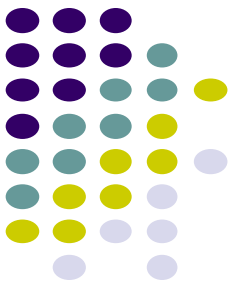
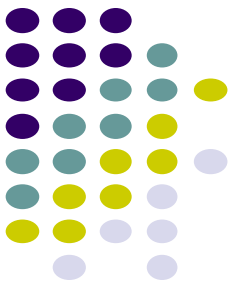


Foreign Exchange Markets - Conventions & Dynamics

Objectives



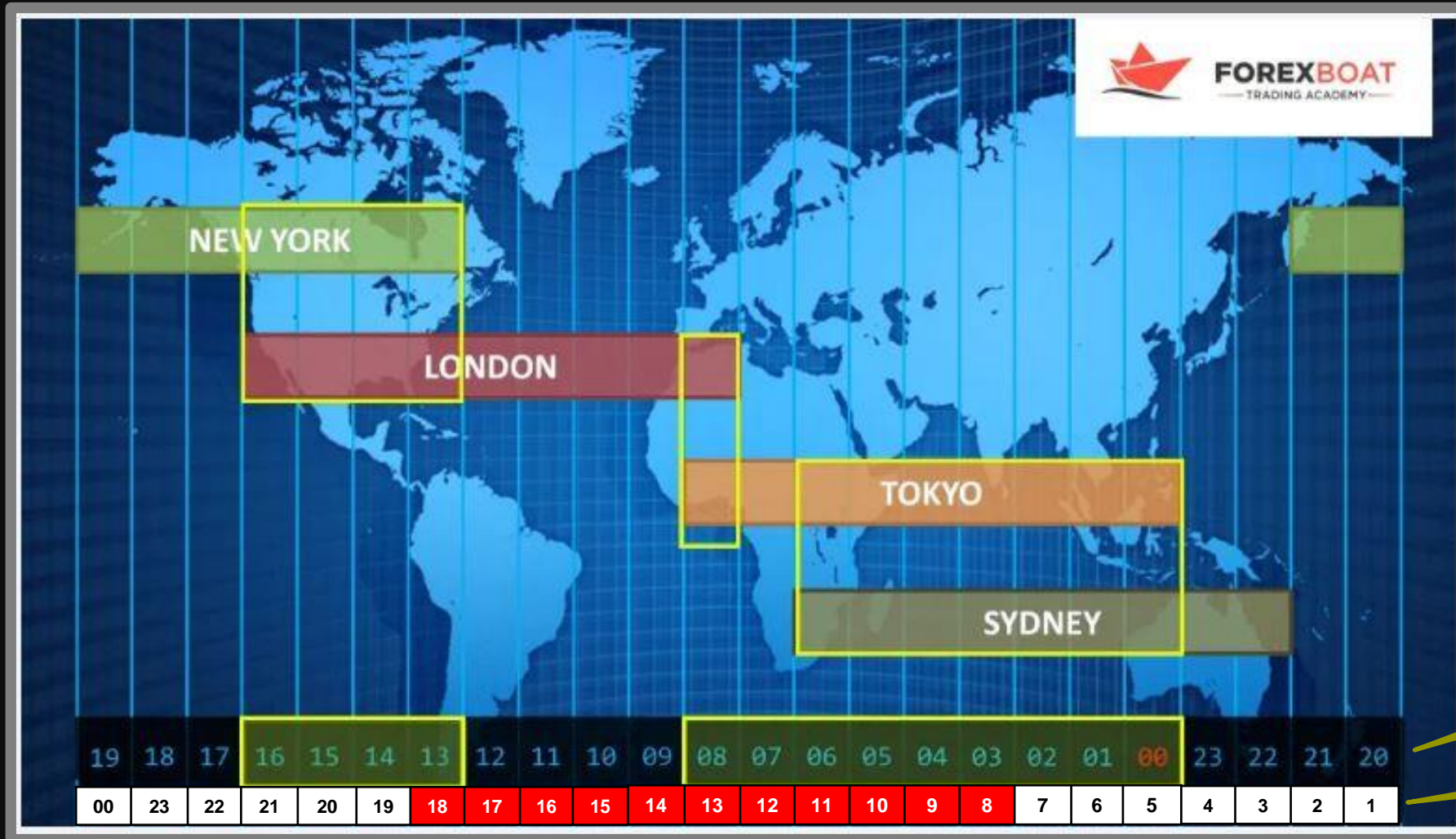
- What is foreign exchange market
- How it operates
- Understand the essentials of Foreign Exchange
- Understand what is Exchange Rate Risk
- How banks & corporates expose to Exchange Risk
- How Exchange Risk is managed



The FX Market

- The FX market is the largest global financial market.
- Daily turnover is ~ \$6.6 trillion, (according to the 2019 Triennial Central Bank Survey of FX and OTC derivatives markets)
- Top four global forex trading centers
 - London
 - New York
 - Tokyo
 - Singapore
- FX Market is a 24- hour market- This is due to the different international time zones and trading being done over a network of computers instead of physical centralised exchanges.

Foreign Exchange Market – Market Hours

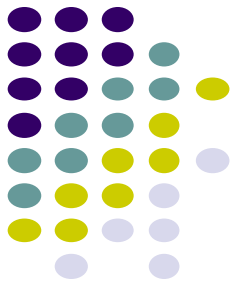


- Foreign Exchange market is a 24-hour market.

