The Foreign Exchange Market

Financial Markets

- IN THE FINANCIAL markets, people and organizations needing or wanting to raise funds or capital are brought together with people or organization who has spare or surplus funds (savers).

- FINANCIAL markets - There are many & of different types. Each one dealing with a different type of financial asset, serving a different set of customers, or operating in a different part of the country.

Global Financial Market

- The global financial markets are characterized as a totally interconnected marketplace, unhampered by time zones or national boundaries.

- Financial markets facilitate:
- The raising of capital (in the capital markets)
- The transfer of risk (in the derivatives market); and
- International trade (in the currency market i.e. Foreign Exchange market).

- They are used to match those who *want* capital to those who *have* it.

Financial Market

- There are various markets - Distinctions between them are *not always clear* and may not be as important except for as a point of reference and to develop a sense as to the big differences among various types of markets.

- Money Markets : A Financial Market in which funds are borrowed or loaned for short period of time i.e. it is a market in which highly liquid debt securities (treasury notes & bills, corporate commercial papers) with short maturity (less than a year) are traded.

- Capital Markets : A market in which longer term debt (Bonds with longer than one year maturity) and corporate stocks are traded.

Financial Market……

- **Primary Markets :** A primary market is one in which companies raise new capital by selling newly issued securities. The corporation selling the new issue receives the proceeds from the sale in a primary market transaction.

- **Secondary markets -** Markets in which existing, previously issued and already outstanding securities are traded among investors. Corporation whose securities are being traded is not involved in a secondary market transaction and therefore does not receive any funds from such a sale.

- **Private Markets -** Markets in which transactions are carried out between the two parties. Bank loans and private placement of debt with insurance companies are examples of private market activity. Transactions structures are often customized, i.e. structured in a manner that appeal to both parties. Private market securities are less liquid.

Financial Market……

- **Spot Market** - A commodities or securities market in which goods are sold for cash and delivered immediately.
- Contracts bought and sold on these markets are immediately effective or a futures transaction for which commodities can be reasonably expected to be delivered in one month or less.
- Though these goods may be bought and sold at spot prices, the goods in question are traded on a forward physical market.
- The spot market is also called the "cash market" or "physical market", because prices are settled in cash on the spot at current market prices, as opposed to forward price.
- Crude oil is an example of a future that is sold at spot prices but its physical delivery occurs in one month or less.

Financial Market……

- **Futures Market -** An auction market in which participants buy and sell commodity/future contracts for delivery on a specified future date. Trading is carried on through open yelling and hand signals in a trading pit.

- **Forward Markets -** Forward contracts are personalized between parties and therefore not frequently traded on exchanges. The forward market is a general term used to refer to the informal market in which these contracts are entered and exited.

Financial Market……

- **Over the Counter ("OTC")** money market products such as loans / deposits. These products are based upon borrowing or lending.
- They are known as "over the counter" because each trade is an individual contract between the two counterparties making the trade.

- **They are neither negotiable nor securitized**. *Hence if I lend your company money, I cannot trade that loan contract to someone else without your prior consent.*

- *Additionally if you default, I will not get paid until holders of your company's debt securities are repaid in full. I will however, be paid in full before the equity holders see a penny.*

Major Types of financial Markets

- The financial markets can be divided into different subtypes:
- Capital markets which consist of:
  - Bond markets, which provide financing through the issuance of Bonds, and enable the subsequent trading thereof.
  - Stock markets, which provide financing through the issuance of shares or common stock, and enable the subsequent trading thereof.
- Money markets, which provide short term debt financing and investment.
- Commodity markets, which facilitate the trading of commodities.
- Derivatives markets, which provide instruments for the management of financial risk.
  - Futures markets, which provide standardized forward contracts for trading products at some future date.
- Insurance markets, which facilitate the redistribution of various risks.
- Foreign exchange markets, which facilitate the trading of foreign exchange.

Financial Instruments

- Financial instruments are legal agreements (Real or virtual) having some sort of monetary value and can be either cash instruments or derivative instrument.

- *Cash instruments* are financial instruments whose value is determined directly by markets. They can be divided into securities, which are readily transferable, and other *cash* instruments such as loans and deposits, where both borrower and lender have to agree on a transfer.

- *Derivative instruments* are financial instruments which derive their value from some other financial instrument or variable. They can be divided into exchange traded derivatives and over-the counter (OTC) derivatives.

- Financial instruments can be categorized by "asset class" depending on whether they are **equity** based (reflecting ownership of the issuing entity) or **debt (long term/ short term)** based (reflecting a loan the investor has made to the issuing entity).

Financial Instruments

- **Equities:** or shares (termed "stocks" in the US). Stocks are ownership shares in a company.

- **Mutual funds:** Investor's money is pooled together, generally to purchase stocks and bonds. Investors participate in the mutual fund by purchasing shares of the entire pool of assets, thus diversifying their investment. The pooled assets are invested by professional managers who buy and sell securities on behalf of the investors.

- **A *closed-end fund:*** has a fixed number of shares outstanding and is traded just like other stocks on an exchange or over the counter.

- **The *open-end funds:*** sell and redeem shares at any time directly to shareholders. Sales and redemption prices of open-end funds are determined based on the fund's net asset value; closed-end funds may trade a discount (usually) or premium to net asset value.

- **Bonds:** Bonds are medium to long-term negotiable debt securities issued by governments, government agencies, federal bodies (states), supra-national organizations such as the World Bank, and companies. *Negotiable* means that they may be freely traded without reference to the issuer of the security. There are various different varieties of Bond e.g., Eurobonds, domestic bonds, fixed interest / floating rate notes, etc.

