

## **Chapter-11 Equity Derivatives**

Certificate in Risk Management



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## Chapter – 11 Equity Derivatives

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### Introduction

The term equity derivative describes financial instruments whose value is derived from one or more underlying equity securities. Market participants trade equity derivatives in order to transfer or transform certain risks associated with the underlying. In contrast to direct investing in the equity market, however, are a number of indirect methods and these indirect methods lead to innovations in the field of equity derivatives. Stock index futures contracts are well-known and widely used as a means of investing in a stock index, and the early but developing market in futures on individual stocks offers even more possibilities.

### Learning Objective

- Understand the various equity derivative instruments
- Understand the differences between these derivatives
- Understand the difference between weighted and outweighed derivative
- Explain the various equity index derivatives and also specialized equity index derivatives
- Explain the functioning of each equity derivative
- Understand the trading of these derivatives
- Advantages and Disadvantages associated with these derivatives

### 11.1 Derivatives

Derivative is a contract or a product whose value is derived from value of some other asset Known as underlying. Derivatives are based on wide range of underlying assets. These include:

- Metals such as Gold, Silver, Aluminum, Copper, Zinc, Nickel, Tin, Lead
- Energy resources such as Oil and Gas, Coal, Electricity
- Agro commodities such as wheat, Sugar, Coffee, Cotton, Pulses and Financial assets such as Shares, Bonds and Foreign Exchange.

### Products in Derivative Market

**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 pre-decided on the date of contract. Both the contracting parties are committed and are obliged to honour the transaction irrespective of price of the underlying asset at the time of delivery. These are OTC contracts.

**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 exchange traded forward contracts.

**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 buyer of option pays the premium and buys the right, writer/seller of option receives the premium with obligation to sell/buy the underlying asset, if the buyer exercises his right.

**Swaps** - A swap is an agreement made between two parties to exchange cash flows in the future according to a prearranged formula. Swaps are series of forward contracts. Swaps help market participants manage risk associated with volatile interest rates, currency exchange rates and commodity prices.

There are broadly three types of participants in the derivatives market - hedgers, traders (also called speculators) and arbitrageurs.

### i. EQUITY FUTURES

Equity Futures are contracts to buy or sell equity shares at a future date and at a fixed price. Futures contract have standard trading units, contract or delivery dates thus these are standardized products. A future contact dealing in interest rate, equity or forex are known as financial futures. Future contract which deal with commodities like Gold, silver or oil are known as commodity futures. The price at which the stock is agreed to be traded is called the strike price. The shares that are promised to be bought or sold are called the underlying shares. Entering into a contract of futures is called opening a position.

A person is said to be long on futures if he agrees to buy the underlying shares at a future date, the person who sells it in the future is said to take the short position. A person going long makes a profit if the prices rise (that means he is buying at a price lower than the market). A person who is on the short will gain if the prices fall (that means he sells at higher than the market).

The Cash Flow, gain or loss is given by:

$$CF = \text{Contract multiplier} * (\text{Index value} - \text{Contract Value})$$

The holder of the long position makes a profit if this number is positive; if it is negative, the holder of the short position makes the profit. The value of the contract multiplier varies for the various indices (For S&P 500, the multiplier is USD 250 per index point, for Nikkei 255, it is USD 5 per index point).

Futures, though they come with an expiration date on which the trade has to take place, can be settled by cash payments, equal to the difference in the purchase and sale price.

Futures (like forwards and swaps) are symmetrical hedging instruments, i.e. they produce gains that offset the losses on the underlying positions. Asymmetrical hedging instruments (options and option derivatives) allow investors to hedge against adverse price movements, yet enjoy the benefits of the price movements. Since they give the

investors a better chance to make profits, they are more expensive than symmetrical instruments.

The liquidity of equity index futures can be judged by the bid/offer spreads at which they trade (that is the difference in the bid price, price at which a person can buy, and the offer price, price at which a person can sell). Since all futures are traded on a stock exchange, and all futures have a proper structure (standardized), the liquidity of futures market is reasonably good.

