CHAPTER 2
FOREIGN EXCHANGE DERIVATIVES

LEARNING OBJECTIVES:

After studying this chapter, you should know about:

- Meaning of derivatives
- Types of derivatives products and its functions
- Difference between exchange traded and OTC derivatives

2.1 Derivatives - Definition

Derivative is something that is *derived* from another called the underlying. The underlying is independent, and the derivative is dependent on and derived from the underlying. The derivative cannot exist without the underlying. This is the general definition of derivative. For example, wheat farmers may wish to sell their harvest at a future date to eliminate the risk of a change in prices by that date. Such a transaction is an example of a derivative. The price of this derivative is driven by the spot price of wheat which is the "underlying".

However, accounting standards like FAS 133 (in the US), IAS 39 (in the EU) and AS 30 (in India) impose more qualifications for derivatives. For example, IAS 39 and AS 30 require the following three criteria to be satisfied for financial derivatives.

1. Value of derivative is linked to the value of underlying
2. Trade settled on a "future" date
3. On trade date, there should be no full cash outlay

FAS 133 requires an additional qualification:

4. Trade must settle (or capable of being settled) on *net* basis and not on gross basis.

The first requirement implies that the price of derivatives is determined by the price of underlying, and not by the demand-supply for derivative. The underlying is the raw material and derivative is the finished product. If the underlying price goes up (or down), the derivative price will go up (or down) regardless of demand-supply for derivative.

The "future" date in the second requirement means that the settlement of the derivative must be later than that for underlying. For example, if the underlying settles on two business days after trade date (T+2), the derivative on that underlying must settle later than T+2; if the underlying settles in T+5, the derivative on that underlying must settle later than T+5; and so on.

The third requirement provides "leverage": ability to buy the underlying without fully paying for it immediately or sell it without delivering it immediately.

Derivatives are classified into five asset classes: interest rate, credit, equity, forex and commodity. In each asset class, there are four generic products: *forward, futures, swap* and *option*.

Derivative products initially emerged as hedging devices against fluctuations in commodity prices, and commodity linked derivatives remained the sole form of such products for almost three hundred years. Financial derivatives came into spotlight in the post 1970 period due to growing instability in the financial markets. However, since their emergence, these products have become very popular and by 1990s, they accounted for about two thirds of total transactions in derivative products. In recent years, the market for financial derivatives has grown tremendously in terms of variety of instruments available, their complexity and also turnover.

Derivatives are tools to manage price risk. How you manage risk depends on your approach to risk. If you want to take risk, you will trade in derivatives which is called speculation. When you want to avoid risk, you manage it one of the three ways: elimination (called hedging); insurance and minimization (called diversification). The following table summarizes the approaches to market risk management.

The following table summarizes the approaches to risk management.

Approach	Explanation
Speculation	Taking risk (more formally called "trading") It results in the possibility of a positive return (*i.e.* profit) or a negative return (*i.e.* loss) in future
Hedging	You are already exposed to risk and hedging substantially reduces that risk and locks in the future return at a known level.
Insurance	You are already exposed to risk and insurance selectively eliminates the negative return but retains the positive return. It has an explicit upfront cost, and requires a particular derivative called option to implement it.
Diversification	It reduces both return and risk but in such a way that risk is reduced more than return so that risk is minimized per unit return (or, alternately, return is maximized per unit risk).

2.2 Key Economic Functions of Derivatives

While the primary function of derivatives is risk management, the derivatives market also performs the following functions:

- Hedging risk exposure: Since the value of the derivatives is linked to the value of the underlying asset, the contracts are primarily used for hedging risks. For example, an investor may purchase a derivative contract whose value moves in the opposite direction to the value of an asset the investor owns. In this way, profits in the derivative contract may offset losses in the underlying asset.
- Price discovery: Derivative market serves as an important source of information about prices. Prices of derivative instruments such as futures and forwards can be used to determine what the market expects future spot prices to be. In most cases, the information is accurate and reliable. Thus, the futures and forwards markets are especially helpful in price discovery mechanism.
- Market efficiency: It is considered that derivatives increase the efficiency of financial markets. By using derivative contracts, one can replicate the payoff of the assets. Therefore, the prices of the underlying asset and the associated derivative tend to be in equilibrium to avoid arbitrage opportunities.

