THE INSTITUTE OF FINANCE MANAGEMENT

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LECTURE NOTES

THE ECONOMICS OF FOREIGN EXCHANGE MARKET

INTRODUCTION

Definition and Characteristics

Definition

The foreign exchange market is the market in which national currencies are bought and sold against one another. This market is called the "foreign exchange market" and not the "foreign currency market" because the commodity that is traded on the market is more appropriately called "foreign exchange" than "foreign currency". Most of the trading takes place in few currencies: the US dollar (US$), Euro (€), British pound sterling (£), Japanese Yen (¥), Swiss franc (SF) and the Canadian Dollar (C$).

Characteristics

Largest Market
The foreign exchange market is characterized by being the largest market in the wolrd in terms of sales volume (turnover).

Most Perfect Market
It is the most perfect of all markets because it possesses the requirements for market perfection namely:

- Large number of buyers and sellers,
- Homogenous products,
- Free flow of information, and

- The absence of barriers to entry.

Over the Counter Market

The foreign exchange market is an over-the counter (OTC) market, as participants rarely meet and actual currency is rarely seen. There is no single location where traders get together. Instead traders are located in the major commercial and investment banks around the world. They communicate using computer terminals, telephones, and other telecommunication devices.

The principal trading centers around the globe include:

1. *Australasia Market Segment*: consists of the following trading centers: Tokyo, Hong-Kong, Sydney and Bahrain.
2. *Europe Market Segment*: consists of the following trading centers: Frankfurt, London, Paris, Amsterdam, and Zurich.
3. *North America Market Segment*: consists of the following trading centers: Los Angeles, New York, Chicago, Montreal, and Toronto

Foreign Exchange Market Participants

There are five broad categories of participants in the foreign exchange market:

Large Commercial Banks

Large commercial banks make the market (i.e. they are price makers) by standing ready to buy and sell currencies at the exchange rate they declare. On the retail side commercial banks deal with customers, but on the wholesale side they deal in the inter-bank or the wholesale market, i.e. with other banks. Commercial banks participate in the foreign exchange market mainly as speculators, trying to make short term profits b getting exposed to foreign exchange risk.

Other Financial Institutions

Other financial institutions such as investment banks and mutual funds conduct heir foreign exchange operations themselves and not through banks.

Foreign Exchange Brokers

The function of the broker is to spread market information and to bring together buyers and sellers with matching needs. Brokers differ from dealers in that they do not take position themselves, but obtain their “living” by charging commission fees. Major brokerages houses are global in nature, servicing the inter-bank market around the clock.

Commercial Customers

These include individuals and companies utilizing the services of commercial banks to buy and sell foreign exchange in order to finance international trade and investment operations. They include, *inter alia* exporters, importers, tourists, immigrants, and investors. Customers are price takers in the foreign exchange market, which means that they buy currencies at the prices determined by the market makers.

Central Banks

These participate in the foreign exchange market because they act as bankers for their governments and also because they run the exchange rate and monetary policies. All of these

functions require market participation. Central banks intervene the market from time to time to smooth exchange rate fluctuations or to maintain target exchange rates.

Divisions of the Foreign Exchange Market

Depending on the timing of the actual delivery of the currency being traded, we may distinguish between two divisions within the foreign exchange market: The *Spot Market* and the *Forward Market.*

The Spot Market

This is the foreign exchange market where national currencies are bought and sold against one another for immediate delivery. In the spot exchange market one buys a spot contract for the exchange of one currency for another on the spot. It is a contract for immediate delivery, though that might actually take a day or two. The currency sells at its spot price. The spot price is also known as the spot rate or the spot exchange rate. The spot exchange rate is the rate today for exchanging one currency for another for immediate delivery.

The Forward Market

This is the foreign exchange market where national currencies are bought and sold against one another for future delivery. In the forward market one purchases a forward contract for the exchange of one currency for another in the future. The currency sells at its forward price, also known as the forward rate or forward exchange rate.

Functions of the Foreign Exchange Market

There are two principal functions of the foreign exchange market namely:

Transfer of Purchasing Power

The foreign exchange market is used to transfer fundes from one nation and currency to another. This is also known as the transfer of purchasing power. Transfer of purchasing power is necessary because international trade and capital transfer transactions involve parties living in different countries with different currencies.

Currency Risk Hedging and Speculation

The foreign exchange market may also be used for hedging and speculative purposed. The forward market can be used to hedge foreign currency receivables and foreign currency payable, so called *forward market hedge*. Speculative activities involving the foreign exchange market include spot speculation and forward speculation.

