



Rohini college of Engineering and Technology Palkulam

Unit-IV MUTUAL FUNDS, DERIVATIVES MARKETS AND VENTURE CAPITAL AND PRIVATE EQUITY

After going through this unit, you will be able to:

- explain the concept of a derivative;
 - describe the various types of derivatives;
 - discuss various models of derivative pricing; and
 - describe the evolution of Derivatives in India.
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7.0 INTRODUCTION

Derivative products like futures and options on Indian stock markets have become important instruments of price discovery, portfolio diversification and risk hedging in recent times. The volumes in derivative markets, especially in the case of National Stock Exchange (NSE), have shown a tremendous increase and presently the turnover in derivative markets is much higher than the turnover in spot markets. At the NSE, the total turnover in the cash segment was Rs.6, 95,049 crore during April-September 2005. The turnover in the NSE's derivative segment continued to be higher than in the cash segment. It increased by 59.2 per cent to

Rs.17, 55,790crore during April-September 2005 (Chart 53). Hence, it becomes increasingly important to know its intricacies.

7.1 DERIVATIVE: BASIC CONCEPTS

The term “Derivative” indicates that it has no independent value, i.e., its value is entirely “derived” from the value of the underlying asset. The underlying asset can be

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securities, commodities, bullion, currency, live stock or anything else. In other words, Derivative means a forward, future, option or any other hybrid contract of predetermined fixed duration, linked for the purpose of contract fulfillment to the value of a specified real or financial asset or to an index of securities. Derivatives are also known as “deferred delivery of deferred payment instruments”. In a sense, they are similar to securitised assets, but unlike the later they are not the obligations, which are backed by the original issuer of the underlying assets or security.

With Securities Laws (Second Amendment) Act, 1999, Derivatives has been included in the definition of Securities. The term Derivative has been defined in Securities Contracts (Regulations) Act, as:

A Derivative includes:

- a) a security derived from a debt instrument, share, loan, whether

secured or unsecured, risk instrument or contract for differences or any other form of security;

- b) a contract which derives its value from the prices, or index of prices, of underlying securities.

Eg. A stock option is a derivative whose value is dependent on a price of a stock. However, derivative can be dependent on almost every variable from price of hogs to the amount of snow falling at a certain ski resort.

The derivative contract also has a fixed expiry period mostly in the range of 3 to 12 months, from the date of commencement of the contract. The value of the contract depends on the expiry period and also on the price of the underlying asset.

For example, a farmer fears that the price of wheat (underlying), when his crop is ready for delivery will be lower than his cost of production. Let's say the cost of production is Rs 8,000 per ton. In order to overcome this uncertainty in the selling price of his crop, he enters into a contract (derivative) with a merchant, who agrees to buy the crop at a certain price (exercise price), when the crop is ready in three months time (expiry period). In this case, say the merchant agrees to buy the crop at Rs 9,000 per ton. Now, the value of this derivative contract will increase as the price of wheat decreases and vice-a-versa. If the selling price of wheat goes down to Rs 7,000 per ton, the derivative contract will be more valuable for the farmer, and if the price of wheat goes down to Rs 6,000,

the contract becomes even more valuable. This is because the farmer can sell the wheat he has produced at Rs 9000 per tonne even though the market price is much less. Thus, the value of the derivative is dependent on the value of the underlying.

If the underlying asset of the derivative contract is coffee, wheat, pepper, cotton, gold, silver, precious stone or for that matter even weather, then the derivative is known as a commodity derivative.

If the underlying is a financial asset like debt instruments, currency, share price index, equity shares, etc, the derivative is known as a financial derivative.

Derivative contracts can be standardized and traded on the stock exchange. Such derivatives are called exchange-traded derivatives. Or they can be customized as per the needs of the user by negotiating with the other party involved. Such derivatives are called over-the-counter (OTC) derivatives.

From the example above: if he thinks that the total production from his land will be around 150 quintals, he can either go to a food merchant and enter into a derivatives

contract to sell 150 quintals of soybean in three months time at Rs 9,000 per ton. Or the farmer can go to a commodities exchange, like the National Commodity and Derivatives Exchange Limited, and buy a standard contract on wheat. The standard contract on wheat has a size of 100 quintals. So the farmer will be left with 50 quintals of wheat

uncovered for price fluctuations.