Changes in Global Financial Markets

- Financial Institutions routinely move trillions of dollars of assets (stocks, bonds, and other instruments) around the globe.
- Cross border capital flows and foreign holdings of financial assets continue to grow linking individual markets into an increasingly integrated global market.
- Global capital markets are huge (more than $118 trillion)
- Stock of global financial assets has grown faster than the world's DGP – implication - more liquid and deeper markets.
- Much of the growth comes from corporate and government debt.
- European markets are becoming more integrated and gaining in market share and depth and is considered an alternative to the US markets which is the largest of all markets and attracts foreign investors and issuers alike. Japan's role is diminishing and China is becoming a new force.

The Foreign Exchange Market

- The foreign exchange market allows currencies to be exchanged in order to facilitate international trade or financial transactions.
- The system for exchanging foreign currencies has evolved from the gold standard, to agreements on fixed exchange rates, to a floating rate system.

Gold Standard

- From 1876 to 1913 – each currency was convertible to gold at a specified rate & thus exchange rate between two currencies was determined by their relative convertibility rates per ounce of gold.
- Suspended during World War-I during 1914.
- Revived again in 1920 but abandoned due to banking panic in USA & Europe during Great Depression.
- In 1930s some countries pegged their currencies to the dollar or pound, but due to instability in FE market, system did not work.

Agreement on Fixed Exchange Rate

- In 1944, Bretton Woods Agreement called for fixed exchange rates between currencies, which lasted till 1971.
- During this period, governments would intervene to prevent exchange rates from moving more than 1 % above or below their initially established levels.
- In 1971, US $ was overvalued – foreign demand was less than supply (to be exchanged for other currencies) – Exchange rates were allowed to fluctuate by 2.25% in either direction from newly set rates – resulting in Smithsonian Agreement.

Floating Exchange Rate System

- Even after the Smithsonian Agreement, governments still had difficulty maintaining exchange rates within stated boundaries.

- By March 1973, the more widely traded currencies were allowed to fluctuate in accordance with the market forces & the official boundaries were eliminated.

Exchange rate System in India

- Till 1975, rupee was pegged to pound sterling – in September, 1975 it was linked up with a basket of currencies (US $, pound sterling, deutsche mark, swiss franc) – it was done to moderate the fluctuations in the exchange rates & moderate the depreciation of Indian rupee.

- With effect from March 1992, US $ was adopted as the intervention currency in place of sterling and rupee was partially floated – system was known as ‘Liberalized Exchange Rate Management Systems (LERMS).

The Foreign Exchange Market

- The FX market encompasses:
  - Conversion of purchasing power from one currency to another; bank deposits of foreign currency; credit denominated in foreign currency; foreign trade financing; trading in foreign currency options & futures, and currency swaps
- No central market place
  - World-wide linkage of bank currency traders, non-bank dealers (IBanks, insurance companies, etc.), and FX brokers—like an international OTC market
- Largest financial market in the world
  - Daily trading is estimated to be US$3.21 trillion
  - Trading occurs 24 hours a day
  - London is the largest FX trading center

