International Finance Issues and Scope

International finance deals with the management of international financial flows, institutions, and foreign exchange rate between the two currencies.

Functions of International Finance:

Investment Decisions-

Investment decisions deals with the investing efficiently in overseas markets.

Finance decisions-

Finance decisions deals with the raising of finance from international markets.

International Business vs International trade

- Fundamentally international trade is a much narrow set of activities and consists of exports and imports (e.g. goods and services) only.
- International business is a much broader concept and includes international trade, direct foreign production or any other activity across countries conducted by an entity in managing and carrying out its operations.

Documents in International Trade

The following documents are need in international trade.

Bill of Lading

It is a contract between the carrier and exporter in which the carriers agrees to carry the goods from port of shipment to port of destination.

Bill of lading includes-

- –Details of merchandise
- –Details of exporter and importer
- –Details of mark on the merchandise
- –Date of shipment
- –Date of delivery
- –Details of freight charges and other charges.
- –Details of the liability of carrier.

Documents in International Trade

3. Insurance Certificate

All cargoes going to abroad are insured. The policy of insurance covers all shipments made by the exporters.

4. Consular certificate

Exports to many countries requires a special consular invoice. This invoice which varies the details and information requirements from nation to nation.

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International Trade Financing

International trade financing is required especially to get funds to carry out international trade operations.

1. Letter of credit-
2. Pre shipment financing
3. Post shipment financing

Letter of Credit

- A Letter of Credit is a letter from a bank that guarantees that the payment due by the buyer to a seller will be made timely and for the given amount. In case the buyer cannot make payment, the bank will cover the entire or remaining portion of the payment.

Letter of Credit

A written commitment to pay, by a buyer's or importer's bank (called the issuing bank) to the seller's or exporter's bank (called the accepting bank, negotiating bank, or paying bank).

A letter of credit guarantees payment of a specified sum in a specified currency, provided the seller meets precisely-defined conditions and submits the prescribed documents within a fixed timeframe. These documents almost always include a clean bill of lading or air waybill, commercial invoice, and certificate of origin. To establish a letter of credit in favour of the seller or exporter (called the beneficiary) the buyer (called the applicant or account party) either pays the specified sum (plus service charges) up front to the issuing bank, or negotiates credit.

Payment Methods for International Trade

Letters of credit (L/C)

- These are issued by a bank on behalf of the importer promising to pay the exporter upon presentation of the shipping documents.
- *Time of payment* : When shipment is made
- *Goods available to buyers* : After payment
- *Risk to exporter* : Very little or none
- *Risk to importer* : Relies on exporter to ship goods as described in documents

Trade Finance Methods

Letters of Credit (L/C)

- These are issued by a bank on behalf of the importer promising to pay the exporter upon presentation of the shipping documents.
- The importer pays the issuing bank the amount of the L/C plus associated fees.
- Commercial or import/export L/Cs are usually *irrevocable*.

Pre shipment Financing

Pre Shipment Finance is issued by a financial institution when the seller want the payment of the goods before shipment. The main objectives behind pre shipment finance or pre export finance is to enable exporter to:

- Procure raw materials.
- Carry out manufacturing process.
- Provide a secure warehouse for goods and raw materials.
- Process and pack the goods.
- Ship the goods to the buyers.
- Meet other financial cost of the business.

Pre shipment Financing...cont.

Types of Pre Shipment Finance

- Packing Credit
- Advance against Cheques/Draft etc. representing Advance Payments.
- Pre shipment finance is extended in the following forms :
- Packing Credit in Indian Rupee
- Packing Credit in Foreign Currency (PCFC)

Post shipment Financing

Post Shipment Finance is a kind of loan provided by a financial institution to an exporter or seller against a **shipment** that has already been made. This type of export **finance** is granted from the date of extending the **credit after shipment** of the goods to the realization date of the exporter proceeds.

Post shipment Financing...cont.

The characteristics of the post shipment finance

- Finance after the shipment of goods.
- It is extended to those exporters in whose name the documents stand. (He may be the original exporter or the documents would have been transferred in his name.)
- It can be a short term finance (for cash exports), or long term finance (for deferred exports)
- It is a working capital finance since it is against receivables.
- It is extended only against the evidence of authenticated documents evidencing shipment of goods.
- Only a fund based finance.
- Concessionary rate of interest upto due dates (for normal transit period for sight bills and upto notional due date in case of usance bills). Rate of interest as per RBI guidelines.
- Finance can be extended upto 100 % of the bill.

Post shipment Financing...cont.

Classification of post shipment finance.

- Negotiation/Payment/Acceptance of export documents under Letters of credit.
- Purchase/Discount of export documents under confirmed order or export contract.
- Advance against bills sent for collection.
- Advance against exports on consignment basis.
- Advances against undrawn balance on exports.
- Advances against Government receivables.
- Advances against retention money (by foreign buyer) relating to exports .
- Advances against approved deemed exports.

International Trade Theories

- Theory of absolute cost advantage
- Theory of comparative cost advantage
- Factor endowment theory

THEORY OF ABSOLUTE COST ADVANTAGE (By Adam Smith)

- Producing a good with fewer inputs (capital, labor, land, raw materials, etc.) per unit of output than other countries
- If input prices are the same in two countries, the country with an absolute advantage in a good will have a lower unit cost of production for that good
- A country should produce and export products in which it has an absolute advantage
- A country should import products in which it has an absolute disadvantage

Per unit cost of production(Rs.)

Country	Cotton	Tea
India	5	10
Indonesia	10	5

- India has absolute cost advantage in the production of cotton and Indonesia in the production of tea
- Both countries will gain if India produces and exports cotton and Indonesia produces and exports tea.

THEORY OF COMPARATIVE COST ADVANTAGE (By David Ricardo)

- Focus on comparative cost advantage not on absolute cost advantage.
- Each country specialises in the production of that commodity in which its comparative cost of production is the least.
- A country will export those commodities in which its comparative costs are less.
- A country will import those commodities in which its comparative costs are high.

Commodities (Per unit cost of production)

Country	A	B	C	D	E
X	10	12	13	14	15
Y	9	5	8	13	14
Cost Difference	1	7	5	1	1

- Country Y has comparative advantage in products B and C
- Country Y will put all its resources in the production of B and C
- Country X will produce other products i.e. A, D, and E.

FACTOR ENDOWMENT THEORY (By Heckscher and Ohlin)

- A country that is relatively abundant in a factor of production should export goods that use a lot of that factor in the production process, and import other goods

- Example: a country like China with a lot of labour should export labour-intensive goods

- Why? If a factor is relatively abundant, it will be relatively cheap, and a country will be more globally competitive in products that use a lot of that factor

HECKSCHER-OHLIN THEORY

- *Assumptions:*

  1. There are 2 nations (Nation 1 and Nation 2), 2 commodities (Commodity X and Y), and 2 factors of production (Capital and Labor).

  2. Both nations use the same technology in production.

  3. Commodity X is labor intensive and commodity Y is capital intensive in both nations
     - Commodity X requires relatively more labor to produce than commodity Y.
     - $(K/L)_X < (K/L)_Y$

HECKSCHER-OHLIN THEORY

- *Assumptions:*

  9. There are no transportation costs, tariffs or other obstructions to the free flow of international trade.

  10. All resources are fully employed in both nations.

  11. International trade between two nations is balanced.

– Factor Intensity

- In a world of two goods (cloth and food) and two factors (labor and land), food production is *land-intensive*, if at any given wage-rental ratio the land-labor ratio used in the production of food is greater than that used in the production of cloth:

$$T_F/L_F > T_C/ L_C$$

  - Example: If food production uses 80 workers and 200 acres, while cloth production uses 20 workers and 20 acres, then food production is *land-intensive* and cloth production is *labor-intensive*.

Modern Theory or Heckscher-Ohlin Theory of International Trade:

Modern theory of International Trade was propounded by Swedish economist **Heckscher** in an article published in 1919.

It was further improved upon by his disciple **Bertil Ohlin** in a research paper published in 1924 and later in his book " International and Inter-regional Trade". This theory does not contradict Comparative Cost Theory of international trade.

ASSUMPTIONS OF THE HECKSCHER-OHLIN THEORY

- **Heckscher-Ohlin theory** is based on the following assumption:

1) This theory relates to two countries, two commodities and the two factors. It is therefore, called 2x2x2 model.
2) There is same production function for each commodity in two countries.
3) Factor are mobile within the country but immobile between two countries.
4) There is perfect competition in all markets. As a result:(a) all factors are fully employed,(b)factors get their reward in accordance with their marginal productivity, and (c) prices of the commodities are equal to their marginal productivity.
5) No restriction is imposed on the exchanged of goods , i.e. free trade exists between two countries.
6) Consumers' tastes and preferences are identical in two countries.
7) Technique of production employed in two countries is the same.
8) There is lack of transport costs. Factor endowments are different in two countries.
9) Goods can be classified on the basis of factor intensity, such as capital-intensive goods and labour-intensive goods etc.
10) Production function of all goods is homogeneous of the first degree. It means that output will be doubled if all factors of production are doubled.

Explanation of the Theory:

- *According to **Ohlin** "International trade is a special case of inter-regional trade". Difference in factor endowments is the main cause of international trade along with inter-regional trade.*

Heckscher cites the following causes for difference in comparative costs:

(i) Difference in factor Endowments, and

(ii) Difference in factor Intensities.

- *According to **Heckscher-Ohlin theory** of international trade, the immediate cause of international trade is the difference in relative commodities prices.*

1. The cause of difference in the relative prices of the goods is the difference in the amount of factor endowments, like capital and labour, between the two countries.

2. As a result, there is difference in the relative demand and supply of factors, these difference cause difference in the prices of the factors.

3. It is due to difference in factor prices that difference in the relative prices of the commodities takes place and it is this difference that constitutes the main cause of international trade.

Abundance or scarcity of factor of ***Heckscher-Ohlin*** *has been explain on the basis of two criteria. (i)* ***price criterion*** *and (ii)* ***physical criterion***.

- ***(i) Prices criterion of factor Abundance or Scarcity:***

Price criterion of factor abundance or scarcity means that a country, where capital is relatively cheap and labour relatively dear, will be called **capital abundant** country, even if the quality of capital in that country is relatively less.

On the contrary, if capital is relatively dear and labour relatively cheap, such a country will be called **capital scarce** country, even if the quality of capital in such a country is relatively more.

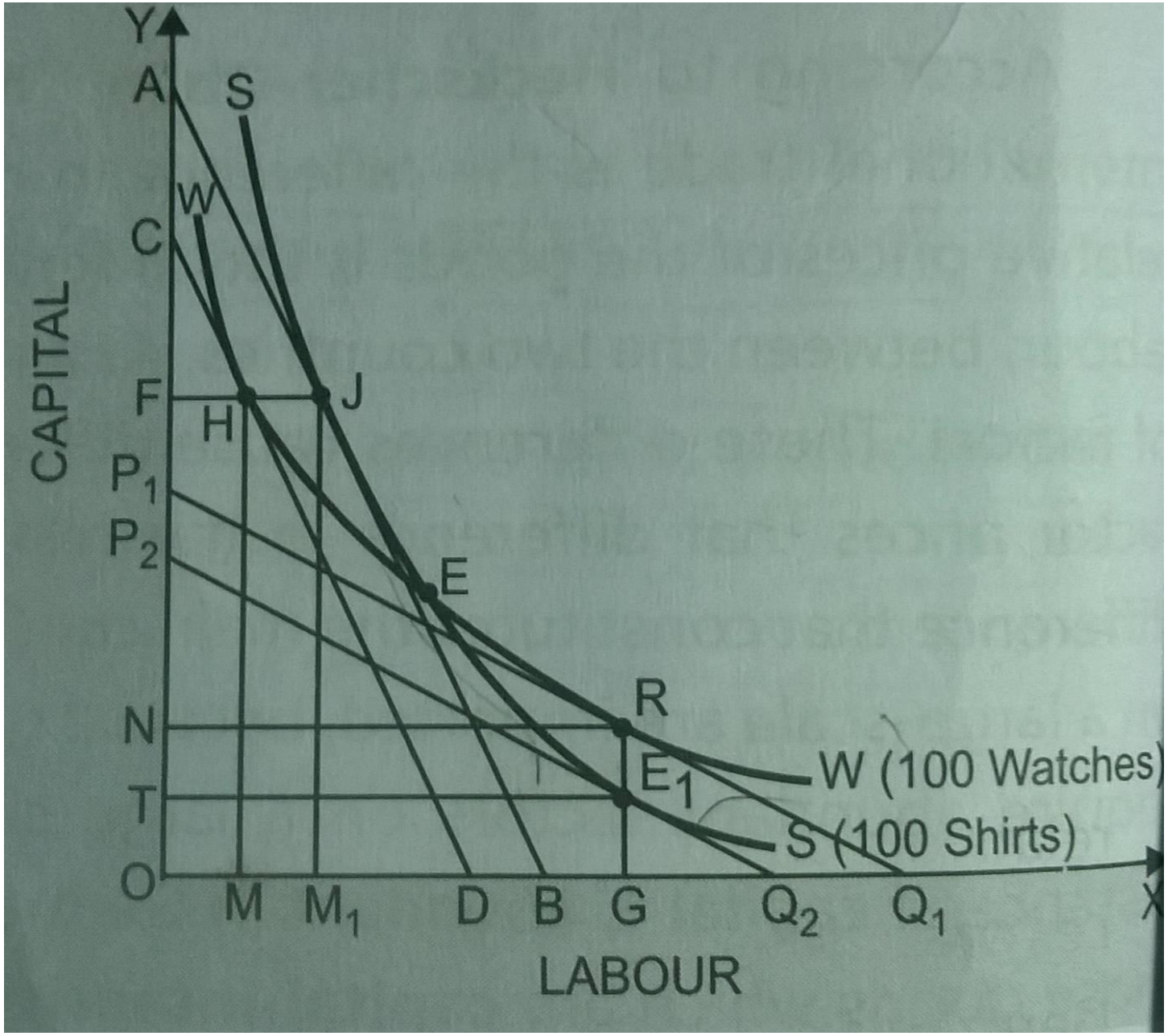
Diagrammatic Illustration:

Let us take Germany and India as two trading countries. It is assumed that Germany is a capital-intensive country and India is a labour-intensive country. The capital is cheaper in Germany in relation to labour; and labour is cheaper in India in relation to capital. This can be expressed in term of the following equation:As shown in figure.(1)

Germany India

$(P_k/P_L) < (P_k/P_L)$

(Here, P_k=Price of capital; P_L= price of labour.)


Y
A
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CAPITAL
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P1
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W (100 Watches)
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S (100 Shirts)
O
M
M1
D
B
G
Q2
Q1
X
LABOUR

(ii) Physical criterion of factor abundance or Scarcity:

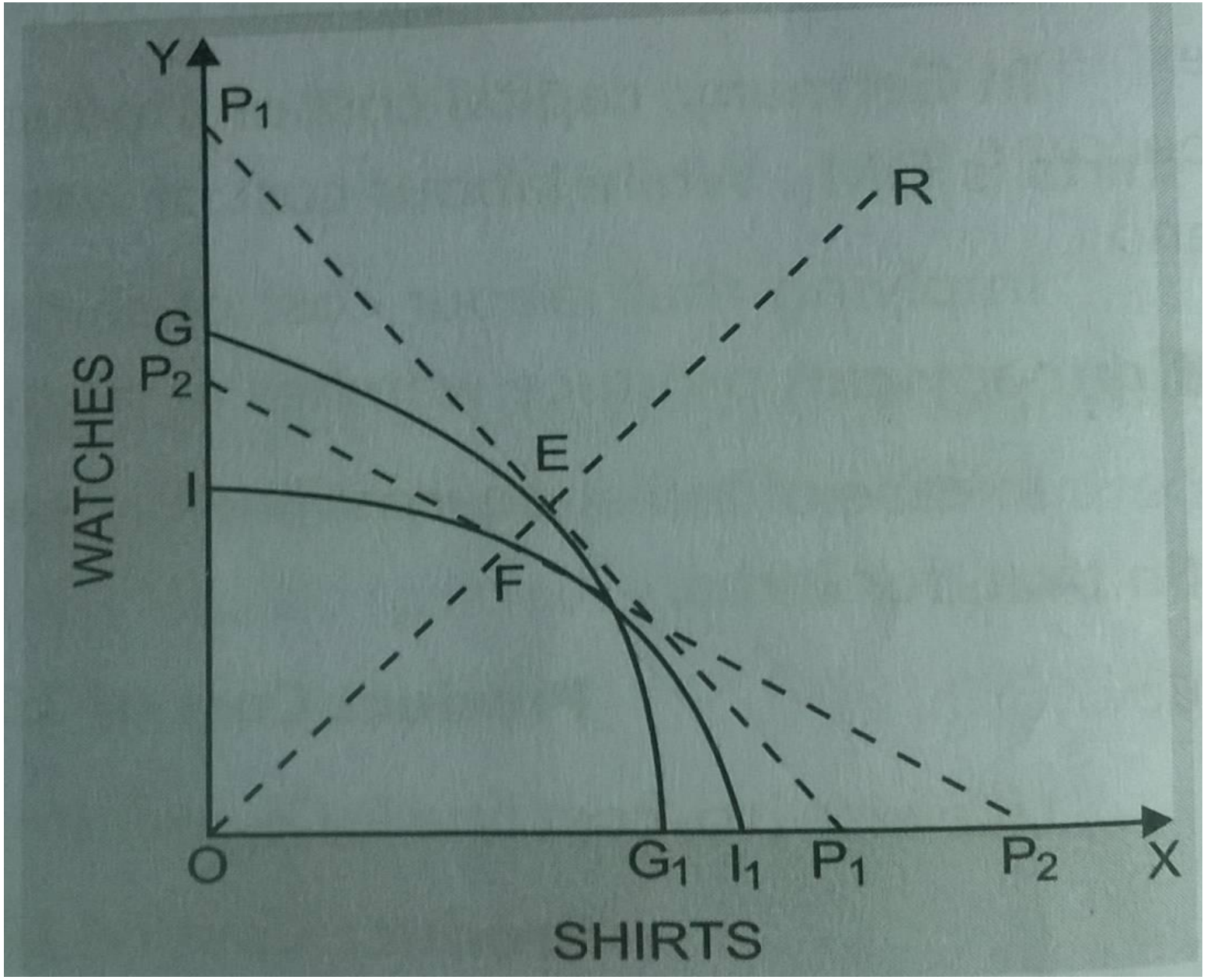
Physical criterion of factor abundance or scarcity means that if in a country capital ratio is greater than labour as against another country, then it will be called ***capital-intensive*** *country. Likewise , if in a country labour ratio is greater than capital as against another country, then it will be called labour-intensive country.*

Diagrammatic Illustration:

According to Heckscher-Ohlin whether two countries, say Germany and India are capital-intensive or labour-intensive depends on the fulfilment of the following condition:

Germany		*India*
(K_G/L_G)	>	(K_I/L_I)

(Here, K_G*=Quantity of capital in Germany;* L_G*= Quantity of labour in Germany;* K_I*= Quantity of capital in India;* L_I*=Quantity of labour in* India)


Y
P1
R
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P2
WATCHES
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F
O
G1
I1
P1
P2
X
SHIRTS

Superiority of Ohlin's Theory or comparison between classical Theory and Modern Theory:

Ohlin's theory does not contradict classical theory rather it is a clear and modified version of it. Superiority of this theory is evident from the following:

Basis of classical theory is the difference of comparative costs in different countries. Basis of modern theory is to explain the cause of difference in comparative costs.

a)Classical theory is based on labour theory of value which is unrealistic. Ohlin's theory is based on money cost which is more realistic.

b)Classical theory treats labour alone as the most important factor of production while Ohlin treats both labour and capital as important factor of production.

c)Classical theory is a theory of partial equilibrium because it studies labour theory of value alone, but Ohlin has based his theory on general equilibrium of value.

Balance of Payment

Balance Of Payment (BOP) is a statement which records all the monetary transactions made between residents of a country and the rest of the world during any given period. This statement includes all the transactions made by/to individuals, corporates and the government and helps in monitoring the flow of funds to develop the economy.

BOP statement of a country indicates whether the country has a surplus or a deficit of funds i.e when a country's export is more than its import, its BOP is said to be in surplus. On the other hand, BOP deficit indicates that a country's imports are more than its exports. Tracking the transactions under BOP is something similar to the double entry system of accounting. This means, all the transaction will have a debit entry and a corresponding credit entry.

Components of BoP

1.Current Account

The current account monitors the flow of funds from goods and services trade (import and export) between countries. Now this includes money received or spent on manufactured goods and raw materials. It also includes revenue from tourism, transportation receipts, revenue from specialized services (medicine, law, engineering), and royalties from patents and copyrights. In addition, the current account includes revenue from stocks.

Current Account deficit : Current account deficit is said to exist when the imports of Goods and Services is greater than the exports of Goods and Services.

2. Capital Account

The capital account monitors the flow of international capital transactions. These transactions include the purchase or disposal of non-financial assets (for example, land) and non-produced assets. The capital account also includes money received from debt-forgiveness and gift taxes. In addition, the capital account records the flow of the financial assets by migrants leaving or entering a country and the transfer, sale, or purchase of fixed assets.

3. Financial Account

The financial account monitors the flow of funds pertaining to investments in businesses, real estate, and stocks. It also includes government-owned assets such as gold and Special Drawing Rights (SDRs) held with the International Monetary Fund (IMF).

Indian BOP

Main items of exports of India

The following export product groups represent the highest dollar value in Indian global shipments during 2018. Also shown is the percentage share each export category represents in terms of overall exports from India.

1. Mineral fuels including oil: US$48.3 billion (14.9% of total exports)
2. Gems, precious metals: $40.1 billion (12.4%)
3. Machinery including computers: $20.4 billion (6.3%)
4. Vehicles: $18.2 billion (5.6%)
5. Organic chemicals: $17.7 billion (5.5%)
6. Pharmaceuticals: $14.3 billion (4.4%)
7. Electrical machinery, equipment: $11.8 billion (3.6%)
8. Iron, steel: $10 billion (3.1%)
9. Cotton: $8.1 billion (2.5%)
10. Clothing, accessories (not knit or crochet): $8.1 billion (2.5%)

India’s top 10 exports accounted for just over three-fifths (61%) of the overall value of its global shipments.

Indian BOP

Main its of Indian imports

The following product groups represent the highest dollar value in India's import purchases during 2018. Also shown is the percentage share each product category represents in terms of overall imports into India.

- Mineral fuels including oil: US$168.6 billion (33.2% of total imports)
- Gems, precious metals: $65 billion (12.8%)
- Electrical machinery, equipment: $52.4 billion (10.3%)
- Machinery including computers: $43.2 billion (8.5%)
- Organic chemicals: $22.6 billion (4.4%)
- Plastics, plastic articles: $15.2 billion (3%)
- Iron, steel: $12 billion (2.4%)
- Animal/vegetable fats, oils, waxes: $10.2 billion (2%)
- Optical, technical, medical apparatus: $9.5 billion (1.9%)
- Inorganic chemicals: $7.3 billion (1.4%)
- India's top 10 imports accounted for four-fifths (80%) of the overall value of its product purchases from other countries.

International Monetary System

The international monetary system refers to the policies, institutions, practices, regulations and mechanism that determines the rate at which one currency is exchanged for another.

The International Monetary System Consists

- Policies related to the foreign exchange rate
- Institutions which monitor the exchange rate
- Practices regarding the management of forex rate
- Regulation regarding the management of forex rate
- Mechanism of the management of the forex rate

History of International Monetary System

Classical gold Standard

Under the gold standard, the currency which was in circulation consist or represents certain amount of gold.

It was the oldest system which was in operation till the beginning of the 1st world war (1931). Under this system, the actual currency in circulation consists of coins with a fixed gold content.

Determination of Exchange Rate under Gold Standard

Exchange rate determination depends upon, currencies consist how much gold.

Suppose, a pound sterling is worth 0.05 ounces of gold in the UK, and dollar is worth equal to 0.00125 ounces of gold in the US.

Then the exchange rate between pound sterling and dollar would be 4.00dollar equal to 1 sterling pound.

International Monetary System

The Bretton Wood System (1946-1971)

To come up the depressed economy after world war 2nd, the US and UK and other countries agreed to overhaul the world monetary system to accelerate the international trade.