However, exchange traded derivatives have some advantages like low transaction costs and no risk of default by the other party, which may exceed the cost associated with leaving a part of the production uncovered.

Economic Functions of Derivatives Market

- 1) They help in transferring risks from risk averse people to risk oriented people.
- 2) They help in the discovery of future as well as current prices.
- 3) They catalyze entrepreneurial activity.
- 4) They increase the volume traded in markets because of participation of risk averse people in greater numbers.
- 5) They increase savings and investment in the long run.

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It is a one to one bipartite contract, which is to be performed in the future at the terms decided today. One of the parties in the forward contract assumes a *long position* and agrees to buy the underlying asset on a certain specified future date for a certain specified period. The other party assumes a *short position* and agrees to sell the asset on the same date at the same price. Let us understand the concept with the help of an illustration.

Two parties enter into a contract to buy and sell 100 shares of Reliance at Rs 850 per share, two months down the line from the date of the

contract. Assume A is the buyer and B is the seller. In the instant case, the product (shares of Reliance), quantity of product (100 shares), product's price (Rs. 850 per share), and time of delivery (2 months from the date of the contract) have been determined and well understood, in advance by both the parties concerned. The delivery and payment (settlement of the trade) will take place as per the terms of the contract on the designated date and place.

But there could be risk of default here, suppose the Reliance's price two months down the line goes up substantially, seller B would prefer to sell the share the markets rather than selling these shares to A as contracted; because, market would fetch him better price. Therefore he may default. Similarly, in case, price of Reliance goes down, buyer may choose to default because he may find he would find it attractive to buy Reliance share from the market at lower price, instead of honoring the contract. This way, both A and B are exposed to each other's risk of default.

Forwards markets are used in India on a large scale in foreign exchange market to hedge the currency risk. Forward contracts being negotiated by the parties on one to one basis, offer them tremendous flexibility to articulate the contract in terms of price, quantity, quality, delivery time & place. But because they are customized they are plagued with poor liquidity and default risk (credit risk) as explained in the example above.

Calculation of Payoffs from Forward Contracts

This example will help us understand it better, two parties might agree today to exchange 500,000 barrels of crude oil for US \$ 42.08 a barrel three months from today.

A forward contract is specified with four variables:

- 1) the underlier,
- 2) the notional amount n ,
- 3) the delivery price k , and
- 4) the settlement date on which the underlier and payment will be exchanged.

In our example, oil is the underlier. The notional amount is 500,000 barrels. The delivery price is US \$ 42 per barrel. The settlement date is the actual date three months from now when the oil will be delivered in exchange for a total payment of US \$ 21.04 MM.

The party who receives the underlier is said to be long the forward. The other party is short. At settlement, the forward has a market value given by

$$n(s - k) \quad [1]$$

where s is the spot price of the underlier at settlement. This formula derives from the fact that, at settlement, the long party is paying a delivery price k for an underlier

then trading at price s . The difference between those two prices,

multiplied by the notional amount, is the market value of the forward.

Formula [1] tells us that forwards have linear payoffs.

A forward may be cash settled, in which case the underlier and payment never exchange hands. Instead, the contract settles with a single payment for the market value of the forward at settlement, as given by [1]. If the market value is positive, the short party pays the long party. If it is negative, the long party pays the short party.

Suppose the forward in our oil example were cash-settled. On the settlement date three months from today, no oil would change hands, and there would be no payment of US \$ 21.04MM. If the spot price at settlement were, say, US \$ 47.36, then the forward would settle with a single payment of

$$500,000(47.36 - 42.08) = \text{US } \$ 2.64\text{MM}$$

made by the short party to the long party.

Forwards are generally quoted as delivery prices, which are called forward prices. Forward prices fluctuate with market conditions. When a forward is entered into, the contract's delivery price is set equal to the quoted forward price. That delivery price then remains fixed until the forward settles. For example, a dealer might quote a three-month oil forward at 41.25/41.29. Those are the bid and offer forward prices. If a counterparty accepts the offer price for 500,000 barrels, then the delivery price on that contract will be USD 41.29.