GMT

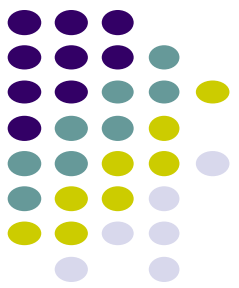
SL Time

Requirement of Foreign Exchange



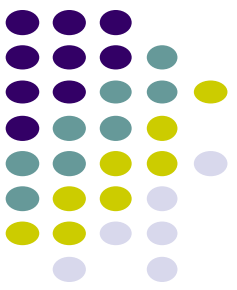
- Different countries have adopted different currencies as their local medium of exchange.
- Purchase and sale of foreign currencies to
 - Allow customers to partake in and complete international commercial trade transactions or travel.
 - For hedging purposes to offset customer exposure in any given currency.
 - Investment purposes
 - For speculative purposes base on view.

Definition of exchange rate



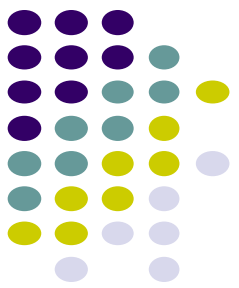
- A foreign exchange rate is a means of expressing the value of one currency (“base” currency) in terms of another (“counter” currency or “quoted currency”).

Quote	Base	Counter
● USD/LKR	1 USD =	LKR 300.50
● USD/INR	1 USD =	INR 86.86
● GBP/USD	1 GBP =	USD 1.2606
● EUR/JPY	1 EUR =	JPY 159.57



FX Quoting Conventions

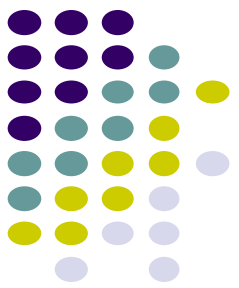
- Base / Counter Currency
 - Hierarchy :
 - 1) Euro (EUR)
 - 2) Sterling (GBP)
 - 3) Australian dollar (AUD)
 - 4) New Zealand dollar (NZD)
 - 5) US dollar (USD)
 - 6) Others (CHF, JPY, SGD, HKD etc)
- Interbank FX rates are quoted against the US dollar



Direct Quotes

- Direct quotes : Quoting a fixed amount of foreign currency (USD) against variable amount of domestic currency. Eg . USD/JPY, USD/LKR, USD/SGD
- USD is the base currency, one unit of USD in relation to quoted currency

USD/ JPY	= 149.76	1 USD = JPY 149.76
USD /SGD	= 1.3423	1 USD = SGD 1.3423
USD/LKR	= 300.52	1 USD = LKR 300.52



Indirect Quotes

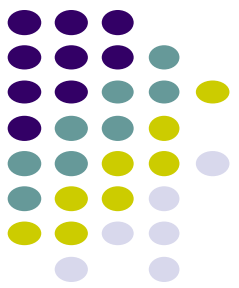
- Indirect Quotes : FX rate quoted as the foreign currency as the variable amount & domestic currency fixed at one unit. Used for Eur, GBP, AUD, NZD

GBP/USD, EUR/USD AUD/USD, NZD/USD

- USD is the counter currency or quoted currency

EUR /USD	= 1.0852	1 EUR = USD 1.0852
GBP /USD	= 1.2702	1 GBP = USD 1.2702
AUD/USD	= 0.6517	1 AUD = USD 0.6517
NZD/USD	= 0.6091	1 NZD = USD 0.6091

FX Cross Rate

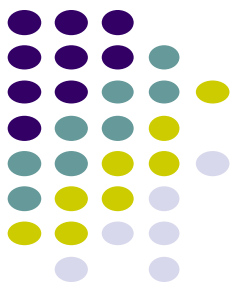


- Cross Rate: When one currency expressed in terms of other currency, instead of against USD
- The exchange rate between two non-USD currencies is referred to as a cross-rate.

e.g CHF / JPY (called “Swiss/Yen” Cross Rate)

GBP/AUD = 1.9499 1GBP =AUD 1.9499

EUR/JPY =162.7200 1EUR= JPY 162.7200

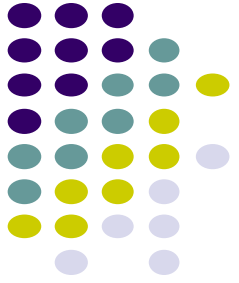


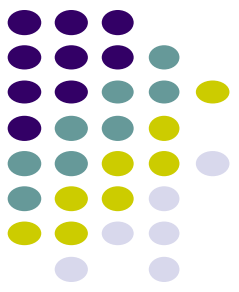
Precision

- Different currency pairs are quoted with different number of decimal places to the right.
- But regardless of number of decimal places , the last two figures are always referred to as pips (points) .
- The first three digits are always known as the big figure.
 - E.g USD/CHF = 0.8 8 4 2 USD/JPY = 1 4 3 .45