The outcome was so called Bretton Wood System which become the cause of establishing International Monetary Fund (IMF) and World Bank in 1946.

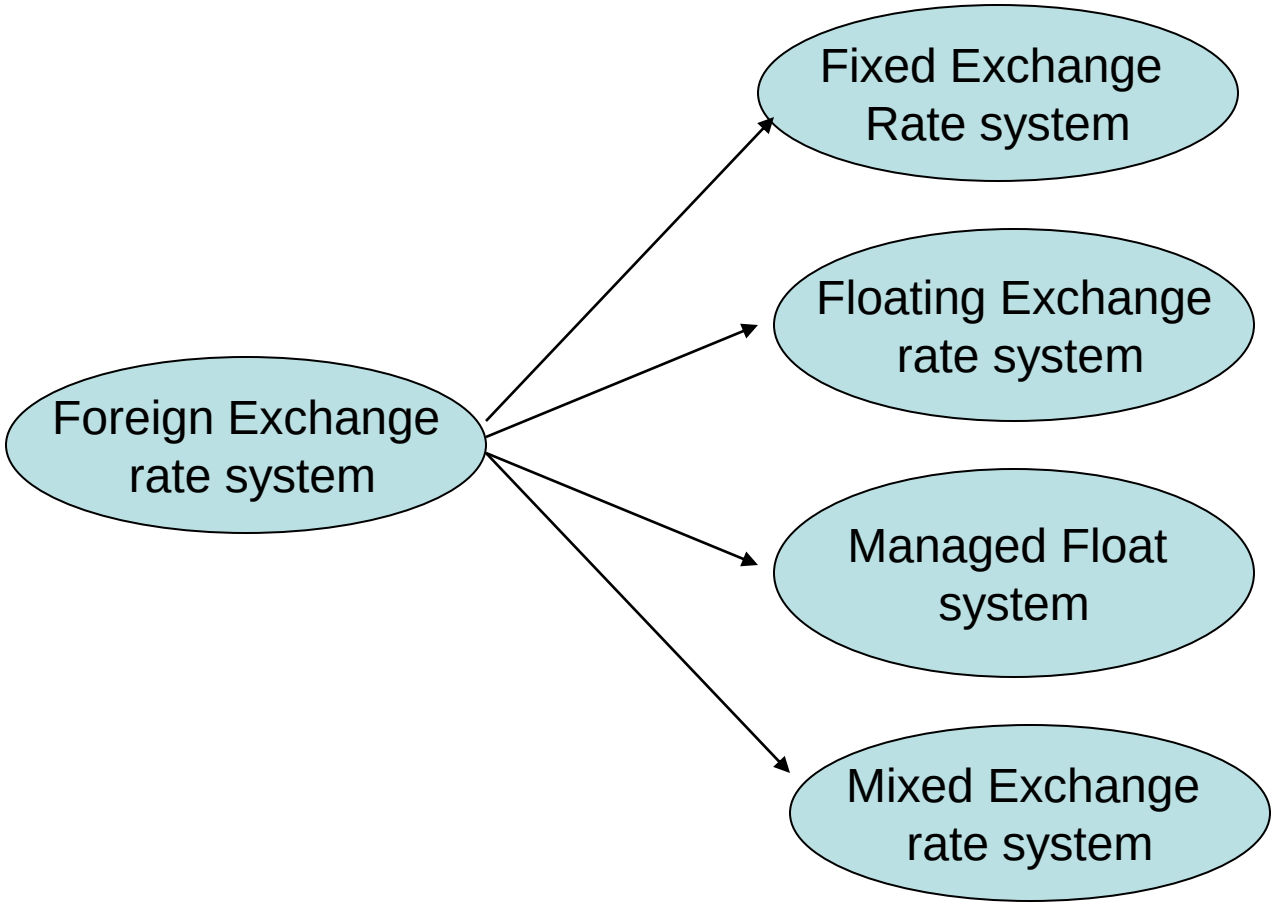
The Bretton Wood System…cont

The exchange rate regime that was put in place can be characterized as the Gold Exchange Standard continued till 1971. Under this system the main mechanism of exchange rate was:

- The US govt. undertook to convert the US dollar freely into gold at a fixed parity of $35 per ounce.
- Other member of IMF agrees to fix the exchange rate of their currencies against dollar with the variation within 1% on either side of the central parity being permissible.

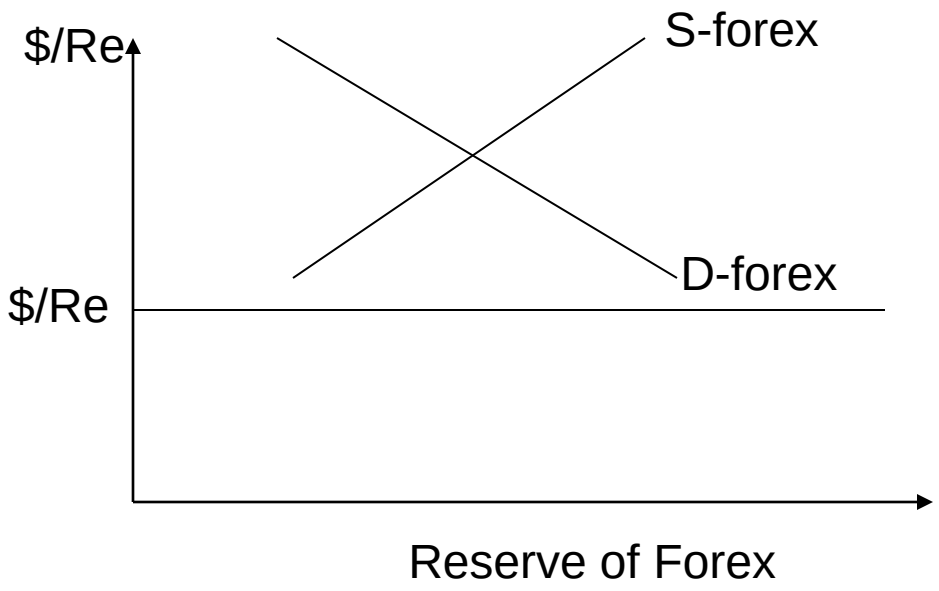
Post Bretton Wood System-Alternative Foreign Exchange Rate System

Foreign exchange rate system deals with how foreign exchange rate between two currencies is determined.



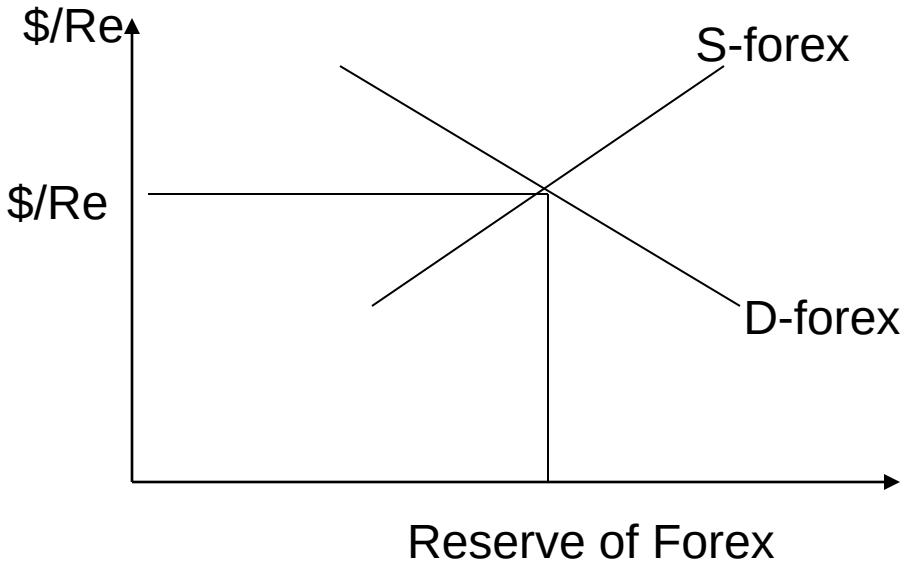
Fixed Exchange rate system

Fixed exchange rate system is that exchange rate system where exchange rate is directly regulated by central bank, and it is determined accordingly. Under fixed exchange rate system, demand and supply forces have no role in determine the exchange rate.



Floating Exchange rate system

Floating exchange rate system is that exchange rate system where exchange rate is directly determined by demand and supply forces.



Demand for Foreign currency-

1.Importers

2. Gifts to abroad

3. Remittance to abroad

4.Financial Assistance to abroad.

5. Investment in foreign currency denominated assets.

Supply for foreign currency-

- Exporters.

2. Gifts to home country.

3. Remittance to home country.

4. Financial assistance to home country.

5. Investment in home country .

Managed Float Exchange Rate System

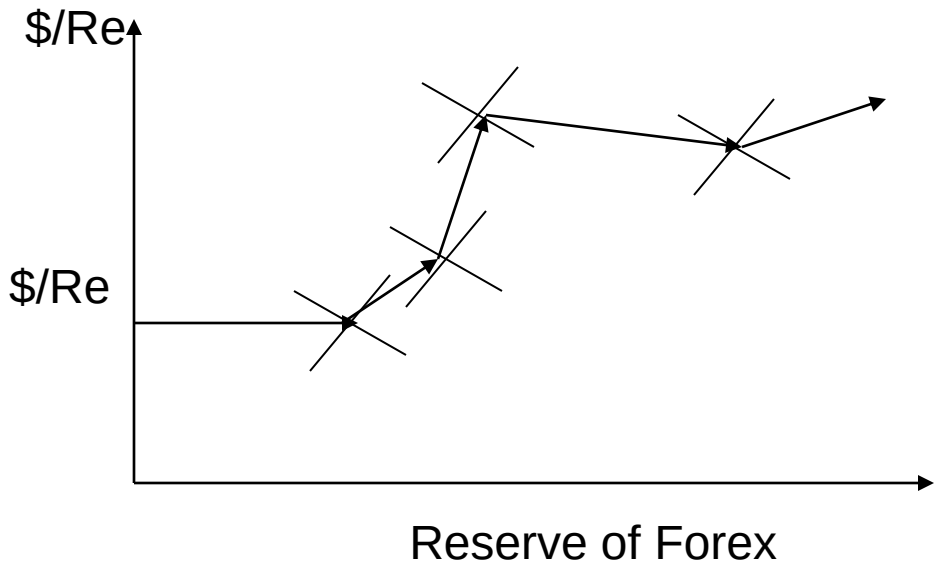
Managed float exchange rate system is that exchange rate system wherein the exchange rate is deliberately determined or fixed. Generally it is of two types-

- Crawling Peg exchange rate system-
- Target Zone exchange rate system-

Crawling Peg Exchange Rate System

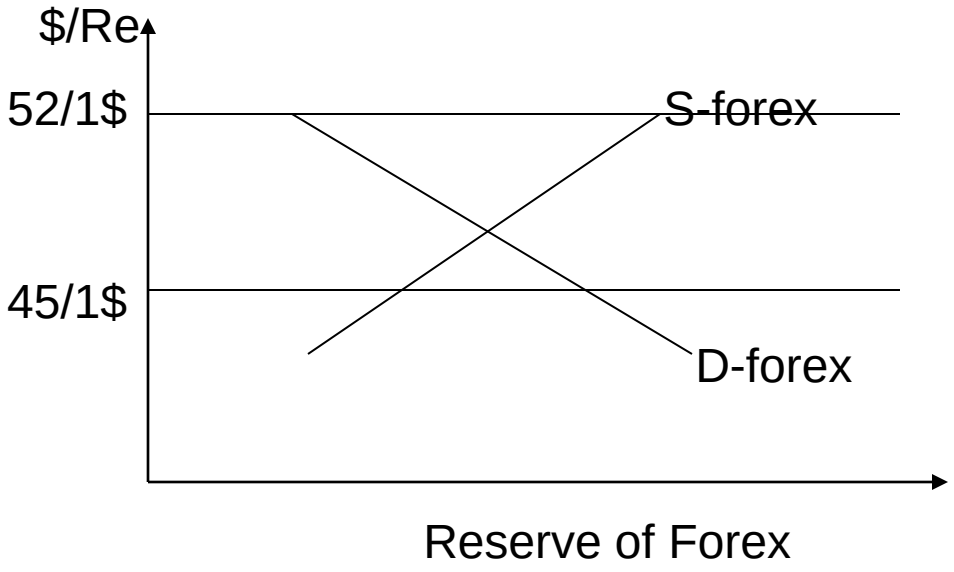
Crawling peg exchange rate system is also called managed float exchange rate system.