Issues such as the time value of money, short-term supply and demand, market expectations of future spot prices and cash-and-carry arbitrage tend to make forward prices diverge from spot prices, but relevant factors vary from one market to the next. A graph of forward prices for different maturities is called a forward curve.

Futures

Futures contract means a legally binding agreement to buy or sell the underlying security on a future date. Future contracts are the organized/standardized contracts in terms of quantity, quality (in case of commodities), delivery time and place for settlement on any date in future. The contract expires on a pre-specified date which is called the expiry date of the contract. On expiry, futures can be settled by delivery of the underlying asset or cash. Cash settlement enables the settlement of obligations arising out of the future/option contract in cash.

Unlike forward contracts, futures are normally traded on an exchange. These markets being organized/standardized, are very liquid by their own nature. Therefore, the liquidity problem, which persists in the forward market, does not exist in the future market. In future markets, clearing corporation /house becomes the counter party to all the trades or provides the unconditional guarantee for their settlement i.e. assumes the financial integrity of the entire system. In futures markets, clearing corporation/house maintains the accounts of all the operations in the market. So it is in a position to tell in the last trading day of the contract, who two are the counterparties to each other and provides the solution to

the settlement problem, which is very acute in the forward market.

The following example will help to understand the concept in a better way. Referring to the earlier example of A & B entered into a contract to buy and sell Reliance shares. Now, assume that this contract is taking place through the exchange, traded

The option will be exercised if $S_T > K$ and not be exercised if $S_T \leq K$. The payoff to the holder of a short position in the European call option is

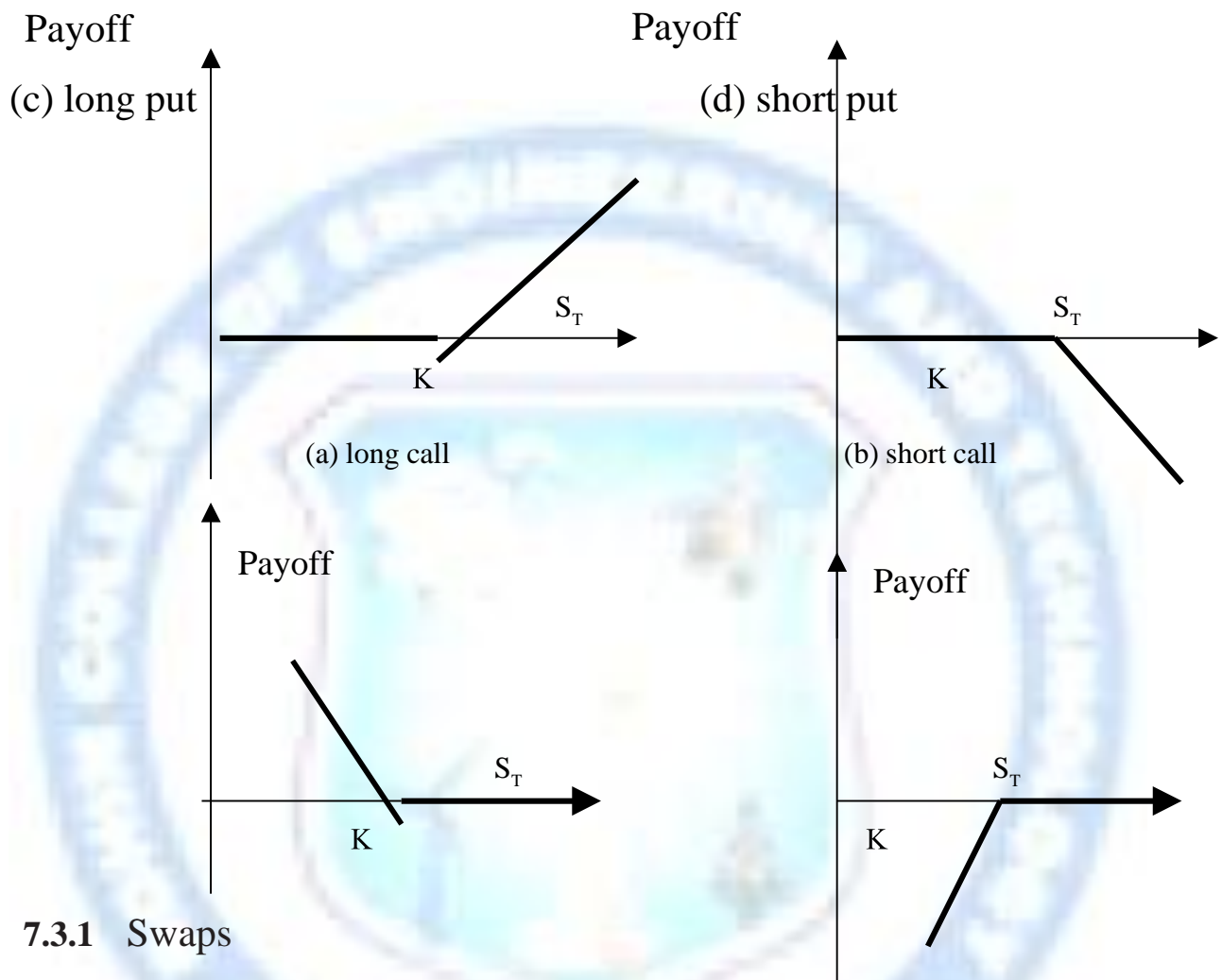
$$- \max (S_T - K, 0) = \min (K - S_T, 0).$$