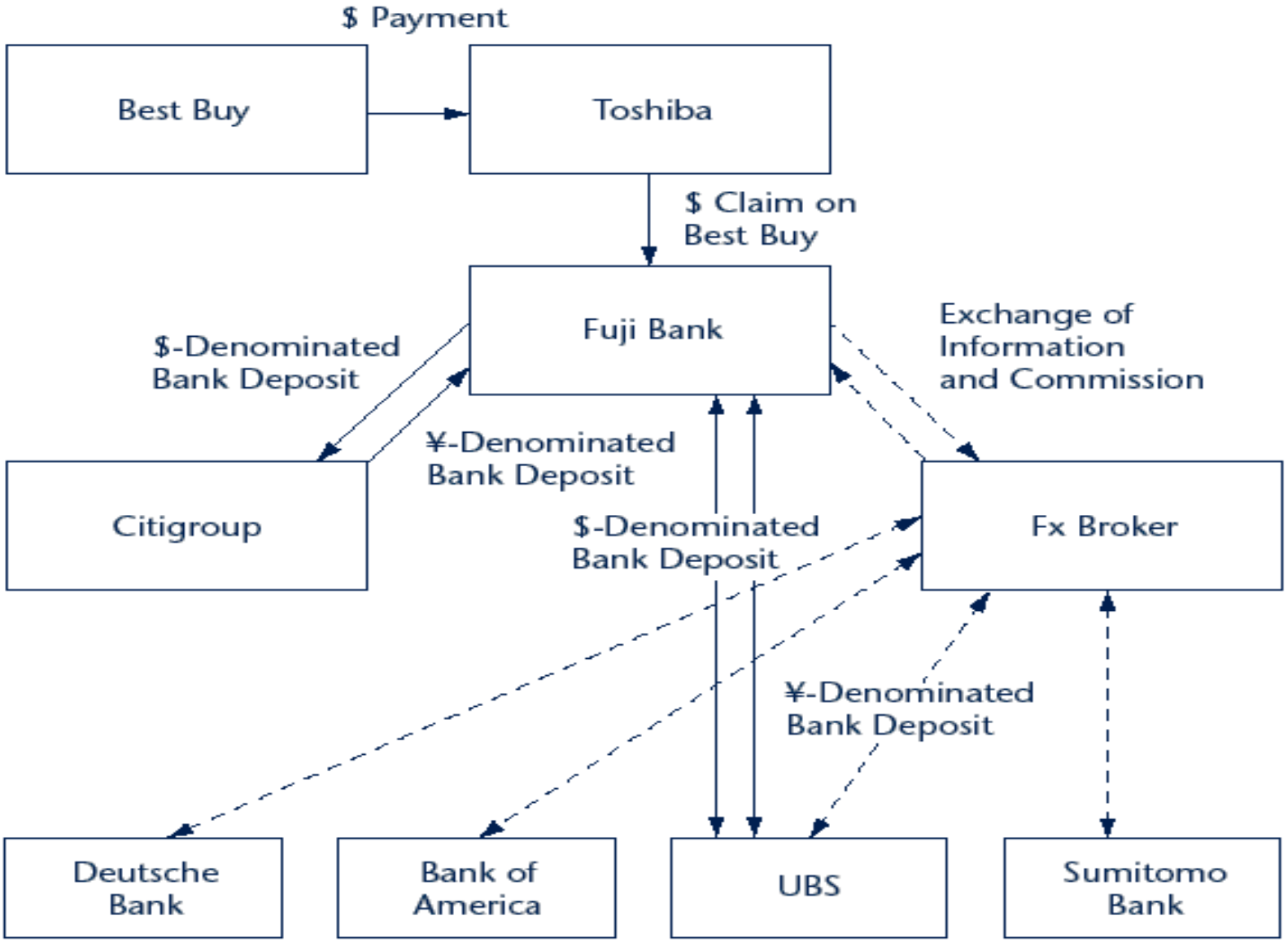
It is a 24-hour market

- The business day opens in Wellington, New Zealand, followed by Sydney, Tokyo, Hong Kong and Singapore.
- A few hours later, trading begins in Bahrain.
- Late in the Tokyo day, markets open in Europe.
- In the early afternoon in Europe, markets open in the United States.
- In the mid to late afternoon in New York, markets open in the Asia-Pacific area.
- Most of the activity takes place when European markets are open.

London is the largest market

- London's size as a financial centre is partially due to its historical importance and it relative lack of regulation.
- London benefits from its proximity to major Eurocurrency markets.
- London benefits from its time zone: London's morning overlaps with late trading in the Far East and London's afternoon overlaps with New York.
- Most of the trading in London is done by foreign-owned institutions.

How a Foreign Exchange Transaction is Conducted



From a 1998 publication by the NY Fed:

- Individual trades of $200 – 500 million are not uncommon.
- Quoted prices change as often as 20 times a minute.
- It is estimated that the world's most active exchange rates can change 18,000 times a day.

Global Foreign Exchange Market Turnover

Table 1

Global foreign exchange market turnover[1]

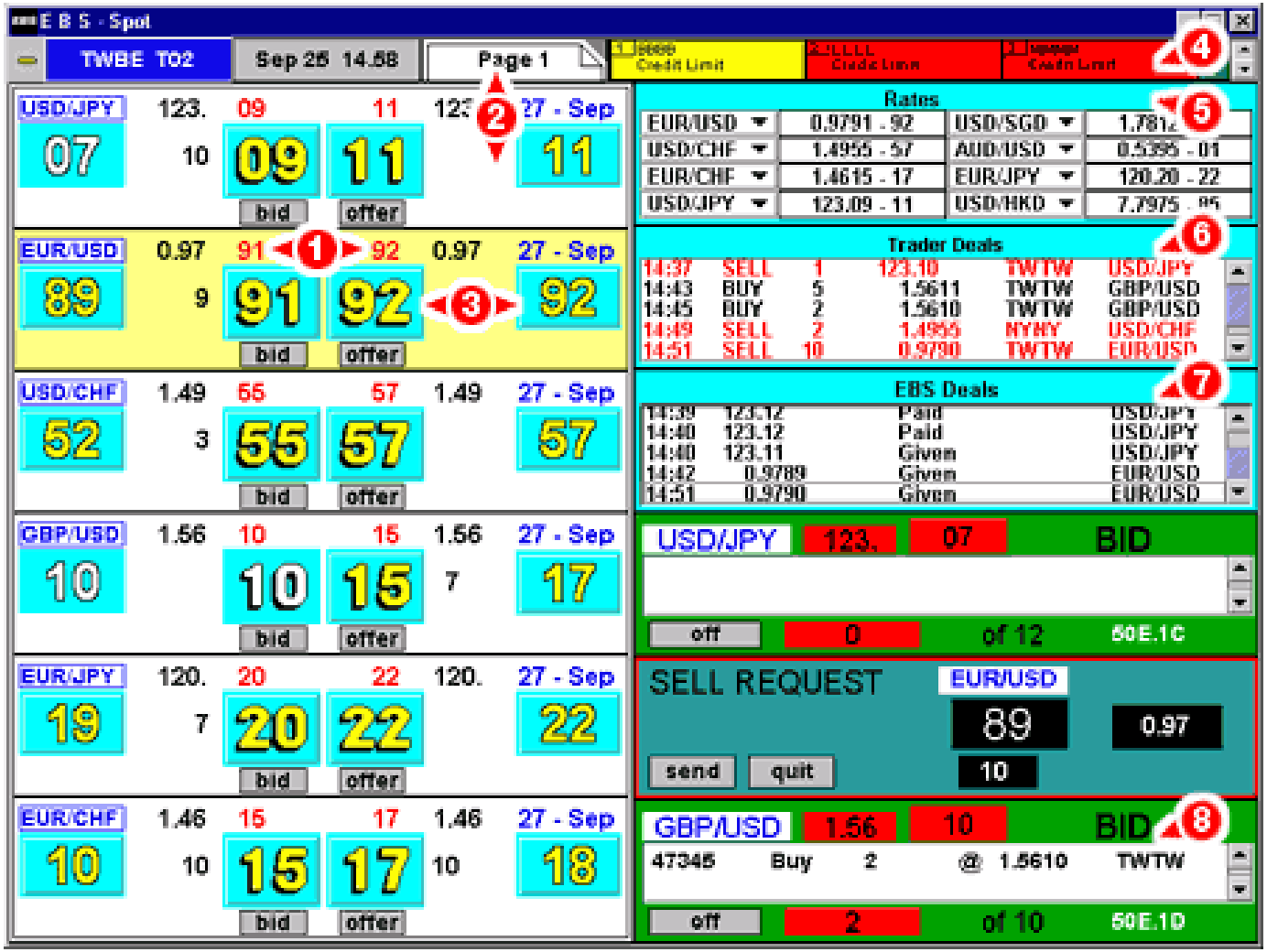
Daily averages in April, in billions of US dollars