It is that exchange rate system where foreign exchange is directly determined by central bank of the country. But in this exchange rate system, exchange rate is frequently adjusted depending upon the market requirements.



Targeted Zone Exchange Rate System

In targeted Zone Exchange Rate System, Exchange Rate is kept at desired level by adjusting the all economic and commercial policies.



Mixed Foreign Exchange

Mixed exchange rate system is combination of fixed exchange rate system and floating exchange rate system. Under this system imports and exports of some items are subject of fixed exchange rate and imports and exports of some items are subject of floating exchange rate.

For example-

- In India the imports and exports of current a/c items are subject of floating rate. Importers and exporters are free to purchase and sell the foreign currency from open market.

- The imports and exports of capital a/c items are subject of fixed exchange rate. Importers and exporters have to purchase and sell the foreign currency at govt. determined exchange rate.

International Financial Institutions

Under the Bretton Wood System two major financial institutions were established in 1946.

- International Monetary Fund
- International Bank for Reconstruction and Development (World Bank)

IMF

IMF was established to promote the financial stability among the member countries.

The currency of the IMF is SDR (Special Drawing Rights). It is a currency basket whose value is the weighted average of the currencies of five countries (Germany, France, Japan, England, USA)

The main roles of IMF are:

- To monitor the exchange rate policies of the member countries.
- To advise the developing countries about their monetary stability.
- To act as the lender of last resort-It means if member countries fails to avail financial help from any where than IMF would provide the financial help on concessional basis.
- To provide financial help to recover the balance of payment deficit.

Currency of IMF SDR

- **Special drawing rights** currency code **XDR** also abbreviated **SDR**) are supplementary foreign-exchange reserve assets defined and maintained by the International Monetary Fund(IMF). The SDR is the unit of account for the IMF, and is not a currency *per se*. SDRs instead represent a claim to currency held by IMF member countries for which they may be exchanged. The SDR was created in 1969 to supplement a shortfall of preferred foreign-exchange reserve assets, namely gold and the U.S. dollar. SDRs are allocated to countries by the IMF.

The value of the SDR is based on a basket of key international currencies reviewed by IMF every five years. The weights assigned to each currency in the XDR basket are adjusted to take into account their current prominence in terms of international trade and national foreign exchange reserves.

Currency of IMF SDR

CurrencyWeights Determined in the 2015 Review Fixed Number of Units of Currency for a 5-Year Period Starting Oct 1, 2016.

U.S. Dollar 41.73 %

Euro 30.93%

Chinese Yuan10.92%

Japanese Yen 8.33%

Pound Sterling 8.09%

Currency of IMF SDR

KEY TAKEAWAYS

- Special drawing rights, or SDR, are an artificial currency instrument created by the International Monetary Fund, which uses them for internal accounting purposes.
- The value of the SDR is calculated from a weighted basket of major currencies, including the U.S. dollar, the euro, Japanese yen, Chinese yuan, and British pound.
- The SDR interest rate (SDRi) provides the basis for calculating the interest rate charged to member countries when they borrow from the IMF and paid to members for their remunerated creditor positions in the IMF.

World Bank

The International Bank for Reconstruction and Development (IBRD), commonly referred to as the World Bank, is an international financial institution whose purposes include assisting the development of its member nation's territories, promoting and supplementing private foreign investment and promoting long-range balance growth in international trade.

Roles

- World Bank provide the financial assistance to the member countries for development purposes.
- To provide the long term loan to developing countries.
- IDA (International Development Association) which is known as soft window of loan of world bank provide long term loan to developing countries at highly subsidized rates.
- To provide financial assistance for Infrastructure projects.

World Bank…roles

- To provide long-run capital to member countries for economic reconstruction and development.
- To induce long-run capital investment for assuring Balance of Payments (BoP) equilibrium and balanced development of international trade.
- To provide guarantee for loans granted to small and large units and other projects of member countries.
- To ensure the implementation of development projects so as to bring about a smooth transference from a war-time to peace economy.
- To promote capital investment in member countries by the following ways;
- (a) To provide guarantee on private loans or capital investment.
- (b) If private capital is not available even after providing guarantee, then IBRD provides loans for productive activities on considerate conditions.

Foreign Exchange Market

Foreign exchange market is that market where foreign currencies are traded at spot price or future price.

Participants in Foreign Exchange Market-

Participants in Foreign Exchange Market-

1. Foreign Exchange Brokers- Foreign Exchange brokers are those entities which are ready to buy and sell the foreign currency.

2. Arbitrageurs- Arbitrageurs are those entities which take advantage of foreign exchange rate differential in two markets. USA Forex Market-For example in USA lets assume-Re.48/ $1 and in India Forex Market-Re.50/$1then arbitrageurs will start to purchase dollar in U.S stock market and sell it in Indian forex market.

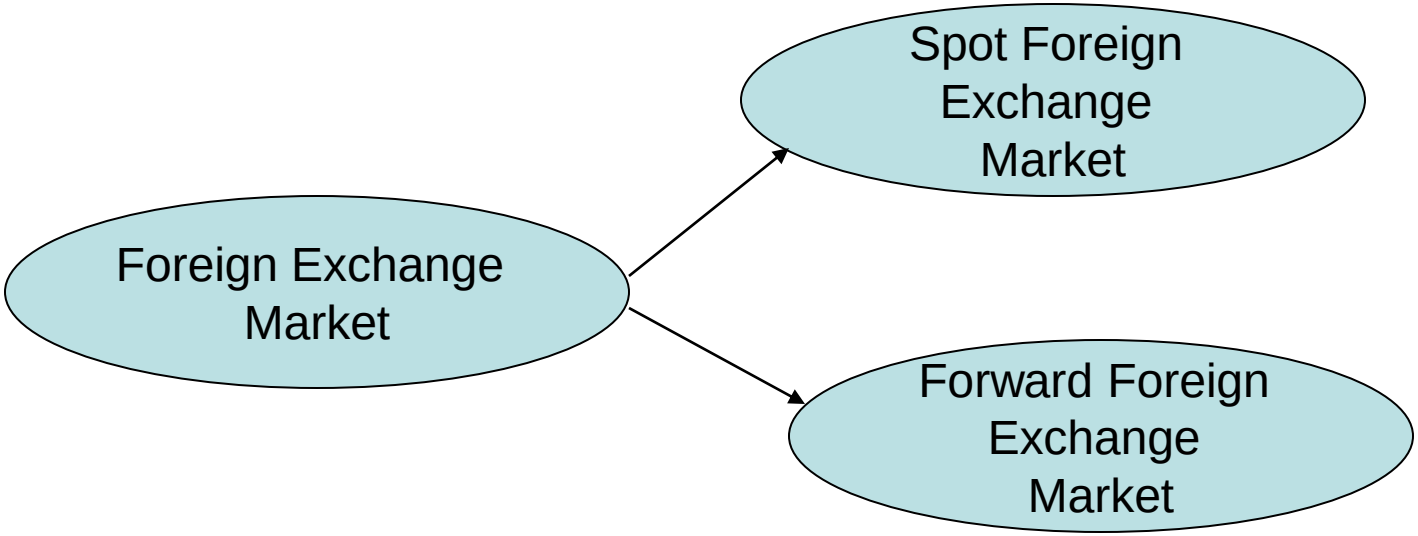
3. Speculators- Speculators are those who take advantage of speculation in Forex Market.

4. Traders- These are entities which are in the business of export and import.

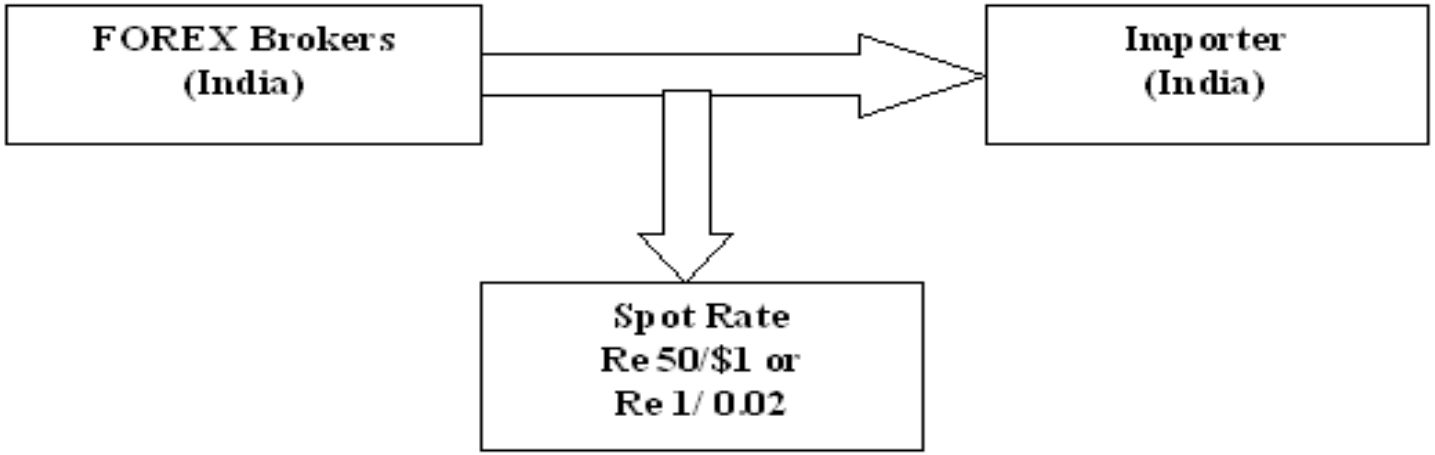
5. Hedgers- mostly multinational firms, engage in forward contracts to protect the value of outstanding contracts.

Transactions in Fx Market

All the transactions in foreign exchange market either take place at spot rate which is called spot market or forward rate which is called forward foreign exchange market.



Transactions in Spot Market



Spot foreign exchange market is that market where currency is delivered at prevailing foreign exchange rate.

Spot Quotations in Foreign Exchange Market

Direct Quotations-

In foreign exchange market direct quotations exist when value of one unit of foreign currency is expressed in certain units of domestic currency.

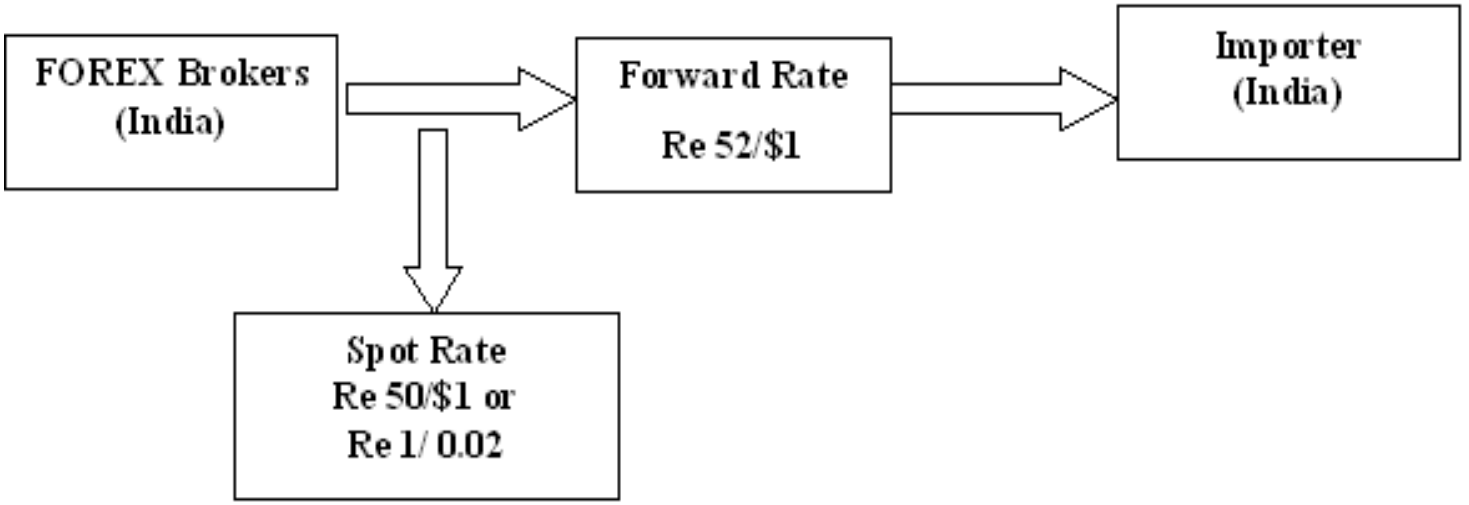
For example Re. 50/1$

Indirect Quotations-

In foreign exchange market direct quotations exist when value of one unit of domestic currency is expressed in certain units of foreign currency.