THE SPOT MARKET

Spot Quotations

The spot exchange rate is the price of one currency in terms of another for immediate delivery. The commodity that is traded is a currency, but the price is expressed in terms of another currency. Thus the exchange rate between two currencies, X and Y, can be expressed as X/Y, that is the number of units of X per unit of Y or as Y/X, the number of units of Y per unit of X. Quotations can being terms of the domestic currency or in terms of the foreign currency.

Spot Quotation Methods

There are two well known quotation methods, the Direct Quote and the Indirect Quote. Thus the price of a currency in terms of another currency can be given either directly or indirectly.

Direct Quote

This is a foreign exchange quote that states the number of units of the local currency needed to buy one unit of the foreign currency. In Tanzania the US$ might be quoted at TZS1000 while, in the USA, the TZS would be quoted at US$0.001. In their dealing with nonblank customers, banks in most countries use a system of direct quotation. Banks in Great Britain, however quote the value of the pound sterling (£) in terms of the foreign currency – for instance TZS2700 = £1.

Indirect Quote

This is a foreign exchange quote that states the number of units of a foreign currency needed to buy one unit of the local currency. The price of the domestic currency is expressed in terms of the foreign currency. For example an indirect quotation of the US$ in Tanzania would be US$0.001 = TZS1, while in USA the TZS is quoted indirectly as TZS1000 = US$1.

Table 1: Alternative Methods of Making Direct and Indirect Quotes

Direct Quotation of US$ against the TZS	**Indirect Quotation of US$ against the TZS**
TZS1000 = US$1	US$0.001 = TZS1
TZS1000/US$	US$0.001/TZS
TZS/US$ 1000	US$/TZS 0.001
US$:TZS1000	TZS: US$0.001

Terms Relating to Changing the Value of Currency

Currency Appreciation and Depreciation

Appreciation: Refers to a rise in the value of a currency against other currencies under flexible (floating) exchange rate system.

Depreciation: Refers to a decline in the value of a currency against other currencies under flexible (floating) exchange rate system.

When the exchange rate between two currencies say, X and Y, expressed as X/Y rises then this would indicate an appreciation of Y and a depreciation of X, and vice versa. This is because a larger number indicates that one unit of Y after its appreciation is worth more that before in terms of units of X. When X/Y changes between two points in time from $[X/Y]_0$ and $[X/Y]_1$, then the percentage rate of appreciation or depreciation (i.e. the percentage change in Y) is given by:

$\%\Delta Y = [X/Y]_1/[X/Y]_0 - 1$

Currency X will change in the opposite direction but not necessarily by the same percentage. The

rate of change will be equal and of opposite sign only if the exchange rate changes slightly.

Revaluation and Devaluation
Revaluation: Refers to an official increase in the value of a currency by the government of that currency under a fixed exchange rate system.
Devaluation: Refers to an official reduction in the value of a currency by the government of that currency under a fixed exchange rate system.

Two Way Quote [Pair-wise Quotations]

When dealers exchange two currencies they quote exchange rates in terms of two numbers, the so- called "pair-wise quotation", "two-way quote" or "two-way rate". Quotes are usually given in pairs because a dealer usually does not know whether a prospective customer is I the market to buy or sell a foreign currency. The first is the buy rate, or the bid price; the second is the sell, or ask price or offer rate. Banks do not normally charge a commission on their currency transactions, but profit from the spread between the buying and selling rates. The bid-ask spread is usually stated as a percentage cost of transaction in the foreign exchange market. It is computed as follows:

Percentage Spread = [Ask Price – Bid Price]/Ask Price x 100

Cross Exchange Rates
A cross exchange rate is the exchange rate between two currencies derived from their exchange rates against another currency. When two currencies, say the Tanzanian shilling and the Kenyan shilling, both are quoted against another currency say the US dollar, then it is possible to calculate the exchange rate between these two currencies. The resulting exchange rate is termed *the cross rate* between these two currencies.

Cross Rate: Single Quote
In general if X, Y, and Z are three currencies, then: X/Y = [X/Z]/[Y/Z]

Example 2 (Calculating Cross Rates: Single Quote)
You are given the following quotes:
Australian dollar A$ 1.3806/US $
Danish Krone DKr 6.4680/US $

Required:
How many Australian dollars can you exchange for one krone?

Solution
The number of Australian dollars one can exchange for one krone can be determined thus:
AS$/DKr = [AS$/US$]/[DKr/US$] = [A$ 1.3806/US $]/[DKr 6.4680/US $]
= AS$0.2134/DKr
Thus 0.2134 Australian dollars can be exchanged for one Danish Krone.