Instrument	1992	1995	1998	2001	2004	2007
Spot transactions	394	494	568	386	621	1,005
Outright forwards	58	97	128	130	208	362
Foreign exchange swaps	324	546	734	656	944	1,714
Estimated gaps in reporting	43	53	61	28	107	129
Total "traditional" turnover	**820**	**1,190**	**1,490**	**1,200**	**1,880**	**3,210**
Turnover at April 2007 exchange rates[2]	*880*	*1,150*	*1,650*	*1,420*	*1,950*	*3,210*

[1] Adjusted for local and cross-border double-counting. [2] Non-US dollar legs of foreign currency transactions were converted into original currency amounts at average exchange rates for April of each survey year and then reconverted into US dollar amounts at average April 2007 exchange rates.

Source: BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in April 2007.

The Foreign Exchange Market



The Foreign Exchange Market

- The FX market is a two-tiered market:
  - Interbank Market (Wholesale)
    - Accounts for about 83% of FX trading volume—mostly speculative or arbitrage transactions
    - About 100-200 international banks worldwide stand ready to make a market in foreign exchange
    - FX brokers match buy and sell orders but do not carry inventory and FX specialists
  - Client Market (Retail)
    - Accounts for about 17% of FX trading volume
- Market participants include international banks, their customers, non-bank dealers, FX brokers, and central banks

Note: Data is from 2007.

Participants of FE Market

- Large Commercial banks (through combisters or dealers) operating either at retail level for individual exporters or corporations or at wholesale level in the inter-bank market (known as Authorised Dealer)– act as Market Maker.
- Central banks of various countries – intervene in order to maintain or influence the exchange rate of their currencies within a certain range (execution of govt. order).
- Individual Brokers/ Corporations – Bank dealers often use brokers to stay anonymous since the identity of banks can influence short-term quotes.

Market Makers

- A market maker for a currency is a dealer who regularly quotes the rates at which he is willing to buy and to sell that currency.
- During normal hours, he creates a two-sided market for its customers. He is willing (within reason) to both buy and sell at the rates he quotes.
- He makes a profit from the spread; that is the difference between the selling and buying rates.

Central Banks

- Central Banks intervene in the foreign exchange market to influence the value of their currency.
- Many central banks serve as the primary banker for their government and for other public enterprises.
- Some central banks (for example, the Federal Reserve Bank of New York) act as agent for other central banks.
- Some central banks actively manage their foreign exchange reserves.

$ is the most important currency

- Many central banks hold the bulk of their reserves in the form of dollars; many central banks conduct much of their intervention in dollars; many international transactions are done using dollars; many contracts are invoiced in dollars.

- The dollar is the major “vehicle” currency: if a dealer wants to trade Swiss francs for Mexican pesos, he will probably trade the francs for dollars and the dollars for pesos.

Maintenance of Accounts by Banks

- To facilitate dealings in foreign exchange, a bank in India maintains accounts with banks abroad – also foreign banks maintain accounts with banks in India.

- Nostro Account (our account with you): e.g. Bank of India maintains an account with Natwest Bank London in pound & sterling;

- Vostro Account (your account with us): e.g. the account opened by a foreign bank in Indian rupee with an Indian bank would be referred in all correspondence by the Indian bank as vostro account, meaning your account with us.

3. Loro Account (their account with you): e.g. Bank of india has an account in US dollars with Chasemanhattan Bank in New York. When Bank of Baroda wishes to refer the account of Bank of india with Chasemanhattan Bank, it would refer to it as ‘Loro account’, meaning their account with you.

Depreciation of Currency Value

- Depreciation is a decrease in the value of a currency relative to another currency.
- A depreciated currency is *less valuable* (less expensive) and therefore can be exchanged for (can buy) a smaller amount of foreign currency.
- $1/€1 ! $1.20/€1 means that the dollar has depreciated relative to the euro.
- The euro has appreciated relative to the dollar: it is now more valuable.

Depreciation Factors

- Factors that cause a currency to ***depreciate***:
  - A rapid growth of income *(relative to trading partners)* that stimulates imports relative to exports.
  - A higher rate of inflation than one's trading partners.
  - A reduction in domestic real interest rates *(relative to rates abroad)*.