For example $0.02/Re 1

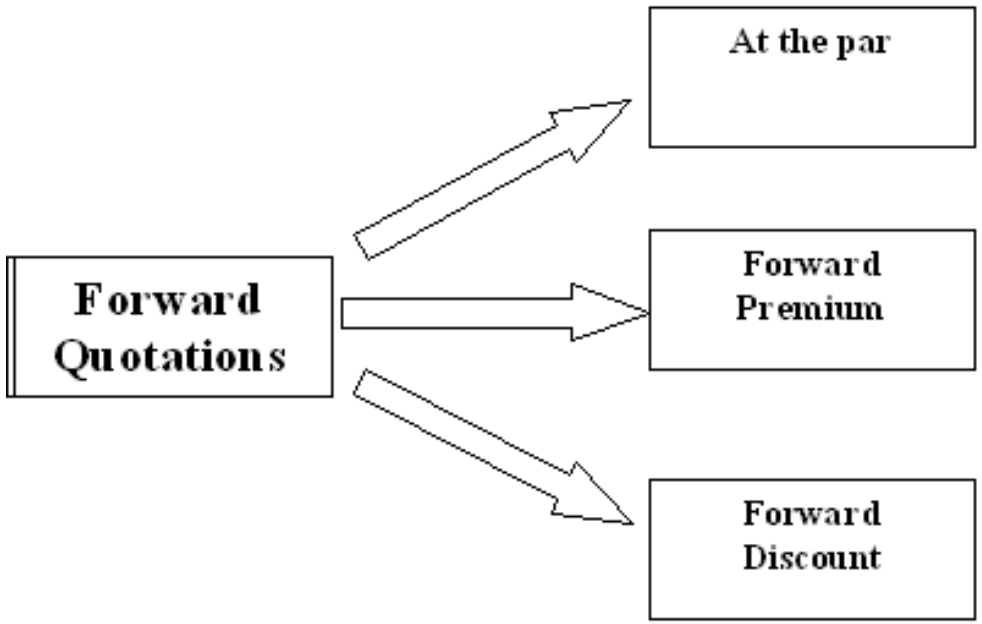
Transactions in Forward foreign exchange market



Forward foreign exchange market is that market where currency is delivered at some future date at an agreed price.

Forward Quotations

Forward quotations refers the way in which the value of foreign currency is expressed in some future date.



Forward Premium

When dealing with foreign exchange (FX), forward premium is a situation where the futures exchange rate, with respect to the domestic currency, is trading at a higher spot exchange rate. In other words forward rate is higher than the spot rate.

$$Forward\ \Pr emium = \frac{Forward\ Rate - Spot\ Rate}{Spot\ Rate} \times \frac{360}{Forward\ Contract\ No.\ of\ days}$$

Suppose spot Yen on Dec 3, 2001 sold at $0.008058, whereas 180 days forward Yen were priced at $0.008135. It means Yen is quoted 77 point premium. The annualized forward premium is:

$$Forward\ \Pr emium = \frac{0.008135 - 0.008058}{0.008976} \times \frac{360}{180} = 0.0191\ or\ 1.91\%$$

Forward Discount

When dealing with foreign exchange (FX), forward discount is a situation where the futures exchange rate, with respect to the domestic currency, is trading at a lower spot exchange rate.

$$Forward\ Discount = \frac{Forward\ Rate - Spot\ Rate}{Spot\ Rate} \times \frac{360}{Forward\ Contract\ No.\ of\ days}$$

Suppose the British pound was quoted $1.4248 while the 90 days forward pound was quoted at $1.4179. It means the pound is quoted 69 point discount. The annualized discount is:

$$Forward\ Discount = \frac{1.4179 - 1.4248}{1.4248} \times \frac{360}{90} = -0.0194\ or\ -1.94\%$$

Bid, Ask and Spread

Bid is that quotation at which foreign currency is purchased.

Ask is that quotation at which currency is sold. Suppose pound is quoted at $1.4419-28. It means that banks are ready to purchase pound at $1.4419 and ready to sell at $1.4428.

Spread is the difference between the bid price and ask price. For example if ask price for pound is $1.4428 and Bid price is $1.4419, then the spread will be:

$$Percentage\ Spread = \frac{Ask\ \Pr ice - Bid\ \Pr ice}{Ask\ \Pr ice}$$

$$Percentage\ Spread = \frac{1.4428 - 1.4419}{1.4428} \times 100 = 0.062\%$$

Swap rates

What Is a Currency Swap?

A currency swap, sometimes referred to as a cross-currency swap, involves the exchange of interest – and sometimes of principal – in one currency for the same in another currency. Interest payments are exchanged at fixed dates through the life of the contract.

A forex swap is the interest rate differential between the two currencies of the pair you are trading, and it is calculated according to whether your pos ition is long or short.

SWAP IN:

Swap in forex trading is simply the **interest rate that is either paid or charged to you** at the end of each trading day. When you **trade on margin** (using leverage) and **hold a position overnight**, you receive interest on your positions that involves buying currencies of a country that has a higher interest rate, and contrary to that, you pay interest on positions selling such currencies.

Calculation of Forward rate from spot rates

What will be 30days and 60days forward rates ?

	Spot rate	30days	60 days
($/Bp):	2.20-30	10-20	30-20

Ans. 30 days forward rates will be: ($/BP): 2.30/2.50

60 days forward rates will be: ($/BP): 1.90/2.10

Notes: if exchange rates are expressed in such a manner, it is also called swap rates or outright rates.

If swap rates are in increasing order just like in the case of 30 days. Then then points are added in spot bid and ask rate respectively.

On the other hand if swap rates are in decreasing order, just like in the case of 60 days, then swap points are deducted from spot rates respectively.

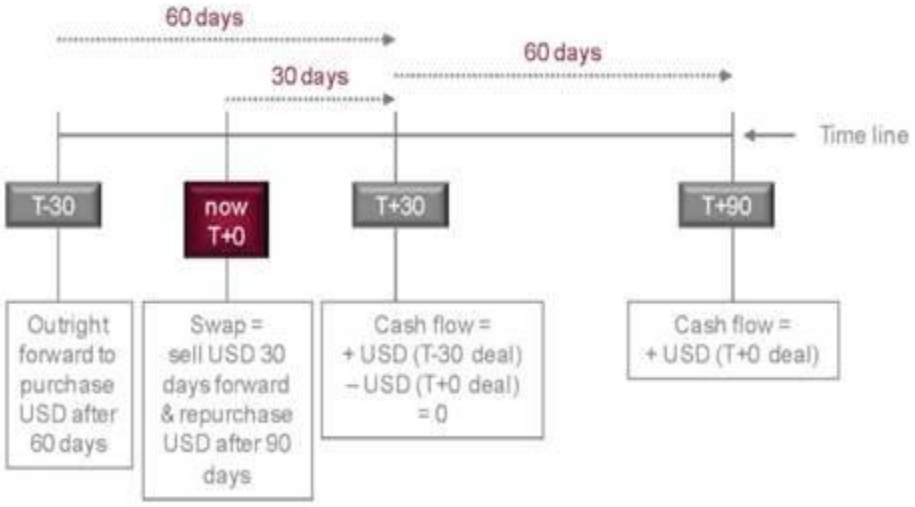
Swap rates...cont

What is a Forward-Forward SWAP

Swap transactions need not be restricted to SWAPs between spot and a forward date. They can be between two forward dates. For example a one month forward sale can be combined with a three month forward purchase.

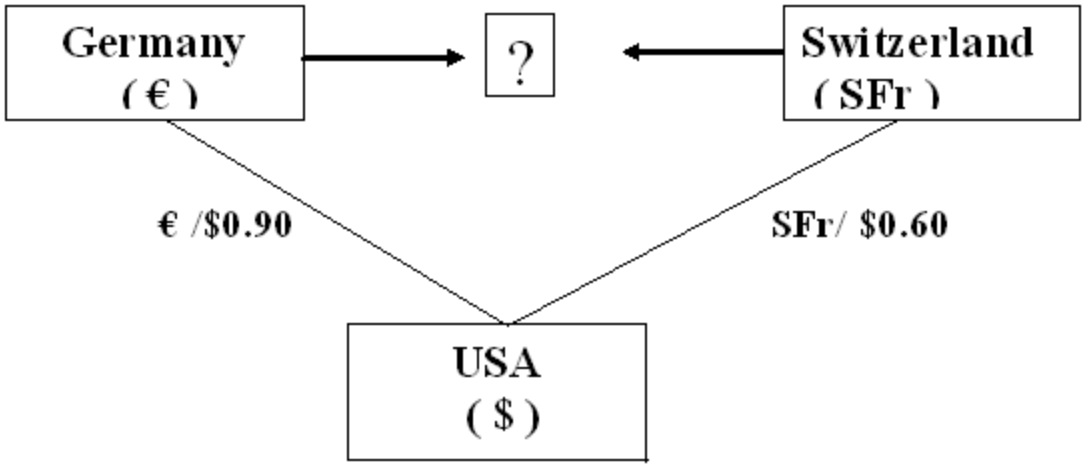
A forward-forward is a swap deal between two forward dates as opposed to an outright forward that runs from a spot to a forward date. An example is to sell USD 30 days forward and buy them back in 90 days time. The swap is for the 60-day period ***between*** 30 days from deal date (now = T) and 90 days from deal date.

The backdrop to this deal may be that the client (company) previously bought USD forward (30 days' ago for the date 30 days from now) but wishes to defer the transaction by a further 60 days because it will not need the USD until then. It can be explained with the following figure.



Cross Rates with zero transaction cost

Cross Rates refers when exchange rate between two currencies is determined with the help of third currency with which the two currencies have exchange rate.



If **$0.90/ €, then €1.11/ 1$, in the same way if $0.60/SFr, then SFr1.66/1$**

The exchange rate between Euro and Swiss Franc will be-- €1.11=SFr1.66 or SFr1.49/1$

Cross Rates with positive transaction cost

Q. 1. spot rates are given as:

$/euro: 1.3520/1.3550

$/BP: 2.0250/2.0285

What will be cross/synthetic rates ?

$$bid\ rate\ of\ BP = \frac{\$/euro : 1.3520}{\$/BP : 2.0285} = BP0.6665/euro\ or\ euro1.50/1BP$$

$$ask\ rate\ of\ BP = \frac{\$/euro : 1.3550}{\$/BP : 2.0250} = BP0.6691/euro\ or\ euro1.49/1BP$$

Cross/synthetic rates will be:

BP/euro: BP0.6665/0.6691

Cross Rates with positive transaction cost

Q. 1. spot rates are given as:

$/Bp: 1.4419-36

$/SFr: 0.6250-67

What will be cross/synthetic rates ?

$$bid\ rate\ of\ BP = \frac{\$/BP : 1.4419}{\$/SFr : 0.6267} = SFr\,2.3007/BP$$

$$ask\ rate\ of\ BP = \frac{\$/BP : 1.4436}{\$/SFr : 0.6250} = SFr\,2.3097/BP$$

Cross/synthetic rates will be:

SFr/BP: 2.3007/2.3097

Currency Arbitrage

Currency arbitrage is a situation which involves purchasing a currency from a market where it is available at cheap rate, and selling the same currency where it is trading at higher rate.

Type of arbitrage:

1 One point arbitrage:

2. Two point arbitrage

3. Three point arbitrage:

One point arbitrage

One point arbitrage implies purchasing currency at lower price and selling the same currency at the higher price in the market.

If USD/BP :1.24/1.30

It means arbitrage can purchase 1 BP at 1.24 and sell at 1.30 for one dollar. The profit of arbitrageur from this arbitrage is USD0.06.