 big figure pips big figure pips

EUR/USD = 1.0852 /57 \Rightarrow bid 1.0852/ offer 1.0857
USD/JPY = 149.76/80

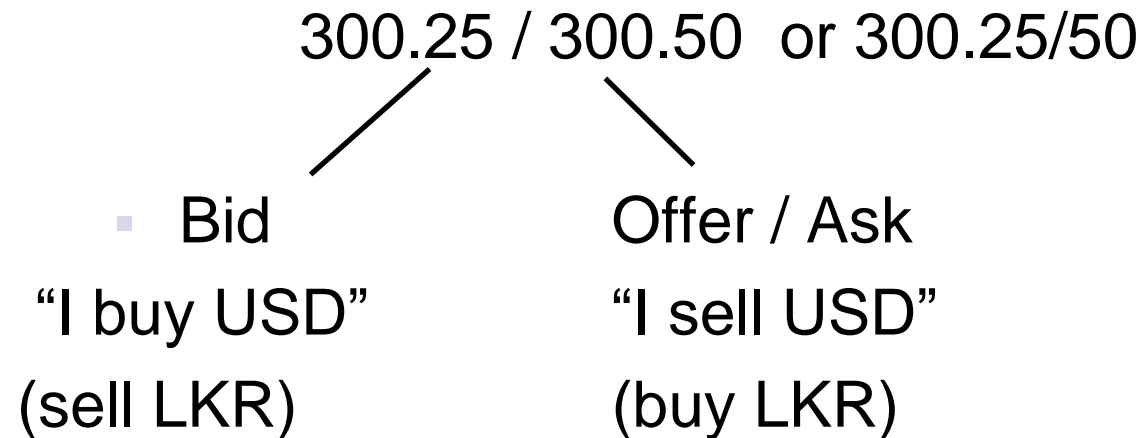




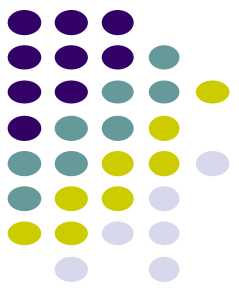
FX Market Making – Two-way Quote

- Bid = price in ccy at which market maker is willing to pay for the base currency
- Offer = price at which mkt is willing to sell the base currency

Example: USD /LKR



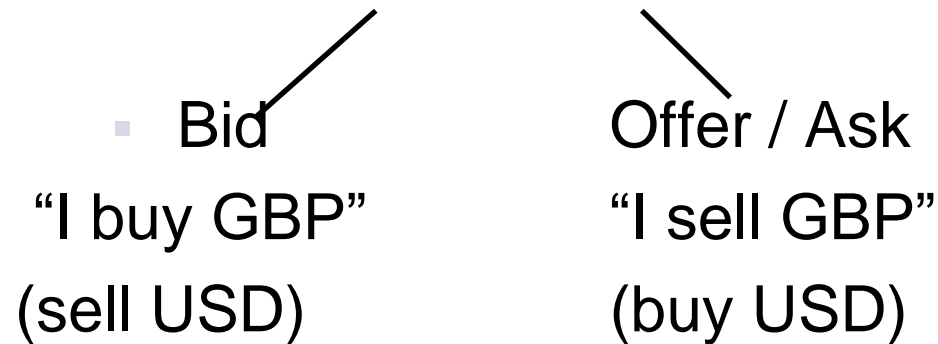
- Spread = difference between bid and offer above e.g 25 cents
- “Buy low at bid, sell high at offer”



FX Market Making – Two-way Quote

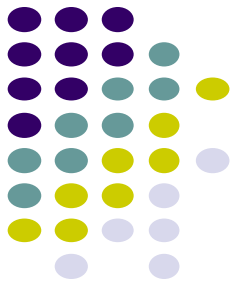
- Example: GBP /USD

1.2701 / 1.2705 or 1.2701/ 05



- Spread = difference between bid and offer above e.g 4 pips
- EUR/USD 1.0850 / 52
- EUR /JPY 162.72/75

Calculating FX Cross Rate

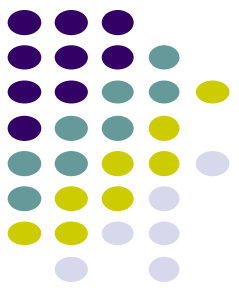


Cross Rate: When one currency expressed in terms of other currency, instead of against USD

e.g USD / LKR = 308.10 1 USD = LKR 308.10
 USD /SGD = 1.3423 1USD =SGD 1.3423
 SGD/LKR = ? \Rightarrow 1 SGD = LKR ? = $308.10 / 1.3423 = 229.53$

 EUR / USD = 1.0853 1 EUR = USD 1.0853
 GBP /USD = 1.2706 1 GBP = USD 1.2706
 GBP /EUR = ? \Rightarrow 1 GBP = EUR ? = $1.2706 / 1.0853 = 1.1707$

 USD / LKR = 308.10 1 USD = LKR 308.10
 GBP /USD = 1.2706 1 GBP = USD 1.2706
 GBP/ LKR = ? \Rightarrow 1 GBP = LKR ? = $1.2706 \times 308.10 = 391.47$



Calculating FX Cross Rate

e.g


EUR / USD = 1.0853

1 EUR = USD 1.0853

USD / JPY = 146.76

1 USD = JPY 149.76

EUR / JPY = ?

1 EUR / JPY ? = 

1 EUR = JPY ? = 1.0853 X 149.76 = 162.53

- Rule of thumb

- Direct/ Direct or Indirect / Indirect



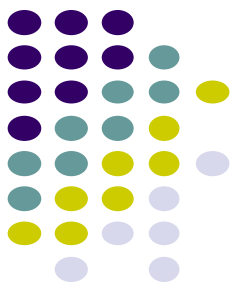
Divide

- Direct /indirect or Indirect /Direct



Multiply

Calculating FX Cross Rate



USD /SGD = 1.3400 / 1.3405

USD /JPY = 149.70 / 149.80

SGD/JPY = Bid /Offer ?  **Base currency** SGD (select stronger currency as base currency)

Deriving the Bid – bank will buy SGD and sell JPY , Splitting each leg in to two transactions against USD

- buy SDG , sell USD at the offer price of 1.3405
- sell JPY , buy USD at the bid price of 149.70

The bank receive SGD 1.3405 per unit of USD and pays 149.70 JPY per unit of USD

The bid price is $149.70/1.3405 = 111.67$

Deriving the Offer – bank will sell SGD and buy JPY, Splitting each leg in to two transactions against USD

