

# FOREIGN EXCHANGE MARKET MECHANISM

## Objective

1. Definition
2. Quotation Systems
  - a) Direct vs. Indirect
  - b) Spot Rate vs. Forward Rate
  - c) Bid vs. Ask
  - d) Outright vs. Point
  - e) Premium vs. Discount
  - f) Cross Rates
  - g) Appreciation vs. Depreciation
3. Potential Activities
  - a) Arbitrage
  - b) Hedging
  - c) Speculation
4. Spot Arbitrage: Location vs. Triangle

## The Foreign Exchange Market

- 1.1 Participants:
  - a) Large Commercial Banks
  - b) Foreign Exchange Brokers
  - c) Commercial Customers
  - d) Central Banks
- 1.2 Size
- 1.3 Exchange rate is defined as price or value of a currency expressed in terms of units of another currency. e.g. FF 2.00/\$
2. Quotation Systems
  - 2a. Spot Quotation: Whole sale price of one currency in terms of another currency for immediate delivery.  
(Two working days).  
Forward Quotation: Whole sale price of one currency in terms of another currency for future delivery, normally after 1,3 or 6 months.

- 2b. Direct Quotation: What is the unit of account?  
 Home Currency quoted for one unit of foreign currency. e.g. \$7/DM  
 Indirect---1/Direct  
 Indirect Quotation: Foreign Currency quoted for one unit of home currency.
- 2c. Bid: The Commercial Bank's buying rate of a foreign currency.  
 Ask: The Commercial Bank's selling rate of a foreign currency.  
 Always Ask rate > Bid rate
- 2d. Point Quotation: Quoted on point basis.  
 \$0.3968/78 15/17 33/38 93/103 per SF

Outright Quotation:	Bid	Ask
Spot	0.3068	0.3978
	0.0015	0.0017
30 Days	0.3983	0.3995
90 Days	0.4001	0.4016
180 Days	0.4061	0.4081

Swap Points: Difference between Spot and Forward rate.

- 1) Ascending order: Forward Premium
- 2) Descending order: Forward Discount

- 2e. Convert above quotation into Indirect quotation \$/SF in US  
 Use reciprocal i.e.  $1/\text{bid}=\text{ask}$  and  $1/\text{ask}=\text{bid}$

	Bid	Ask
Spot	2.5138	2.5202
30 Days	2.5031	2.5107
60 Days	2.4900	2.4994
180 Days	2.4504	2.4624

\$2.5138/202 107/95 238/208 634/578 per SF

- 2f. Forward Premium vs. Forward Discount

- It must be annual basis
- If Forward rate > Spot rate => Forward Premium
- If Forward rate < Spot rate => Forward Discount

## Exchange Rate Quotations

### Direct vs. Indirect

Direct Quote: Units of local currency per foreign currency.

Indirect Quote: Units of foreign currency per local currency.

From a US perspective, a direct quote is expressed as dollars/unit of foreign currency.

Examples:

$$\begin{array}{ll} 1.746 \text{ \$/\pounds} & \$1.746 = \pounds 1 \\ 0.6154 \text{ \$/DM} & \$0.6154 = \text{DM } 1 \end{array}$$

When expressed in this fashion, the exchange rate is the dollar price of a foreign currency, and is conceptually equivalent to a commodity price.

To do virtually any exchange rate calculation (for example appreciation/depreciation) you must first express the exchange rate as a direct quote.

Most currencies on the interbank market are quoted as units of foreign currency/dollar.

For example:

$$\begin{array}{ll} 1.6250 \text{ DM/\$} & \text{DM } 1.6250 = \$1 \\ 133.25 \text{ \yen/\$} & \yen 133.25 = \$1 \end{array}$$

From a US perspective, these quotes are indirect. To convert from indirect to direct use the formula:

$$\text{Direct} = 1/\text{Indirect}$$

## Forward Premium/Discount

The difference between an N-day forward exchange rate and the spot rate, expressed as a percent per annum. General formula is:

$$\text{Premium} = [(\text{Forward} - \text{Spot}) / \text{Spot}] * [360 / N]$$

Both Forward and Spot rates must be direct quotes (\$/unit of F.C.). If the Premium is negative, the F.C. is said to be trading at a discount. Example:

4/3/91 Spot rate	0.6154 \$/DM
4/3/91 90-Day FW rate	0.6069 \$/DM

$$[(0.6069 - 0.6154) / 0.6154] * [360/90] = - 5.525 \% \text{ (discount)}$$

## Cross Rates

A cross rate is an exchange rate involving two currencies other than the US dollar. Generally, cross rates are calculated from US dollar rates. For example, given the following dollar exchange rates:

133.25 ¥/\$	¥/\$ ⇨ DM/\$
1.6250 DM/\$	

The cross rate is:

$$(133.25 \text{ ¥}/\$) / (1.6250 \text{ DM}/\$) = 82.00 \text{ ¥}/\text{DM}$$

When expressing cross rates, keeping the units straight is crucial. How do we know, in the above example, that the cross rate is 82.00 ¥/DM, and not 82.00 DM/¥? Because:

$$(\text{¥}/\$) / (\text{DM}/\$) = (\text{¥}/\$) * (\$/\text{DM}) = \text{¥}/\text{DM}$$

When we divide or multiply the dollar rates to obtain the cross rate, we must do so in such a way that the \$ cancels out in the accompanying unit calculation, so we are left with one foreign currency in terms of another.

Triangular Arbitrage ensures that cross rates at any given time will equal to some ratio of US dollar rates.

### Appreciation / Depreciation

The % change in the dollar value of a foreign currency, measured over some interval of time. Example:

Jan. 1, 1991 Ex. Rate: 0.50 \$/DM  
Dec. 31, 1991 Ex. Rate: 0.65 \$/DM

$$\% \text{ Change: } (0.65 - 0.50) / 0.50 = 30\%$$

Because the % change is positive, the DM appreciated 30% with respect to the dollar. If % change is negative, the currency is said to have depreciated.

Note that appreciation/depreciation must always be calculated using direct quotes (\$/unit of foreign currency). Often, you must first convert indirect quotes to direct. Example:

Jan. 1, 1991 Ex. Rate: 130 ¥/\$  
Dec. 31, 1991 Ex. Rate: 160 ¥/\$

$$[(1/160) - (1/130)] / (1/130) = - 18.75\%$$

So, Yen depreciated 18.75% during 1991.

I. Potential Activities:

1. **Arbitrage**: Creating a position to realize a riskless (sure) Profit from market disequilibrium.

- a. Location Arbitrage
- b. Triangular Arbitrage
- c. Covered Interest Arbitrage

2. **Hedge**: Covering an existing or prospective position (i.e. Payable and receivables) to avoid the foreign exchange risk.

If cash-flows are denominated in foreign currency and firms show risk averse behavior → Hedging

When Future Spot > < Forward Rate, then

Importer (payables) OR Exporter (receivables) will hedge to lock-in cost or profit

3. **Speculation**: Creating a position to realize a profit from his/her expectation.

Risk taking Behavior

When future spot > < expected

Either gain or lose

The underlying questions whether the forward rate is an accurate or poor predictor of future spot rate.