Appreciation of Currency Value

- Appreciation is an increase in the value of a currency relative to another currency.
- An appreciated currency is *more valuable* (more expensive) and therefore can be exchanged for (can buy) a larger amount of foreign currency.
- Factors that cause a currency to ***appreciate***:
  - A slower growth rate relative to one's trading partners.
  - A lower inflation than one's trading partners.
  - An increase in domestic real interest rates *(relative to rates abroad)*.

Foreign Exchange Rates & Quotations

- A foreign exchange rate is the price of one currency expressed in terms of other currency.
- **Spot Exchange Rate =** applies when the transaction is completed at the same time the price is agreed on (delivery is usually within two days)
- **Forward Exchange Rate =** Price of foreign exchange to be delivered at some future time, e.g., in 30 days, 60 days, …
- A foreign exchange quotation is a statement of willingness to buy or sell at an announced rate.
- Professional dealers and brokers may state foreign exchange quotations in one of two ways: 1) the foreign currency price of one $, or 2) the $ price of one unit of foreign currency.

Codes for selected Currencies required for quotes

- USD – US Dollar
- GBP – British Pound
- JPY – Japanese Yen
- CAD – Canadian Dollar
- SEK – Swedish Kroner
- DKK – Danish Kroner
- INR – Indian Rupee
- EUR – Euro
- IEP – Irish Pound
- CHF – Swiss Franc
- AUD – Austrialian Dollar
- MEP – Mexican Peso
- NZD – New Zealand $
- SAR – Saudi Riyal

European vs. American Quote (For Inter-bank Customers)

- 'European Quote' expresses the rate as the foreign currency price of one US $:
- SF 1.6000/$, read as "1.6000 Swiss Franc per Dollar"
- The alternative method is called 'American Quote', where foreign exchange rates are stated as the US $ price of one unit of foreign currency:
- $0.6250/SF, read as "0.6250 Dollar per Swiss Franc"
- European & American Quotes are reciprocal:
- 1 / (SF 1.6000/$) = $0.6250/SF

Direct vs. Indirect Quotes (For non-bank customers)

- Direct quotes (Home Currency Quotation) state the domestic currency price with one unit of foreign currency:
- 'Rs.39.4106 / $' is a Direct Quote in India.
- Indirect or Reciprocal Quotes (Foreign Currency Quotation) state the foreign currency price of one unit of domestic currency:
- '$ 2.5374/ Rs.100' is an Indirect Quote in India.

Rule to Earn Profit

- Depending on what type of method of exchange quotation is used by a country, following cardinal principle of profit motive would be employed:

- Direct Quotation – Buy Low Sell High (price)–the banker would buy the currency at as low a price as possible & sell it at a price as high as possible.

2. Indirect Quotation – Buy High Sell Low (unit) – since home currency units are fixed, banker would try to buy as many foreign currency units as possible against payment of home currency, and try to sell as less foreign currency units against the surrender of home currency.

Foreign Exchange Transactions

- In a transaction classification, i.e. a purchase or sale, is always referred to the bank's point of view and the item referred to is the foreign currency.
- *Purchase transaction* means bank purchases/ acquires foreign currency & pays the home currency.
- *Sale transaction* means bank sells/ part with foreign currency & accepts/acquires the home currency.

Bid & Ask Rates

- Inter-bank quotations are given as a bid & ask (offer).
- A bid is the price (exchange rate) in one currency at which a dealer would buy another.
- An ask is the price (exchange rate) in one currency at which a dealer will sell another.
- Dealers bid at one price and sell at a slightly higher price, making their profit from the spread between buying & selling price (normally expressed as a % of ask quote).
- Bid-Ask Spread % = (Ask Rate – Bid Rate) ÷ Ask Rate
- The spread on currency quotations is positively influenced by order costs, inventory costs, and currency risk,and negatively influenced by competition, and volume.

How Bid/Ask spread can affect?

- Assume that you have Rs.10,00,000 & plan to travel USA from India. Assume further that the bank's bid rate for the $ is Rs. 39.4106 and ask rate is Rs.39.5212.
- Before starting for USA, you would try to convert Rs.10,00,000 to $ = (10,00,000 ÷ 39.5212) =$25,302.875
- Now, owing to an emergency, you can not take the trip & thus reconvert $ to Rs. = (25,302.875 X 39.4106) =Rs.9,97,201.5
- Due to bid-ask spread, you have Rs.2798.5 less than what you have started.
- **Single rate mentioned in some news paper quotes is 'Mid-Rate' i.e. the arithmetic mean of Bid & Ask rate.**

Cross Exchange Rate

- Many currency pairs are only inactively traded, so their exchange rate is determined through their relationship to a widely traded third currency – referring to Cross Exchange Rate.
- Both the Mexican Peso (Ps) and the Japanese Yen (¥) are commonly quoted against US $. Assume the following quotes:

Japanese Yen: ¥ 121.13/ $
Mexican Peso: Ps 9.1900/$

$$\text{Cross Rate} = \frac{\text{Japanese Yen/ US Dollar}}{\text{Mexican Peso/ US Dollar}}$$

$$= \frac{¥\ 121.13\ /\ \$}{Ps9.1900\ /\ \$}$$

$$= ¥\ 13.1806\ /Ps$$

Spot Market & Arbitrage

- The integration of markets implies that there is no significant arbitrage between markets.

- If dollars are cheaper in New York than in London, people will buy them in New York and stop buying them in London. The price of dollars in New York rises and the price of dollars in London falls, until the prices in the two markets are equal.