- Access to unavailable assets or markets: Derivatives can help organizations get access to otherwise unavailable assets or markets. By employing interest rate swaps, a company may obtain a more favorable interest rate relative to interest rates available from direct borrowing.
- Price Stability: It has been seen that central banks of many countries use derivatives for stabilizing the currency prices. In India, RBI also intervenes in the forex market through derivatives for INR stability.
- Derivatives, due to their inherent nature, are linked to the underlying cash markets. With the introduction of derivatives, the underlying market witnesses higher trading volumes because of participation by more players who would not otherwise participate for lack of an arrangement to transfer risk.
- Speculation: This is not the only use, and probably not the most important use, of financial derivatives. Financial derivatives are considered to be risky. If not used properly, these can lead to financial destruction in an organization. However, these derivatives act as a powerful instrument for knowledgeable traders to expose them to calculated and well understood risks in search of a reward, that is, profit.
- Derivatives market helps shift of speculative trades from unorganized market to organized market. Risk management mechanism and surveillance of activities of various participants in organized space provide stability to the financial system.

Market Participants must understand that derivatives, being leveraged instruments, have risks like counterparty risk (default by counterparty), price risk (loss on position because of price move), leverage risk (magnifying the gain and losses), liquidity risk (inability to exit from a position), legal or regulatory risk (enforceability of contracts), operational risk (fraud, inadequate documentation, improper execution, etc.) and may not be an appropriate avenue for someone of limited resources, less trading experience and low risk tolerance. A market participant should therefore carefully consider whether such trading is suitable for him/her based on these parameters. Market participants who trade in derivatives are advised to carefully read the Risk Disclosure Document, given by the broker to his clients at the time of signing agreement.

2.3 Derivative Products

As specified earlier, derivatives can be classified into five asset classes: interest rate, credit, equity, forex (currency) and commodity. In each asset class, there are four generic products: *forward, futures, swap* and *option*. We will examine this product with currency as asset class. A foreign exchange derivative (currency derivative) is a financial derivative whose payoff depends on the exchange rates of two (or more) currencies. In Indian context "Foreign exchange derivative contract"[5] means a financial contract which derives its value from the change in the exchange rate of two currencies at least one of which is not Indian Rupee, or which derives its value from the change in the interest rate of a foreign currency and which is for settlement at a future date, i.e. any date later than the spot settlement date, provided that contracts involving currencies of Nepal and Bhutan shall not qualify under this definition.

"Exchange traded currency derivatives'" means a standardized foreign exchange derivative contract traded on a recognized stock exchange to buy or sell one currency against another on a specified future date, at a price specified on the date of contract

2.3-1 Forwards

It is a contractual agreement between two parties to buy/sell an underlying asset at a certain future date for a particular price that is predetermined on the date of contract. Both the contracting parties are committed and are obliged to honour the transaction irrespective of the price of the underlying asset at the time of delivery. Since forwards are negotiated between two parties, the terms and conditions of contracts are customized.

These are Over-the-counter (OTC) contracts. Contracts are mainly settled by delivery. However, in certain cases, they are settled in cash on the expiration date. Generally, no initial margin or mark-to-market margin is collected for such contracts.

Foreign exchange forward' means an OTC derivative involving the exchange of two currencies on a specified date in the future (more than two business days later) at a rate agreed on the date of the contract.

For e.g.: "XYZ" has exported cashews to the US and the total value of the shipment is $5,000,000 (Dollar 5 million) which is due after 3 months. The current

[5] Foreign Exchange Management (Foreign exchange derivative contracts) Regulations, 2000.

rate (spot rate) for exchange is 1 USD = INR 75.10. "XYZ" enters into forward agreement with the bank to realize the proceeds after 3 months at the rate of INR 75.80 per dollar. Agreed rate of 1USD=INR 75.80 shall be the forward rate for the particular transaction.