Futures have little credit risk as the trade happens through a stock exchange and the chance of a counter party defaulting is very little. The stock market collects margins from all the traders for all the open positions that they hold, which act as collateral in case a participant defaults. Therefore, futures have little risk when compared to the other hedging instruments.

Futures are marked-to-market daily, i.e. the net value of all the open positions are calculated daily and the transfer of funds happens from the party who's booked a loss to the one who's made a profit.

**Settlement:** It's the process whereby payment is made by all those who have made purchases and shares are delivered by all those who have made sales.

**Settlement Cycle:** It's the period in which settlement is made i.e. the period within which a buyer receives their shares and seller receives their money. The settlement cycle is usually expressed as T (for trading day) plus the additional number of days it will take.

**Did You Know?** Less than 5% of the futures are held till maturity.

#### **Arbitrage opportunities in futures market**

Arbitrage is simultaneous purchase and sale of an asset or replicating asset in the market in an attempt to profit from discrepancies in their prices. Arbitrage involves activity on one or several instruments/assets in one or different markets, simultaneously. Important point to understand is that in an efficient market, arbitrage

opportunities may exist only for shorter period or none at all. The moment an arbitrager spots an arbitrage opportunity, he would initiate the arbitrage to eliminate the arbitrage opportunity. Arbitrage occupies a prominent position in the futures world as a mechanism that keeps the prices of futures contracts aligned properly with prices of the underlying assets. The objective of arbitragers is to make profits without taking risk, but the complexity of activity is such that it may result in losses as well.

Arbitrage in the futures market can typically be of three types:

- **Cash and carry arbitrage** - Cash and carry arbitrage refers to a long position in the cash or underlying market and a short position in futures market.
- **Reverse cash and carry arbitrage** - Reverse cash and carry arbitrage refers to long position in futures market and short position in the underlying or cash market.
- **Inter-Exchange arbitrage** - This arbitrage entails two positions on the same contract in two different markets/ exchanges.

## ii. **FORWARDS**

Forwards are also contracts to sell (or buy) underlying equity shares at a future date. However unlike futures, they are traded over-the-counter (OTC). That means that they are not traded on any stock exchange. Since a stock exchange is not involved, forwards are not standardized like futures; they have no settlement or margins rules.

Forwards are more flexible, as a forward agreement can be entered into on any stock, and the users can add modifications that suit them the most. However the credit risk (counter party risk) is much higher for forwards, as there is no regulatory authority that checks the credibility of the trading parties. It is the discretion of the trading parties to enter into a contract with each other.

### Major Limitations of Forwards

- **Liquidity Risk** - Liquidity is nothing but the ability of the market participants to buy or sell the desired quantity of an underlying asset.
- **Counterparty risk** - Counterparty risk is the risk of an economic loss from the failure of counterparty to fulfill its contractual obligation.

- **Tick Size-** It is minimum move allowed in the price quotations. Exchanges decide the tick sizes on traded contracts as part of contract specification. Tick size for Nifty futures is 5 paisa. Bid price is the price buyer is willing to pay and ask price is the price seller is willing to sell.
- **Contract size and contract value-** Futures contracts are traded in lots and to arrive at the contract value we have to multiply the price with contract multiplier or lot size or contract size. For S&P CNX Nifty, lot size is 50 and for Sensex Index futures contract, it is 15.
- **Basis-** The difference between the spot price and the futures price is called basis. If the futures price is greater than spot price, basis for the asset is negative. Similarly, if the spot price is greater than futures price, basis for the asset is positive.
- **Cost of Carry -** Cost of Carry is the relationship between futures prices and spot prices. It measures the storage cost (in commodity markets) plus the interest that is paid to finance or 'carry' the asset till delivery less the income earned on the asset during the holding period. For equity derivatives, carrying cost is the interest paid to finance the purchase less (minus) dividend earned.
- **Margin Account-** As exchange guarantees the settlement of all the trades, to protect itself against default by either counterparty, it charges various margins from brokers. Brokers in turn charge margins from their customers.
- **Initial Margin -** The amount one needs to deposit in the margin account at the time entering a futures contract is known as the initial margin.
- **Marking to Market (MTM) -** In futures market, while contracts have maturity of several months, profits and losses are settled on day-to-day basis – called mark to market (MTM) settlement. The exchange collects these margins (MTM margins) from the loss making participants and pays to the gainers on day-to-day basis.