Arbitrage in Spot Market (Between Banks)

- All banks may not have identical quotes for a given pair of currencies at a given point of time – For £/$, following are quotes in two banks:
- | | Bank A | Bank B |
- £/$ 1.4550/1.4560 1.4538/ 1.4548
- In such a situation, £ can be bought from B @1.4548 @ sold to A @1.4550 –till B will ↑its Ask rate / A will↓ its Bid rate
- Such arbitrage opportunity will rarely emerge, & even if it is there, it will disappear very fast.

Arbitrage in Spot Market (Between Banks)

- But if the quotes for £/$, are in the following way, what will happen?
- | | Bank A | Bank B |
- | £/$ | 1.4550/1.4560 | 1.4545/ 1.4555 |
- There is no Arbitrage opportunity (A will face many sellers in £ than buyers, & B will have large buyers of £ than sellers).
- Rule: Two quotes must overlap to prevent arbitrage.

Inverse Quotes & Two-Point Arbitrage

- Buying a cuurency at one market & selling it at higher price in another market is known as “Two-Point Arbitrage”.
- Consider the following spot quotations:Zurich Bank quotes: USD/CHF 1.4955/1.4962 & a Bank in New York quotes: CHF/USD 0.6695/0.6699
- Can there be an arbitrage?
- To acquire one million Swiss francs from Zurich Bank $(1,000,000 ÷ 1.4955)=$6,68,700 has to be invested.
- At New York Bank, $ (0.6695 X 1,000,000) = $6,69,500has to be spent to acquire one million Swiss francs
- There is arbitrage if we buy one million Swiss francs against $ from the Zurich bank & sell them to New York bank i.e. $800.
- To prevent arbitrage, New York bank’s (CHF/USD) quotes must overlap the (CHF/USD) quotes implied by the Zurich Bank (worked out to be 0.6686/0.6690).
- Foreign exchange markets very quickly eliminate two-point arbitrage.

Cross Rates & Triangular Arbitrage

- Suppose the following exchange rates are quoted:
- Citibank quotes US $ per € - $0.9045/ €
- Barclays Bank quotes US $ per £ - $1.4443/ £
- Deresdner Bank quotes € per £ - € 1.6200/ £

- The cross rate between Citibank & Barclays Bank is: ($1.4443/ £) ÷ ($0.9045/ €) = €1.5968/ £

- But this cross rate is not the same as Dresdner Bank's quotation – thus opportunity exists to profit from arbitrage among three markets - Triangular Arbitrage.

Triangular Arbitrage……contd.

- A market trader with $1,000,000 can sell that sum spot to Barclays Bank for ($1,000,000 ÷ $1.4443/£) = £692,377.
- Simultaneously, these £ can be sold to Dresdner Bank for (£692,377 X €1.6200/ £) = € 1,121,651;
- Now, the trader can sell these euros to Citibank for $: (€1,121,651 X $ 0.9045/ €) = $1,014,533.
- The profit on one such turn is a risk free $14,533.
- Such Triangular Arbitrage will continue till exchange rate equilibrium is re-established i.e. calculated cross rate equals the actual quotation (less any tiny margin for transaction cost).

Learn how to compute Cross Rates

- Suppose you are given exchange rates for currencies A and B in terms of currency C and that you are told to find the price of currency B in terms of currency A (or equivalently, units of currency A / currency B).
- First, find the exchange rates for A and B in the form: units of A / units of C and units of B / units of C.
- Then: units of A / units B = (units of A/units of C)/ (units of B/units of C)

Types of Contracts

- **Spot contracts** -- a price and quantity are agreed upon. The two currencies are typically exchanged two business days later.
- **Forward contracts** -- a fixed price contract made today for delivery of a certain amount of a currency at a specified future date.
- The specified date is the **settlement date** and the agreed price is the **forward rate**. More precisely, the two currencies are exchanged on an agreed upon date which is a certain number of days or months after the spot date.
- Thus, a three-month forward contract is conventionally settled in three months plus two days. Typically, no money changes hands at the time the contract is written

Example of a Forward Contract

- Frank Dollar, the foreign exchange manager at the Big American Automobile Company was informed that the BAAC is importing parts from Japan at a cost of 600 million yen, to be paid upon delivery in two months time.

- To protect the BAAC from exchange rate fluctuations, Frank Dollar arranged to purchase 600 million yen forward from Mega Bank. The two-month forward price was 120.00 yen/dollar. In two months and two days, Dollar paid 5 million dollars and received 600 million yen.

Example of a Forward Contract……

- The Timing of the Contract
- At time zero: All of the details of the contract were worked out
- At time zero plus two months and two days: The exchange is carried out.

Measuring a change in Spot Exchange Rates

- Assume that Swiss franc, recently quoted at SF1.5625/$ (which is the same as $0.6400/SF), suddenly strengthens to SF1.2800/$. What is the % increase in $ value of the Swiss franc- denominated accounts receivable or payable?

Measuring a change in Spot Exchange Rates

- Under Direct Quotations (quotations expressed in home currency term):

$$\%\Delta = \frac{EndingRate - BeginingRate}{BeginingRate} \times 100$$

$$\%\Delta = \frac{\$0.78125/SF - \$0.6400/SF}{\$0.6400/SF} \times 100 = +22.07\%$$

- In this instance, the SF is 22.07% stronger at the ending rate. Holders of US $ receivables will receive 22.07% more $ - but those who owe Swiss francs will have to pay 22.07% more to buy them.