How does this type of forward cover benefit XYZ?

- Assurance that company will realise inflow of Rs. 37.90 Crs. (5,000,000×75.80)
- If the rupee appreciates to Rs.74.50/USD or remain same at Rs. 75.10/USD, does not have much to worry because they have already locked in the exchange forward rate of Rs.75.80/USD
- Businesses generally have payables against their receivable. Company confident that the inflow will take care of the payable with minimum risk of cash flow uncertainty
- Notional loss in case rupee weakens beyond Rs. 75.80/USD.

2.3-2 Futures

A futures contract is similar to a forward, except that the deal is made through an organized and regulated exchange rather than being negotiated directly between two parties. Indeed, we may say futures are standardized exchange-traded forward contracts. The futures contracts are standardized in terms of lot size, underlying, expiry date etc. Contracts are mainly settled in cash; however, in certain cases they are settled physically on the expiration date. Margins and mark to market are applicable for such contracts. Settlement guarantee is provided by the clearing corporation of the Exchanges.

Currency Futures means a standardized foreign exchange derivative contract traded on a recognized stock exchange to buy or sell one currency against another on a specified future date, at a price specified on the date of contract, but does not include a forward contract.

2.3-3 Options

An Option is a contract that gives the right, but not an obligation, to buy or sell the underlying on or before a stated date and at a stated price. While the buyer of an option pays the premium and buys the right, the writer/seller of the option

receives the premium with the obligation to sell/ buy the underlying asset, if the buyer exercises his right. A call option gives the buyer the call the right to buy the asset and a put option gives the buyer of the put the right to sell the asset. In case of futures/forwards it is an obligation for both buyer as well as seller to settle the contract, however in an option contract, the option buyer has the right but not the obligation to buy/sell the underlying asset.

'Foreign exchange option (Currency Option)' is an option that gives the buyer the right, but not the obligation, to buy or sell an agreed amount of a certain currency with another currency at a specified exchange rate on or before a specified date in the future.

In subsequent chapters we will learn in detail about Exchange-traded currency futures and options.

2.3-4 Swaps

A swap is an agreement made between two parties, to exchange cash flows in the future, according to a prearranged formula. Swaps are, broadly speaking, a series of forward contracts. Swaps help market participants to manage the risk associated with volatile interest rates, currency exchange rates, commodity prices etc. Most swaps involve cash flows based on a notional principal amount such as a loan or bond, although the instrument can be almost anything. One cash flow is generally fixed (can be floating), while the other is variable and based on a benchmark interest rate, floating currency exchange rate, or index price etc.

Interest rate swap is a derivative contract that involves exchange of a stream of agreed interest payments on a `notional principal' amount during a specified period. Such contracts generally involve exchange of a `fixed to floating' or `floating to floating' rates of interest. On each payment date that occurs during the swap period, cash payments based on fixed/ floating and floating rates, are made by the parties to one another.

In forex market there are two kinds of swaps namely, foreign exchange swap and currency swap. The two are basically the same but there are slight differences.

- 'Foreign exchange swap' means an OTC derivative involving the actual exchange of two currencies (principal amount only) on a specified date (the

short leg) and a reverse exchange of the same two currencies at a date further in the future (the long leg), at rates agreed at the time of the contract.

A Pays $ National	→ $ 1000000	B Receives $ National	Initial Notional Exchange @ Spot Rate
A Receives INR Notional	← INR 73000000	B Pay INR Notional	
A Receives $ Notional	← $ 1000000	B Pays $ Notional	Final Notional Exchange @ Forward Rate
A Pays INR Notional	INR 73500000	B Receives INR Notional	

In the example given above, the spot rate for the short leg is Rs.73 while the rate agreed upon for the long leg is Rs.73.50.