- **Open Interest and Volumes Traded-** An open interest is the total number of contracts Outstanding (yet to be settled) for an underlying asset. The level of open interest indicates depth in the market.

### **What can make forwards more attractive than futures?**

For the futures contract, to eliminate credit risk, the stock markets (on which the futures trade) collect margins from the investors, the margins are of two types broadly.

Initial margin is collected whenever the participants open a position in the futures market. It is paid in cash or in government securities or is a letter of credit between the participant and the exchange (it is highly liquid). The amount of the margin depends on the expectation about how the price of the equity futures would change in one day's trading (the idea is that if the open position loses money, the exchange will have enough cash to cover the loss for the counter party in case the loss-making party cannot meet the obligation).

Each open account also has to meet the minimum maintenance margin (which is less than the initial margin). When the value of the position is marked-to-market daily, the amount to be paid as maintenance margin also changes (if a position loses value by a large extent on a day, the participant is required to pay more to meet the requirement of the minimum margin.)

These margin requirements cause major CF uncertainties to investors, they would have to maintain a reasonable amount of liquidity always, if the minimum requirements are not met, the stock market may unceremoniously close all the open positions of the participant at the market price.

This is where the forwards, who have no minimum margin requirements and settlement cycles, are easier to transact for the investors.

### **iii. EQUITY OPTIONS**

Equity options are the most common type of equity derivative. They provide the investor the right, but not the obligation to trade a particular stock at a set price at a future time. There are two types of equity options

- 1) Call option
- 2) Put option

Option, which gives buyer a right to buy the underlying asset, is called Call option and the option which gives buyer a right to sell the underlying asset, is called put option. Though these options give the right to the investors but they don't create any obligation on them to go for these options to be traded.

**Writer of an option** - The writer of an option is one who receives the option premium and is thereby obliged to sell/buy the asset if the buyer of option exercises his right.

**American option** - The owner of such option can exercise his right at any time on or before the expiry date/day of the contract.

**European option** - The owner of such option can exercise his right only on the expiry date/day of the contract. In India, Index options are European.

**Strike price or Exercise price (X)** - Strike price is the price per share for which the underlying security may be purchased or sold by the option holder

**In the money (ITM) option** - This option would give holder a positive cash flow, if it were exercised immediately. A call option is said to be ITM, when spot price is higher than strike price. And, a put option is said to be ITM when spot price is lower than strike price. In our examples, call option is in the money.

**At the money (ATM) option** - At the money option would lead to zero cash flow if it were exercised immediately. Therefore, for both call and put ATM options, strike price is equal to spot price.

**Out of the money (OTM) option** - Out of the money option is one with strike price worse than the spot price for the holder of option. In other words, this option would give the holder a negative cash flow if it were exercised immediately. A call option is said to be OTM, when spot price is lower than strike price. And a put option is said to be OTM when spot price is higher than strike price. In our examples, put option is out of the money.

**Leverage** - An option buyer pays a relatively small premium for market exposure in relation to the contract value. This is known as leverage. Leverage also has downside implications. If the underlying price does not rise/fall as anticipated during the lifetime of the option, leverage can magnify the investment's percentage loss. Options offer their owners a predetermined, set risk.

**Fundamental parameters on which Option depends:**

- 1) Spot price of the underlying asset
- 2) Strike price of the option
- 3) Volatility of the underlying asset's price
- 4) Time to expiration
- 5) Interest rates

**Spot price of the underlying asset**- If price of the underlying asset goes up the value of the call option increases while the value of the put option decreases. Similarly if the price of the underlying asset falls, the value of the call option decreases while the value of the put option increases.

**Strike Price** - If all the other factors remain constant but the strike price of option increases, intrinsic value of the call option will decrease and hence its value will also decrease. On the other hand, with all the other factors remain constant; increase in strike price of option increases the intrinsic value of the put option which in turn increases its option value.