Indirect quotes and Two Point Arbitrage

Bank A is quoting in USA:

USD/BP: 1.4550/1.4560

It means bid rates of banks are $1.4550 for 1BP, and $1.4560 is ask rate for 1BP

Bank B is quoting in UK

USD/BP: 1.4538/1.4548

It means bid rates of banks are $1.4538 for 1BP, and $1.4548 is ask rate for 1BP

Now arbitrate opportunities are there, arbitrageur will purchase 1BP from UK at $1.4548 and sell at $1.4550 in USA.

Net profit will be (1.4550-1.4548)=$0.0002

Triangular Arbitrage

Suppose pound is bid at $1.5422 in New York and euro is offered at $0.9251in Frankfurt. At the same time London banks are offering pound at Euro1.6650.

$1.5422/1BP (New York) 1

$0.9251/1Euro (Frankfurt) 2

Euro1.6650/1BP (London) 3

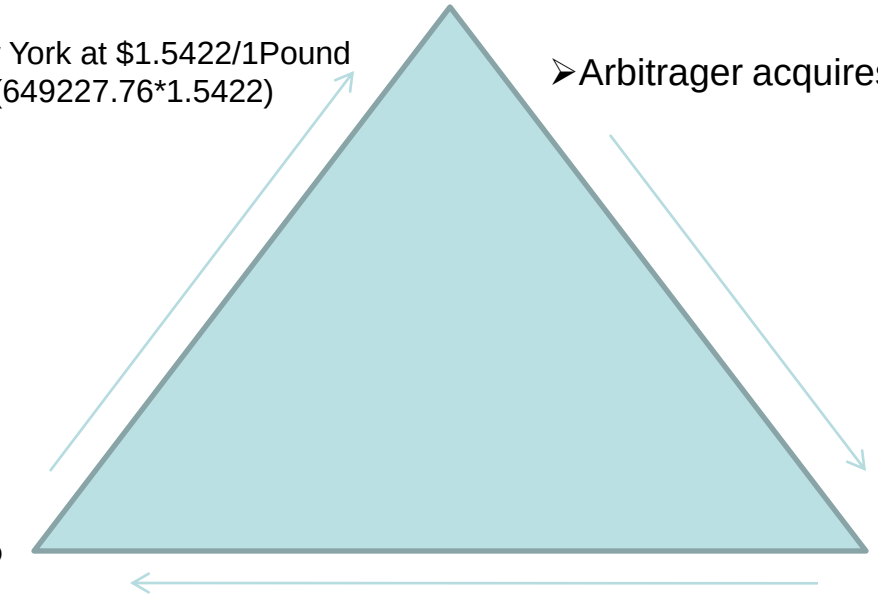
Let's examine whether arbitrage opportunities exist or not:

As we known 1 and 3 are equal.

$1.5422=Euro1.6650 or $0.9260/1Euro

But in Frankfurt the exchange rate between dollar and euro is $0.9251, it means arbitrage opportunities exists.

Triangular Arbitrage…cont



- Sells Pound in New York at $1.5422/1Pound
- for $1,001,239.05 (649227.76*1.5422)

- Arbitrager acquires $1million in New York

- Sells euro1,080964.22 in London at euro1.6650/1pound for Pound649227.76 (1080964.22*0.600)

- Sells $10,00,000 in Frankfurt at $0.9251/1euro for euro 1,080964.22 (10,00,000*1.080964)

- Net Profit from Arbitrage=$1,001,239.05-10,00,000=$1239.05

Triangular Arbitrage with positive transaction cost

The bid and ask rates of different currencies are given in three different markets. Is there any arbitrage opportunities?

Value of BP in USD:$1.60/$1.61

Value of Real in USD:$0.200/$0.24

Value of BP in Real: R8.10/R8.20

There will be no arbitrage opportunities if the following condition is holding true:

$$\frac{1}{ask(\$/BP)} * bid(\$/R) * bid(R/BP) \leq 1$$

$$\frac{1}{1.61} * 0.200 * 8.10 = \$1.0062$$

The calculated value 1.062 is more than 1, it means arbitrage opportunities are possible.

If we start with $10,0000, than finally we will have- $10,00,000*1.062=$1006200

Triangular Arbitrage with positive transaction cost

The bid and ask rates of different currencies are given in three different markets. Is there any arbitrage opportunities?

Value of BP in dollars: $1.60/$1.61

Value of Malaysian ringgit (MYR) in dollars: $0.200/$0.201

Value of BP in MYR: MYR8.10/MYR8.20

Suppose you have $10,000 to invest. What will be profit from arbitrage?

Convert $10,000 into BP at ask price which will be BP 6211

Then convert BP6211 into MYR at bid price for BP which will be BP 6211x8.1=MYR50,309.

Then convert MYR 50,309 into dollars at bid price which will be MYR50,309x$0.200=$10,062

Profit=$10,062-$10,000=$62

Foreign Exchange Derivative Market

- Foreign exchange derivative market is that market where such kind of financial instruments are traded which are used to hedge the foreign exchange risk.
- MNCs which have global business operation are getting their sales in multiple currencies. So large and unexpected fluctuations in exchange rate between domestic currency and host currency will expose the company to the foreign exchange risk.
- To the hedge the foreign exchange risk MNCs and other investors purchase derivative contracts.

Forward Market

A forward contract is a contract in which currency is delivered in future date at an agreed price.

Features-

- 1. Non Standardized Contracts.
- 2. Traded at over the counter the market.
- 3. Fear of Default.
- 4. No involvement of third party.
- 5. Party known to each other very well.

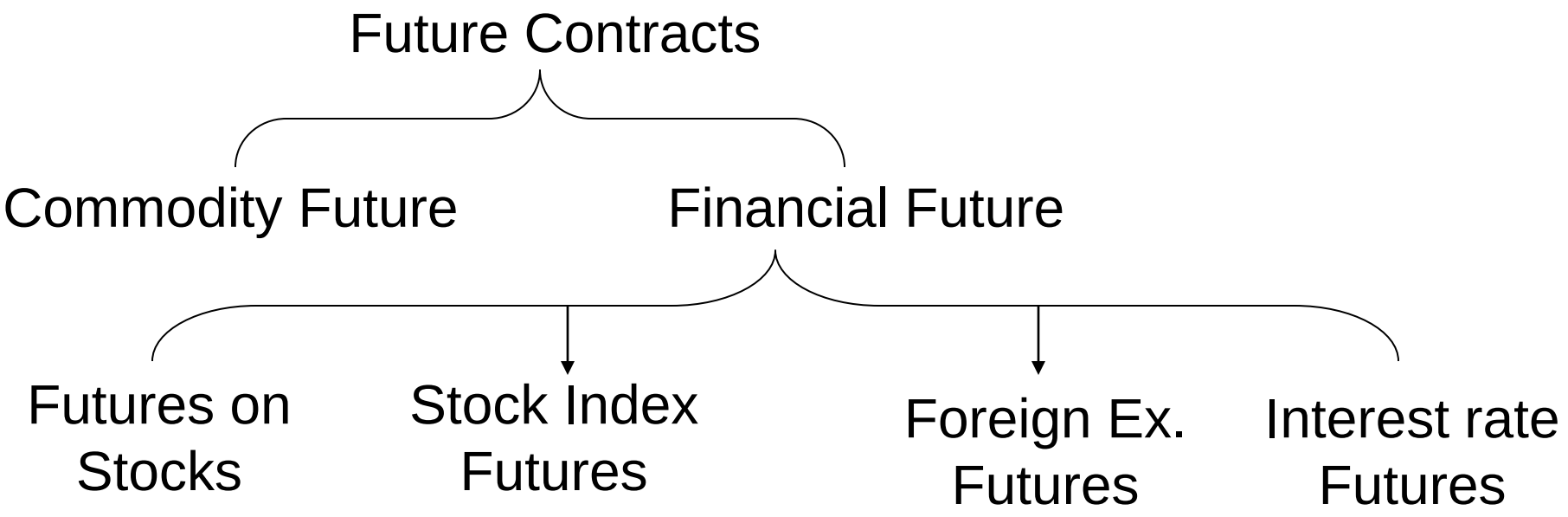
Futures Contract

A future contract is contract in which seller agrees to make delivery of specified amount of currency at specified future date at specified exchange rate. A Future contract is stated in details. Under Future contract both the parties have to put a margin money to clearing house. In case of default the margin of the respective party is seized.

Features –

- 1. Standardized Contract.
- 2. Between two parties who not necessarily known to each other.
- 3. No default, guarantee for performance by a clearing corporation or clearing house.
- 4. Margin placement to the clearing house.

Future Contracts



Motives for purchasing Future Contracts

- Hedging

  Hedging involves wherein exporters, importers and firms need foreign currency purchase future contract to avoid the unexpected fluctuations in the forex markets.

- Trading

  Future contracts are financial products which are used for trading purposes. Traders are purchasing and selling future contracts mearly for trading purpose.

Motives for purchasing Future Contracts…cont

- Speculation

  Speculators take advantage of Forex market fluctuations by purchasing the currency futures.

- International Spreading

  When there are expectations that two Forex will not co-vary in the same directions then International spreading like Straddle or Strangle can be created to utilize this situations.

- Arbitrage Between two stock Exchanges

  Arbitrager is a process of taking advantage of price differential of two Forex markets.

Options

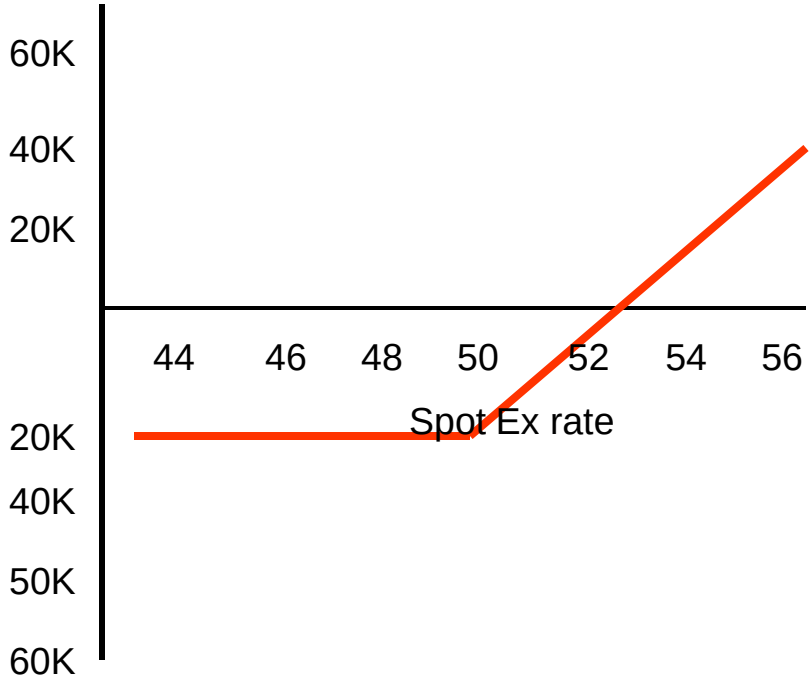
Call Option on Currency

A call option is that agreement in which the writer or seller gives the right to purchase a specified amount of currency at specified exchange rate to the option buyer or investor. A call option is purchased to minimize the risk of hiking the price of underlying currency.

Call Options are purchased to hedge the upside risk.

Calculation of Profit/Loss of Investor on Call Option

Call Option-Contract Size $10,000, Exercise Price 50/$, Option Premium 2/$, Maturity Period 3 months.



Profit/Loss of Investor

Spot Ex. Rate	Gross Profit/Loss	Net Profit/Loss
44/$	-20000	-20000
46/$	-20000	-20000
48/$	-20000	-20000
50/$	-20000	-20000
52/$	20000	0
54/$	40000	20000
56/$	60000	40000

Calculation of Profit/Loss of Writer on Call Option

Call Option-Contract Size $10,000, Exercise Price 50/$, Option Premium 2/$, Maturity Period 3 months.

Profit/Loss of Writer

Spot Ex. Rate	Gross Profit/Loss	Net Profit/Loss
44/$	20000	20000
46/$	20000	20000
48/$	20000	20000
50/$	20000	20000
52/$	-20000	0
54/$	-40000	-20000
56/$	-60000	-40000

Put Option

A put option is that agreement in which the writer gives the right to sell the specified amount of foreign currency at specified exchange rate to the option seller or writer. A put option is purchased to minimize the risk of declining the price of underlying currency.