- sell SDG , buy USD at the bid price of 1.3400
- buy JPY , sell USD at the offer price of 149.80

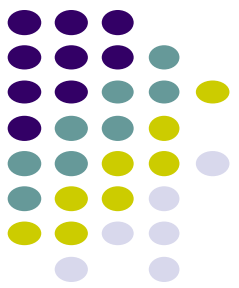
The bank pays SGD 1.3400 per unit of USD and receive 149.80 JPY per unit of USD

The offer price is $149.80/1.3400 = 111.79$

Cross Rate

SGD/ JPY = 111.67/111.79

Calculating FX Cross Rate



$$\text{GBP / USD} = 1.2700 / 1.2705$$

$$\text{AUD / USD} = 0.6510 / 0.6515$$

$$\text{GBP/AUD} = \text{Bid / Offer ?} \Rightarrow \text{Base currency GBP}$$

Deriving the Bid – bank will buy GBP and sell AUD , Splitting each leg in to two transactions against USD

- buy GBP, sell USD at the bid price of 1.2700
- sell AUD , buy USD at the offer price of 0.6515

The bank pay USD 1.2700 per unit of GBP and sell Unit of AUD for USD 0.6515

The bid price is $1.2700/0.6515 = 1.9493$

Deriving the Offer – bank will sell GBP and buy AUD, Splitting each leg in to two transactions against USD

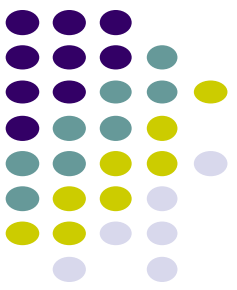
- sell GBP , buy USD at the offer price of 1.2705
- buy AUD , sell USD at the bid price of 0.6510

The bank receive USD 1.2705 per unit of GBP and pay USD 0.6510 per unit of AUD

The offer price is $1.2705/0.6510 = 1.9516$

Cross Rate

$$\text{GBP/AUD} = 1.9493/1.9516$$



Market makers & Price takers

- Market makers (Quoter) provide liquidity to the market by quoting two-way price
- Price takers are end-users of the forex market. They sell at (“hit”) the bid or buy at (“pay”) the offer of the market maker.
- Corporations, non-reciprocal banks, fund managers, small and medium sized enterprises and individuals are typical price takers.

E.g Market maker(quoter) quotes USD/LKR 308.00/308.50

You are a price taker (importer) At what rate you buy the base currency ?

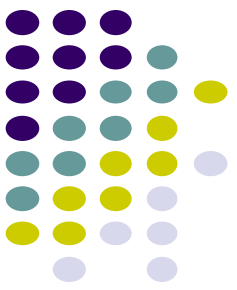
You are a price taker (exporter) At what rate you sell the base currency ?

- Price taker (Asker)
 - Buy – RHS
 - Sell - LHS



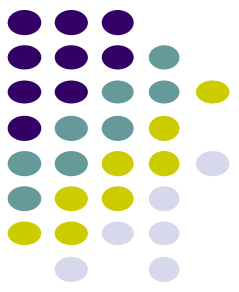
Value dates

- Trade date” is the day FX trade is done
- Also known as “contract date.”
- “Value date” is the date when exchange of currencies is done.
- Also known as “settlement date” or “delivery date”
- Value date is usually two business days after trade date. Also known as “value spot”



Types of Forex Deals

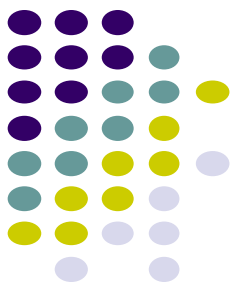
- Cash Transaction
Deal date = Value date
- Tom Transaction
Deal date + 1 = Value date
- Spot Transaction
Deal date + 2 = Value date
- Forward trade
Maturity beyond Spot date. Private agreement. Binding. Carries credit risk / settlement risk.



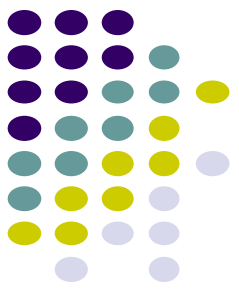
Defining the Value Date

- US holiday on T+1 generally doesn't affect the SPOT. No TOM value date
- For a non-USD currency in the currency pair has a holiday on T+1, then it will push the spot date out to T+3.
- If USD or either of the currencies of a pair have a holiday on T+2, then the spot date will be T+3.
- USD/CAD Spot T+1
- Trading end to end - Last working day of a month
- Arab Countries – Can not settle on Friday and Saturday