**Volatility** - It is the magnitude of movement in the underlying asset's price, either up or down. It affects both call and put options in the same way. Higher the volatility of the underlying stock, higher the premium because there is a greater possibility that the option will move in-the-money during the life of the contract.

Higher volatility = Higher premium, Lower volatility = Lower premium (for both call and put options).

**Time to expiration** - The effect of time to expiration on both call and put options is similar to that of volatility on option premiums. Generally, longer the maturity of the option greater is the uncertainty and hence the higher premiums. If all other factors

affecting an option's price remain same, the time value portion of an option's premium will decrease with the passage of time. This is also known as time decay.

#### iv. EQUITY SWAPS

Equity swaps are like any other swaps, where they involve the exchange of the CFs from one set of equity shares with the CFs from another set. They enable the exchange of unwanted equity risk with equity risk (or other risk, if the swap is some other form of instruments) that is acceptable.

An equity swap is a transaction involving two parties wherein each party agrees to make a series of payments to the other party of the contract, with at least one of the series of payments to be determined according to movements of the returns of a particular stock or stock index. The payments occur over a specified period of time on the scheduled dates.

The CFs exchanged as a part of the swap is arrived at by using a formula, which uses a notional principal (that is never exchanged). The returns on equity which are formed by dividends and capital gains (realized if the equity is sold) are exchanged for another type of a CF.

The returns on the underlying equity stock can be exchanged with a fixed-income or floating rate instrument. Equity swaps can be used if an investor who invests only in the debt market wants to invest in equities for just a small period of time. He can pay a fixed or floating rate for receiving the return on an equity stock. For example, an investor who invested in bonds that pay him LIBOR+50bp can enter into an equity swap by paying LIBOR+25bp to receive the returns on a stock of his choice.

Equity Forwards Swaps are forward agreements to enter into an equity swap at a future date. The price of the equity forward swap depends on the forecasted prices of the swap at the beginning and end of the forward period.

Total Return Swaps involve exchange of the total return on an equity portfolio with the returns on another portfolio.

### Types of Equity Swaps – Examples

- **An Equity Swap with the Equity Return Paid Against a Fixed Rate**

In this kind of equity swap one party pays the return to the other party according to a stock or stock index and the other party pays an agreed fixed rate.

- **An Equity Swap with the Equity Return paid against a Floating Rate**

In this kind of equity swap one party pays the return to the other party according to a stock or stock index and the other party pays a floating rate return.

### Advantages and Disadvantages of Equity Swaps

#### Advantages

- Highly Flexible & can be customized to the parties
- Cost of transacting in the market is fairly low
- Private transaction between 2 parties (unregulated)
- Equity swaps are private transactions which don't involve much of regulations by any regulatory authority as well as there are no governmental restrictions on the entities to engage in an equity swap.
- Equity options can be customized for an investor's situation and one more advantage is that they are over-the counter instruments.

#### Disadvantages

- Requires finding a Counter-party willing to accept the terms
- An Illiquid Market (require consent of counter-party to terminate)
- Unregulated: lots of potential Credit Risks
- Credit risk exposure of the equity swap is also one concern associated with it. The user of an equity swap has to assume that the risk of the default is there.
- There can be large cash outflows for an equity swap which must be funded.
- If the gains from the equity swaps are not sufficient enough to offset such outflows then gains on the stock may have to be utilized to fund these cash outflows.

## 11.2 Index Derivatives

Financial derivatives like futures or options are powerful investment alternatives available to the investors through which hedging, speculation, investment and arbitrage takes place in modern economy.

The most natural and easily visualized derivative product in the market today is an option on individual securities. For example, the Indian market can trade options on Reliance as they directly tap interest in speculation in the market. If an investor thinks that the price of Reliance might go up in future then he can buy call options on the shares instead of buying the shares of Reliance. He will make profits if the prices of the shares go up in the market without suffering any downside loss which means that he doesn't need to payout anymore in case the price does not go up. On the other hand if the investor thinks that the market price of the shares may go down then he can buy put options which would yield a profit if the price of Reliance shares drop, with no more payouts in case this fails to happen so.