Put Options are purchased to hedge the downside side.

Put Option

Contract Size $10,000

Exercise Price 45/$

Option Premium Rs 4/$

Maturity Period 3 months

Calculation of Profit/Loss of Investor on Put Option

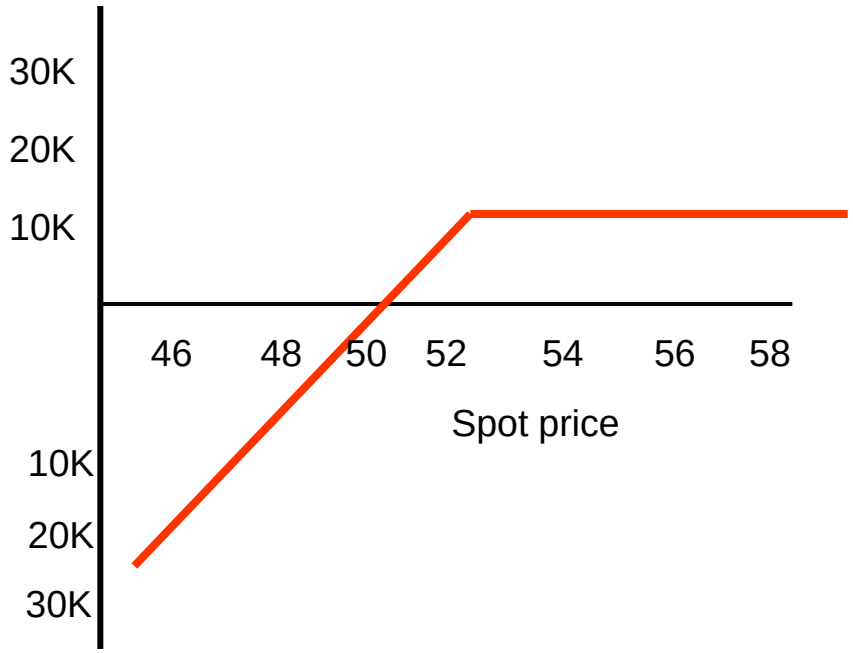
Contract size $10,000, Exchange rate 52/$, Option Premium, 2/$, Maturity Period 3 months.

Profit/Loss of Investor

Spot Ex. Rate	Gross Profit/Loss	Net Profit/Loss
46/$	60000	40000
48/$	40000	20000
50/$	20000	0
52/$	-20000	-20000
54/$	-20000	-20000
56/$	-20000	-20000
58/$	-20000	-20000

Calculation of Profit/Loss of writer on Put Option

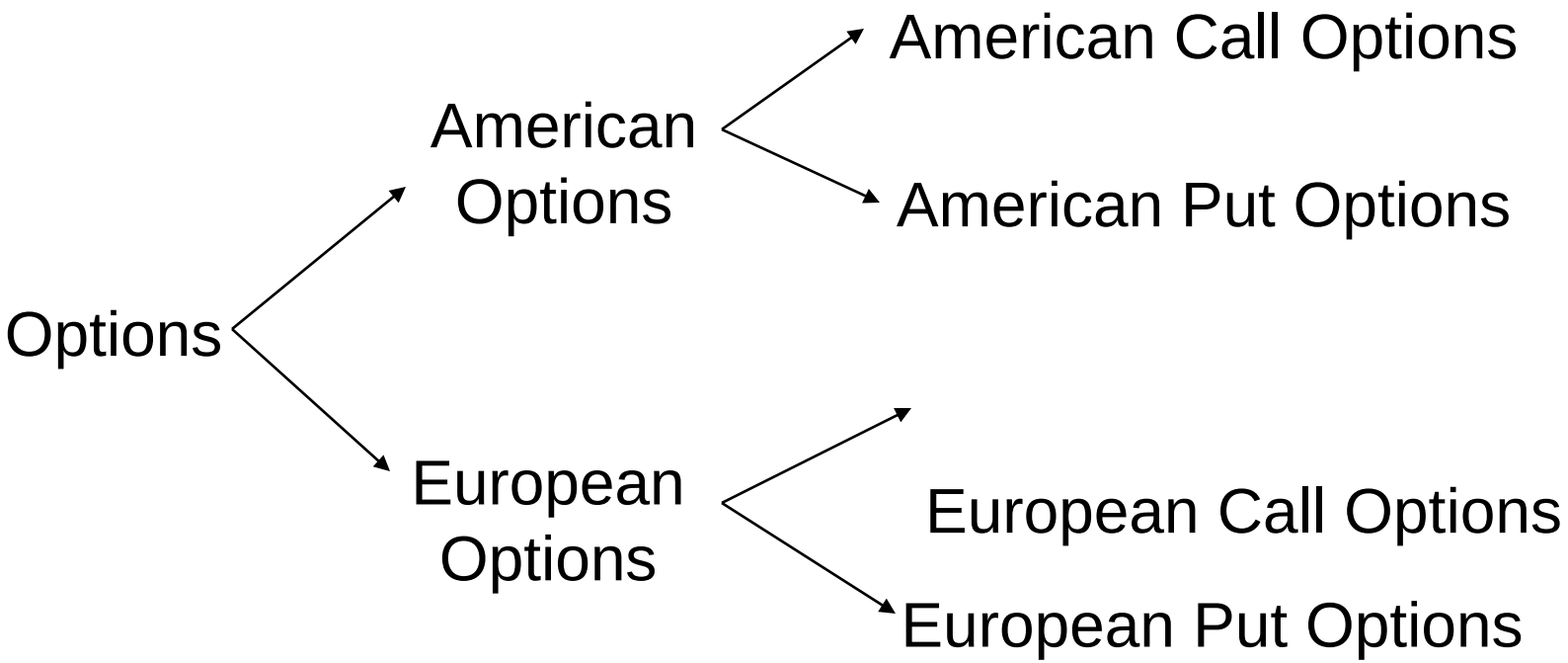
Contract size $10,000, Exchange rate 52/$, Option Premium, 2/$, Maturity Period 3 months.



Profit/Loss of Writer

Spot Ex. Rate	Gross Profit/Loss	Net Profit/Loss
46/$	-60000	-40000
48/$	-40000	-20000
50/$	-20000	0
52/$	20000	20000
54/$	20000	20000
56/$	20000	20000
58/$	20000	20000

Types of Options



- American option-American option can be exercised at any time with the maturity period.
- European option-European option can not be exercised before the maturity period.

Measuring Exchange Rate Movements

- An exchange rate measures the value of one currency in units of another currency.
- When a currency declines in value, it is said to depreciate. When it increases in value, it is said to appreciate.
- On the days when some currencies appreciate while others depreciate against a particular currency, that currency is said to be “mixed in trading.”

Measuring Exchange Rate Movements

- The percentage change (% Δ) in the value of a foreign currency is computed as

$$\frac{S_t - S_{t-1}}{S_{t-1}}$$

where S_t denotes the spot rate at time t.

- A positive % Δ represents appreciation of the foreign currency, while a negative % Δ represents depreciation.

Determination of Foreign Exchange Rate

There are number of factors which determines the exchange rate between two currencies. These are:

- Demand and Supply conditions of a currency
- Central Bank Intervention
- Govt. controls on forex rates

Intervention of Central Bank

The central bank of the country have dominate role in determining the exchange rate between domestic currency and foreign currency.

If central bank wants to increase the exchange rate, then central bank will start to purchase the foreign currency with domestic currency.

On the other hand if central bank wants to lower down the exchange rate then central bank starts to sell the foreign currency in exchange of domestic currency in the market.

In fact central bank do the intervention in the market by two ways-

1. Sterilization Intervention
2. Unsterilized Intervention

Sterilization and Unsterilized Intervention

In fact, when central when central bank sells the domestic currency in exchange of foreign currency in order to regulate the value of the foreign currency. It leads rise in the supply of the money in the domestic market which results inflation in the economy.

So when central bank doest not insult their domestic money supply from the foreign exchange transactions, this is called unsterilized intervention. This is called purchasing power effect.

On the other hand, when central bank insult their domestic money supply from the foreign exchange transactions, this is called sterilized intervention

Sterilization Intervention

Open market operation

In case of sterilized intervention when central bank sells domestic currency in exchange of foreign currency it leads inflation in the economy.

To check this inflation central bank simultaneously starts to absorb this excess money supply from the market through open market operation.

In open market operation central bank sells short term securities like Treasury bills in the market to absorb excess liquidity.

So in sterilized intervention, central bank regulate the exchange rate but at the same time insulate the inflation from the exchange rate.

Devaluation of Currency

Devaluation of currency is process in which central bank of the country officially decline the value of the domestic currency. For example if current exchange rate is INR50/$. If RBI devaluate the home currency by 50% then new exchange rate will be INR55/$.

Revaluation of Currency

Revaluation of currency is process in which central bank of the country officially increase the value of the domestic currency. For example if current exchange rate is INR50/$. If RBI revaluate the home currency by 50% then new exchange rate will be INR45/$.

Theories of Exchange Rate Determination

There are two theories which empirical examines how the exchange rate between two currencies are determined. These theories are:

- Purchasing power parity theory
- Interest rate parity theory

Purchasing power parity theory of Exchange Rate

The theory of **purchasing power parity (PPP)** explains movements in the exchange rate between two currencies by changes in the price levels of respective countries.

The exchange rate between two counties' currencies equals the ratio of the counties' price levels.

It compares average prices across countries.

It predicts a Re/dollar exchange rate of:

$$\mathrm{Re}/\$ = \mathrm{Pr}\,ice(Ind) / \mathrm{Pr}\,ice(US)$$

Purchasing Power Parity

- Absolute PPP and Relative PPP

Absolute PPP

- It states that exchange rates equal relative price levels.

For example if in USA a basket of goods can be purchased by one dollar, and the basket of same goods can be purchased in India by Rs 50/-, the exchange rate between rupee and dollar will be 50/1$.

Likewise if Burger in USA cost USD2.43 and the same burger is of BP 1.90 in England then the exchange rate between USD and BP is

USD2.43/BP1.90=USD1.29/BP1

Purchasing power parity theory of Exchange Rate…cont.

Relative PPP

- It states that the percentage change in the exchange rate between two currencies over any period equals the difference between the percentage changes in national price levels.

$$e_t = \frac{1+P_f}{1+P_h} - 1$$

Where et is forward rate, Ph is price level in the home country, Pf is the price level in the home country.

Relative PPP …example

For example if inflation in USA is 5%, and it is 10% in UK. The spot exchange rate is USD1.6/BP 1. Then the future spot exchange rate between the two currencies will be:

$$e_t = \frac{1+0.05}{1+0.10} - 1 = -0.045 \; or \; -4.5\%$$

It means the BP will depreciate by 4.5%. In other words, USD 1.6/1.045 or USD 1.53/BP

So, the exchange rate between USD and BP will be USD1.53/BP.

Relative PPP …example

For example if inflation in USA is 5%, and it is 3% in Switzerland. The spot exchange rate is USD0.75/SFr 1. Then the one year forward rate between the two currencies will be:

$$e_t = \frac{1+0.05}{1+0.03} - 1 = 0.0194 \; or \; 1.94\%$$

It means the SFr will appreciate by 1.94%. In other words, USD 0.75/0.986 or USD 0.760/SFr

So, the exchange rate between USD and SFr will be

USD0.760/SFr.

Relative PPP …example

For example if inflation in USA is 5%, and it is 3% in Switzerland. The spot exchange rate is USD0.75/SFr 1. What will be 90 forward rate between the two currencies will be:

3 month inflation in US will be = 5*3/12=1.25%

3 month inflation in Switzerland = 3*3/12=0.75%

$$e_t = \frac{1+0.0125}{1+0.0075} - 1 = 0.0050 \; or \; 0.50\%$$

It means the SFr will appreciate by 0.50%. 90 days forward rate will be USD 0.75/0.995 or USD 0.753/SFr

So, the 90 days forward rate will be USD 0.753/SFr.

Real Exchange Rate

The real exchange rate is the nominal exchange rate adjusted for changes in the relative purchasing power of each currencies.