The payoff to the holder of a long position in a European put option is $\max (K - S_T, 0) = \min (S_T - K, 0)$

And the payoffs from a short position in a European put option is

$$- \max (K - S_T, 0) = \min (S_T - K, 0)$$

Payoffs from positions in European options



7.3.1 Swaps

A swap is an agreement between two parties to exchange assets or sets of financial obligations or a series of cash flows for a specified period of time at predetermined intervals. They include both spot and forward transactions in one agreement, and are generally customized transactions. The corporations, banks, individual investors, etc. are now using swaps to arrange complex and innovative financing that reduces borrowing costs, and to increase control over interest rate risk and foreign currency exposure.

While swaps are used for various purposes—from hedging to speculation—their fundamental purpose is to change the character of an asset or liability without liquidating that asset or liability. For example, an investor realizing returns from an equity investment can swap those returns into less risky fixed income cash flows—without having to liquidate the equities. A corporation with floating rate debt can swap that debt into a fixed rate obligation—without having to retire and reissue debt.

The most common type of swap is a “plain vanilla” interest rate swap. In this, a company agrees to pay cash flows equal to interest at a predetermined fixed rate on a notional principal for a number of years. In return, it receives interest at a floating rate on the same notional principal for the same period of time. The floating rate in many interest rate swap agreements is the London Interbank Offer Rate (LIBOR).

The markets have developed a variety of swaps viz., interest rate swaps, coupon swaps, basis rate swaps, bond swaps, substitution swap, intermarket spread swap, swaps with timing mismatches, swaps with options like payoffs, currency swap etc. Out of this interest rate swaps & currency swaps are the most commonly used swaps.

An interest rate swap is a transaction between two parties involving an exchange of one stream of interest obligations (payments) for another. It has specific maturity on a notional principal amount, which is simply a reference amount against which the interest is calculated; no principal amount ever really changes hands in such a transaction. Maturities range

from under a year to over 15 years, but most transactions fall within a two year to 10-year period.

A currency swap is a contract exchanging foreign currency in the spot market with simultaneous agreement to reverse the transaction in the forward market. Both exchange rate and timing of the forward market transaction are specified at the time of the swap. Put differently, in a currency swap, both the principal and interest in one currency are swapped for principal and interest in another currency. On maturity the principal amount are swapped back.

For Example, a company that has borrowed rupees at a fixed interest rate can swap away the exchange rate risk by setting up a contract whereby it receives rupees at a fixed rate in return for dollar at either a fixed or floating interest rate. Currency swap can help to manage both interest rate and exchange rate risk. By setting up a contract whereby it receives Rs at a fixed rate in return for dollars at either a fixed or floating interest rate.

Type of Traders in the Market

The derivative market has been very successful because they have attracted different type of traders because of liquidity. There are three broad categories of traders: hedgers, speculators and arbitrageurs.

- Hedgers use forwards, futures and options to reduce the risk that they face from potential future movements in a market variable.
- Speculators use them to bet on the future direction of a market variable.

- Arbitrageurs take offsetting positions in two or more instruments to lock in a profit.