Index derivatives are the major focus of the equity derivatives industry worldwide. And also it has been seen internationally that the trading volume on index derivatives is many times larger than that seen on other securities like options.

### **Equity Index**

Equity indexes are numbers that are built in a way so that they capture the performance of a basket of stocks. They are used as parameters to judge how the basket of portfolios (which are said to be 'listed' on the index) has performed over the period.

Equity indices could represent the whole market (like the NIFTY or NASDAQ) or they could be for specialized sections like the Merrill Lynch 100 technology index.

The advantage of equity indices is that they act as indicators to reflect the performance of the equity market of the economy (or a certain segment of the market for special, customized indices). For investors who want to invest in a diversified portfolio without too much risk, investing in an equity index portfolio is a viable alternative.

An equity index portfolio is constructed in the same way as the index itself, using the same stocks that are listed on the index. It has been proved empirically that the returns on the stock index are higher than the returns on the portfolios managed by many managers.

### **Formation of equity index**

An equity index is constructed using a certain set of stocks (the number of stocks varies from index to index S&P uses 500 stocks, NASDAQ uses 100) and assigns weights to them. The value of the index is derived depending upon the method used by that stock market.

An index could be of any of the three types, price weighted, value weighted or weighted, depending on the method used for calculation of the index:

#### **i. Price-weighted Indices:**

The prices of the stocks influence the value of the index in a big way. The more the price of a stock, the more its fluctuations will affect the value of the index. An index may also be classified according to the method used to determine its price. In such index each stock influences the index in proportion to its price per share.

The value of the index is mostly the arithmetic mean generated by adding the prices of each of the stocks in the index and dividing them by the total number of stocks. Stocks with a higher price will be given more weight and has a greater influence over the performance of the index.

Let's take that an index contains only two stocks, one priced at \$10 and one priced at \$90. The \$90 stock is weighted nine times higher than the \$10 stock which means that this index is composed of 90% of the \$90 stocks and 10% of \$10 stock. A change in the value of the \$10 stock will not affect the index's value by a large amount because it constitutes a very small percentage of the index.

A simplified form of the calculation of the price-weighted index would be the average of the prices of all the stocks listed on the index (sum of the prices of all the stocks divided by the number of stocks). The difference in this average for the starting and the closing period on the market is the change in the value of the index. Examples of price-weighted indices are Dow Jones Industrial Average, which is an index of the 30 blue chip companies in the US and NIKKEI, which is the index of the Tokyo stock market.

**ii. Value-weighted Indices/ Capitalization Weighted index:**

The market value of the stocks, which is equal to the product of the number of shares of the firm that are in the market and the market price of the stock of the firm (also called the market capitalization of the firm), determines the value of the index.<sup>1</sup> Value-weighted index is an index whose components are weighted according to the total market value of their outstanding shares. It is a market index whose individual components are weighted according to their market capitalization, i.e. the larger components carry a larger percentage weighting in the calculation of the index value. The value of a capitalization-weighted index is computed by adding up the market capitalizations of its members and dividing it by the number of securities in the index.

The weighting of each stock changes with changes in the stock's price and with changes in the number of shares outstanding. The value of the index fluctuates in accordance with the price move of the stocks. Thus, a small shift in the price of a large company will heavily influence the overall value of the index.

The criticism for value-weighted indices is that the price fluctuations of big firms affect the index much more than the fluctuations for a small firm. NASDAQ composite, which is a stock index in the US, is composed using the value-weighted method.

**iii. Equity index futures**

Equity index futures are futures on an equity index; they give the holder the right to sell (or buy) an equity index in the future at a certain price. They are highly liquid as most of them are short-term contracts on major indices; traders are ready to trade in them for hedging or arbitrage purposes owing to their high convertibility into cash.

Like other future contracts, equity index futures also require a margin payment and are marked-to-market daily. Index futures are also not physically settled, transacting physically becomes difficult because of the large number of stocks trading on the index. The position is netted (after marking-to-market) on the closing day and the transactions are settled in cash.

The price of the equity index futures is affected by the cost of carry (the cost which is proportional to the time of execution of the contract) and the dividends pay out of the firms

listed on the index. The dividend yield is subtracted from the risk free rate when calculating the price of the future.