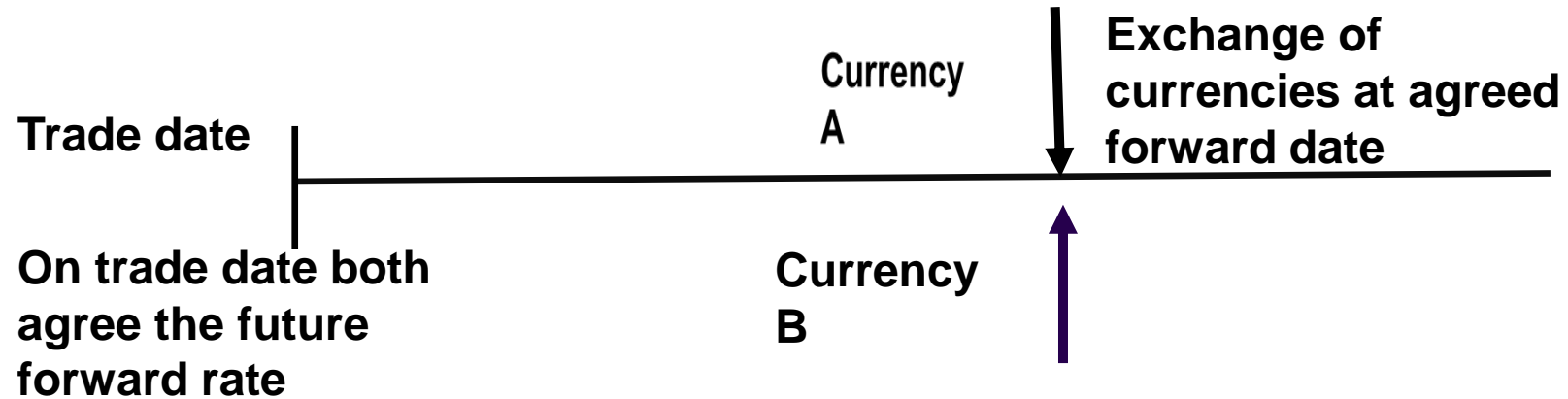
Forward Foreign Exchange

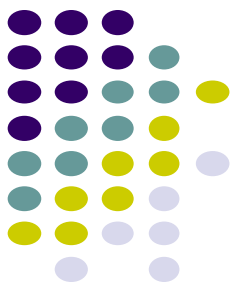


- Agreement to exchange currencies at date beyond spot value date
- OTC market
- Is used to hedge or speculate in future foreign exchange rate movement.
- Is a derivative of interest rates and spot foreign exchange rates
- Exchange rate incorporates cost + benefit of carrying a position from spot to forward delivery date (“no arbitrage” pricing boundaries)
- Allow end-users much wider alternatives in dealing with currency-related exposure

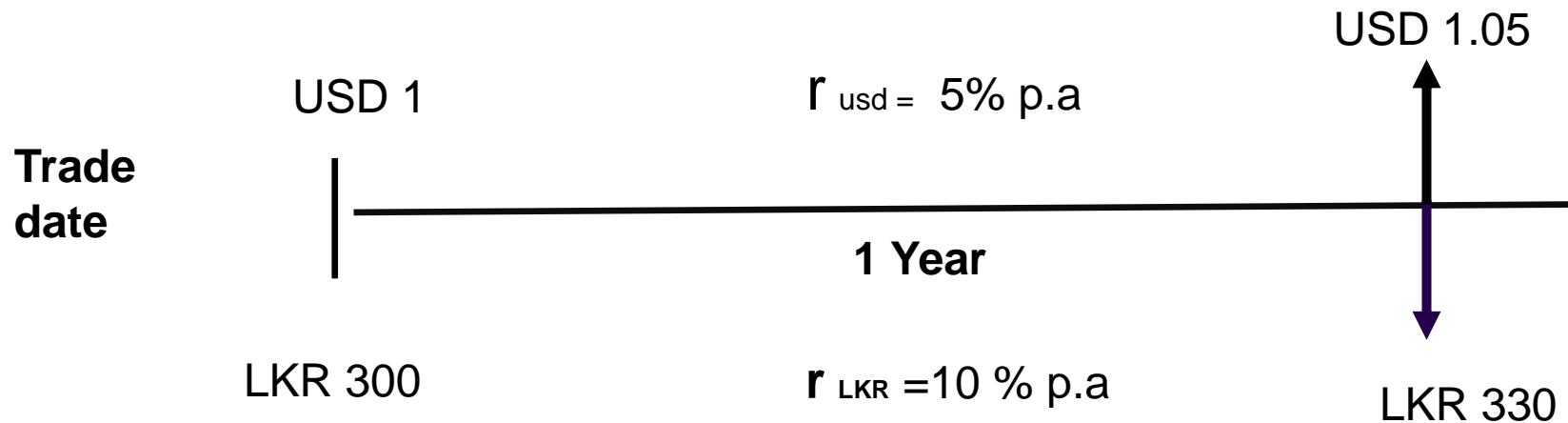


Forward Outright Contracts:



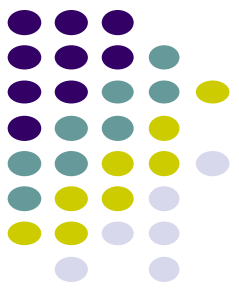


Forward Rate Calculation : No arbitrage pricing

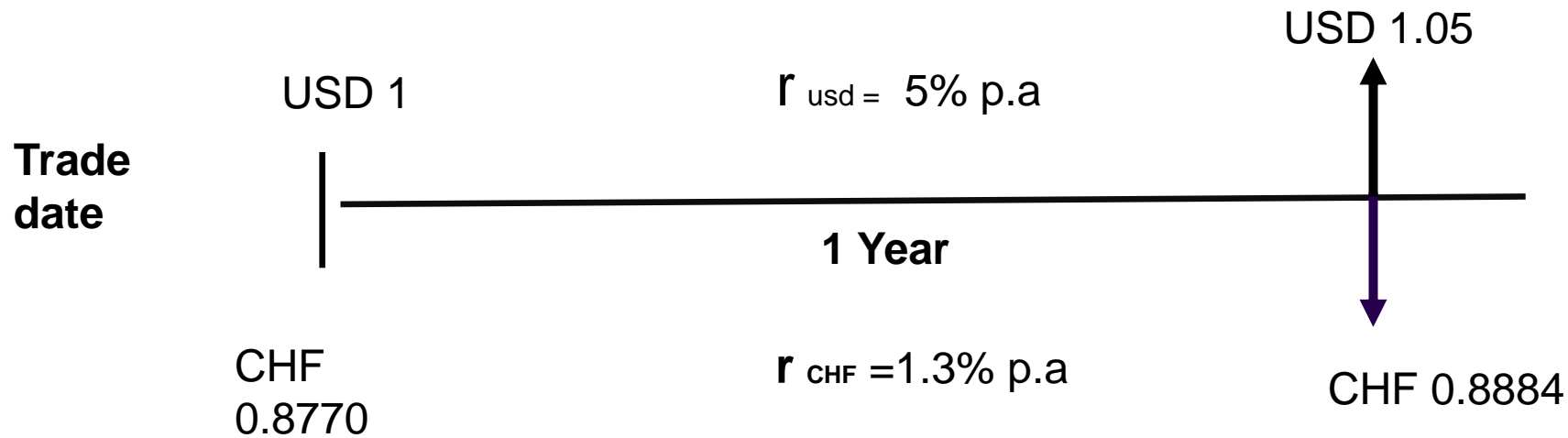


$$\begin{aligned}\text{Forward Exchange Rate USD /LKR} &= 330 / 1.05 \\ &= \mathbf{314.29}\end{aligned}$$

$$\begin{aligned}\text{Forward points} &= \text{forward rate} - \text{spot rate} \\ &= 314.29 - 300 = 14.29 \\ &= + 1429 \text{ points}\end{aligned}$$

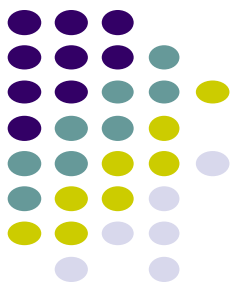


Forward Rate Calculation : No arbitrage pricing



Forward Exchange Rate USD /CHF = $0.8884 / 1.05 = \mathbf{0.8461}$

Forward points = forward rate – spot rate
= $0.8461 - 0.8770 = -0.0309$
= - 309 points



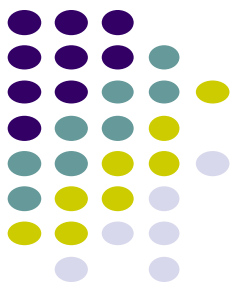
Forward Rate Calculation : No arbitrage pricing

$$\text{Forward Rate} = \text{Spot Rate} \left(\frac{\left[1 + \frac{I_q \times \text{number of days}}{\text{Day base } q \times 100} \right]}{\left[1 + \frac{I_b \times \text{number of days}}{\text{Day base } b \times 100} \right]} \right)$$

I_q = Interest rate of quoted currency

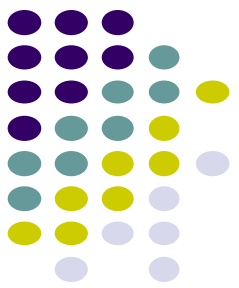
I_b = Interest rate of base currency

$$\text{Forward points} = \text{Forward Rate} - \text{Spot Rate}$$



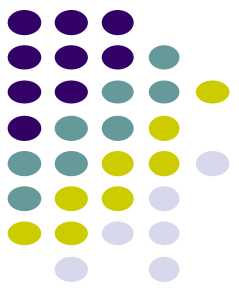
Forward Foreign Exchange

- When base currency interest rate is higher than quoted currency interest rate
 - Forward points are **negative**
 - Then base currency would be describe as being at a **discount** to the quoted currency
- When base currency interest rate is lower than quoted currency interest rate – Forward points are **positive**
 - Then base currency would be describe as being at a **premium** to the quoted currency
- Forward points for some currencies are calculated to 2 decimal places (e.g JPY) and other currencies are calculated to 4 decimal places
 - e. g 21.5 points in USD/JPY becomes 0.215 when subtracting /adding to spot
 - In case of EUR/USD 21.5 points becomes 0.00215 subtracting /adding to spot



Forward Points

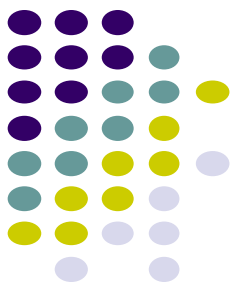
- In a forward point two-way quote where the LHS (Bid) is lower than the RHS (offer), the points are positive
 - eg spot USD /LKR = 308.00 / 308.50
USD/LKR 3M points are quoted 270/300.
USD/LKR 3 month Fwd rate $308.00 + 2.70 / 308.50 + 3.00 = 310.70 / 311.50$
 - If forward points **LHS < RHS** \Rightarrow points are positive , Premium \Rightarrow **ADD**
- In a forward point two-way quote where the LHS (Bid) is higher than the RHS (offer), the points are negative
 - eg spot USD /JPY = 147.93/94
USD/JPY 3M points are quoted 2.0 /1.0 OR -2.0/-1.0
USD/JPY 3 month Fwd rate $147.93 - 0.02 / 147.94 - .01 = 147.91 / 147.93$
 - If forward points **LHS > RHS** points are negative, Discount \Rightarrow **DEDUCT**



Forward Foreign Exchange

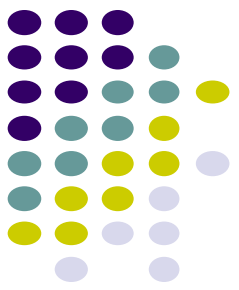
- Your company has an import bill payment of USD 1 million due in 3 months
- The current USD/LKR spot offer rate is 300.
- The bank quotes 3-month forward points as 150/160,
- You can either:
 - Buy USD spot at 300 now and hold it in a USD deposit earning 5% per annum.
 - Enter a forward contract at 301.60 for settlement in 3 months.
- If you keep funds in LKR, you can earn 10% per annum.
- Which option is financially better? How should you decide?

