DM = \$5,625$
- 4. Purchase 5 contract profits =  $\$171,875 - \$156,250 - \$5,625 = \$10,000$
- 5. Company need  $DM312,500$  and pay for  $\$161,875$  ( $\$156,250 + \$5,625$ ) regardless of exchange rate

# Call Option – Foreign Currency

- ☞ Need FX in the future, buy FX-contract now
- ☞ Buy foreign currency(FX), Sell local currency(LC)
- ☞ Spot rate of FX > contract of FX
- ☞ Sell FX in the market, buy FX in the contract at the same time
- ☞ As a result, makes a profits

# Call Option - Speculative

- ☛ Expect SFR rises, he need to buy SFR contract
- ☛ In May, spot rate =  $\$0.5672/\text{SF}$  and the contract price =  $\$0.57/\text{SF}$
- ☛ Buy a Sept call (cost =  $\$0.0155/\text{SF}$ )
- ☛ At Sept, spot price =  $\$0.6/\text{SF}$

# Call Option - Speculative

- 1. Spot market, sell SF = SF62,500 x \$0.6/SF = \$37,500
- 2. Future market, buy a call = SF62,500 x \$0.57/SF = \$35,625
- 3. Cost of call = SF62,500 x \$0.0155/SF = \$968.75
- 4. Speculative profits = \$37,500 - \$35,625 - \$968.75 = \$906.75

# Interest Rate Future

- ✦ Borrowing cost =  $12 \times 6.75\% \times 6/12 = 405,000$
- ✦ Additional interest =  $585,000 (12 \times 9.75\% \times 6/12) - 405,000 = 180,000$
- ✦ Gain on future =  $2.8\% \times 3/12 \times 48 \times 0.5 = 168,000$
- ✦ Net loss =  $12,000$
- ✦ Hedging efficiency =  $168/180 = 93\%$

# Interest Rate Future

- Interest decrease by 2%, future price increase by 1.8%
- Interest saving = 120,000
- Loss on future  $(1.8\% \times 3/12 \times 48 \times 0.5)$   
= 108,000
- Gain = 12,000
- Gain is reduced by hedging

# Spot rates and forward rates

- Spot rates : SNG\$/US\$ = 1.66
- One year interest rate (SNG = 17.25%, US = 9.5%)
- SNG\$/US\$ forward rate for one year time
- $F = [1.66 \times (1 + 17.25\%)] / (1 + 9.5\%)$
- $F = 1.775$
- Forward point =  $F - \text{spot rate} = 0.1175$  (1175 points)

# Determine Exchanges Rates

- ✓ Economic Theory
- ✓ Purchasing power Parity
- ✓ International Fisher parity Theory

# Purchasing Power Parity

- Law of one price – standard commodity basket
- Exchange rates between two countries = ratio of the countries' price level
- Differential inflation rate offset by exchange rate, competitive position will not systematically affected by exchange rate changes
- Changes in nominal exchange rates cause change in real exchange rates

# Purchasing Power Parity

- Absolute PPP – overvalue or undervalue of one currency
- Relative PPP – rate of change

# Purchasing power Parity

- Assume the current spot rate between UK and USD is USD1.5/£ . Inflation in UK is 3% and USA is 4%

$$\frac{\text{Expected Spot - US}}{\text{Current Spot - US}} = \frac{1 + \text{rate of inflation - US}}{1 + \text{rate of inflation - UK}}$$