The price of the equity index futures is calculated using the formula:

$$F = S e^{(r-q)T}$$

Where  $S$  is the current index level;  $r$  is the risk free rate of return;  $q$  is the dividend yield;  $T$  is the time to maturity and  $e$  is 2.71828.

The risk free interest rate is considered because the person selling the future has to hold stocks (to deliver at the expiration of the future), this is an investment which is made, and the investor takes more risk by investing in these shares rather than in the risk free bonds. Therefore the risk free rate is the minimum return that would be expected.

#### iv. **Equity index options**

Equity index options are the options to sell or buy an equity index. Equity index calls and puts are similar in principle to the normal calls and puts. Equity index options can be traded through an exchange, over-the-counter. European and American styles of Index options exist.

An index option, just like any other option is in-the-money, at-the-money or out-of-money depending on the position of the market price of the index in comparison with the strike price of the option.

Index options are priced taking into account the time and intrinsic value of the option. The intrinsic value of outstanding options (those that are not settled yet) is the probability that they will be in the money.

The Black and Scholes Model are used to price the options, a revised version of Black and Scholes, given by Merton is used to price European index options. American options have to be priced using the binary tree method

### 11.3 Specialized equity index derivatives

Specialized equity index derivatives have some additional features embedded in them, which make them more appealing to certain investors. Some popular forms of specialized index derivatives are:

#### i. LEAPS

Leaps stands for Long-term Equity Anticipation Securities, these are options that have a long time to maturity, more than one year. The time value of the LEAPS is higher than normal options, and therefore LEAPS come at a price higher than the normal options. Investors can customize LEAPS to adjust the time to maturity as it suits them. Two main reasons for investing in LEAPS include:

Diversification - An investor who makes decisions for the long term investment can benefit from buying LEAPS calls. A buyer of a LEAPS call has the right to purchase shares of a particular stock at a specified date and price for up to three years in the future.

Hedge - A purchase of LEAPS put gives the buyer the right to sell the underlying stock at the strike price till option's expiration.

#### Difference between a common stock and LEAPS

There are many differences between an investment in common stock and an investment in options. An option has a limited life with an expiration date while a stock has unlimited life. If an option is not exercised prior to its expiration date, it will expire and will not exist as a financial instrument.

Options investors face the risk of losing their entire investment in a very short period of time even with slight movements of the underlying stock. In the purchase of an option the value of the option contract generally fluctuates by a greater percentage than the value of the underlying interest.

#### ii. Equity Index Portfolio

For investors trying to maximize their gains, it is difficult to understand the underlying factors that affect the performance of the various stocks and therefore predict their performance (and the profit or loss they will make).

An equity index portfolio is a portfolio of stocks that is constructed to mimic the performance of a benchmark index (like the S&P 500 or NIFTY, etc). An equity index is constructed by assigning weights to the various stocks that are listed on the index (like S&P has 500 stocks listed on it, Sensex has 30 stocks on it, etc). The equity index portfolio also considers the same stocks that are listed on the index and invests in them in proportion to the weights they have been assigned on the stock market index.

- One obvious advantage of this approach is that it is much cheaper than building portfolios after exclusive studies about all the stocks trading on the stock market.
- It is also simpler (the weights that various firms are given on the index is publicly released, so that information is not difficult to obtain).
- The other benefit is that the performance of this portfolio will be much more consistent than other portfolios as stock indices are more stable than the normal equity stocks.

### iii. **Synthetic Portfolio**

This type of portfolio is used to represent an aggregation of selected actual positions from actual portfolio. Since trading in derivatives does not require that they are actually owned by the investor (who is having an open position in derivatives), derivatives are called Synthetic Assets. For example, a future contract to sell at 250 USD can be entered into without owning the underlying stock, the person going short may think that the prices will fall, and he can buy lower and sell higher. Portfolios that are constructed using **derivatives** are called **Synthetic Portfolios**.

By combining a cash position and derivatives (either equity futures or equity swaps) a synthetic portfolio is created. The function of the synthetic portfolio is the same as that of the equity indexed portfolio, to mirror the performance of a stock index.