Cross Rate: Two-Way-Quote
A bid-offer cross exchange rate may be calculated by assuming that two transactions take place. We assume that a customer wants to convert X into Y via Z. This deal involves the following two transactions:

Buying Z and selling X at the rate $X/Z_{\text{Offer Rate}}$ to obtain $1/ [X/Z_{\text{Offer Rate}}]$ units of Z
Buying Y and selling Z at the rate $Y/Z_{\text{Bid Rate}}$ to obtain $[Y/Z]_{\text{Bid Rate}}/[X/Z]_{\text{Offer Rate}}$ units of Y.

This means that: $[X/Y]_{\text{Offer Rate}} = [X/Z]_{\text{Offer Rate}}/[Y/Z]_{\text{Bid Rate.}}$ This is because one unit of X will eventually be converted into $[Y/Z]_{\text{Bid Rate}} / [X/Z]_{\text{Offer Rate}}$ units of Y. Hence the exchange rate between X and Y is the reciprocal of $[Y/Z]_{\text{Bid Rate}} / [X/Z]_{\text{Offer Rate}}$ or $/ [X/Z]_{\text{Offer Rate}} / [Y/Z]_{\text{Bid Rate}}$ Since the customer is buying Y, the underlying exchange rate must be the offer rate, i.e. $[X/Y]_{\text{Offer Rate.}}$
Assume now that the customer that the customer wants to convert Y into X via Z. This deal has two transactions:

Buying Z and selling Y at the rate $Y/Z_{\text{Offer Rate}}$ to obtain $1/ [Y/Z_{\text{Offer Rate}}]$ units of Z
Buying X and selling Z at the rate $X/Z_{\text{Bid Rate}}$ to obtain $[X/Z]_{\text{Bid Rate}}/[Y/Z]_{\text{Offer Rate}}$ units of X.

This means that: This means that: $[X/Y]_{\text{Bid Rate}} = [X/Z]_{\text{Bid Rate}}/[Y/Z]_{\text{Offer Rate}}$

Example 3: [Calculating Bid-Offer Cross Rates, Cross Trading]
On 29 January 1996, the bid-offer exchange rates of the Tanzanian shilling against the US dollar and the Ugandan shilling and the US dollar were as follows:
TZS/US$ 475.45 – 483.81
UGS/US$ 587.85 – 598.09

Required:

Calculate the bid-offer exchange rates of the Ugandan shilling against the Tanzanian shilling.

How much will a customer who wants to obtain UGS1,000 by selling TZS at the cross rate pay?

If on the other hand, the customer wants to obtain TZS1,000 by selling UGS how much will deal cost him?

Solution
1. The bid-offer exchange rates of the Ugandan shilling against the Tanzanian shilling can be calculated as follows:

$[TZS/UGS]_{\text{Bid Rate}} = [TZS/US\$]_{\text{Bid Rate}}/[UGS/US\$]_{\text{Offer Rate}}$
$= 475.45/598.09$
$= 0.7950$
$[TZS/UGS]_{\text{Offer Rate}} = [TZS/US\$]_{\text{Offer Rate}}/[UGS/US\$]_{\text{Bid Rate}}$
$= 483.81/587.85$
$= 0.8230$

Thus the bid-offer exchange rates of the Ugandan shilling against the Tanzanian shilling were as follow: TZS/UGS 0.7950 – 0.8230

2. A customer who wants to obtain UGS1,000 by selling TZS at the cross rate would pay TZS823.00 calculated as follows:
1000 x TZS0.8230 = TZS823.00

3. If on the other hand, the customer wants to obtain TZS1,000 by selling UGS then the deal would cost him UGS 1257.86 determined as follows:
1000/0.7950UGS = UGS1257.86

Uses of Cross Exchange Rates
Cross rates can be used for at least two purposes:

- Settlement of international business transactions where the exchange rate between the two currencies is not available.
- To check on opportunities for profits from triangular arbitrage.

Triangular Arbitrage
Exchange traders are continuously alert to the possibility o taking advantage, through currency arbitrage transactions, of exchange inconsistencies in different money centers. These transactions involves buying a currency in one market and selling it in another. Cross rates can be used to detect opportunities for inter market arbitrage. This particular activity is called triangular arbitrage because it involves moving through three different exchange rates. Currency arbitrage activities tend to keep exchange rates uniform in the various markets.