$$\text{Expected Spot - US} = 1.05 \times (1.04/1.05) = 1.5146$$

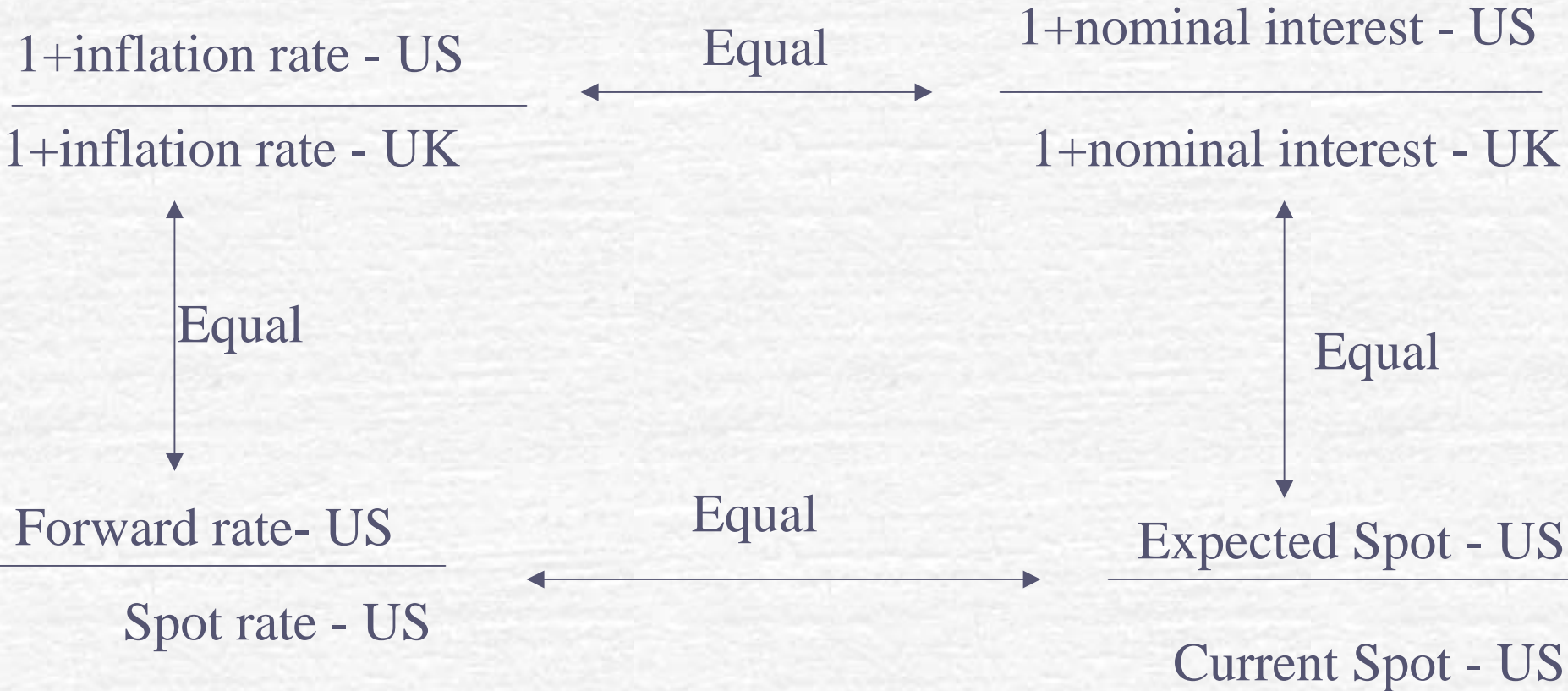
# International Fisher Parity Theory

- Current spot rate between UK and USD is USD1.5/£
- Nominal interest in UK = 3.5%
- Nominal interest in USA = 4.75%

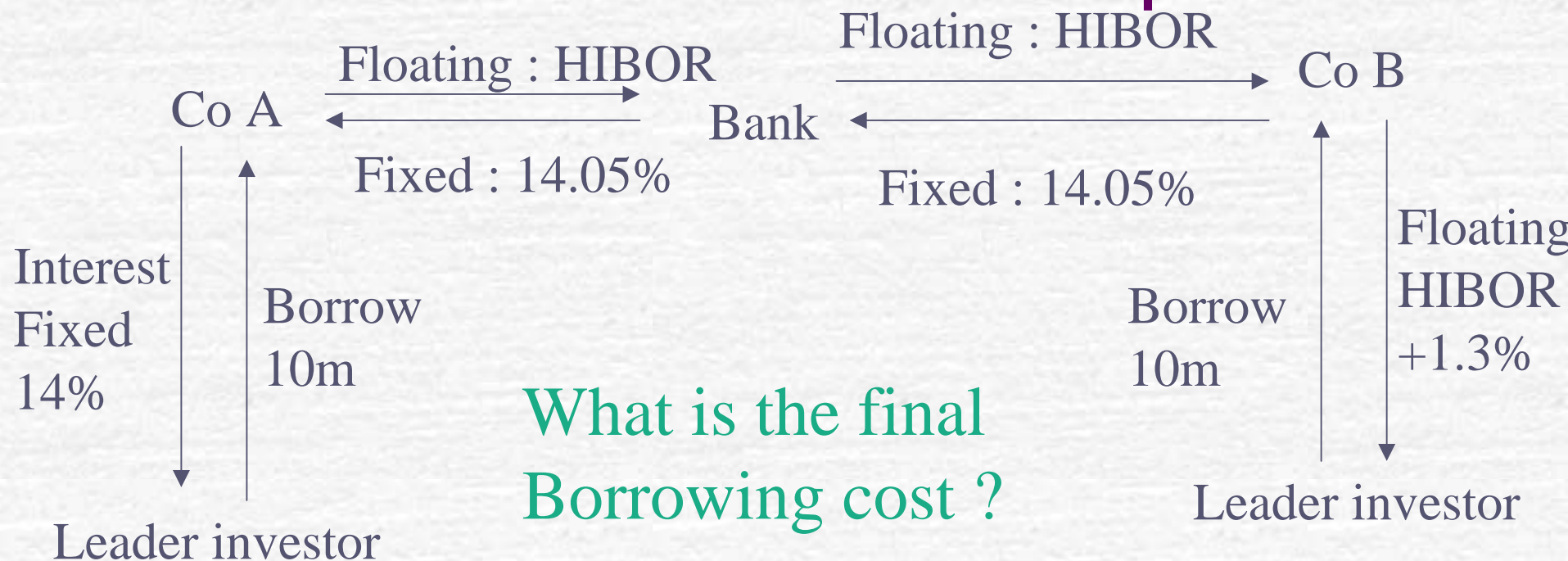
$$\frac{\text{Expected Spot - US}}{\text{Current Spot - US}} = \frac{1 + \text{nominal interest - US}}{1 + \text{nominal interest - UK}}$$

$$\text{Expected Spot - US} = 1.05 \times (1.0475/1.035) = 1.518$$

# Relationship of Expected Rates and Forward Rates



# Interest Rate Swap



# Interest Rate SWAP

	Co A	Co B
Borrow cost before SWAP	14%	HIBOR + 1.3%
SWAP Receipts	14.05%	HIBOR
Net borrowing cost	-0.05%	1.3%
SWAP	HIBOR	14.05%
Final borrowing cost	HIBOR – 0.05%	15.35%

# Interest rate SWAP

- ☛ Two type
- ☛ Single-currency interest rate swap – interest rate swap
- ☛ Cross-currency interest rate swap – currency swap

# Currency SWAP

# Linked Exchange Rate System