- 'Currency swap' (also known as cross currency swap) means an OTC derivative which commits two counterparties to exchange streams of interest payments and/or principal amounts in different currencies on specified dates over the duration of the swap at a pre-agreed exchange rate. The rate is based on a prevailing spot or predetermined forward rate (for forward start swaps) and agreed upon at the time of the transaction. For example, a customer in India with a long-term USD borrowing is typically exposed to exchange rate risk between the USD and the INR as well as USD interest rate risk. The company can eliminate the risk by entering into a USD/ INR currency swap with a bank at the spot exchange rate of Rs.74. The customer receives from the bank USD floating interest rate payments and USD principal amortisations. Simultaneously, the customer pays the bank fixed interest rate in INR and the equivalent INR principal amortisations at an exchange rate based on a spot rate (or forward rate) prevailing at the time of the transaction and locked in for the entire tenure of the swap. At the start, initial principal is exchanged, though not obligatory.

No Initial Exchange of Principal Amount			
Corporate Receives $	← 6-month LIBOR+100 on $ 50mn	Banks Pays $	Continuing Interest Payment during SWAP period
Corporate Pays INR	→ 6% on INR 370 Crs	Bank Receives INR	

Corporate Receives $ Notional Corporate Pays INR Notional	←——————→ $ 50 mn ——————→ INR 370 Crs/INR 400 Crs	Banks Pays $ Notional Banks Receives INR National	Final Notional Exchange @ Initial Spot Rate/Forward Rate

The following table summarizes the key feature of four generic types of derivatives.

Generic derivative	Key feature	Market
Forward	To buy or sell the underlying asset with cash for settlement on a future date. Customized contract.	OTC
Futures	To buy or sell the underlying asset with cash for settlement on a future date. Standardized contract.	Exchange
Swap	To buy or sell returns from the underlying asset with returns from other underlying asset / cash over a period	Mainly OTC
Option	A right to buy or sell on underlying with cash for settlement on a future date	OTC and Exchange

Different kind of derivatives based on underlying

Underlying	Derivatives			
	Forward	Futures	Swap	Option
Interest Rate & Interest Rate Instrument	Forward Rate Agreement and Bond forward	Interest rate & Bond futures	Interest rate swap	Interest rate and Bond option
Equity & Equity Indices	Equity forward	Equity futures	Equity swap	Equity option
Currency Pairs	FX forward/ Currency forward	FX futures/ Currency futures	FX swap and Currency swap	FX option / Currency option
Commodity	Commodity forward	Commodity futures	Commodity swap	Commodity option

Additionally, "Credit" risk as underlying, Credit Default Swaps (CDS) are also very popular in the financial market. One counterparty in the CDS contract (the "buyer of protection") makes a regular periodic payment to the other counterparty (the "seller of protection"); in exchange the protection seller agrees to pay the protection

buyer any loss in value on the specified reference obligation if a "credit event" (e.g., default) were to occur during the life of the CDS contract.

2.4 Growth Drivers of Derivatives

Over the last three decades, the derivatives market has seen a phenomenal growth. A large variety of derivative contracts have been launched at exchanges across the world. Some of the factors driving the growth of financial derivatives are:

1. Increased volatility in asset prices in financial markets,
2. Increased integration of national financial markets with the international financial markets,
3. A significant growth of derivative instruments has been driven by technological breakthrough. Advances in this area include the development of high-speed processors, network systems and improved methods of data entry.
4. Development of more sophisticated risk management tools, providing a wider choice of risk management strategies, and
5. Innovations in the derivatives markets, which optimally combine the risks and returns over a large number of financial assets, leading to higher returns, reduced risk and lower transactions costs as compared to individual financial assets.

Currency derivatives are one of the most important among all derivatives, as shown in the following tables of notional outstanding amount:

Notional Amount Outstanding (USD Billion) in OTC Derivative Products as of June 2023

Foreign exchange contracts	120250
Interest rate contracts	573697
Equity-linked contracts	7838
Commodity contracts	2244
Credit derivatives (including Credit default swaps)	10122
Other derivatives	593
Total	**714744**

Source: Bank for International Settlement