Synthetic portfolios can be constructed using equity futures; if an investor wants to invest 10 million USD in a synthetic portfolio, he will invest the 10 million in the cash market, and then purchase futures on the stock index (the index itself, not on any stock listed on the index) for the amount worth 10 million USD. The interest money earned in the cash money market is used to offset the margin paid for the futures.

When the investor pays a fixed rate against a swap, he is taking the market risk, the risk that the performance of the index may fall onto him. If the index falls by 50bp, then the investor has to pay the counter party of the swap LIBOR+ 50bp (since a swap exists whether there is a loss or a profit).

### The advantages of using a synthetic portfolio

The synthetic portfolios are cheaper to construct than the equity indexed portfolio, because the purchase of the underlying stocks is not necessary for the synthetic portfolios. The costs of an equity index portfolio can be divided into

- Commissions: Paid to the brokers, every time a position is opened or closed. So for every trade in equity, there is a double commission that is paid.
- Custody Fees: Paid to the bank, which takes the custody of the stocks that are traded.
- Bid-Offer Spreads: Are incurred as a transaction cost.
- Rebalance Cost: Mergers and acquisitions change the weights assigned to the firms listed on an index. Every time anything of that kind happens, the investor will have to reshuffle his portfolio to match the index.

The extent to which these costs are incurred goes down drastically for synthetic portfolios. There is no investment made in stocks, therefore there are no rebalance costs. Also the broker who does the trading can hold the futures, and there is no holding cost for swaps at all. So a custody fee is also not incurred for synthetic portfolios.

#### 11.4 Financial Instruments

##### i. Dividend Enhanced Hybrids

Hybrid Instruments are those that have the features of more than one financial instrument, like instruments that have embedded options in debt, etc. Generally, the term **hybrid instrument** is used to refer to financial instruments which combine the characteristics of both the debt and the equity markets. An example of such an instrument is convertible bonds. Convertible bonds are the debt instruments that have an embedded option within them allowing the holder of the bonds to exchange them with the shares of the issuing company's stock in future. This is the reason why the price of these bonds is influenced by interest rate movements of the market as well as the issuer's stock price.

Dividend Enhanced Hybrids are equity linked fixed income structures; they are like convertible debt (debt which can be converted into equity).

The first issue of Dividend Enhanced Hybrids was done by Morgan Stanley in 1998 as Preferred Equity Redeemable Cumulative Stock (PERCS); it was equity that was issued at a return rate that was way higher than that for the common stock. But Morgan Stanley not only could redeem the stock any time, but it also put a limit on the capital gains that the holders of the stock could make.

This method is particularly useful for firms which need to raise capital, but issue of common equity will not be of much help (either because of bearish markets or lack of popularity for the firm's issue); this will attract the investors due to the high rate of return it offers.

## ii. **Warrants**

A derivative security that gives the holder the right to purchase securities (usually equity) from the issuer at a specific price within a certain time frame. Warrants are over the counter derivative securities issued by the issuer that gives the holder the right to purchase securities at a specific price and specific time. Warrants are issued as part of a bond issue to enhance the yield of the bond so as to attract the potential investors. Warrants issued by private parties are much similar in many ways to equity options.

A warrant usually has the same rights for an investor as an equity option. A warrant can even be traded in secondary markets. Only the financial institutions with the capacity to settle and clear the specific transactions of the over the counter instruments deal with warrant trading. The difference between warrants and call options is that options are exchange traded instruments and are not issued by any company in particular, on the other hand warrants are issued and guaranteed by a company,. The lifetime of a warrant extends to many years; on the other hand the **usual lifetime of an option is measured in months.**

### **Characteristics of Warrants**

Warrants have many similar characteristics to that of other equity derivatives like options, for instance:

- **Exercising:** A warrant is said to be exercised when shares are bought with its use.