Measuring a change in Spot Exchange Rates

- Under Indirect Quotations (quotations expressed in foreign currency term):

$$\%\Delta = \frac{BeginingRate - EndingRate}{EndingRate} \times 100$$

$$\%\Delta = \frac{SF1.5625/\$ - SF1.2800/\$}{SF1.2800/\$} \times 100 = +22.07\%$$

- By both methods of calculation, the Swiss Franc increased by 22.07% in value relative to the Dollar.

Forward Exchange Rates

- Forward rates are exchange rates negotiated between individual institutions in the present for currency exchanges that will occur at a future (“forward”) date.
- USD/SEK 3-Month forward: 9.1570/9.1595
- Refers to bank will give Swedish Kroner to buy a $ & require SEK 9.1595 to sell a $, delivery from corresponding spot value date.

Discounts & Premiums in the Forward Market

Consider the following pair of spot & forward quotes:

- £/$ Spot: 1.5677/1.5685
- £/$ 1-month Forward: 1.5575/1.5585
- The £ is cheaper for delivery one month hence compared to Spot £.
- So the £ is said to be at a forward discount in relation to a $ or, equivalently, the $ is at a forward premium in relation to the £.

CALCULATING THE FORWARD PREMIUM OR DISCOUNT

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

where F = the mid forward rate of exchange
S = the mid spot rate of exchange
n = the number of months in the forward contract

= {(1.5580 – 1.5681)÷ 1.5681} X 12 X100 = -7.73%

- For any quotation (A/B), a negative answer would indicate that currency B is at Forward Premium vis-à-vis Currency A where as a positive answer would imply that B is at a forward discount against A.

Swap Transaction

- While banks quote & do outright forward deals with their non-bank customers, the inter-bank market forwards are done in the form of swaps.

- Swap is a double-leg deal, in which one buys spot currency A selling currency B & simultaneously sells forward currency A buying currency B.

Swap Transaction (Example)

- An American investor has a future receipt in € & he thinks that European Union bonds are presently good investment (Has $ assets but no cash in €).
- He may sell $ & buy € in the spot market (but may not wish to block money in a foreign exchange venture as he can not forecast the exchange value of future receipts). OR
- He may sell $ against € spot, getting € & buy his bonds. Simultaneously, he will buy $ forward against €, matching the value on the date of receipt.
- Upon expiry of forward period, investor cashes the receipt, pays back the € that he owes & gets his original $ - overcoming the time-lag problem.

Forward Exchange Rates

- The forward rates are typically quoted in terms of points, also referred to as “Cash Rates” & “Swap Rates”, depending on maturity.
- A point is the last digit of a quotation, with convention dictating the number of digits to the right of the decimal point.
- A forward quotation expressed in points is not a foreign exchange rate as such – rather it is the difference between the forward & spot rate.

Swaps in Foreign Exchange Market

- A Swap Transaction between currency A & B consists of a spot purchase (sale) of A coupled with a forward sale (purchase) of a, both against B. The amount of one of the currencies is identical in the spot & forward.
- Since there will be a forward discount or premium on A vis-à-vis b, the rate applicable to the forward leg of the swap will differ from that applicable to the spot leg.
- The difference between the two is Swap Margin corresponding to forward premium or discount.
- A pair of Swap points to be added or subtracted from spot rate to arrive at the implied forward rate.

Swap Margins & Swap Points

- A typical Swap Quotation appears as follows:
- USD/CHF Spot: 1.4265/1.4275
- 1-month Swap: 15/8
- Here Swap price is quoted in points or pips.
- Currency prices for the US$ are usually expressed to 4 decimal points – hence a point is equal to 0.0001 of most currencies (But Japanese Yen (¥) are quoted to 2 decimal points).
- S, here 15/8 refers to CHF 0.0015/ CHF 0.0008

Swap Margins & Swap Points….

- Now, 0.0015 must be added or subtracted from spot bid rate of 1.4265 & 0.0008 must be added or subtracted from spot ask rate of 1.4275
- Whether to add or subtract?
- Two guiding principles to be followed.

Swap Margins & Swap Points…. (Guiding principles)

- The bank must always make profit i.e. the rate at which bank sells a currency must exceed the rate at which it buys the same currency – Hence outright forward ask rate must exceed the bid rate.

- As a rule, bid-ask spread widens as we go further into future. It is narrowest for spot, narrower for 1-month forward than for 3-month forward & so on.

- For this example, if the swap points are to be added, then we get, USD/CHF 1-month forward: (1.4265 +0.0015)/ (1.4275 + 0.0008) = 1.4280/1.4283
- Now, it implies the bid-ask spread of 3 pips, which is less than the spread in spot quote, violating the 2nd principle

Swap Margins & Swap Points…. (Guiding principles)

- Consider another quote:
- USD/CAD Spot: 1.2275/1.2282
- 3-month Swap: 25/30
- If we subtract, we get a 3 month forward of 1.2250/1.2252, violating the widening of spread rule.
- If we add we get 1.2300/1.2312 which satisfies both requirements.
- Note the difference – in USD/CHF case, swap quotation was 15/8 – large number is followed by a small; in USD/CAD it was 25/30, a smaller number followed by a large one.

Rule to compute outright forwards implied by a swap quotation

- Spot Rate (B/A): Bid Rate for B/ Ask rate for A – Units of A per unit of B.
- A is the quoted currency, B is the base currency.
- If swap points are: Low/High
- Add Swap points – Quoted currency A is at Discount; Base currency B is at Premium.
- If Swap Points are: High/Low
- Subtract Swap Points – Quoted currency A is at Premium; Base currency B is at Discount.
- Note that this rule is conditional upon the convention of quoting rates (B/A) viz. rates are given as units of A per unit of B; Bid followed by Ask; Bid is for the bank buying currency B & Ask is for bank selling currency B.