FX Swap



- A swap deal is an exchange of one currency for another at a value date (“near leg”) and at the same time agreeing to exchange it back at an agreed price at a future date (“far leg”).
- Usually, the rate for near leg is the current spot rate and that of the far leg is the spot rate plus (premium) minus(discount) the swap points of the currency pair.
- The swap points reflects the cost of carry due to the interest differential between the two currencies during that period of time.
- FX swaps are widely used by banks as a liquidity support instrument, especially for short-term foreign currency funding.

FX Swap



A deal to Buy and Sell (“B/S”) USD against LKR one-month swap would be:

Given USD/LKR spot = 308.00/50 and

One month USD/LKR swap points = 90/100

Market-maker (MM) Bid (left-hand side quoted) is to purchase the base currency in the forward date

Market-maker offer or ask (right-hand price quoted) is to sell the base currency in the forward date

Market- maker will sell USD spot and buy USD forward at 90 points

Market- maker will buy USD spot and sell USD forward at 100 points

MM will sell USD against LKR value spot at 308.25 (Spot rate- mid rate)

MM will buy USD against LKR value 1 month at $308.25 + 0.90 = 309.15$

MM will buy USD against LKR value spot at 308.25 (Spot rate- mid rate)

MM will sell USD against LKR value 1 month at $308.25 + 1.00 = 309.25$

In market swap trades we use mid rate in near leg as it won't impact the number of forward points receive or pay in the swap

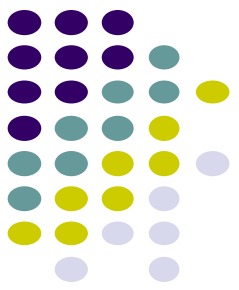
FX Swap



A deal to Buy and Sell (“B/S”) USD against SGD one-month swap would be:
Given USD/SGD spot = 1.7500/10 and
One month USD/SGD swap = - 20/-15

MM will sell USD/SGD value spot at 1.7505 (Spot mid rate)
MM will buy USD/SGD value 1 month at $1.7505 - 0.0020 = 1.7485$

MM will buy USD/SGD value spot at 1.7505 (Spot mid rate)
MM will sell USD/SGD value 1 month at $1.7505 - 0.0015 = 1.7490$



FX Swap

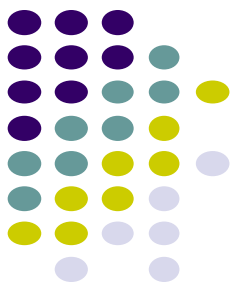
- When the base currency interest rate is lower than the quoted currency interest rate
- Swap points are positive
- In a two way quote $LHS < RHS$
- LHS is the bid of the MM to buy the base currency on forward date
- RHS is the offer of the MM to sell the base currency on forward date
- In this case ,If you enter in to a Sell/Buy swap you pay the premium
- If it is Buy /Sell swap you receive the premium

e.g Given USD/LKR spot = 308.00/50 and One month USD/LKR swap = 90/100

A deal to Buy and Sell (“B/S”) USD against LKR one-month swap – MM receive 100 cents

A deal to Sell and Buy (“S/B”) USD against LKR one-month swap – MM pay 90 cents

FX Swap



Market-maker quote one-month swap points as follows

One month USD/LKR swap = 90/100

You are the price taker (Asker) . You want to do USD B/S swap . Which side to hit ?

LHS 90 means MM's bid to buy the base currency (S/B swap) on forward by paying 90 cents

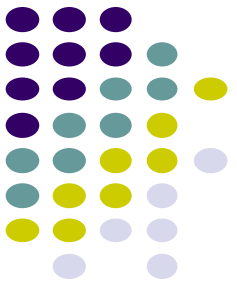
RHS 100 means MM's offer to sell the base currency (B/S swap) on forward by receiving 100cents

You (as the price taker) wants to buy USD against LKR spot and sell USD against LKR on forward date. To sell USD forward date means , you need to hit MM's bid.

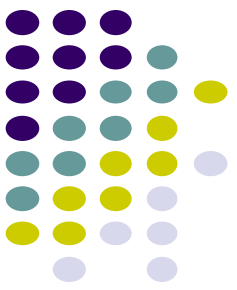
You have to hit LHS , that means you as the price taker will agree to do USD/LKR Buy /Sell swap by receiving 90 cents .

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Mechanism of FX trading

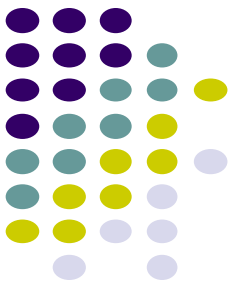


- Voice broker – brokered market
- Reuters dealing – direct market
- Electronic broker (EBS) – order-driven matching system
- On-line trading



Inter-bank FX Jargon:

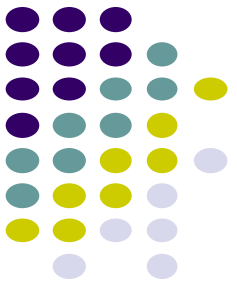
- Your risk” means quotes are no longer firm.
- “My risk” I will take time and will ask the price again
- “Mine” means I buy all of a pre-specified amount of base currency.
- “Yours” means I sold all of a pre-specified amount of base currency.
- “Choice” means bid and offer at the same rate.
- “Not in direct” means not quoting
- “Check/ chk means Check the price now
- Mio means million
- Qtr/Half amount in million
- Small means USD around 0.25 mio
- Tiny means USD around 0.1 mio
- Value / Val means value date



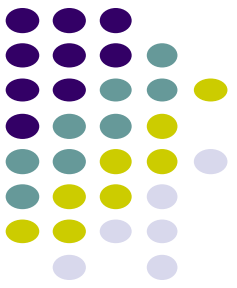
Market Price Action

- Purely supply and demand driven
- Near perfect information dissemination
- Extended periods of liquid trading
- Voice- Broking, Direct trades

Foreign Exchange Risk



- Translational Risk
- Transactional Risk



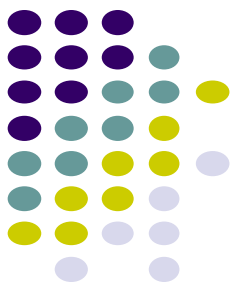
Foreign Exchange Risk

- **Translational Risk :-**

This exposure is also well known as accounting exposure. It is because the exposure is due to the translation of books of accounts into the home currency. Translation activity is carried out on account of reporting the books to the shareholders or legal bodies.