Example:
Given: Actual Market Exchange Rates: TZS1000/US$
KES1000/US$
TZS15/KES
Required: Illustrate how an arbitrageur can benefit from the above data. Assume the arbitrageur has 1,000,000 units of the TZS or 1,000,000 units of the KES

Solution:

- Exchange TZS1,000,000 for US$ spot at TZS1,000/US$ to obtain US$1,000
- Convert the US$1,000 into KES spot at KES100/US$ to realize KES100,000
- Exchange the KES100,000 for TZS at TZS15/KES to have TZS1,500,000

Arbitrage Profit = TZS500,000

THE FORWARD MARKET

The forward market involves contracting today for the future purchase or sale of foreign exchange. Banks provides quotes for maturities of 1, 3, 6, 9 and 12 months. Maturities extending beyond one year are becoming more frequent, and for good bank customers, a maturity extending out to 5 years and even as long as 10 years is possible.

Uses of Forward Contracts
Forward contracts can be used for many purposes including:

Speculation
The aim of forward speculation is to gain from changes in exchange rates. The source of profit to the speculator is the difference between the forward rate and the future spot rate. A speculator speculates by buying forward the currency that is expected to appreciate. On the date of settlement of the forward contract the speculator acquires the currency and sell it spot at the forecast spot rate should that turn out to be true.

Forward Market Hedging
Foreign exchange risk (transaction risk) can be hedged through forward market transactions. In the process of forward market hedge currencies are bought and sold forward. An exporter will hedge foreign currency receivables by selling the foreign currency forward while an importer will hedge his foreign currency payables by purchasing the foreign currency forward.

Forward Rate Quotations
The forward price may be the same as the spot price (at par), but usually it is higher (at a premium) or lower (at a discount) than the spot price.

- If the Forward Rate is EQUAL to the Spot Rate the currency is trading at PAR
- If the Forward Rate is HIGHER than the Spot Rate the currency is trading at A FORWARD PREMIUM
- If the Forward Rate is LOWER than the Spot Rate the currency is trading at A FORWARD DISCOUNT

Calculating Forward Differentials [Forward Premium/Forward Discount]

There are two general formulae:

1. Forward Premium or Discount = [FR – SR]/SR x 12/n x 100

2. Forward Premium or Discount = [FR – SR]/SR x Days in a Year/Length of Forward Contract in Days x 100

Where: n = Length of Forward Contract in Months
FR = Forward Rate
SR = Spot Rate

SWAP RATES AND OUTRIGHT RATES

Outright Rates
Are exchange rate quoted to commercial customers. They are easy to understand as the bid and sellin prices are shown clearly.

Swap Rates
Are quotations for inter-bank dealings. The quotations are made in either of the following ways:

- Point Form
- Cent Form

The Point Form

The Definition of a "Point" in Exchange Rate Quotations: All major currencies are decimal in the sense that the unit is divided into 100 parts. Thus, a Tanzanian shilling is 100 cents, a pound is 100 pence, a mark is 100 pfennigs and a franc is 100 centimes. A hundredth (1/100) of a cent, pence, a pfennig or a centime is called *one basis point* or simply *one point.*

Spot Quotation

Example 4: [Points Determination in Exchange Rate Quotations]

The following were the bid-ask rates of a dealer in Dar Es Salaam for the US dollar on the 20 January 2000: TZS/US$ 899.3230 – 40.

Required: Determine bid-ask spread in point form.

Solution

The spread in the above example is 0.0010 or 10 points (899.3240 minus 899.3230).

Forward Quotation

Example 5:
Given: Spot Rate: £:US$1.7550 – 90
1 Month 8 – 9

The Outright Rates

	Bid	Ask
Spot Rate: US$/£	1.7550	1.7590
Add: Rising Points	8	9
One Month Forward	1.7558	1.7599

Example 6:
Given: Spot Rate: £:US$1.7550 – 90
1 Month 5 – 2

The Outright Rates

	Bid	Ask
Spot Rate: US$/£	1.7550	1.7590
Less: Falling Points	5	2
One Month Forward	1.7545	1.7588

The Cent Form

Example 7: [Spot Cent Form Quotations]

The following were the bid-ask rates of a dealer in Dar Es Salaam for the US dollar on the 20 January 2000: TZS/US$ 899.3230 – 899.3240.

Required: Determine bid-ask rates.

Solution

Bid Rate = TZS899.3230/US$ Ask Rate = 899.3240/US$

Forward Quotation

Example 5:

Given: Spot Rate: £:US$1.7550 – 1.7590
1 Month 8c – 5c pm

The Outright Rates

	Bid	Ask
Spot Rate: US$/£	1.7550	1.7590
Less: Premiums	0.0800	0.0500
One Month Forward	1.6750	1.7090

Example 6:

Given: Spot Rate: £:US$1.7550 – 90
1 Month 3c – 9c dis

The Outright Rates

	Bid	Ask
Spot Rate: US$/£	1.7550	1.7590
Add: Discounts	0.0300	0.0900
One Month Forward	1.7855	1.8490