Forward – Forward Swaps

- Example: Purchase (Sale) of currency A 3-months forward and simultaneous Sale (Purchase) of currency A 6-months forward, both against currency B.

- Basically it is a combination of two spot-forward swaps:

4. Sell A spot & buy 3-months forward against B
5. Buy A spot and sell 6 months forward against B.

- In such a deal, both spot-forward swaps will be “done off” an identical spot so that the spot transactions offset each other.
- The customer & the bank have created a **Swap Position** – matched inflow & outflow in a currency with mismatched timing.
- The gain/ loss from such a transaction depends only on the relative sizes of 3-months & 6-months swap margins.

Non-Deliverable Forward

- It is available with some currencies with restricted capital accounts.
- Here the full amounts of two currencies are not exchanged as contract maturity; only the difference between the contract rate & the spot rate at maturity is settled in a convertible currency such as US $.
- Thus if a firm enters into a 90-day non-deliverable forward contract to buy US $5,00,000 against the rupee @ Rs.39.26; at maturity the spot rate is Rs. 38.86.
- The firm must pay the bank US $ equivalent (at the spot rate) of Rs. {500000 X (39.26 – 38.86)} i.e. Rs.2,00,000
- The payment would be US $(2,00,000 / 38.86)= $5146.68
- This product allows foreign investors to hedge their investments in the local currency without actual outflow of foreign exchange.

Short-Date Contracts

- Usually, the normal value date for a spot transaction is 2 business days ahead.
- But it is possible to deal for shorter maturities i.e. value same day – “cash”- or value next day – “tom” or tomorrow – in currencies whose time zone permits the transaction to be processed.
- For example, it is possible to do a £/$ deal for delivery same day because the 5-6 hours delay between New York & London allows instructions to be transmitted & processed in New York.
- Short date transactions are those in which value date is **before** the spot value date.

Short-Date Contracts…..

- In the FE markets, one-day swaps are quoted between today & tomorrow (Overnight or O/N), tomorrow & the next day (tom/next or T/N) and Spot date & the next day (spot/next or S/N).

- Note that the T/N swap is between tomorrow & the spot date – these swap rates are governed by the relevant interest rate differentials for one day borrowings – these are used for rolling over maturing positions

- Rule for calculating outrights before spot date – **Reverse the Swap margins & then follow the usual rule (i.e. add if low/high subtract if high/low).**

Broken Date Contracts

- Normally banks quote forward rates for certain standard maturities viz.1,2,3,6,9,12 months. However, they offer deals with any maturity e.g. 47 days or 73 days etc. i.e. not in whole months.

- Such deals are called **broken date** or **odd date deals**; & rates for such deals are calculated by interpolating between two standard dates.

Broken Date Contracts…… (Example)

- Suppose today is September 7, the spot date is September 9 & we have
- GBP/USD Spot: 1.7075/80
- 2 months: 45/35 3 months: 120/110
- We need the Bid Date for November 19 (i.e. 2 months & 10 days from the spot date)
- On the Bid side, the GBP is at a discount of 45 points value Nov 9 & a discount of 120 points value Dec 9; & there are 30 days between Nov9 to Dec9.
- This is interpreted to imply that between Nov9 to Dec9, a discount of 2.5 per day on GBP gets added to the bid rate applicable for Nov9.
- Hence for the value date of Nov19, we may apply a discount on GBP of 25 points over & above the Nov9 quote. This yields a quote of (1.7075 – 0.0045 – 0.0025) or 1.7005 for value date of Nov19.
- **Note: Interpolating by this procedure between dates far apart can produce serious errors.**

Exchange Rate Calculations (Indian Context)

- Foreign exchange contracts are for ***'Cash' or 'Ready'*** delivery means delivery same day, ***'Value next day'*** which means delivery next business day and ***'Spot'*** which is two business days ahead.
- For forward contracts, either the delivery date is fixed in which case the tenor is computed from the spot value date, or
- it may be an option forward where delivery may be during a specified week or fortnight, in any case not exceeding one calendar month.
- Market follows a system of direct quote given as rupee per unit (or per 100 units) of foreign currency, with the bid-rate referring to market-maker buying the foreign currency & the offer rate being market maker's rate for selling the foreign currency.

Quotes for various Merchant Transactions (Indian Context).....

- The rates quoted by banks to their non-bank customers are called 'Merchant Rates'.
- In retail market the simplest one is Outward/Inward Remittances:
- Telegraphic Transfer (TT buying / selling rates)
- Bills of Exchange (Bills buying / selling rates)
- Purchase/ Sale of Foreign currency & Travelers' cheques (TC buying / selling rates)

Quotes for various Merchant Transactions…….

Spot TT Buying Rate: A Base Rate *minus* Exchange Margin

Spot TT Selling Rate: A Base Rate *plus* Exchange Margin

Spot Bill Buying Rate: Inter-bank forward rate for a forward tenor equal to transit *plus* usance period of the bill if any *minus* Exchange Margin.

Bills are of 2 types – Sight or Demand Bills (payment by drawee on presentation – delay is the transit period) & **Time or Usance Bills** (give time to the importer to settle the payment – delay is transit period plus usance period).

Spot Bill Selling Rate: TT Selling Rate *plus* Exchange Margin