In other words real exchange rate is inflation adjusted exchange rate.

$$e_t = \frac{1+i_f}{1+i_h} - 1$$

Where et is real exchange rate, eo is spot exchange rate, ih is inflation rate in home country, if is inflation in foreign country, t is time period.

Alternatively when some exchange rate is adjusted with some price index like WPI or CPI, then the real exchange rate will be:

$$e_t = e_0(f/h)\frac{P_f}{P_h}$$

Where et is real exchange rate, eo is spot exchange rate, Ph is inflation rate in home country, Pf is inflation in foreign country, t is time period.

Calculating the Real exchange rate between USD and Japanese Yen

Between 1980 and 1995, the USD/JY moved from JY 226.63/USD 1 to JY93.96. During this 15 years, the consumer price index (CPI) in Japan rose from 91.0 to 119.2, and CPI in USA rose from 82.4 to 152.4.

Q. 1. if PPP had held over the period, what would the USD/JY exchange rate in 1995?

$$e_t = e_0(f/h)\frac{P_f}{P_h} = (226/1)\frac{119.2/91.0)}{(152.4/82.4)} = JY160.51/USD1$$

Calculating the Real exchange rate between USD and Japanese Yen…cont

Q.2. What happened to the real value of the yen in terms of dollars during this time period?

$$e_t = e_0(h/f)\frac{P_h}{P_f} = (1/93.96)\frac{119.2/91.0)}{(152.4/82.4)} = USD0.007538/JY1$$

International Fisher Effect

International Fisher effect integrates the purchasing power parity theory and Fisher effect in explaining the behavior of exchange rate between two currencies.

PPP states that the percentage change in the exchange rate between two currencies over any period equals the difference between the percentage changes in national price levels.

On the other hand Fisher effect states that with no government intervention, the nominal interest rate differential will approximately equal the anticipated inflation differential between the two countries.

International Fisher Effect

The interest rates which are quoted for financial contracts are stated in nominal terms. According to fisher effect, the real interest rate must be adjusted to reflect the expected inflation.

It states that nominal interest rate is made up of two components real required rate of return and inflation premium equal to the expected amount of inflation. The fisher equation is:

R=Required rate of return + Expected inflation

$$R=a+i$$

If required rate of return is 3% and inflation is 10%, then nominal interest rate must be 13%.

Fisher Effect….cont

Fisher effect states that the real rate of return on financial contracts are equal across the countries that is:

af=ah

If expected real returns is higher in one currency than another than capital flow would flow from the second country to first country.

In equilibrium then no government intervention, the nominal interest rate differential will approximately equal the anticipated inflation differential between the two countries.

$$R_h - R_f = i_h - i_f$$

If inflation rates in the USA and UK are 4% and 7% respectively, then Fisher effect states that nominal interest rate in UK should be 3% higher then USA.

.

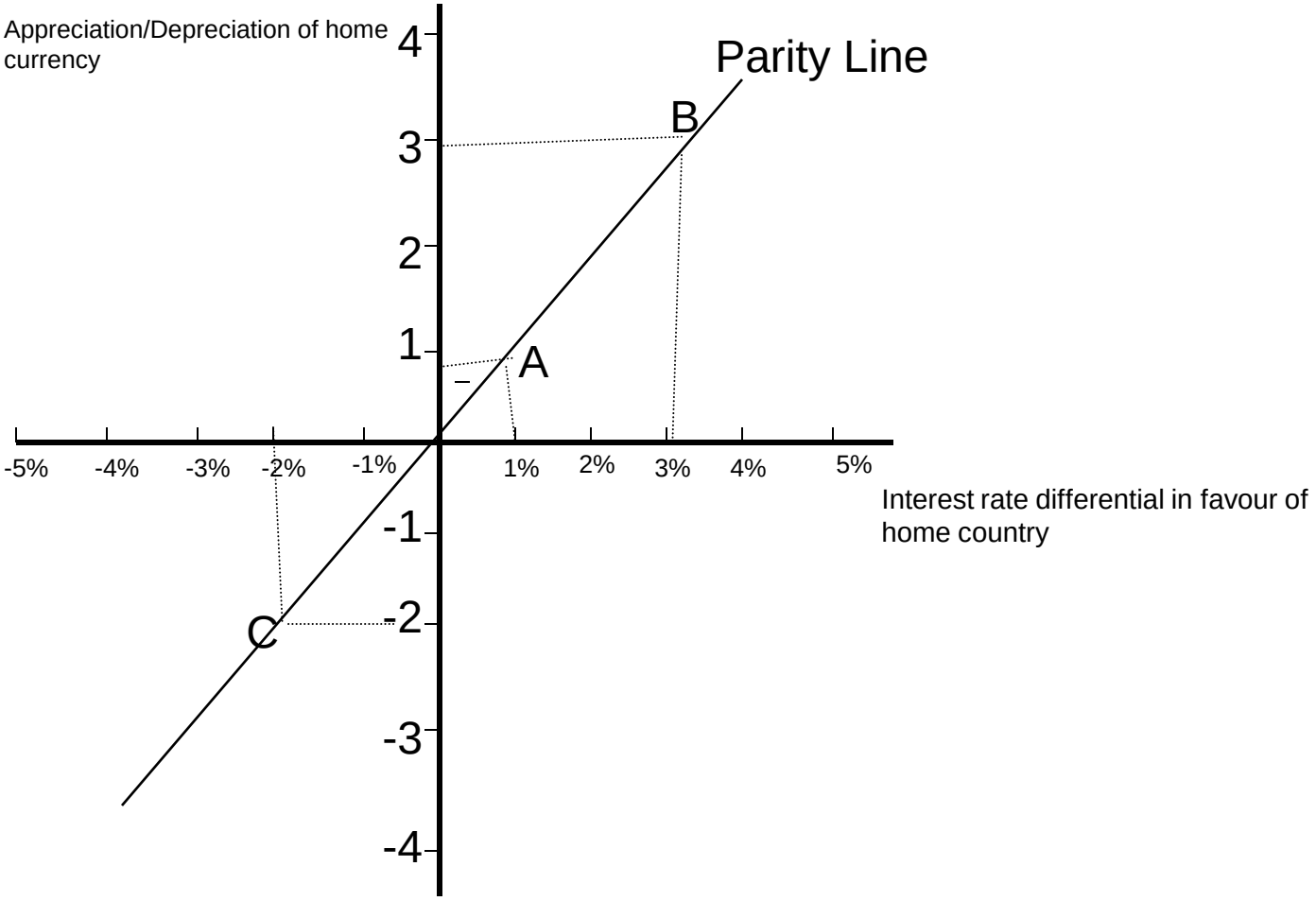
Fisher Effect….cont

In conclusion International fisher effect states that higher interest rate in the home country will lead depreciation in the value of the home country, on the other hand a lower interest rate in the home country will lead appreciation in the value of the home currency.

This relationship can be shown in the following equation and diagram.

$$e_t = \frac{1 + I_f}{1 + I_h} - 1$$

Fisher Effect….cont



Fisher Effect….cont

At point A, interest rate differential is 1% in favour of home country, it will lead 1% market appreciation of the home currency.

At point C interest rate differential is -2%, it means home interest rate is 2% more than the interest rate of foreign country. As a result the home currency will depreciate by 2%.

IFE…example

For example if interest rate in USA is 5%, and it is 10% in UK. The spot exchange rate is USD1.6/BP 1. Then the future spot exchange rate between the two currencies will be:

$$e_t = \frac{1+0.05}{1+0.10} - 1 = -0.045 \; or \; -4.5\%$$

It means the BP will depreciate by 4.5%. In other words, USD 1.6/1.045 or USD 1.53/BP

So, the exchange rate between USD and BP will be USD1.53/BP.

IFE…example

For example if interest rate in USA is 5%, and it is 3% in Switzerland. The spot exchange rate is USD0.75/SFr 1. Then the one year forward rate between the two currencies will be:

$$e_t = \frac{1+0.05}{1+0.03} - 1 = 0.0194 \; or \; 1.94\%$$

It means the SFr will appreciate by 1.94%. In other words, USD 0.75/0.986 or USD 0.760/SFr

So, the exchange rate between USD and SFr will be

USD0.760/SFr.

IFE…example

For example if interest in USA is 5%, and it is 3% in Switzerland. The spot exchange rate is USD0.75/SFr 1. What will be 90 forward rate between the two currencies will be:

3 month interest in US will be = 5*3/12=1.25%

3 month interest in Switzerland = 3*3/12=0.75%

$$e_t = \frac{1+0.0125}{1+0.0075} - 1 = 0.0050 \; or \; 0.50\%$$

It means the SFr will appreciate by 0.50%. 90 days forward rate will be USD 0.75/0.995 or USD 0.753/SFr

So, the 90 days forward rate will be USD 0.753/SFr.

Interest Rate Parity Theory

According to IRP theory spot and forward rates are closely related to each other and it is the interest rate differential between the two currencies which creates the opportunities for arbitrage.

In other words interest rate differential should be equal to the forward rate differential.

Interest rate parity ensures that the return on a hedged (covered) foreign investment will just equal the domestic interest rate on investment of identical risk. When this condition holds the covered interest rate differential will be zero.

Interest Rate Parity Theory….cont

The covered interest arbitrage relationship can be explained as follow:

Let eo is current spot rate, et is forward rate, if rh and rf is prevailing interest rate in New York and London respectively, then one dollar invested today in NY will yield 1+rh at the year end. The same dollar invested in London will be worth (1+rf)et/eo.

Now Funds will flow from New York to London, if following situation happens:

$$1+r_h < (1+r_f)\frac{e_t}{e_0}$$

Now Funds will flow from London to NY, if following situation happens:

$$1+r_h > (1+r_f)\frac{e_t}{e_0}$$

Covered Interest Arbitrage with zero transaction cost

The interest rate on pound is 12% in London, and 7% on USD in New York on comparable investment. The pound spot rate is $1.75 and the one year forward rate is $1.68.

$$1+0.12<(1+0.07)\frac{1.68}{1.75} \qquad 1.12<1.02$$

It means funds will flow from New York to London.

Borrow USD10,00,000 in New York at an interest rate of 7%.This means at the year end arbitrager will have to repay USD10,70,000.

Convert the USD 10,00,000 to pound at the spot rate $1.75 for pound 571428.57 (10,00,000/1.75).

Invest pound 571428.57 at 12% for one year in London which will yield pound 640000 to arbitrageur after one year.

Simultaneously sell pound 640000 one year forward contract at a rate of $1.68, which will yield USD10,75,200.

Net profit=10,75,200-10,70,000=USD 5200.

IRP and Covered Interest Arbitrage

The interest rate on USD is 8% per annum in New York and 6% per annum on euro in London. The current spot rate is euro1.13110/USD1, and the 90 days forward rate is euro1.12556/USD1. Show the covered interest arbitrage regardless of currency choice of the investor?

Investor starts with $ 10,00,000 in New York.

He will convert $10,00,000 to euro at euro1.13110/USD1 for euro11,13,100 (10,00,000*1.13110) in London.

He will invest euro 11,13,100 at 1.5% for 90 days, yielding him euro 11,48,066.50.

Simultaneously with euro investment, sell the euro 11,48,065.50 forward contract at rate of euro1.12556/USD1 for delivery in 90days, and receive $10,20,000

Net profit $10,00,000-$10,20,000=$20,000

Covered Interest Arbitrage with positive transaction cost

The following exchange rates and one year interest rates exist. Suppose you have $ 10,00,000 for arbitrage.

	Bid rate	Ask rate
Euro spot rate	$1.25	$1.35
Euro one year forward rate	$1.42	$1.52
	Deposit rate	loan rate
Interest rate on US$	6.0%	7.5%
Interest rate on euro	6.5%	8.5%

Investor starts with $ 10,00,000 from US.
He will convert $10,00,000 to euro at euro1.135/USD1 for euro 740741
He will invest euro 740741 at 6.5% for one year, yielding him 740741(1+0.065)=euro 7,88,888.89.
Simultaneously he will purchase a one year forward contract on euro.
After one year he will convert his euro 7,88,888.89 for dollars by using purchased forward contract at bid rate $1.42 which will yield $ 11,20,222.16

Determination the yield earned= ($ 11,20,222.16- $ 10,00,000)/ $ 10,00,000=0.12 or 12%. The yield is higher than the US deposit rate 6.0%. Therefore arbitrage will take place and it will be profitable.