- **Premium:** the extra amount which an investor has to pay for his shares when buying them through the warrant in comparison to the regular buying of the shares is represented as the premium of the warrant.
- **Gearing (leverage):** the extra exposure which an investor has to bear as compared to the exposure he would have taken by buying the shares from the market represents the gearing of the warrant. Suppose the equity share of a company is quoted at Rs 15.00 and the warrant of the same company to buy it at Rs 15.00 is quoted at Rs 2.00. Now if the price of the equity increases to Rs. 18.00 the price of warrant will also increase to Rs 3.00 thus the increase is more in the warrants as compared to equity share. And hence warrants are more volatile than the equity share.
- **Expiration Date:** This is the date the warrant expires. Exercise of the warrant should take place before the expiration date. The more time remaining for expiry, the more the time available for the underlying security's value to appreciate. This appreciation in the value of the underlying results in an increase in the price of the warrant.

### Types of Warrants

For different investors there are different reasons to invest in any one type of warrant or the other type. There is a wide range of warrant types that are available.

- **Equity Warrants:** Equity warrants can be call and put warrants.
  - Equity call warrants give the investors the right to buy the underlying securities
  - Equity put warrants give the investor the right to sell the underlying securities
- **Basket Warrants:** these are the warrants classified at industry level which show the performance of a particular industry.
- **Covered Warrants:** A covered warrant is a warrant issued in a foreign currency.
- **Index Warrants:** The warrants are priced using index points and they use an index as their underlying asset.
- **Currency Warrants:** A currency warrant, like other option derivatives, get its value from the underlying exchange rates. Also currency warrants are priced the same way as currency options and allows holder the right to exchange the amount of one

currency into another currency at the specified exchange rate before or on a specified date.

### iii. Convertible Bonds

**Convertible bonds** are the bonds issued by a corporation to raise equity; effectively they are a combination of bonds and equity. Convertible bonds are bonds for which the holder has the right to convert them into equity on a particular maturity date.

For the investor in the convertible bonds the main advantage is:

- The bonds provide asset protection because the value of the convertible bonds can only fall to floor value only, as well as it provides the opportunity to the bondholder to get shares as returns from the issuing corporation.
- Convertible bonds provide the investor the possibility to get 'high equity returns'.
- The volatility of the value of the convertible bonds is usually less as compared to the 'regular' shares.

#### Behavior of Convertible Bonds

The three main stages of the convertible bond behavior are:

- In-the-money convertible bonds
- At-the-money convertible bonds
- Out-the-money

In-the-money convertible bonds have: Conversion Price < Equity Price.

At-the-money convertible bonds have: Conversion Price = Equity Price.

Out-the-money convertible bonds have: Conversion Price > Equity Price.

#### Monetizing a stock without selling

Stock can be monetized (liquidated, i.e. cash can be realized) from it even without selling the underlying stock by using derivatives. An investor can monetize the stock using a forward contract or a reverse collar (a reverse collar is to buy a put option and sell a call option).

The investor can sell the shares forward for an upfront cash payment. That payment can be used to make other investments. Since the transfer of the underlying securities happens at a much later date (sometimes as late as 10 years), the cash proceeds can be used for other investment purposes.

The other way for monetization (particularly if the investor feels that the prices are going to fall) is to buy a put option that is at-the-money (strike price of the option equals the market price of the security), the purchase is funded by selling a call option that is out-of-money (strike price of the option is greater than the market price of the security). The call option is sold on a part of shares, so that when the prices appreciate, the investor can still reap the benefits.

The put option on equity can be used as collateral in banks to obtain cash that can be used for other investments. This technique is more useful in a bearish market, where the prices are expected to fall (so that the call option that the investor sold will not be executed).

## Summary

- Derivative financial instruments, which include futures, options and swaps, are based on underlying cash assets. This session dealt in details with the various equity derivatives and how these derivatives are traded.
- Equity derivatives are based on stocks and stock indices and their pricing and performance are closely linked to those of the underlying equity instruments.
- They are traded on futures and options exchanges and on over-the-counter markets, and in a similar way to equities.
- Warrants are over the counter derivative security issued by the issue which gives the holder the right to purchase securities at a specific price and specific time.
- Convertible bonds are the bonds issued by a corporation to raise equity; effectively they are a combination of bonds and equity. Convertible bonds are bonds for which the holder has the right to convert them into equity on a particular maturity date.