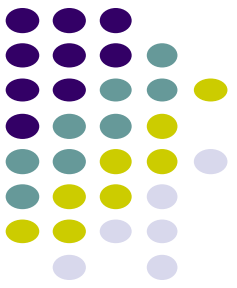
- **Transactional Risk**

The exposure due to an actual transaction taking place in business involving foreign currency..



Transactional Risk –In Corporates

- This occurs when a company has **foreign currency-denominated payables or receivables**, leading to uncertain future cash flows.
 - Import Payments – A Sri Lankan importer purchasing goods from the US must pay in USD. If LKR depreciates, the cost increases.
 - Export Receipts – A Sri Lankan exporter selling goods to Europe receives EUR payments. If EUR depreciates against LKR, revenue declines.
 - Foreign Currency Loans – If a company borrows in USD but earns revenue in LKR, depreciation of LKR increases repayment costs.
 - Dividend Payments – If a subsidiary needs to repatriate profits to a parent company in another currency, FX movements impact the amount received

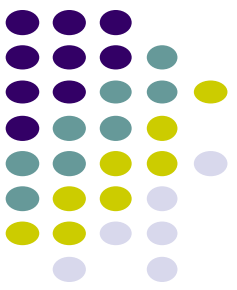


Transactional Risk –In Bank

Foreign Exchange Trading Activities include

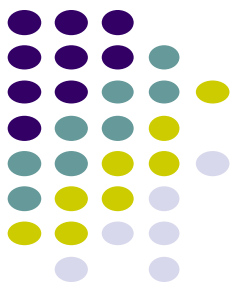
Purchase and sale of foreign currencies to

- Allow customers to partake in and complete international commercial trade transactions or travel.
- Allow customers to take positions in foreign real and financial investments.
- for hedging purposes to offset customer exposure in any given currency.
- for speculative purposes base



FX Risk Management in Corporates

- Private corporations have multiple options to hedge **FX risk**, depending on their exposure type, risk appetite, and market conditions.
- These hedging tools can be categorized in to
 - **Financial instruments**
 - **Operational strategies**



Financial Instruments

- **Forward Contracts**

Agreement to buy or sell a currency at a fixed rate for future settlement.

- **FX Options**

Gives the right, but not the obligation, to buy/sell currency at a fixed rate (strike price).

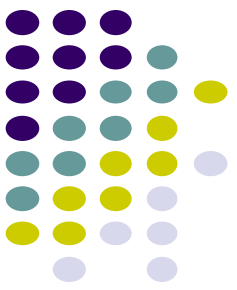
Call Option: Right to buy FX at a set price.

Put Option: Right to sell FX at a set price.

- **FX Swaps**

Simultaneous buying and selling of the same currency at different value dates. Helps manage liquidity mismatches in foreign currency holdings.





Financial Instruments

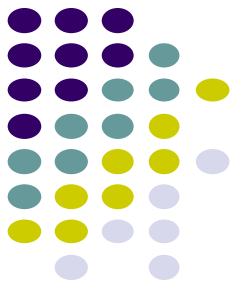
- **Cross-Currency Interest Rate Swaps**

Agreement to exchange interest and principal payments in different currencies.

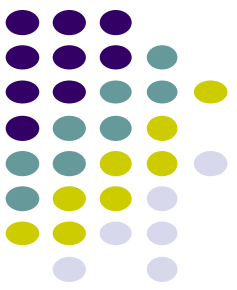
Useful for long-term hedging, especially for foreign currency-denominated debt.

Example: A Sri Lankan company borrowing in USD but generating revenue in LKR can swap its USD debt obligations into LKR.

Foreign Currency Exposure of a Commercial Bank

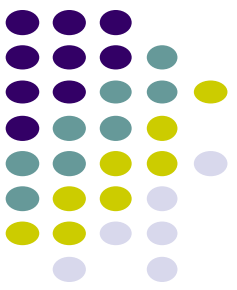


- Any unhedged position in a particular currency gives rise to FX risk. i.e called open position
- At any given time bank's Net Open Position on currency can be
 - Net short position or
 - Net long position
- Net short position : If a bank has sold more foreign currency than it has purchased
- Net long position : if a bank has purchased more foreign currency than it has sold
- Net Open Position is managed by bank treasury department -Forex desk



FX Trading Risks

- Market Risk
 - Price - Position Limits
 - Liquidity - Limits by time of day , currency pair
- Counter-party Risk
 - Pre-settlement - Counter- party Limit
 - Settlement - Netting agreements
- Operational Risk - Segregation of duties, Supervision, Code of conduct



Summary of Key Learnings

- Global FX market , how it operates
- FX quotes – Direct , Indirect & Cross Currency Quote
- Forward contracts and Forward points
- FX Swaps and how it is quoted
- Interbank FX Trading
- Risks involve in FX and how they can be mitigated



Q & A